Liberty®

Liberty 2027 Base Wildfire Mitigation Plan_R0











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1. Executive Summary

Instructions[1]: In the opening section of the Base WMP, the electrical corporation must provide an executive summary that is no longer than ten pages. The electrical corporation must summarize the primary goal, plan objectives, and framework for the development of the Base WMP for the three-year cycle. The electrical corporation may use a combination of brief narratives and bulleted lists.

Primary Goal

Consistent with California Public Utilities Code Section 8386(a), the primary goal of Liberty Utilities' (CalPeco Electric) LLC ("Liberty") 2027 Wildfire Mitigation Plan ("WMP") is to minimize the risk of catastrophic wildfire posed by utility electrical lines and equipment while maintaining safe, dependable, and cost-effective service across its high fire-threat footprint.

Liberty will achieve this goal by implementing preventive strategies for the construction, operation, and maintenance of its facilities, enhancing situational awareness, and making risk-informed decisions through its new risk model. Liberty's 2027 WMP is a comprehensive portfolio of wildfire mitigation initiatives that build on past successes, key lessons learned, and identified areas for improvement across the previous WMP cycles.

Plan

Liberty's 2027 WMP is headlined by its new risk model plus the continuation of drone inspections and the implementation of early fault detection systems. Further, the plan includes core mitigations such as risk-informed grid hardening, asset inspections, vegetation management, situational awareness, and emergency management.

Core Upgrades and Technology Deployment

Overhauled Risk Model: Developed with Filsinger Energy Partners ("FEP"), this feeder-level model combines machine learning and five years of historical outage data with the results of Technosylva wildfire simulation tools. The new risk model quantifies wildfire and outage program risk into dollar-denominated utility risk and subsequent Benefit-Cost Ratios ("BCR") to guide mitigation activities.

[1] Text in orange text boxes are instructions from the Office of Energy Infrastructure Safety Final Wildfire Mitigation Plan Guidelines, February 2025.

Permanent Drone Inspections: Transitions aerial drone inspections across the extreme fire threat district near South Lake Tahoe into a permanent, core asset inspection strategy following a successful 2026 launch.

Early Fault Detection ("EFD"): Deploys 1,000 GridScope multi-sensor units in late 2026 to detect micro-faults and line stress, paired alongside covered conductor installations and other high-risk circuit segments.

Key Mitigation Initiatives

Grid Hardening: Uses risk model results and BCR calculations to prioritize covered conductor installation, pole and non-exempt fuse replacements, and continued grey wire replacements and tree attachment removals.

Asset Inspections: Continue detailed inspections and patrols and execution of incremental aerial drone inspections in the extreme fire threat district, exceeding GO 95 requirements.

Vegetation Management: Combines cycle-based and condition-based methodologies to maintain clearances and proactively identify hazard trees for removal, above and beyond the baseline standards established in GO 95 and Public Resources Code (§4292/§4293) .

Advanced Tech and Situational Awareness: Evaluates early fault detection systems and leverages the Sensitive Relay Profile ("SRP") program, Sagehen Field Station Microgrid, as well as weather forecasts and weather station network to refine Public Safety Power Shutoff ("PSPS") decisions and adjust operations based on fire danger indices.

Emergency Planning: Focuses on community outreach, early and timely customer notifications, and local emergency service coordination to prepare residents for PSPS events.

Framework

Liberty's 2027 WMP is built upon a modernized risk model that was comprehensively redesigned to enhance effectiveness and better support evolving expectations. Liberty worked with FEP, an expert in wildfire mitigation and risk modeling, and onboarded an industry expert to achieve a comprehensive and foundational model, right-sized for Liberty and capable of scaling and delivering high-quality results. Beginning in April 2026, Liberty began the heavy lift of rebuilding its model. By July 2026, the model was rebuilt, and the riskiest circuits were prioritized by total risk and risk-per-mile to guide certain initiatives, such as non-exempt fuse and pole replacements. Further, mitigation effectiveness was determined for key programs, and Liberty produced benefit cost ratios by circuit and per program to determine the most efficient and cost-effective mitigation. Liberty then used this information to determine project

types and locations for 2027. The new risk model and risk-informed mitigation framework represents a significant advancement in Liberty's wildfire risk management approach built and guided on the success of past mitigation work and developed to address concerns raised by Office of Energy Infrastructure Safety's ("Energy Safety"), while strengthening the Company's ability to make effective, data-driven mitigation decisions.

In addition to the reformed risk model and mitigation advancements, the 2027 WMP is complemented by the advancement of smart solutions. This includes the continuation of the drone inspection program and the early fault detection systems.

2. Responsible Persons

The electrical corporation must list those responsible for executing the WMP,[2] including:

- Executive-level owner with overall responsibility
- Program owners with responsibility for each of the main components of the plan
- As applicable, general ownership for questions related to or activities described in the WMP.

Electrical corporations may not redact titles, credentials, and components of responsible person(s). This information must be publicly available.

LU Table 2-1: Responsible Persons

WMP Section	Program Owner	Title
Executive-level Owner	Eric Schwarzrock	President
Section 1: Executive Summary	Eric Schwarzrock	President
Section 2: Responsible Persons	Jordan Parrillo	Manager, Rates and Regulatory Affairs
Section 3: Overview of WMP	Peter Stoltman	Director, Wildfire Prevention
Section 4: Overview of Service Territory	Peter Stoltman	Director, Wildfire Prevention
Section 5: Rick Methodology and Assessment	Cody Warner	Lead Analyst, Risk
	Peter Stoltman	Director, Wildfire Prevention
Section 6: Wildfire Mitigation Strategy Development	Cody Warner	Lead Analyst, Risk
	Peter Stoltman	Director, Wildfire Prevention
Section 7: Public Safety Power Shutoff	Peter Stoltman	Director, Wildfire Prevention
Section 8: Grid Design, Operations, and Maintenance	Peter Stoltman	Director, Wildfire Prevention
	Luis Garcia-Perez	Director, Engineering and Projects
	Amanda Chee	Project Manager II, Engineering
	Matt Wetzell	Senior Manager, Operations

[2] Pub. Util. Code § 8386(c)(1).

WMP Section	Program Owner	Title
Section 9: Vegetation Management and Inspections	Eric Oiler	Manager, Vegetation Management
Section 10: Situational Awareness and Forecasting	Scott Witt	Specialist III, Fire Protection
	Peter Stoltman	Director, Wildfire Prevention
Section 11: Emergency Preparedness, Collaboration and Public Awareness	Peter Stoltman	Director, Wildfire Prevention
	John Nalder	Manager, Emergency Management
	Anne Rarick	Lead, Community Outreach (Access and Functional Needs)
	Alison Vai	Senior Manager, Marketing and Communications
Section 12: Enterprise Systems	Peter Stoltman	Director, Wildfire Prevention
	Matt Wetzell	Senior Manager, Operations
	Eric Oiler	Manager, Vegetation Management
Section 13: Lessons Learned	Peter Stoltman	Director, Wildfire Prevention
Appendix A: Definitions	Jordan Parrillo	Manager, Rates and Regulatory Affairs
Appendix B: Supporting Documentation for Risk Assessment	Peter Stoltman	Director, Wildfire Prevention
Appendix C: Additional Maps	Peter Stoltman	Director, Wildfire Prevention
Appendix D: Areas for Continued Improvement	Peter Stoltman	Director, Wildfire Prevention
Appendix E: Referenced Regulations, Codes and Standards	Jordan Parrillo	Manager, Rates and Regulatory Affairs
Appendix F: Liberty 2026 AFN Plan	John Nalder	Manager, Emergency Management
	Anne Rarick	Lead, Community Outreach (Access and Functional Needs)

3. Overview of Base WMP

3.1 Primary Goal

Each electrical corporation must state the primary goal of its Base WMP. The primary goal must be consistent with California Public Utilities Code section 8386(a).[3]

Primary Goal

Consistent with California Public Utilities Code Section 8386(a), the primary goal of Liberty's 2027 WMP is to minimize the risk of catastrophic wildfire posed by utility electrical lines and equipment while maintaining safe, dependable, and cost-effective service across its High Fire-Threat footprint.

High in the Sierra Nevada, Liberty's service territory encompasses one of North America's most extraordinary natural treasures: Lake Tahoe and the surrounding Sierra communities. The territory's dense coniferous canopy, rugged topography, eastern Sierra slopes, high elevation valleys, and extreme alpine weather create an environment where wildfire could have devastating environmental and community consequences. As such, Liberty's operational initiatives center on absolute grid safety, preserving this beautiful landscape, and minimizing Public Safety Power Shutoff ("PSPS") impacts on its customers.

Liberty will achieve this goal by implementing preventive strategies for the construction, operation, and maintenance of its facilities, enhancing situational awareness, and making risk-informed decisions. Liberty's 2027 WMP is a comprehensive portfolio of wildfire mitigation initiatives that build on past successes, key lessons learned and identified areas for improvement across the previous WMP cycles.

[3] "Each electrical corporation shall construct, maintain, and operate its electrical lines and equipment in a manner that will minimize the risk of catastrophic wildfire posed by those electrical lines and equipment." (Pub. Util. Code § 8386(a).)

3.2 Plan Objectives

In this section, the electrical corporation must summarize its plan objectives over the three-year WMP cycle.[4] Plan objectives are determined by the portfolio of activities proposed in the Base WMP.

Plan objectives must address the electrical corporation's most highly prioritized categories of wildfire risk drivers, as listed in Section 3.4.

Electrical corporations must tie plan objectives to targets (both quantitative and qualitative) and performance metrics.

Plan Objectives

Building on the foundation of past wildfire mitigation investment and incorporating regulatory feedback from Energy Safety, the year 2027 represents a pivotal year marked by an overhauled risk model and the increased deployment of advanced technologies and projects that provide increased BCRs for the customers and communities served.

Comprehensive Risk Model Overhaul: Liberty has undertaken a fundamental overhaul of its risk methodology for the 2027 WMP, replacing the prior approach with a new methodology that emphasizes transparency, technical rigor, and documentation of assumptions. This revised methodology was developed in close collaboration with FEP, a recognized industry leader in wildfire risk modeling in the electricity sector.

The foundation of Liberty's new wildfire risk methodology is an empirically grounded, feeder-level probability-of-failure model. This model combines machine learning techniques in conjunction with five years of Liberty's historical outage data, to estimate the likelihood of an outage on each feeder. Liberty then layers an analysis of historical, catastrophic wildfires in and near its service territory onto these outage probabilities to identify the fire-weather conditions under which an outage is most likely to ignite a wildfire capable of escaping initial containment. Liberty then pairs this likelihood assessment with Technosylva's wildfire simulation tools to assess the potential consequences of an ignition occurring on each feeder. The product of these two key model components: likelihood and consequence, produces a quantitative, feeder-level estimate of wildfire risk. This data is then paired with outage program risk so that an overall utility risk is determined, in dollars, for each circuit along with BCR to inform Liberty's mitigation initiatives and investments.

[4] Pub. Util. Code § 8386(c)(2).

Drone Inspection Program Continuation: Following its initial deployment in 2026, Liberty successfully launched an incremental and dedicated aerial drone inspection program across all of the Tier 3 High Fire Threat District ("HFTD") in its service territory. Given the program's success in capturing high-resolution imaging to more thoroughly assess asset conditions, Liberty is continuing drone inspections as a permanent staple of its asset inspection strategy.

Early Fault Detection ("EFD") Development: Liberty is launching 1,000 targeted GridScope multi-sensor units in late 2026. Designed to continuously monitor vibration, acoustic, structural, and electrical anomalies at 6,000 samples per second, this EFD technology identifies micro-faults and physical line stress before an ignition occurs. Liberty anticipates that this launch will be successful, such that Liberty will be able to continue to expand deployment—operating in tandem with covered conductor installations to form a multi-layered defensive shield across high-risk circuits and is looking forward to analyzing the results and subsequent opportunities in 2027.

Other Objectives: In addition to the above, Liberty's other objectives aim to create a comprehensive, risk-informed, proactive approach to wildfire mitigation activities. Liberty's other objectives include:

- Grid Hardening: Liberty's grid hardening strategy includes systematically implementing projects guided by the risk model utilizing a combination of absolute risk and risk per overhead mile. This is used to prioritize grid hardening initiatives such as pole replacements and non-exempt fuse replacements. Liberty also identifies and evaluates projects using a benefit-cost analysis, which serves as Liberty's risk buy-down estimate by calculating BCR to help guide the selection of the most effective and efficient projects. Projects include hardening with covered conductor, undergrounding, or hardening without covered conductor / pole replacements and reinforcements. Additional projects include tree attachment removal, grey wire replacement, and other upgrades to more resilient components that improve the system's ability to withstand extreme weather conditions and reduce the likelihood of wildfire incidents.
- Asset Inspection: Liberty conducts asset inspections in accordance with General Order ("GO") 165 and GO 95 throughout the system to identify safety and reliability conditions that contribute to wildfire risk. As mentioned earlier, Liberty is also continuing drone inspections as a permanent staple of its asset inspection strategy.
- Advanced Technology: Liberty is leveraging modern technology, such as its Sensitive Relay Profile ("SRP") program and the Sagehen Field Station Microgrid, to reduce both ignition risk and PSPS risk for customers. Liberty is also launching an EFD system and

expects it to be successful. This multi-faceted approach enhances the safety and reliability of the electrical system.

- Vegetation Management: Liberty conducts robust vegetation management and inspection activities that exceed the requirements of GO 95, Public Resources Code ("PRC") §4292 and PRC §4293, helping to mitigate vegetation-related wildfire risk and support the safe and reliable operation of the electric system throughout its service territory. Liberty's vegetation management program implements a hybrid approach that integrates both cycle-based and condition-based methodologies. This framework provides the reliability of scheduled maintenance with the adaptability of real-time, condition-driven responses. By leveraging advanced technology and data analytics, Liberty enhances traditional maintenance cycles, applies risk-based criteria to prioritize activities, and proactively addresses vegetation conditions that contribute to wildfire risk.
- Situational Awareness: Liberty has developed a comprehensive situational awareness and forecasting strategy. A key element in this strategy is the use of weather models and weather monitoring for forecasting fire danger, PSPS decision making, and adjusting operational procedures according to fire potential indices. Regular weather station maintenance and calibration help to update and maintain the integrity of the data used in fire risk modeling and operation planning.
- Emergency Planning and Coordination: Through extensive emergency planning and community outreach efforts, Liberty works to prepare the communities it serves for the possibility of PSPS events. These efforts include timely customer notifications, public education campaigns, and coordination with local emergency services so that customers are informed, supported, and prepared to stay safe during power shutoffs.

3.3 Utility Mitigation Activity Tracking IDs

Each electrical corporation must use "Utility Mitigation Activity Tracking IDs" (Tracking IDs) throughout their WMP. Each electrical corporation must implement a tracking system using Tracking IDs, as specified in the applicable Energy Safety Data Guidelines, to tie targets, narratives, initiatives, and activities together throughout its WMP. The electrical corporation must use consistent Tracking IDs in its WMP submission and data submissions. Each Tracking ID must remain consistent across the three-year WMP.

Liberty uses the WMP Initiative Tracking IDs provided in LU Table 3-1.

LU Table 3-1: Liberty WMP Initiative Tracking IDs

WMP Initiative Category	WMP Initiative Activity	WMP Initiative ID
Risk Methodology and Assessment	Risk Methodology and Assessment	WMP-RISK-01
Grid Design, Operations, and Maintenance	Covered conductor installation	WMP-GDOM-GH-01
Grid Design, Operations, and Maintenance	Undergrounding of electric lines and/or equipment	WMP-GDOM-GH-02
Grid Design, Operations, and Maintenance	Distribution pole replacements and reinforcements	WMP-GDOM-GH-03
Grid Design, Operations, and Maintenance	Transmission pole/tower replacements and reinforcements	WMP-GDOM-GH-04
Grid Design, Operations, and Maintenance	Traditional overhead hardening	WMP-GDOM-GH-05
Grid Design, Operations, and Maintenance	Emerging grid hardening technology installations and pilot progress	WMP-GDOM-GH-06
Grid Design, Operations, and Maintenance	Microgrids	WMP-GDOM-GH-07
Grid Design, Operations, and Maintenance	Installation of system automation equipment	WMP-GDOM-GH-08
Grid Design, Operations, and Maintenance	Line removal (in HFTD)	WMP-GDOM-GH-09
Grid Design, Operations, and Maintenance	Other grid topology improvements to minimize risk of ignitions	WMP-GDOM-GH-10
Grid Design, Operations, and Maintenance	Other grid topology improvements to mitigate or reduce PSPS events	WMP-GDOM-GH-11
Grid Design, Operations, and Maintenance	Other technologies and systems not listed above:	WMP-GDOM-GH-12
Grid Design, Operations, and Maintenance	Tree attachment removals	WMP-GDOM-GH-12a
Grid Design, Operations, and Maintenance	Non-exempt fuse replacement	WMP-GDOM-GH-12b
Grid Design, Operations, and Maintenance	Animal guards	WMP-GDOM-GH-12c
Grid Design, Operations, and Maintenance	CalFIRE exempt hardware	WMP-GDOM-GH-12d
Grid Design, Operations, and Maintenance	Open wire/grey wire	WMP-GDOM-GH-12e
Grid Design, Operations, and Maintenance	Detailed inspections of distribution electric lines and equipment	WMP-GDOM-AI-01
Grid Design, Operations, and Maintenance	Intrusive pole inspections	WMP-GDOM-AI-02
Grid Design, Operations, and Maintenance	Patrol inspections of distribution electric lines and equipment	WMP-GDOM-AI-03
Grid Design, Operations, and Maintenance	Other discretionary inspections of distribution electric lines and equipment: Drone inspections	WMP-GDOM-AI-04
Grid Design, Operations, and Maintenance	Quality assurance / quality control of inspections	WMP-GDOM-AI-05
Grid Design, Operations, and Maintenance	Substation inspections	WMP-GDOM-AI-06
Grid Design, Operations, and Maintenance	Work Orders (Asset Management)	WMP-GDOM-AI-07
Grid Design, Operations, and Maintenance	Equipment maintenance and repair	WMP-GDOM-MR-01
Grid Design, Operations, and Maintenance	Equipment settings to reduce wildfire risk	WMP-GDOM-GO-01
Grid Design, Operations, and Maintenance	Grid response procedures and notifications	WMP-GDOM-GO-02
Grid Design, Operations, and Maintenance	Personnel work procedures and training in conditions of elevated fire risk	WMP-GDOM-GO-03
Grid Design, Operations, and Maintenance	Automatic recloser operations	WMP-GDOM-GO-04
Grid Design, Operations, and Maintenance	Asset Management and Inspection Enterprise System	WMP-GDOM-GO-05

WMP Initiative Category	WMP Initiative Activity	WMP Initiative ID
Grid Design, Operations, and Maintenance	Workforce Planning (Asset Management)	WMP-GDOM-GO-06
Vegetation Management & Inspections	Vegetation Management Inspection Program - Detailed	WMP-VM-INSP-01
Vegetation Management & Inspections	Vegetation Management Inspection Program - Patrol	WMP-VM-INSP-02
Vegetation Management & Inspections	Vegetation Management Inspection Program - LiDAR	WMP-VM-INSP-03
Vegetation Management & Inspections	Pole Clearing – PRC 4292 Required	WMP-VM-VFM-01-R
Vegetation Management & Inspections	Pole Clearing – Discretionary	WMP-VM-VFM-01-D
Vegetation Management & Inspections	Wood and Slash Management	WMP-VM-VFM-02
Vegetation Management & Inspections	Substation Defensible Space	WMP-VM-VFM-03
Vegetation Management & Inspections	Integrated Vegetation Management	WMP-VM-VFM-04
Vegetation Management & Inspections	Clearance	WMP-VM-VFM-05
Vegetation Management & Inspections	Fall-In Mitigation	WMP-VM-VFM-06
Vegetation Management & Inspections	High-Risk Species	WMP-VM-VFM-07
Vegetation Management & Inspections	Emergency Response Vegetation Management	WMP-VM-VFM-08
Vegetation Management & Inspections	Vegetation Management Enterprise System	WMP-VM-ESG-01
Vegetation Management & Inspections	Quality Assurance and Quality Control	WMP-VM-QAQC-01
Vegetation Management & Inspections	Workforce Planning	WMP-VM-WFP-01
Situational Awareness & Forecasting	Environmental monitoring systems	WMP-SA-01
Situational Awareness & Forecasting	Grid monitoring systems	WMP-SA-02
Situational Awareness & Forecasting	Fire detection and alarm systems	WMP-SA-03
Situational Awareness & Forecasting	Weather forecasting	WMP-SA-04
Situational Awareness & Forecasting	Fire Potential Index	WMP-SA-05
Emergency Preparedness	Wildfire and PSPS emergency preparedness plan	WMP-EP-01
Emergency Preparedness	Collaboration and coordination with public safety partners	WMP-EP-02
Emergency Preparedness	Public notification and communication strategy	WMP-EP-03
Emergency Preparedness	Preparedness and planning for service restoration	WMP-EP-04
Emergency Preparedness	Customer support in wildfire and PSPS emergencies	WMP-EP-05
Emergency Preparedness	Learning after wildfire and PSPS events	WMP-EP-06
Community Outreach and Engagement	Public outreach and education awareness for wildfires, PSPS, outages from protective equipment and device settings, and vegetation management	WMP-CO-01
Community Outreach and Engagement	Public engagement in WMP decision-making process	WMP-CO-02
Community Outreach and Engagement	Engagement with AFN populations, local governments, and tribal communities	WMP-CO-03
Community Outreach and Engagement	Collaboration on local wildfire mitigation and planning	WMP-CO-04
Community Outreach and Engagement	Best practice sharing with other electrical corporations	WMP-CO-05

3.4 Prioritized List of Wildfire Risks and Risk Drivers

The electrical corporation must provide a list that identifies and prioritizes all wildfire risks, and drivers for those risks, throughout its service territory.[5] The electrical corporation must use the format outlined in Table 3-2 below. Additionally, the list must include, at a minimum, the specific risks and risk drivers provided in Table 3-2. The electrical corporation must also add to its list any wildfire risks and risk drivers applicable to its service territory not already provided in the below table. Prioritization within Table 3-2 must be listed from highest priority to lowest priority.

The electrical corporation must also note topographical or climatological risk factors associated with each risk and risk driver.[6] Topographical and climatological risk factors may include, but are not limited to, elevation, slope, aspect, heat, aridity, humidity, wind, airborne salinity, precipitation (snow, rain, hail, etc.), and lightning. The electrical corporation must include how it determined these topographical and climatological risk factors via narrative (i.e. evaluating short-term/current conditions, long-term/future conditions).

Additionally, the electrical corporation must describe in a narrative accompanying Table 3-2 its basis for prioritizing these risks and risk drivers (e.g., "priority is assigned based on frequency, location with regard to the High Fire Threat District ("HFTD"), and the expected consequence pertaining to the location"). This must also include a description of the timeframes used to evaluate the risks and risk drivers:

Liberty's prioritized list of wildfire risks and risk drivers is included in Table 3-1. The prioritization of risk drivers is based on comprehensive ignition reporting data from 2014 through 2025, along with outage data from January 2022 through December 2025. Due to the limited amount of ignition data, specifically within Liberty's service area, outage data was utilized to supplement the dataset for prioritizing ignition risk. This approach provides an assessment and prioritization of risks, leveraging the most reliable and relevant data available.

Liberty's risk platform includes topography, vegetation-based fuels, climatology, demographics, historic fire weather days, live and dead fuel moisture samples, and impact to the population. These variables are quantified so that Liberty will be able to identify and monitor areas where the data indicates that a wildfire event is likely to occur. Section 5.1.1 provides more details regarding Liberty's Risk Informed Decision Making Framework.

[5] Pub. Util. Code § 8386(c)(12).
[6] Pub. Util. Code § 8386(c)(12)(B).

Topographical Risk Factors:

- Elevation: Higher elevations may experience different weather patterns and vegetation types.
- Slope: Slope can affect likelihood of vegetation contact; steeper slopes can accelerate fire spread; slopes can produce downslope winds that may increase wildfire risk when combined with other risk factors.

Climatological Risk Factors:

- Heat: High temperatures can dry out vegetation, increasing fire risk. Excessive heat can affect equipment by increasing likelihood of failures, conductor sagging, and equipment degradation.
- Aridity: Low humidity levels can make vegetation more flammable.
- Humidity: Low humidity can increase the likelihood and consequence of a risk event.
- Wind: Strong winds can rapidly spread fires. Extreme winds can increase likelihood of vegetation contact and equipment/facility failure or damage.

Table 3-1: List of Risks and Risk Drivers to Prioritize

Priority	Risk	Risk Driver	% of ignitions in HFTD	Topographical and Climatological Risk Factors
1	Equipment / facility failure or damage	Connector device	15.79%	Extreme weather, heat, wind
1	Vegetation contact	Fall-in (branch failure)	10.53%	Elevation, slope, wind, extreme weather
1	Vegetation contact	Fall-in (trunk failure)	10.53%	Elevation, slope, wind, extreme weather
1	Equipment / facility failure or damage	Conductor	10.53%	Extreme weather, heat, wind
1	Wire-to-wire contact	Wire-to-wire contact	5.26%	Extreme weather, heat, wind
1	Vegetation contact	Fall-in (root failure)	0	Elevation, slope, wind, extreme weather
1	Vegetation contact	Blow-in	0	Elevation, slope, wind, extreme weather
1	Vegetation contact	Grow-in	0	Elevation, slope, wind, extreme weather
1	Equipment / facility failure or damage	Fuse	0	Extreme weather, heat, wind
1	Protective Device Operation	Protective Device Operation	0	Extreme weather, wind
2	Contact from object	Animal contact	10.53%	N/A
2	Equipment / facility failure or damage	Other	5.26%	Extreme weather, heat, wind

Priority	Risk	Risk Driver	% of ignitions in HFTD	Topographical and Climatological Risk Factors
2	Equipment / facility failure or damage	Anchor/guy	0	Extreme weather, heat, wind
2	Equipment / facility failure or damage	Capacitor bank	0	Extreme weather, heat, wind
2	Equipment / facility failure or damage	Cross arm	0	Extreme weather, heat, wind
2	Equipment / facility failure or damage	Cutout	0	Extreme weather, heat, wind
2	Equipment / facility failure or damage	Insulator and bushing	0	Extreme weather, heat, wind
2	Equipment / facility failure or damage	Lightning arrestor	0	Extreme weather, heat, wind
2	Equipment / facility failure or damage	Pole	0	Extreme weather, heat, wind
2	Equipment / facility failure or damage	Recloser	0	Extreme weather, heat, wind
2	Equipment / facility failure or damage	Relay	0	Extreme weather, heat, wind
2	Equipment / facility failure or damage	Sectionalizer	0	Extreme weather, heat, wind
2	Equipment / facility failure or damage	Splice	0	Extreme weather, heat, wind
2	Equipment / facility failure or damage	Switch	0	Extreme weather, heat, wind
2	Equipment / facility failure or damage	Tap	0	Extreme weather, heat, wind
2	Equipment / facility failure or damage	Tie wire	0	Extreme weather, heat, wind
2	Equipment / facility failure or damage	Transformer	0	Extreme weather, heat, wind
2	Equipment / facility failure or damage	Voltage regulator / booster	0	Extreme weather, heat, wind
2	Equipment / facility failure or damage	Unknown	0	Extreme weather, heat, wind
3	Unknown	Unknown	10.53%	N/A
3	Contact from object	Unknown	5.26%	Extreme weather, heat, wind
3	Vandalism/ theft	Vandalism / theft	5.26%	N/A
3	Contact from object	Ballon contact	0	Wind
3	Contact from object	Land vehicle contact	5.26%	N/A
3	Contact from object	Aircraft vehicle contact	0	N/A
3	Contact from object	Third-party contact	5.26%	N/A
3	Contact from object	Other contact from object	0	N/A
3	Contamination	Contamination	0	Extreme weather, heat, wind
3	Lightning	Lightning	0	Extreme weather
3	Dig-in	Dig-in	0	N/A

3.5 Performance Metrics

In this section, the electrical corporation must list the performance metrics, beyond those required by Energy Safety, that the electrical corporation uses to evaluate the effectiveness of the plan in reducing wildfire and outage program risk.[7]

For each of these self-identified performance metrics, the electrical corporation must provide the following information in tabular form:

- Associated WMP section (self-identified performance metrics can apply to the entire WMP; e.g. number of ignitions, number of acres burned, etc.)
- The assumptions that underlie the use of the metric.

Metrics listed in this section (including each metric's name and values) must match those reported in the applicable quarterly data submissions.

Liberty does not use performance metrics beyond those required by Energy Safety and thus does not provide a Table 3-2. The comprehensive list of performance metrics required by Energy Safety are sufficient to evaluate the effectiveness of Liberty's plan to reduce wildfire and outage program risk.

Table 3-2: Self-Identified Performance Metrics (N/A)

3.6 Projected Expenditures

The electrical corporation must summarize its projected expenditures in thousands of U.S. dollars per year for the activities set forth in its three-year WMP cycle in both tabular and graph form. For tabular form, the electrical corporation must follow the provided format in Table 3-3.

Energy Safety's WMP evaluation, resulting in either approval or denial, is not an approval of, or agreement with, costs listed in the WMP.

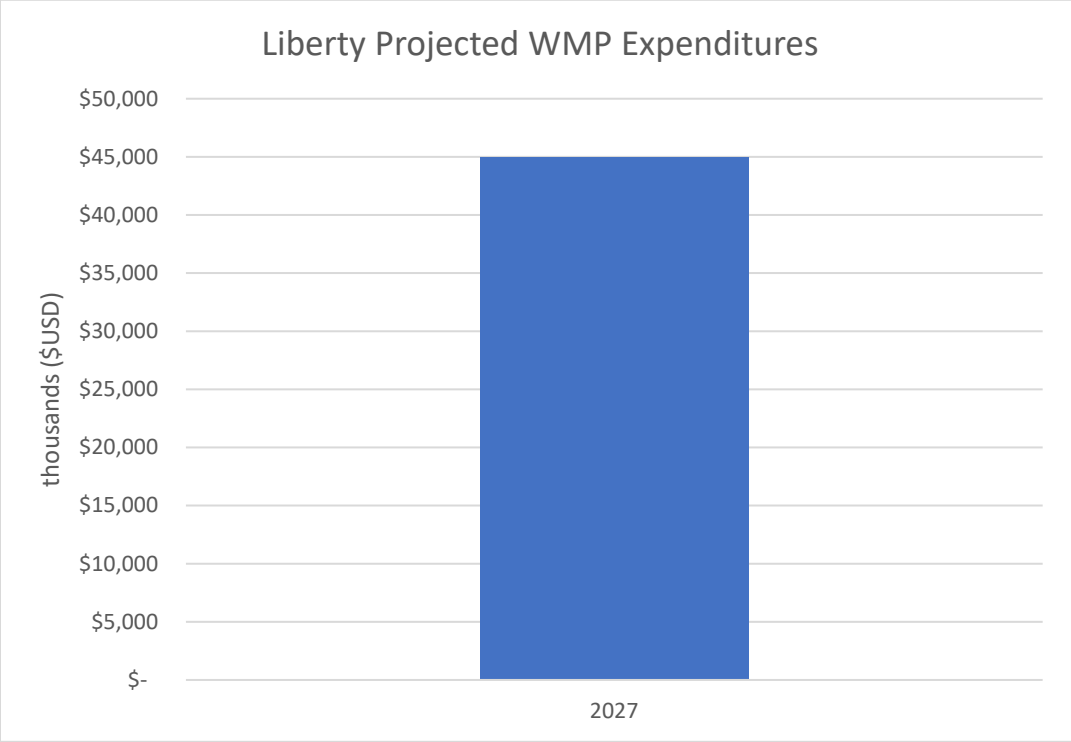
In Table 3-3 and Figure 3-1, Liberty provides a summary of its projected expenditures for the 2027 WMP year.

[7] Pub. Util. Code §§ 8386(c)(4), (5).

Table 3-3: Summary of Liberty Projected WMP Expenditures, 2027

Year of WMP Cycle	Projected Spend (thousands $USD)
2027	$44,924

Figure 3-1: Summary of Liberty Projected WMP Expenditures, 2027



3.7 Climate Change

In this section, the electrical corporation must describe how it has considered dynamic climate change risks in writing its WMP.[8] This description must include reference to the electrical corporation's most recent climate vulnerability assessment addressing new or exacerbated risks related to wildfire. This section is limited to two pages.

3.7.1 General Climate Conditions

Liberty's service territory and the greater Lake Tahoe area experience warm, dry summers that range from an average minimum temperature of 45 degrees Fahrenheit to average maximum temperatures around 80 degrees Fahrenheit. During winters, temperatures reach an average minimum of 20 degrees Fahrenheit and an average maximum of 42 degrees Fahrenheit. Most

of the annual precipitation occurs between the months of November through March, with an average of two to four inches of precipitation per month. Summer months typically see one inch or less of precipitation per month. The lowest daily mean relative humidity occurs around September 1, although relative humidity below 20% can occur at almost any time of year.

In Liberty's service territory, wind patterns of significance from a fire weather standpoint occur primarily due to frontal passages and Washoe Zephyr winds. Ahead of frontal passages, winds typically increase out of the west or southwest before shifting to the north and northeast behind the front. Both wind directions can lead to significant fire weather concerns, but west/southwest winds tend to be more problematic due to the potential for down-sloping winds on the east slope of the Sierra. Frontal passages can lead to fire weather concerns at any time of the year where antecedent moisture or snow cover do not preclude the possibility of fire ignition and spread. During summer months, Washoe Zephyr winds may lead to elevated wind speeds that are typically strongest from early afternoon to late evening. Frontal passages can also lead to enhanced Zephyr winds with higher wind speeds than would occur in the absence of a frontal passage.

3.7.2 Climate Change Trends

California's Fifth Climate Change Assessment projects large increases in extreme heat days across Liberty's service territory.[9] In the most elevated scenario (three-degree Celsius global temperature increase), the number of extreme heat days is expected to increase by approximately 25 days in the Topaz area, which represents more than a 100% increase.

Overall increases in U.S. wildfire activity have been largely concentrated in the Sierra Nevada, second only to the Northern Rockies.[10] In addition, wildfire risk increases have been centered on elevations around six thousand feet in elevation,[11] mapping closely to Liberty's service territory. A key driver of increased U.S. wildfire activity is earlier spring snowmelt, leading to longer fire seasons and drier fuels.[12] In recent years, these effects have had acute impacts during the autumn months in California, and climate change is projected to further exacerbate extreme autumn wildfires.[13]

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[8] Pub. Util. Code § 8386(c)(3).
[9] California's Fifth Climate Change Assessment, Cal-Adapt data download, accessed July 2026.
[10] Westerling, Anthony L., Hugo G. Hidalgo, Daniel R. Cayan, and Thomas W. Swetnam. "Warming and earlier spring increase western US forest wildfire activity." *Science* 313, no. 5789 (2006): 940-943.
[11] Ibid.
[12] Ibid.
[13] Swain, Daniel L., Baird Langenbrunner, J. David Neelin, and Alex Hall. "Increasing precipitation volatility in twenty-first-century California." *Nature Climate Change* 8, no. 5 (2018): 427-433.

In forested parts of Liberty's service territory, climate change is likely to accelerate tree mortality. The 2022 USDA Forest Service Aerial Detection Survey ("ADS") shows there is already significant tree mortality in Liberty's service territory, particularly west of Lake Tahoe. The implications of this for fire behavior potential are not yet completely understood by the fire science community, but such mortality is likely to increase coarse fuel loading, which increases the potential for plume dominated fires.

As part of Liberty's Risk Assessment Improvement ("RAI") Plan, Liberty has identified detailed modeling of climate change impacts and tree mortality as a high priority opportunity item for Liberty's next WMP cycle. As required by R.18-04-019,[14] Liberty participates in the system-wide Climate Adaptation Vulnerability Assessment ("CAVA") proceeding. The results of this proceeding and associated assessments may inform future WMP planning years and cycles.

[14] R.18-04-019. April 26, 2018. Order Instituting Rulemaking to Consider Strategies and Guidance for Climate Change Adaptation.

4. Overview of the Service Territory

In this section of the WMP, the electrical corporation must provide a high-level overview of its service territory and key characteristics of its electrical infrastructure.[15] This information must provide Energy Safety with an understanding of the physical and technical scope of the electrical corporation's WMP. Sections 4.1-4.3 below provide detailed instructions.

4.1 Service Territory

The electrical corporation must provide a high-level description of its service territory, addressing the following components:[16]

- Area served (in square miles)
- Number of customers served
- Overview of electrical infrastructure

Table 4-1 provides the required format for presenting the high-level service territory components.

The electrical corporation must also provide one geospatial representative map that shows its service territory (polygons) and the above required components. The electrical corporation must host this map and any geospatial layers on a publicly accessible web application.

Liberty operates electrical infrastructure across 1,482 square miles of service territory, serving approximately 50,000 customers in Mono, Alpine, El Dorado, Placer, Nevada, Sierra, and Plumas counties. The main component of this service area consists of the 1,471 square miles adjacent to Lake Tahoe, from Walker in the south, to South Lake Tahoe, North Lake Tahoe, and Loyalton. A much smaller section, consisting of 11 square miles, does not connect directly to the rest of the service area and serves only the Portola area in Plumas County.

Liberty's service territory consists mostly of rural communities with a few urban centers. Most residential customers served live in single-family homes, town homes, and duplexes. Terrain varies from flat land in South Lake Tahoe to slopes, ridges, and canyons in the western and northern areas of the service territory, with trees, brush, and timber throughout. Liberty's entire service territory is more than 4,800 feet above sea level. All of these factors present unique challenges to maintaining safe and reliable service.

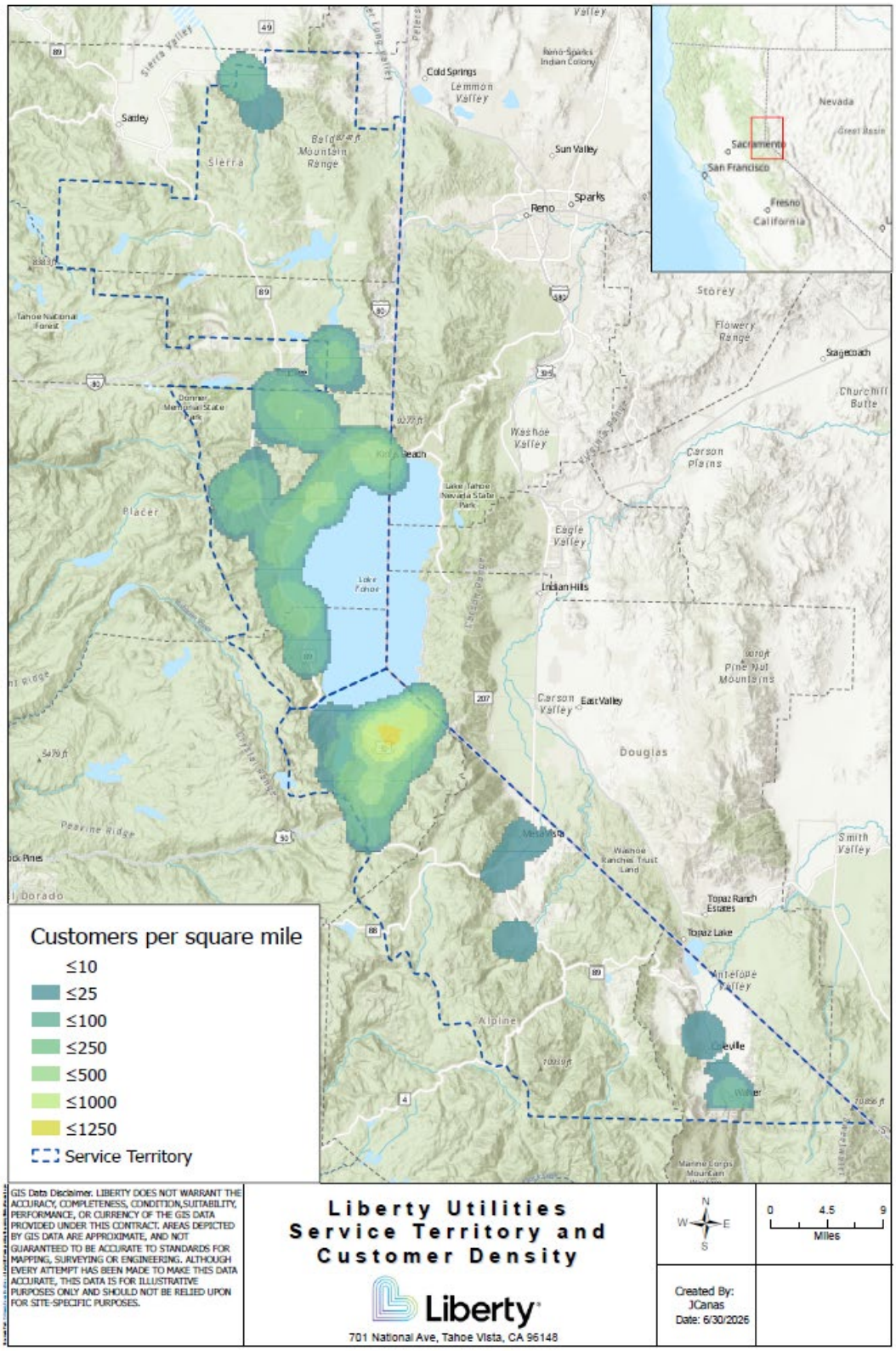
[15] Pub. Util. Code §§ 8386(c)(3), (8).
[16] Annual information included in this section must align with the applicable data submissions.

Table 4-1 provides high-level service territory statistics and Figure 4-1 is a map of Liberty's service territory and the distribution of customers.

Table 4-1. Liberty Service Territory High-Level Statistics

Characteristic	HFTD Tier 2	HFTD Tier 3	Non-HFTD	Total
Area served (square miles)	922.78	13.17	547.92	1,483.87
Number of customers served	42,851	2,956	3,509	49,316
Overhead transmission lines (circuit miles)	28.41	2.36	2.12	32.89
Overhead distribution lines (circuit miles)	1,251.66	124.18	90.23	1,466.07
Underground transmission lines (circuit miles)	1.30	0.00	0.00	1.3
Underground distribution lines (circuit miles)	544.63	10.33	38.80	593.76
Hardened overhead transmission lines (circuit miles)	0.00	0.00	0.00	0
Hardened overhead distribution lines (circuit miles)	47.45	0.00	0.00	47.45
Substations (#)	9	1	2	12
Power generation facilities (#)	0	0	0	0
Distribution transformers (#)	7,016	367	578	7,961
Reclosers (#)	41	1	3	45
Poles (#)	21,071	1,726	1,756	24,553
Microgrids (#)	1	0	0	1

Figure 4-1. Liberty Service Territory and Customer Distribution, 2026



4.2 Catastrophic Wildfire History

The electrical corporation must provide a brief narrative summarizing its wildfire history for the past 20 years as recorded by the electrical corporation, CAL FIRE, or other authoritative government sources. For this section, wildfire history must be limited to electrical corporation ignited catastrophic fires (i.e., fires that caused at least one death, damaged over 500 structures, or burned over 5,000 acres). This includes catastrophic wildfire ignitions reported to the CPUC that may be attributable to facilities or equipment owned by the electrical corporation[17] and where the cause of the ignition is still under investigation by the CPUC, CAL FIRE, and/or other authoritative government sources. The electrical corporation must clearly denote those ignitions as still under investigation. In addition, the electrical corporation must provide catastrophic wildfire statistics in the tabular form provided below, including the following key metrics:

- Ignition date
- Fire name
- Official cause (if known)
- Size (acres)
- Number of fatalities
- Number of structures damaged
- Estimated financial loss (U.S. dollars)
- Any lesson(s) learned

Table 4-2 provides the required format and the content for the tabulated historical catastrophic utility-related wildfire statistics.[18] The electrical corporation must cite to an authoritative government source (e.g., CPUC, CAL FIRE, U.S. Forest Service, or local fire authority) for all data provided to the extent this information is available.

In the past 20 years, Liberty has experienced one catastrophic wildfire in its service territory, the Mountain View Fire in 2020. Refer to Table 4-2 for statistics on the Mountain View Fire.

[17] CPUC emergency reporting instructions: https://www.cpuc.ca.gov/regulatory-services/safety/emergencyreporting.

[18] Annual information included in this section must align with the applicable data submission.

Table 4-2: Liberty Catastrophic Wildfire History[19]

Ignition Date	Fire Name	Official Cause	Fire Size (acres)	No. of Fatalities	No. of Structures Destroyed and Damaged	Financial Loss (US$)	Lessons Learned
11/17/2020	Mountain View Fire	Unknown	20,385	1	80 destroyed	$184M	Developed new PSPS screening criteria to account for late season weather conditions that occurred on the day of the fire.

4.3 Frequently Deenergized Circuits

The electrical corporation must populate Table 4-3 and provide a map showing its frequently deenergized circuits. [20] Frequently deenergized circuits are circuits which have had three or more PSPS events per calendar year. The table and map must include frequently deenergized circuits from the previous six calendar years (i.e., circuits that have had three or more PSPS events in at least one of the six previous calendar years).

The table must contain the following; however, relevant information for an entry can be added as applicable:

- Circuit ID Number
- Name of Circuit
- Dates of Outages
- Number of Customers Hours of PSPS per Outage
- Measures Taken, or Planned to Be Taken, to Reduce the Need for and Impact of Future PSPS of Circuit
- Estimated Annual Decline in PSPS Events and PSPS Impact on Customers

The map must show the following:

- All circuits listed in Table 4-3, colored or weighted by frequency of PSPS

[19] Source: https://ready.mono.ca.gov/pages/mountainview-fire.
[20] Pub. Util. Code, § 8386(c)(8).

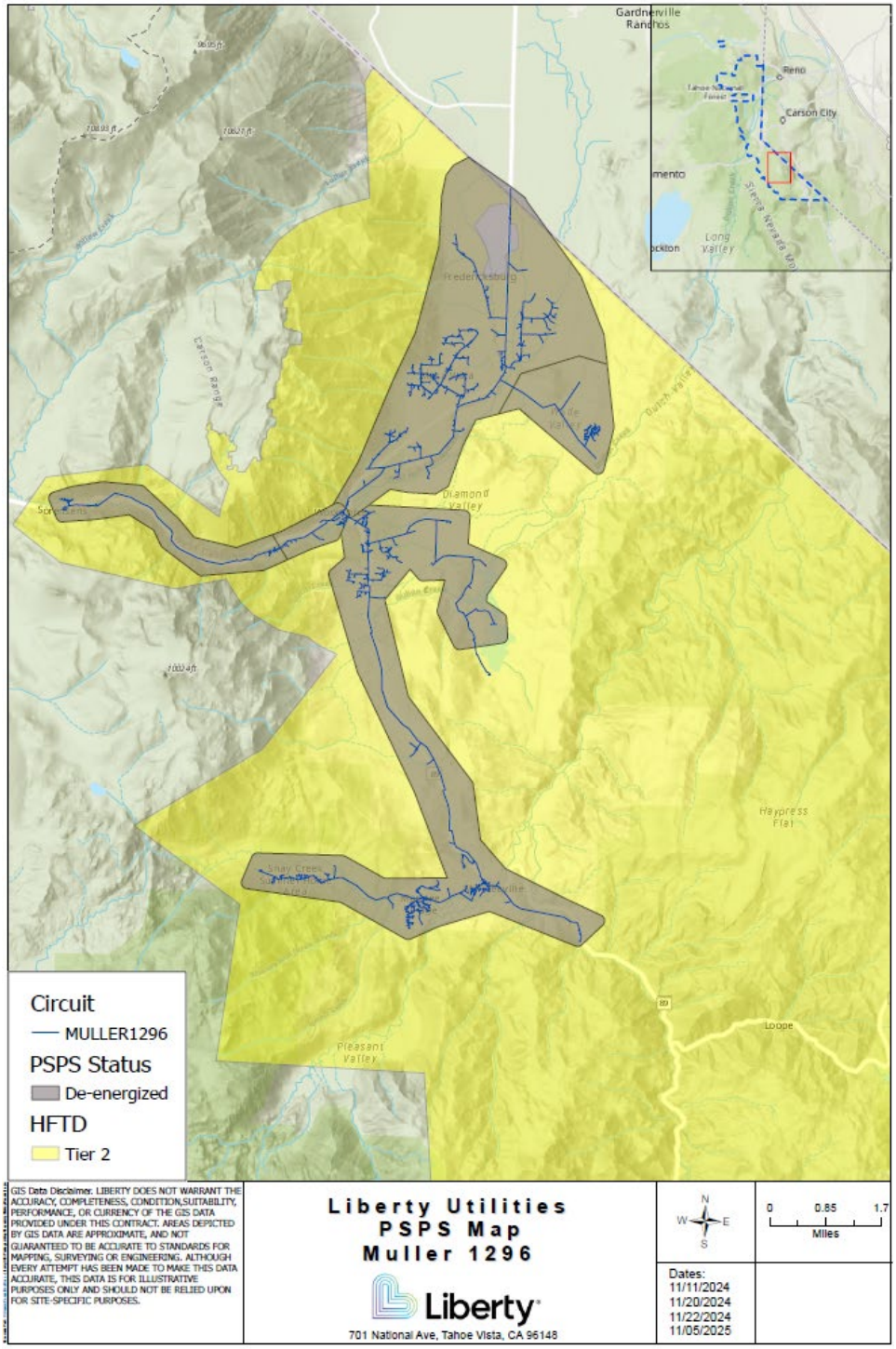
- HFTD Tiers 2 and 3 contour overlay

Refer to Table 4-3 and Figure 4-2 for the Liberty circuit that fits the criteria of a frequently deenergized circuit defined by the Office of Energy Infrastructure Safety.

Table 4-3: Frequently Deenergized Circuits

Circuit ID	Name of Circuit	Dates of Outages	Number of Customer Hours of PSPS per Outage	Measures Taken, or Planned to Be Taken to Reduce the Need for and Impact of Future PSPS of Circuit	Estimated Annual Decline in PSPS Events and PSPS Impact on Customers
Muller 1296	Muller 1296	11/11/2024, 11/20/2024, 11/22/2024, and 11/5/2025	10,516.33, 12,350.78, 9,550.23, and 9,261.2	Measures taken include the installation of covered conductor, distribution pole replacements and reinforcements, additional situational awareness, sectionalizing devices, and Sensitive Relay Profile	Not currently quantified

Figure 4-2: Map of Frequently Deenergized Circuits



5. Risk Methodology and Assessment

In this section of the WMP, the electrical corporation must provide an overview of its risk methodology, key input data and assumptions, risk analysis, and risk presentation (i.e., the results of its assessment).[21] This section must provide the information necessary to understand the foundation for the electrical corporation's wildfire mitigation strategy. Sections 5.1- 5.7 below provide detailed instructions.

The electrical corporation does not need to perform each calculation and analysis indicated in Sections 5.2, 5.3, and 5.6. However, if the electrical corporation does not perform a certain calculation or analysis, it must describe why it does not do so, its current alternative to the calculation or analysis (if applicable), and any plans to incorporate those calculations or analyses into its risk methodology and assessment in the future.

Tracking ID: WMP-RISK-01

5.1 Methodology

In this section, the electrical corporation must present an overview of its risk calculation approach. This includes a concise narrative explaining key elements of the approach, one or more graphics showing the calculation process, and definitions of different risks and risk components.

5.1.1 Overview

The electrical corporation must provide a brief narrative describing its methodology for quantifying its overall utility risk, wildfire risk, and outage program risk (as described in Section 5.2.1 and defined in Appendix A). This methodology will help inform the development of its wildfire mitigation strategy (see Section 6). The electrical corporation must describe the methodology and underlying intent of this risk assessment in no more than five pages, inclusive of all narratives, bullet point lists, and any graphics. The electrical corporation must indicate and describe any industry-recognized standards, best practices, or research used in its methodology.

Liberty has undertaken a fundamental revision of its risk methodology for the 2027 WMP, replacing the prior approach with a new methodology that emphasizes transparency, technical rigor, and documentation of assumptions. This revised methodology was developed in close collaboration with Filsinger Energy Partners ("FEP"), a recognized industry leader in wildfire risk

[21] Pub. Util. Code §§ 8386(c)(3), (8), (12)-(13), (17)-(18).

modeling in the electricity sector. Consistent with Energy Safety's WMP Guidelines, Liberty's overall utility risk is calculated as the sum of wildfire risk and outage program risk, expressed annually in dollars.[22] This section describes the methodology, underlying assumptions, and governance process behind that calculation. Section 6 describes how these risk estimates inform the development and prioritization of Liberty's wildfire mitigation strategy, taking into consideration the costs and risk reduction of mitigation measures.

The foundation of Liberty's wildfire risk methodology is an empirically grounded, circuit-level probability-of-failure model. This model combines machine learning techniques with four years of Liberty's historical outage data to estimate the likelihood of an outage on each feeder.

Liberty then layers an analysis of historical, catastrophic wildfires in and near its service territory onto these outage probabilities to identify the fire-weather conditions under which an outage is most likely to ignite a wildfire capable of escaping initial containment.

Liberty pairs this likelihood assessment with Technosylva's wildfire simulation results, an industry-leading platform used by electric utilities across the Western U.S., to assess the potential consequences of an ignition occurring on each feeder. The product of these two key model components, likelihood and consequence, produces a quantitative, circuit-level estimate of wildfire risk.

Liberty established a cross-functional Risk Focus Group ("RFG") in spring of 2026 to promote internal ownership and high levels of risk model integrity. The RFG includes executive leadership and subject matter experts from wildfire prevention, engineering, operations, vegetation management, and data science, and has served as the primary governance body for reviewing, clarifying, and validating risk model assumptions and methodological decisions throughout development of this WMP.

The RFG met twice weekly throughout spring and summer 2026, with sessions covering probability-of-failure modeling, mitigation effectiveness, unit costs, wildfire consequences, outage risk, program maturity and design/operational standards, and benefit-cost analysis, among others.

Liberty's new risk model includes an updated methodology for assessing PSPS outage risk. Specifically, Liberty monetizes the outage risk of a PSPS event using the latest version of the Berkeley Lab Interruption Cost Estimator ("ICE"), an industry-standard, peer-reviewed tool for estimating the economic cost of service interruptions to customers. This allows Liberty to

[22] Wildfire Mitigation Plan Guidelines, Office of Energy Infrastructure Safety, February 2025.

express PSPS risk in the same monetary units as wildfire risk, enabling a clear expression of overall utility risk as the sum of wildfire and outage program risk.

Liberty has reviewed its historical outage records and is deferring development of a detailed circuit-level PEDS outage-likelihood model to Liberty's 2028-2031 WMP submission next year. This additional time allows Liberty to identify a tractable approach for estimating PEDS outage risk with sparse PEDS-related outages. Liberty's Risk Assessment Improvement ("RAI") plan provides further detail and milestones for robust analysis of PEDS reliability risk.

Liberty's risk model outputs form the basis for benefit-cost analysis that Liberty uses to evaluate and prioritize grid hardening investments. Section 6 describes this benefit-cost methodology and the core results from Liberty's analysis.

Liberty's refreshed risk methodology relies on industry-recognized tools and practices, and Liberty's RFG conducted benchmarking analyses with peer utilities to form the basis of risk modeling assumptions. For example, Liberty's wildfire consequence modeling uses Technosylva's wildfire simulation platform and Liberty's probability-of-failure modeling implements machine-learning and predictive modeling best practices. In addition, Liberty follows Energy Safety's requirements in the overall model architecture of risk quantification, and Liberty follows CPUC guidelines for benefit-cost analysis.[23]

5.2 Risk Analysis Framework

In this section of the WMP, the electrical corporation must provide a high-level overview of its risk analysis framework. This includes a summary of key modeling assumptions, input data, and modeling tools used.

At a minimum, the electrical corporation must evaluate the impact of the following factors on the quantification of risk:

- **Equipment/Assets** (*e.g.*, type, age, inspection, maintenance procedures, etc.)
- **Topography** (*e.g.*, elevation, slope, aspect, etc.)
- **Weather** (at a minimum this must include statistically extreme conditions based on weather history and seasonal weather)
- **Vegetation** (*e.g.*, type/class/species/fuel model, canopy height/base height/cover, growth rates, moisture content, inspection, clearance procedures, etc.)

[23] Staff White Paper on Benefit-Cost Ratio Methodology, California Public Utilities Commission, CPUC Senate Bill 884 Application 26-02-005, April 2026.

- **Climate change** (*e.g.*, long-term changes in seasonal weather; statistical extreme weather; impact of change on vegetation species, growth, moisture, etc.) at a minimum, this must include adaptations of historical weather data to current and forecasting future climate
- **Social vulnerability** (*e.g.*, AFN, socioeconomic factors, etc.)
- **Physical vulnerability** (*e.g.*, people, structures, critical facilities/infrastructure, etc.)
- **Access capacities** (*e.g.,* limited access/egress, etc.)

5.2.1 Risk and Risk Component Identification

In this section, the electrical corporation must provide a brief narrative and one or more simple graphics describing the framework that defines its overall utility risk. At a minimum, the electrical corporation must define its overall utility risk as the comprehensive risk due to both wildfire risk and reliability risk across its service territory. This includes several likelihood and consequence risk components that are aggregated based on the framework shown in Figure 5-1 below. The following paragraphs define each risk component.

While the overall utility risk framework and associated risk components identified in Section 5.2 are the minimum requirements for determining overall utility risk, the electrical corporation may elect to include additional risk components as needed to better define risk for its service territory. Where the electrical corporation identifies additional terms as part of its risk framework, it must define those terms. The electrical corporation must include a schematic demonstrating its adopted risk framework, including any components beyond minimum requirements.

Overall utility risk is broken down into two individual hazard risks:

- **Wildfire risk**: The total expected annualized impacts from ignitions at a specific location. This considers the likelihood that an ignition will occur, the likelihood the ignition will transition into a wildfire, and the potential consequences—considering hazard intensity, exposure potential, and vulnerability—the wildfire will have for each community it reaches.
- **Outage program risk**: The measure of reliability impacts from wildfire mitigation related outages at a given location.

There are a minimum of eleven intermediate risk components:

- **Wildfire likelihood**: The total anticipated annualized number of fires reaching each spatial location resulting from utility-related ignitions at each location in the electrical corporation service territory. This considers the ignition likelihood and the

likelihood that an ignition will transition into a wildfire based on the probabilistic weather conditions in the area.

- **Ignition likelihood**: The total anticipated annualized number of ignitions resulting from electrical corporation-owned assets at each location in the electrical corporation's service territory. This considers probabilistic weather conditions, type and age of equipment, and potential contact of vegetation and other objects with electrical corporation assets. This includes the use of any method used to reduce the likelihood of ignition. For example, the use of protective equipment and device settings (PEDS) to reduce the likelihood of an ignition upon an initiating event.
- **Wildfire consequence**: The total anticipated adverse effects from a wildfire on each community it reaches. This considers the wildfire hazard intensity, the wildfire exposure potential, and the inherent wildfire vulnerabilities of communities at risk (see definitions in the following list).
- **PSPS risk**: The total expected annualized impacts from PSPS at a specific location. This considers two factors: (1) the likelihood a PSPS will be required due to environmental conditions exceeding design conditions, and (2) the potential consequences of the PSPS for each affected community, considering exposure potential and vulnerability.
- **PSPS likelihood**: The likelihood of an electrical corporation requiring a PSPS given a probabilistic set of environmental conditions.
- **PSPS consequence**: The total anticipated adverse effects from a PSPS for a community. This considers the PSPS exposure potential and inherent PSPS vulnerabilities of communities at risk (see definitions in the following list).
- **PEDS outage risk**: The total expected annualized impacts from PEDS enablement at a specific location.
- **PEDS outage likelihood**: The likelihood of an outage occurring while increased sensitivity settings on a protective device are enabled at a specific location given a probabilistic set of environmental conditions.
- **PEDS outage consequence**: The total anticipated adverse effects from an outage occurring while increased sensitivity settings on a protective device are enabled at a specific location, including reliability and associated safety impacts.

There are a minimum of nine fundamental risk components:

- **Equipment caused ignition likelihood**: The likelihood that electrical corporation-owned equipment will cause an ignition either through normal operation (such as arcing) or through failure.

- **Contact from vegetation ignition likelihood**: The likelihood that vegetation will contact electrical corporation-owned equipment and result in an ignition.
- **Contact from object ignition likelihood**: The likelihood that a non-vegetative object (such as a balloon or vehicle) will contact electrical corporation-owned equipment and result in an ignition.
- **Burn likelihood**: The likelihood that a wildfire with an ignition point will burn at a specific location within the service territory based on a probabilistic set of weather profiles, vegetation, and topography.
- **Wildfire hazard intensity**: The potential intensity of a wildfire at a specific location within the service territory given a probabilistic set of weather profiles, vegetation, and topography.
- **Wildfire exposure potential**: The potential physical, social, or economic impact of wildfire on people, property, critical infrastructure, livelihoods, health, environmental services, local economies, cultural/historical resources, and other high-value assets. These may include direct or indirect impacts, as well as short- and long-term impacts.
- **Wildfire vulnerability**: The susceptibility of people or a community to adverse effects of a wildfire, including all characteristics that influence their capacity to anticipate, cope with, resist, and recover from the adverse effects of a wildfire (e.g., AFN customers, Social Vulnerability Index, age of structures, firefighting capacities).
- **PSPS exposure potential**: The potential physical, social, or economic impact of a PSPS event on people, property, critical infrastructure, livelihoods, health, local economies, and other high-value assets.
- **Vulnerability of community to PSPS (PSPS vulnerability)**: The susceptibility of people or a community to adverse effects of a PSPS event, including all characteristics that influence their capacity to anticipate, cope with, resist, and recover from the adverse effects of a PSPS event (e.g., high AFN population, poor energy resiliency, low socioeconomics).
- **PEDS outage exposure potential**: The potential physical, social, or economic impact of an outage occurring when PEDS are enabled on people, property, critical infrastructure, livelihoods, health, local economies, and other high-value assets.
- **PEDS outage vulnerability**: The susceptibility of people or a community to adverse effects of an outage occurring when PEDS are enabled, including all characteristics that influence their capacity to anticipate, cope with, resist, and recover from the related adverse effects (e.g., high AFN population, poor energy resiliency, low socioeconomics).

The electrical corporation must adopt these definitions for this section of the WMP. If the electrical corporation considers additional intermediate and fundamental risk components, it must define those components in this section as well.

Consistent with Energy Safety's WMP Guidelines, Liberty's revised risk model methodology organizes overall utility risk into two components: wildfire risk and outage program risk (see Figure 5-1). Overall utility risk, denominated in dollars, is calculated as the sum of wildfire and outage program risk. This reformulation of overall utility risk is directly responding to Revision Notice Critical Issue RN-LU-26-01.

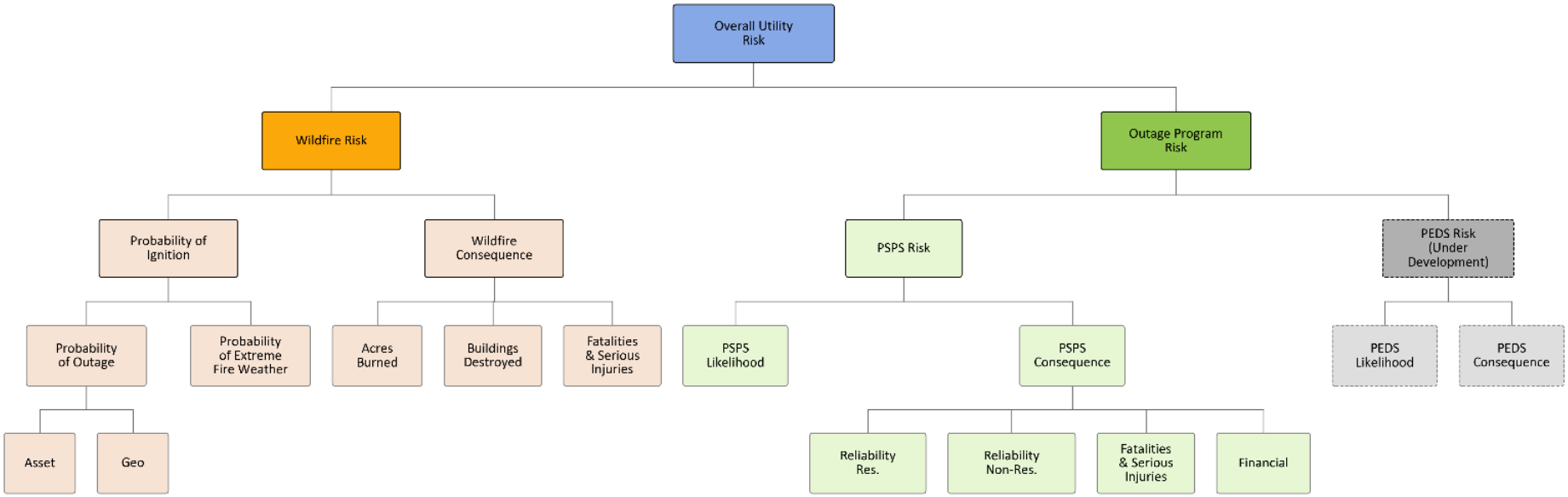
Wildfire risk is calculated as the product of ignition likelihood and potential wildfire consequences. To estimate ignition likelihood across Liberty's distribution and transmission assets, a machine-learning model is trained on four years of outage data, differentiating between cause codes associated with asset failure and geographic-related failures, such as vegetation contact. Outage probabilities are then combined with an analysis of extreme fire weather conditions in and around Liberty's service territory to identify ignitions most likely to spread into potentially catastrophic wildfires.

Wildfire consequence is assessed using Technosylva's wildfire simulation platform. Specifically, the potential economic losses associated with fatalities, serious injuries, acres burned, and structures destroyed are summed to form an estimate of wildfire consequence.

Outage program risk is primarily based on PSPS risk, also expressed as the product of likelihood and consequence. PSPS consequence monetizes the reliability impact of a PSPS event using the ICE calculator, differentiating supply interruptions by residential and non-residential customers. The risk model architecture in Figure 5-1 shows how PEDS risk will combine with PSPS risk to equal total outage program risk, as described in more detail in Liberty's RAI plan later in this section.

Unlike Liberty's prior risk-based decision-making (RBDM) framework, under which asset failure risk was calculated as a third risk component separate from wildfire and PSPS risk, Liberty's revised model architecture treats probability of asset failure as one component of ignition likelihood nested within wildfire risk.

Figure 5-1: Risk Model Architecture



5.2.2 Risk and Risk Components Calculation

The electrical corporation must calculate each risk and risk component defined in Section 5.2.1. Additional requirements for these calculations are located in Appendix B "Calculation of Risk and Risk Components." These are the minimum requirements and are intended to establish the baseline evaluation and reporting of all electrical corporations.

If the electrical corporation includes additional risk components in its calculation, it must report each of those components in its WMP in a similar format. The electrical corporation must list all risk model components it identifies as uncertain and disclose if this uncertainty is assessed using probability distributions, expected values, or percentiles. The electrical corporation must describe how probability distributions are stored and how coherence is maintained. For each uncertain component that is not assessed using probability distributions, the electrical corporation must explain why probability distributions are not used and justify its elected assessment method.

The electrical corporation must provide schematics illustrating the calculation of each risk and risk component as necessary to demonstrate the logical flow from input data to outputs, including separate items for any intermediate calculations. Figure 5-2 provides an example of a calculation schematic for the equipment likelihood of ignition.

The electrical corporation must summarize any differences between its calculation of these risk components and the requirements of these Guidelines. These differences may include any of the following:

- **Additional input parameters** beyond the minimum requirements for a specific risk component
- **Calculations of additional outputs** beyond the minimum requirements for a specific risk component
- **Calculations of additional risk components** defined by the electrical corporation in Section 5.2.1

The process used to combine risk components must be summarized for each relevant risk component. This process must align with the requirements in the most recent CPUC decision governing Risk Assessment and Mitigation Phase (RAMP) filings. If the electrical corporation uses scaling factors (such as multi-attribute value functions [MAVFs] or representative cost), it must present a table with all relevant information needed to understand this procedure (including each scaling factor used, the value of the scaling factor, how it is utilized, an explanation of its purpose, and a justification for the value chosen). The electrical corporation

must organize this discussion into the following two subsections focusing on likelihood and consequence.

5.2.2.1 Likelihood of Risk Event

The electrical corporation must discuss how it calculates the likelihood that its equipment (through normal operations or failure) will result in a wildfire and the likelihood of issuing an outage event. The risk components discussed in this section must include at least the following:

- Ignition likelihood
    - Equipment failure likelihood of ignition
    - Contact from vegetation likelihood of ignition
    - Contact from object likelihood of ignition
- Burn likelihood
- PSPS likelihood
- PEDS outage likelihood

Ignition Likelihood

Liberty's ignition likelihood metric, developed with FEP, is calculated approximately as:

$$P_{\text{ignition}}(i) \approx P_o(i) \times P_{EFW}(i)$$

Where:

- P_{ignition}: is the probability of an ignition at circuit *i*
- $P_o(i)$: the probability of outage at circuit *i*
- $P_{EFW}(i)$: the probability of extreme fire weather

More detail on the underlying calculation is shown in Figure 5-7 and the accompanying set of equations, discussed further in the section.

Probability of Outage

Compiling the outage dataset to train the model

Liberty's probability of outage model estimates the likelihood that an unplanned outage occurs on a given circuit. The model is trained on four years of historical outage records (January 1, 2022 – December 31, 2025), producing an initial dataset of approximately 3,400 outage records, as well as the system configuration and investments made, *i.e.*, areas of covered conductor installed.

Liberty's raw outage records include cause and sub-cause values entered by field and operations personnel. Due to inconsistencies and the nature of entry in the field, Liberty reviewed original cause and sub-cause combinations to produce a clean dataset for model training. In many cases, the provided cause and sub-cause were sufficient to directly map the outage event to a driver and sub-driver. In other cases, Liberty conducted targeted reviews of the comments field in the outage records to validate and assign an appropriate driver and sub-driver. For example, records with an initial "unknown" or "other" cause were reviewed to determine if the comments field could provide greater detail regarding the cause. In another example, an outage record's cause was mislabeled as "equipment corrosion" when the comments field indicated a large tree as the actual cause, with no underlying equipment health issues.

As shown in LU Table 5-1, each outage event is classified along the following three dimensions: risk driver, sub-driver, and cause. The risk driver class primarily consists of asset-related failures and geographic-related failures. The asset class captures outages primarily attributable to Liberty's equipment and infrastructure, such as failure and degradation of equipment. The geographic class describes outages primarily attributable to exposure of Liberty's infrastructure to environmental conditions, *e.g.*, vegetation contact or lightning.

LU Table 5-1: Taxonomy of Outage Causes

Driver	**Sub-Driver**	**Cause Description**
Asset	Third-Party Contact	• Contact from public • Contractors • Inanimate objects
Asset	Animal Contact	• Animal-initiated contact with energized equipment or conductor
Asset	Equipment Failure	• Hardware • Conductor • Connector • Transformer • Fuse
Asset	Vehicle Contact	• Vehicle contact with pole • Conductor • Guy wire
Asset	Asset Other	• Other known asset-related outage
Geo	Snow / Ice	• Snow loading • Ice loading • Snow shed

Driver	Sub-Driver	Cause Description
		• Ice-related asset impact
Geo	Vegetation	• Tree • Limb • Grow-in • Fall-in • Other vegetation contact with conductor or equipment
Geo	Weather (other)	• Lightning • Rain • Flooding
Geo	Wind	• Wire slap • Wind-driven conductor contact • Object-blow in

After reviewing and classifying outage records, Liberty drops planned outages, outages resulting from loss of supply from NV Energy, and remaining outages with unknown causes from the dataset. Liberty drops these records because the intent of the probability of outage model is to capture the likelihood of wildfire risk events, to which a planned outage is unlikely to contribute.

Liberty then aggregates outage records to the circuit, driver, and sub-driver level, a summary of which is shown in Figure 5-2. Equipment-related outages make up the largest share of outages in the cleaned and aggregated dataset, followed by vegetation, which includes fall-in and grow-in contact. Although snow-related causes contribute a large share of Liberty's outages due to significant annual snowfall in parts of the service territory, these outages contribute minimally to Liberty's estimated wildfire risk. The analysis of extreme fire weather conditions and ignition likelihood is described in the next subsection.

Figure 5-2: Distribution of Outage Causes

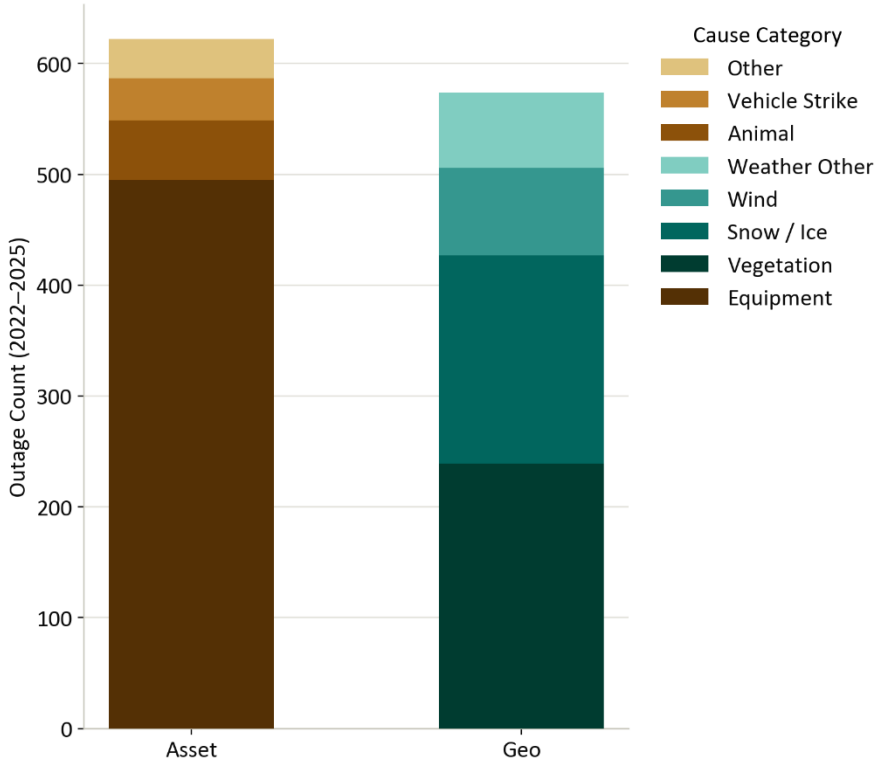


Figure Notes: Third-party contact is combined with "other" category under asset failures for conciseness.

In addition to outage records on Liberty's distribution system, Liberty includes lockout and operation logs from its transmission circuits. Transmission outages are not classified according to the same asset-related or geographic-related taxonomy because the available transmission records lack sufficient detail for a consistent driver and sub-driver classification. Transmission outages typically occur during winter months, and Liberty has identified further investigation into transmission risk sub-drivers as an opportunity item in Liberty's RAI plan.

Model Specification

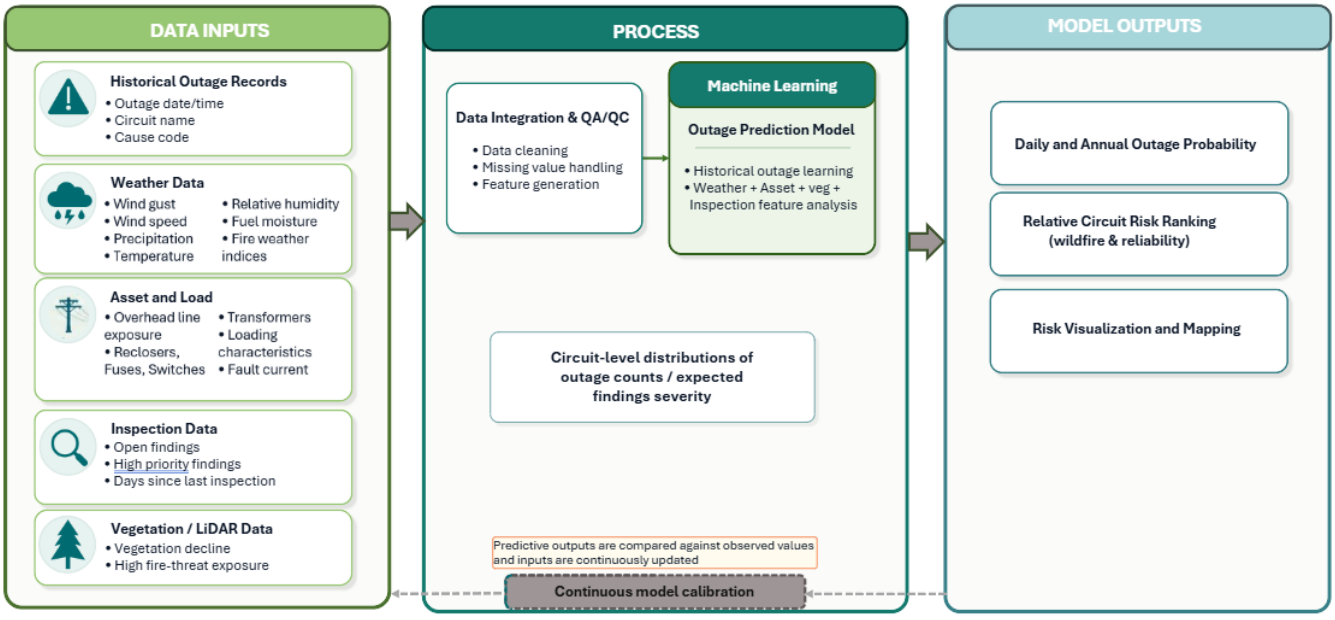
Liberty, in collaboration with FEP, developed two functional approaches to estimating outage likelihood before selecting a primary model. The first approach is a machine-learning model, and several candidate algorithms were evaluated, including Random Forest, Light Gradient Boosting (LightGBM), and Extreme Gradient Boosting (XGBoost). The second approach is a top-down statistical approach, called a Bayesian State-Space model. By approaching the probability of outage modeling from two different models, Liberty can compare where the models align in terms of estimated outage likelihood, providing confidence in model outputs and identifying areas for improvement. Ultimately, the machine-learning model was selected due to its ability to capture nonlinear interactions among model features, which is an important consideration

when modeling failures in electric distribution systems. Because the Bayesian State-Space model is not currently used to produce final monetary estimates of overall utility risk, a description of the methods is provided in Appendix B.

Liberty's primary probability of outage model is a gradient-boosted decision tree (LightGBM), trained on a rich set of weather data, asset and load characteristics, inspection data, and vegetation encroachment from LiDAR data (Figure 5-3). The model is fed a balanced sample of positive circuit-day outage records and negative circuit-day outage records (*i.e.*, the training dataset has an equal number of circuit-days with outages to circuit-days without outages). Feeding the model a balanced training set is critical because days with an outage are relatively infrequent compared to non-outage days.

Liberty uses a five-fold cross-validation approach, where the training dataset is split into five folds, and each fold is shown 80% of the fold for training and 20% of the fold reserved for testing and validation. Because the overall training dataset is artificially balanced (50/50 outage to non-outage circuit-days), the fitted model probabilities must be rescaled to reflect true historical outage rates. Liberty calculates circuit-specific scaling factors as the ratio of true historical daily outages to the model's mean predicted probability for each circuit.

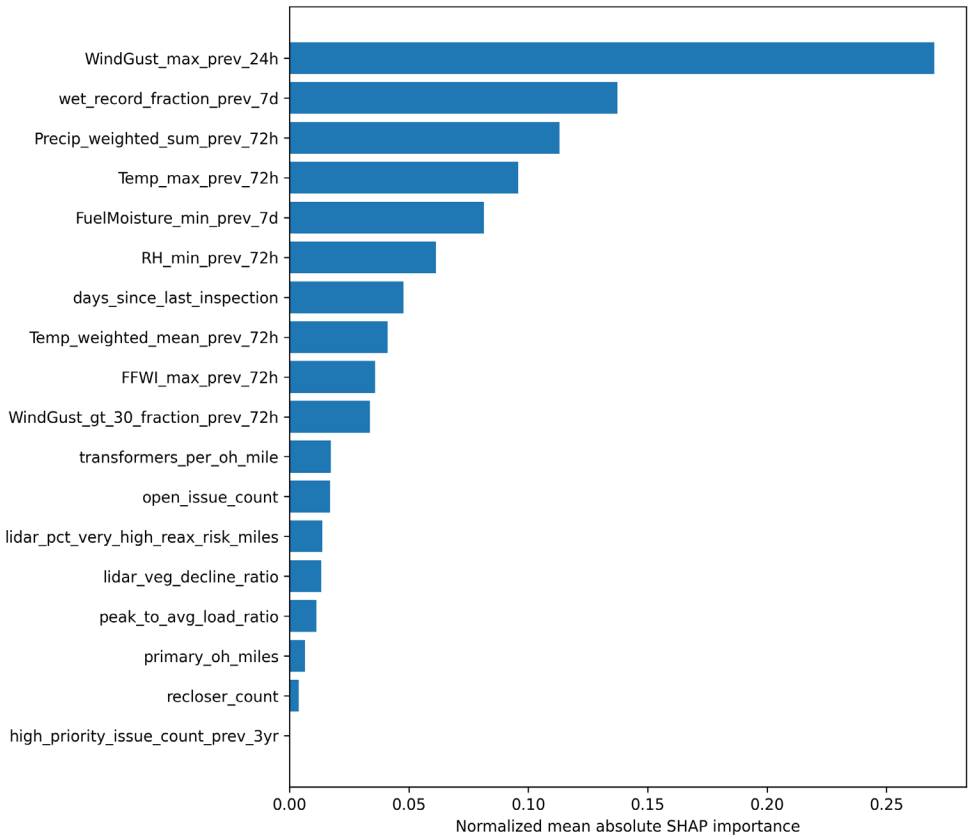
Figure 5-3: Schematic of Liberty's Probability of Outage Model



In terms of feature importance, the model finds that maximum wind gust in the previous 24 hours is the leading predictor of an outage among Liberty's circuits. This aligns with academic

studies that identify extreme winds as a major driver of outage and wildfire risk.[24,25] Other weather-related variables perform highly in Liberty's probability of outage model, including maximum temperature, minimum relative humidity, and minimum fuel moisture. Asset and inspection-related variables, such as the number of days since the last inspection and the number of transformers per overhead mile, perform moderately well as predictors.

Figure 5-4: Feature Importance in the Probability of Outage Model



Liberty's probability of outage model is evaluated using standard machine-learning validation techniques, including the area under the receiver operating characteristic curve ("AUC"), a confusion matrix, and a scatter plot of predicted outages against actual outages. Overall, the model produces an AUC value of 0.69, which indicates that the model demonstrates meaningful predictive skill, while still falling short of exceptional performance. In comparison, PG&E reports

[24] Yao, Mengqi, Meghana Bharadwaj, Zheng Zhang, Baihong Jin, and Duncan S. Callaway. "Predicting electricity infrastructure induced wildfire risk in California." *Environmental Research Letters* 17, no. 9 (2022): 094035.
[25] Abatzoglou, John T., Jennifer K. Balch, Bethany A. Bradley, and Crystal A. Kolden. "Human-related ignitions concurrent with high winds promote large wildfires across the USA." *International journal of wildland fire* 27, no. 6 (2018): 377-386.

AUC values for several of its outage prediction models and finds AUC values ranging from 0.76 – 0.83 for vegetation contact and 0.56 – 0.87 for equipment-related failures.[26]

The confusion matrix breaks out how well the model performs in terms of its predicted outage observations against the actual outage events (LU Table 5-2). The lower right quadrant shows that the model correctly recalls 61% of the actual outage events in the dataset and that its overall accuracy is 62% when considering both outage and non-outage circuit days.

LU Table 5-2: Confusion Matrix for Probability of Outage Model

		Model Prediction	
		No Outage	*Outage*
Actual Event	*No Outage*	648	378
	Outage	408	638

When aggregated up from the circuit-day level to the circuit-year level, the model performs meaningfully well at identifying circuits with the greatest outage rates. The scatterplot in Figure 5-5 tracks closely to the superimposed 45 degree line, indicating that the model's prediction of outage counts per year closely tracks the historical data.

[26] Distribution Event Probability Models Version 4 (DEPM v4) Documentation, PG&E, 2025.

Figure 5-5: Historical vs. Predicted Outages Per Year

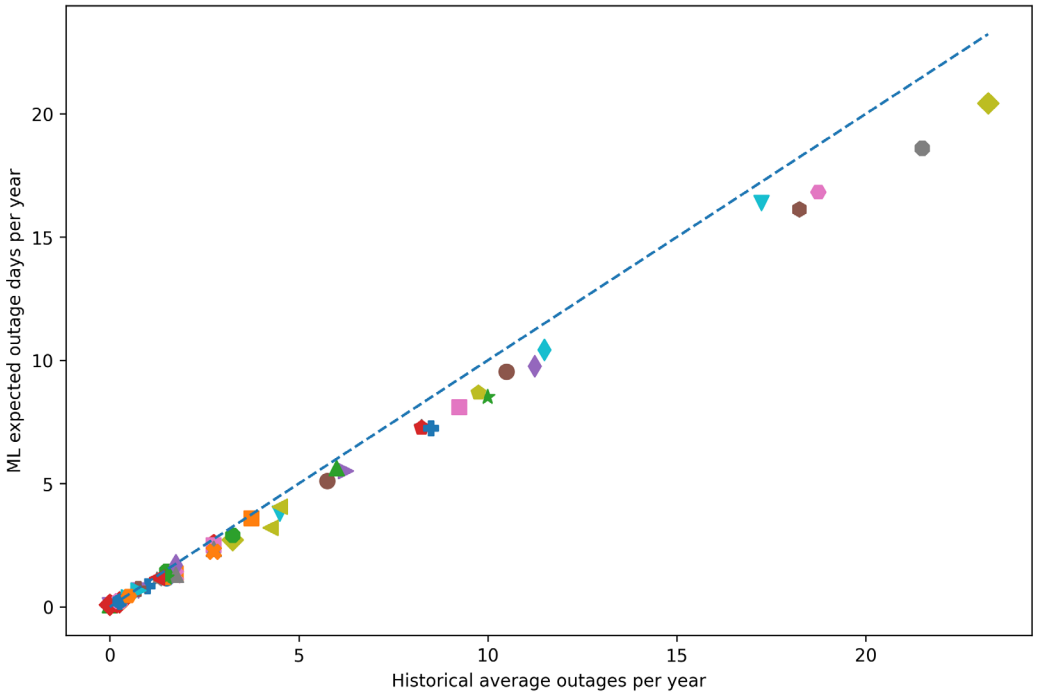


Figure Notes: Each point represents one of Liberty's distribution or transmission circuits.

Liberty's probability of outage model does not produce a metric of uncertainty, such as a confidence interval, unlike a more conventional regression-based predictive model. Rather, the probability of outage model produces point estimates based on averages of the best-performing model within each of the five training and testing folds. Uncertainty and sensitivity analysis is separately addressed through parameter uncertainty related to key assumptions, such as the costs and effectiveness of mitigations. To fully address model uncertainty, the risk model would generate separate estimates of outage probabilities using different machine-learning models, such as extreme gradient boosting and random forest, and then input those alternative probability estimates into the overall risk model and observe how wildfire risk and overall utility risk changes. However, this is outside the scope of Liberty's current risk methodology.

Probability of Extreme Fire Weather

Liberty's probability of outage model estimates how likely a circuit is to experience an outage, but many of Liberty's outages occur during mild weather conditions or winter months when snow cover limits fire spread. To identify outages that pose potential wildfire risk to Liberty and its service territory, Liberty conditions outage probability using an extreme fire weather ("EFW") threshold, as shown previously in the ignition likelihood formula.

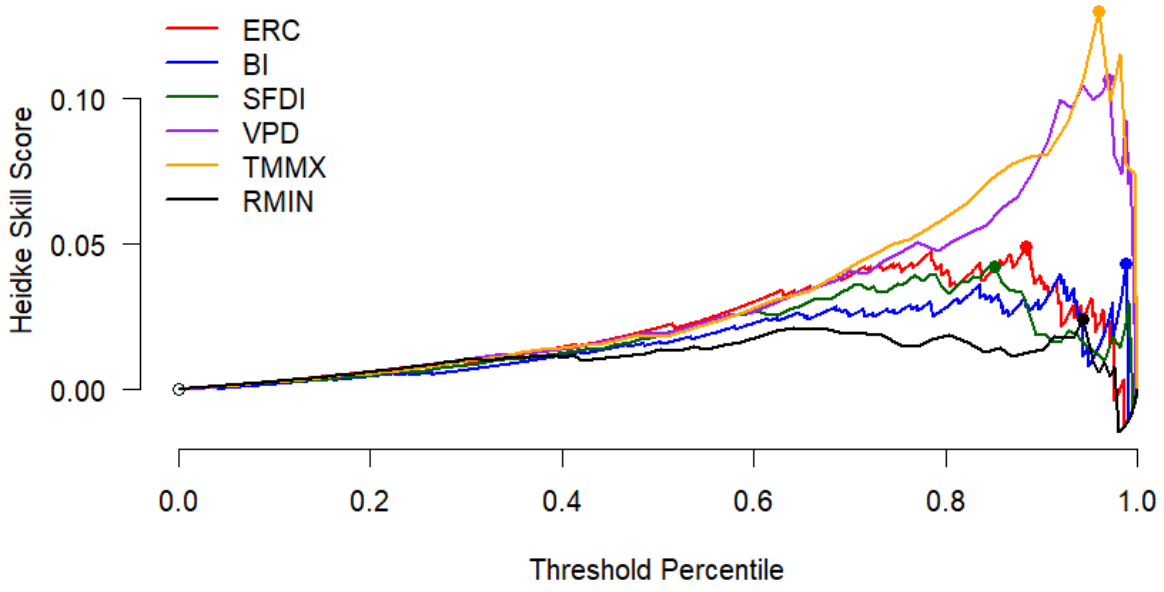
Liberty defines the EFW threshold as vapor pressure deficit ("VPD") greater than or equal to two kilopascals and maximum wind gust greater than or equal to 50 miles per hour, occurring simultaneously.

Liberty derived the VPD component of the EFW threshold through a statistical analysis of daily weather conditions across Liberty's service territory. The analysis compared gridded meteorological data from GRIDMet over a twelve-year period (2013-2024) against actual wildfire events that burned 5,000 or more acres within 100 miles of Liberty's service territory. Five candidate fire-weather indicators—VPD, energy release component ("ERC"), burning index, maximum daily temperature, and minimum relative humidity—were evaluated using the Peirce Skill Score and the Heidke Skill Score to identify which variable and threshold produced the best fit in terms of high-fire risk days (Figure 5-6).

While maximum temperature performed marginally better than VPD, VPD was selected because it directly represents the atmospheric moisture demand that causes fuels to dry.[27] Temperature and VPD are highly correlated (0.94 correlation), so the choice of either variable would yield similar results. The 2 kPa threshold value reflects the value that optimizes the prediction of extreme fire weather conditions based on historical fires.

[27] Abatzoglou, J.T., Battisti, D.S., Williams, A.P. *et al.* Projected increases in western US forest fire despite growing fuel constraints. *Commun Earth Environ* **2**, 227 (2021).

Figure 5-6: Fire Weather Threshold Testing and Performance



The wind gust component of Liberty's EFW definition was derived differently. Rather than being statistically fit against historical fires, the 50-mph threshold was informed by a review of wind conditions present during Liberty's own historical PSPS events. Liberty considers this an appropriate basis for the wind component of EFW, recognizing nonetheless that extreme wildfires may occur at wind speeds less than 50 mph.

Liberty's analysis of historical fires that are within 100 miles of Liberty's service territory includes fires that reflect similar fire regimes, ecology, terrain, and suppression availability. Liberty continues to refine this methodology, as noted in Liberty's RAI plan.

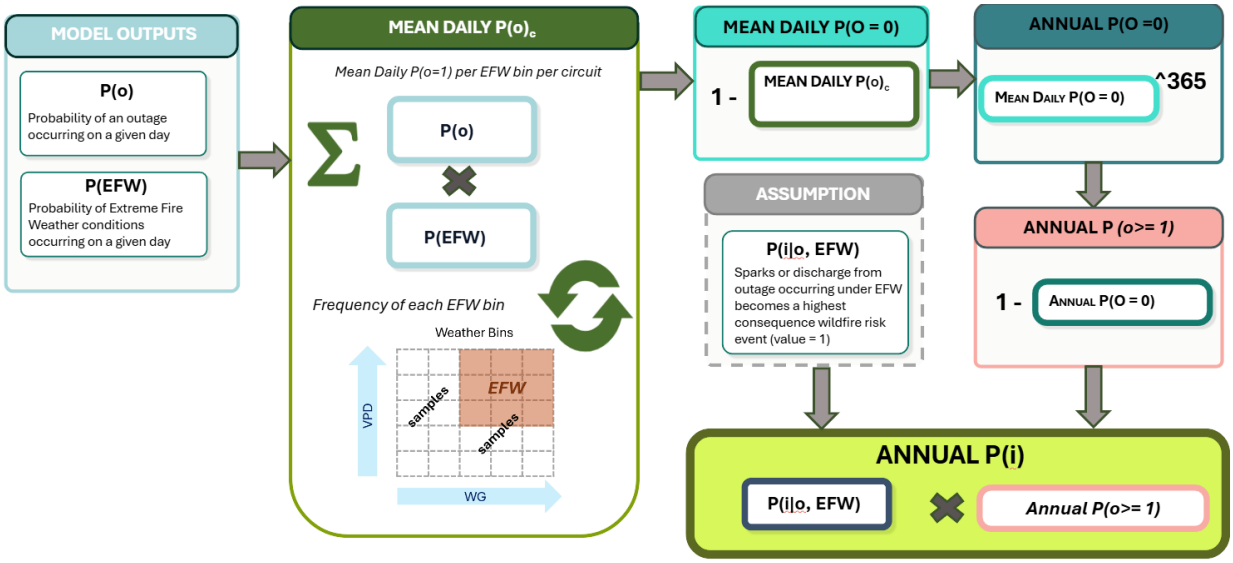
Combining Probability of Outage and Probability of Extreme Fire Weather

For each circuit, Liberty's daily and annual outage probability is intersected with fire weather conditions meeting the EFW threshold. This intersection forms the basis for Liberty's estimate of circuit-level ignition likelihood. In other words, Liberty estimates that any predicted outage occurring under EFW-defined conditions would ignite a wildfire.

Currently, this approach reflects a modeling assumption because ignition likelihood and burn likelihood are compressed into a single term through the use of the EFW threshold. Liberty does not calculate these two risk components separately. Because Liberty does not yet have a

sufficiently mature ignition dataset to support an empirical ignition model, Liberty instead uses the intersection of outage probability and EFW conditions to estimate ignition rates.

Figure 5-7: Calculating Ignition Likelihood



In practice, Liberty calculates each circuit's mean daily probability of an outage occurring under specific weather bins, defined using a matrix of VPD and wind gust. Liberty then weighs each bin in the matrix by how frequently it occurs in the circuit's historical weather records. This yields a mean daily outage probability conditional on EFW, which is then converted to an annual probability. The mechanics of the calculation are shown in Figure 5-7 and detailed in the set of equations below:

$$\bar{P}_o^{EFW}(i) = \sum_{b \in B_{EFW}} f_i(b)\, P_o(i,b)$$

$$P_{\geq 1}^{EFW}(i) = 1 - [1 - \bar{P}_o^{EFW}(i)]^{365}$$

$$P_{\text{ignition}}(i) = P_{\geq 1}^{EFW}(i)$$

Where:

- *i:* circuit
- *b*: a weather bin that is a combination of wind-gust and VPD, and B_{EFW} are the bins included in the EFW threshold (VPD $\geq$ 2 kPa and wind gust $\geq$ 50 mph)
- $f_i(b)$: the historical frequency that circuit *i* experiences weather bin *b*
- $P_o(i,b)$: the modeled probability of an outage averaged over all circuit-day samples given weather bin b

- $\bar{P}_o^{EFW}(i)$: circuit *i* mean daily outage probability, conditional on EFW occurrence and weighted by the frequency of each annual EFW bin
- $P_{\geq 1}^{EFW}(i)$: annual probability of one or more outages occurring under EFW conditions on circuit *i*
- $P_{\text{ignition}}(i)$: the annual probability of ignition on circuit *i* which directly equals the probability of one or more outages occurring under EFW conditions, as discussed earlier

PSPS likelihood:

Liberty expresses PSPS likelihood as the annual frequency that a circuit is expected to experience a PSPS event. Liberty's current risk model incorporates PSPS likelihood by modeling an expected number of PSPS events per circuit per year. This expression of expected PSPS events per year is differentiated coarsely by each circuit's estimated wildfire risk: the top ten highest risk circuits in terms of aggregate risk receive a likelihood value of 1.0 PSPS events per year and the remaining circuits receive a likelihood value of 0.5 PSPS events per year.

Liberty acknowledges that this approach to PSPS likelihood is a coarse approximation. However, by separating Liberty's circuits into tiers to determine PSPS likelihood, Liberty's risk model is able to reflect that historically PSPS events have been concentrated on a small sample of circuits, namely Topaz 1202 and Muller 1296.

Liberty plans to refine PSPS likelihood toward a probabilistic, circuit-specific (or circuit segment) model in the next WMP cycle (see RAI plan). Liberty's prior Direxyon/DRAT model defined PSPS likelihood for SRP-equipped feeders using a Fosberg Fire Weather Index ("FFWI") greater than 50 and wind gust greater than 50 mph. Using this type of parameter combination to define PSPS likelihood or relying on the historical distribution of VPD and wind speed used to define EFW conditions represent tractable approaches going forward to refine this model component.

PEDS likelihood:

In the current scope of Liberty's 2027 WMP Risk Model, Liberty does not quantify PEDS outage likelihood. The availability of historical data from Liberty's SRP program is not sufficient to fit an empirical PEDS likelihood model. Liberty has identified development of a PEDS risk model, including the likelihood component, as a high-priority opportunity in the RAI plan.

For additional context on the availability of SRP data, Liberty customers experienced two SRP-related outages in 2024 and five SRP-related outages in 2025. Five of the seven outages were concentrated on one circuit, making it difficult to specify a service territory estimate of PEDS outage likelihood. Looking ahead, Liberty will prioritize a data-driven approach to quantifying PEDS likelihood. However, Liberty may need to rely on coarser estimates of PEDS likelihood, as

is the case with PSPS currently, given the limited historical dataset. Opportunities likely include broadening the historical dataset to alternative types of PEDS-related outages, such as outages during Liberty's fire-season operating mode in which reclosing attempts are limited. In addition, pursuing disciplined QA/QC on outage records and field personnel training to drive at higher confidence estimates of PEDS is part of Liberty's RAI plan.

5.2.2.2 Consequence of Risk Event

The electrical corporation must discuss how it calculates the consequences of a fire originating from its equipment and the consequence of implementing an outage event. The risk components discussed in this section must include at least the following:

- Wildfire consequence
- Wildfire hazard intensity
- Wildfire exposure potential
- Wildfire vulnerability
- PSPS consequence
- PSPS exposure potential
- PSPS vulnerability
- PEDS outage consequence
- PEDS outage exposure potential
- PEDS outage vulnerability

Wildfire consequence:

Liberty's wildfire consequence estimates are derived from Technosylva's Wildfire Analyst platform. Liberty subscribes to three Technosylva applications: FireSight for long-term planning, FireRisk for situational awareness, and Wildfire Ops, which is a newer situational awareness application for forecasting and monitoring wildfire risk. For risk model development, Liberty primarily relies on outputs from FireSight, and Liberty has used these outputs for risk modeling purposes since the 2023-2025 WMP cycle.

The key wildfire consequence outputs Liberty relies upon from Technosylva are acres burned, population impacted, and structures destroyed. Liberty's current risk model uses the circuit level as its unit of analysis for wildfire consequence. Liberty has recently received updated Technosylva consequence estimates at a more granular zonal level for its circuits. However, the current risk model remains at the circuit level.

Use of Technosylva's 100th percentile scenario

Wildfire consequence typically follows a right-tailed distribution in which a small number of events occurring under extreme conditions account for most losses. Thus, Liberty's risk model uses the 100th percentile Technosylva consequence scenario as an input, rather than a median or lower percentile scenario. It is worth underscoring that this is a conditional value; Liberty's risk model does not assume all outages lead to 100th percentile wildfire consequences. The ignition likelihood component of Liberty's risk model establishes how often an outage coincides with EFW conditions. In other words, when an outage occurs at a circuit and it coincides with relatively infrequent EFW conditions, then Liberty attributes the circuit's 100th percentile wildfire consequences as modeled by Technosylva to that outage.

Several challenges emerge from this approach. First, the binary nature of the model could be improved through a more probabilistic approach. For example, rather than assuming an outage either leads to 100th percentile wildfire consequences or zero consequences, a probabilistic approach would allow the risk model to assign 99th percentile consequences, 95th percentile consequences, and so forth based on the degree of fire weather conditions.

Second, the circuit-level granularity of the risk model ignores the heterogeneity in potential consequences along a circuit. The topography and fuels around one part of a Liberty circuit may produce different 100th percentile consequence estimates from another portion of the same circuit. By moving to the zonal level, Liberty's risk model can better capture the variation in consequences along a circuit.

Third, a central challenge of Technosylva's 100th percentile scenario is that simulated fire sizes are substantially smaller than Liberty's own historical loss experience. This challenge is foundational to the risk model, and it is likely attributed to the eight-hour simulation duration of Technosylva's wildfire products.

Calibrating consequence estimates with empirical losses

A benchmarking analysis compared Technosylva's simulated fire sizes against two public wildfire models—the USFS Wildfire Risk to Communities dataset and CAL FIRE's statewide risk assessment—using historical CAL FIRE incident data (1990-2024) as the ground-truth reference for fire sizes within Liberty's service territory. The benchmarking analysis found that the USFS and CAL FIRE approximated the historical distribution of fires within Liberty's service territory, but that the Technosylva outputs underpredicted acres burned and structures destroyed. The difference is likely attributable to the eight-hour simulation duration constraint in the Technosylva modeling framework, which limits the representation of extended-duration

wildfire growth and is not a constraint present in the USFS or CAL FIRE simulation datasets. The benchmarking analysis can be found in Appendix B.

To correct for the underprediction, Liberty applies a scaling factor to monetized wildfire consequences. Liberty calculates the scaling factor using the set of wildfires within 100 miles of Liberty's service territory and destroying at least 90 structures, inclusive of the Mountain View Fire (LU Table 5-3). Each historical fire's loss was monetized using the consequence parameters (structures destroyed, acres burned, and fatalities) discussed in the following section, and the resulting monetized loss estimates were compared against monetized estimates using Technosylva consequence outputs.

LU Table 5-3: Estimated Historical Wildfire Losses Within 100 Miles of Liberty's Service Territory

		Count				Monetized ($ millions) Using Liberty's Consequence Parameters				
Year	**Fire Name**	**Buildings Destroyed**	**Acres Burned**	**Fatalities**		**Buildings Destroyed**	**Acres Burned**	**Fatalities**	**Total**	**Log Total**
2018	Camp	18,804	153,336	85		$18,804	$358	$1,394	$20,556	10.3
2021	Dixie	1,311	963,309	0		$1,311	$2,250	$0	$3,561	9.6
2020	North Complex	2,352	318,935	16		$2,352	$745	$262	$3,359	9.5
2020	Creek	858	379,895	0		$858	$887	$0	$1,745	9.2
2024	Park	713	429,603	0		$713	$1,004	$0	$1,717	9.2
2021	Caldor	1,005	221,835	0		$1,005	$518	$0	$1,523	9.2
2015	Butte	928	70,868	2		$928	$166	$33	$1,126	9.1
2013	Rim	112	257,314	0		$112	$601	$0	$713	8.9
2017	Detwiler	134	81,826	0		$134	$191	$0	$325	8.5
2017	Cascade (Wind Complex)	264	9,989	0		$264	$23	$0	$287	8.5
2022	Oak	194	19,244	0		$194	$45	$0	$239	8.4
2018	Donnell	135	36,450	0		$135	$85	$0	$220	8.3
2021	River	154	9,656	0		$154	$23	$0	$177	8.2
2020	Mountain View	97	20,385	1		$97	$48	$16	$161	8.2
2017	Wall	93	6,033	0		$93	$14	$0	$107	8.0

Table Notes: Liberty's consequence parameters used to monetize losses are provided and discussed in the following section. Wildfires in the table occurred within 100 miles of Liberty's service territory and destroyed at least 90 structures. The threshold of 90 structures destroyed reflects catastrophic wildfire losses and is inclusive of the Mountain View Fire that occurred within Liberty's service territory.

Average log monetized losses in LU Table 5-4 are then compared to the same metric using the 100th percentile simulation outputs from Technosylva at the circuit level. Structures destroyed and acres burned are direct simulation outputs. However, fatalities are estimated using a proxy ratio discussed in the following section. Average log monetized losses using the Technosylva model outputs are approximately 7.1, leading to the calculation of the scaling factor:

$$\text{Scaling factor} = \frac{\text{Empirical Log Monetized Losses}}{\text{Simulated Log Monetized Losses}} = \frac{8.9}{7.1} = 1.26$$

Monetizing wildfire consequences

Liberty's risk model approximates the economic losses associated with Technosylva's wildfire consequence outputs by applying a set of monetary parameters. To derive these monetary consequence parameters, Liberty conducted a benchmarking analysis of California IOUs. Liberty selected the following monetary consequence parameters based on the results of the benchmarking analysis, and rationales for each selection are provided below.

LU Table 5-4: Wildfire Monetary Consequence Parameters

Category	Consequence	Units	Value
Financial	Structures Destroyed	$/Building	$1,000,000
Financial	Suppression Cost	$/Acre Burned	$876
Financial	Restoration Cost	$/Acre Burned	$1,460
Safety	Fatalities	$/Fatality	$16,500,000
Safety	Fatalities	Fatality/Building Destroyed	1/256
Safety	Serious Injuries	$/Serious Injury	$4,125,000
Safety	Serious Injuries	Serious Injury/Building Destroyed	1/107

A key financial component of wildfire risk is structure loss. Liberty's benchmarking analysis found that the three largest California IOUs all apply the same valuation parameter to structures destroyed. In a consistent manner, Liberty adopts the same parameter to value

structure losses: $1,000,000 per structure destroyed.[28,29,30] This assumed value will be updated in future model versions to reflect changes in structure costs or new analyses of financial losses stemming from catastrophic wildfires.

Liberty's risk model also values the economic losses associated with acres burned through a restoration cost component and a suppression cost component. Liberty relies on the benchmarking analysis of peer utilities to define this parameter. Specifically, Liberty cites SCE's parameter values of $876 and $1,460 per acre burned for suppression and restoration costs, respectively. This yields a total economic loss per acre burned of $2,336.

SCE's suppression cost component is based on a five-year average of reported wildfire suppression costs from 2016-2020, and it aligns with SDG&E's cost per acre burned of $2,350. PG&E cites a lower cost per acre burned of $1,175, but it does not feature a restoration cost component. Liberty ultimately relies on SCE's parameter values because the clearest documentation was provided into the assumed value. Going forward, Liberty can refine this estimate by a specific analysis of historical suppression and restoration costs near its service territory.

In terms of wildfire consequences related to safety, Liberty monetizes the potential economic losses associated with estimated fatalities and serious injuries. Consistent with CPUC Decision 22-12-027, which requires large California IOUs to use the most current published U.S. Department of Transportation value of statistical life ("VSL"), Liberty applies a value of $16.5 million per fatality. This parameter value reflects a California-adjusted VSL that accounts for income and cost-of-living effects in the DOT methodology. The parameter value of $16.5 million falls within the range reported by PG&E, SCE, and SDG&E ($16.2 million - $16.6 million). To value the economic losses associated with serious injuries, Liberty applies one-quarter of the California-adjusted VSL, consistent with CPUC Decision 22-12-027.

Estimating the fatalities and serious injuries component of a wildfire risk model is inherently challenging, primarily due to the limited occurrence of wildfire-related fatalities. Through the benchmarking analysis, Liberty finds that California utilities apply constant ratios that express expected fatalities and serious injuries as a function of structures destroyed. These constant ratios are typically calculated by summing up total fatalities and total structures destroyed for a set of historical fires and expressing them as an average fatality per structure rate. In practice, fatalities and serious injuries are likely a function of advance warning ahead of a wildfire, egress

[28] 2026-2028 Wildfire Mitigation Plan, Southern California Edison, May 2025
[29] Wildfire Consequence Model Version 4 (WFC v4) Documentation, PG&E, 2025
[30] 2026-2028 Wildfire Mitigation Plan, San Diego Gas & Electric, September 2025

capacity, age and mobility of the impacted population, and wildfire hazard characteristics, such as rate of spread and flame length.

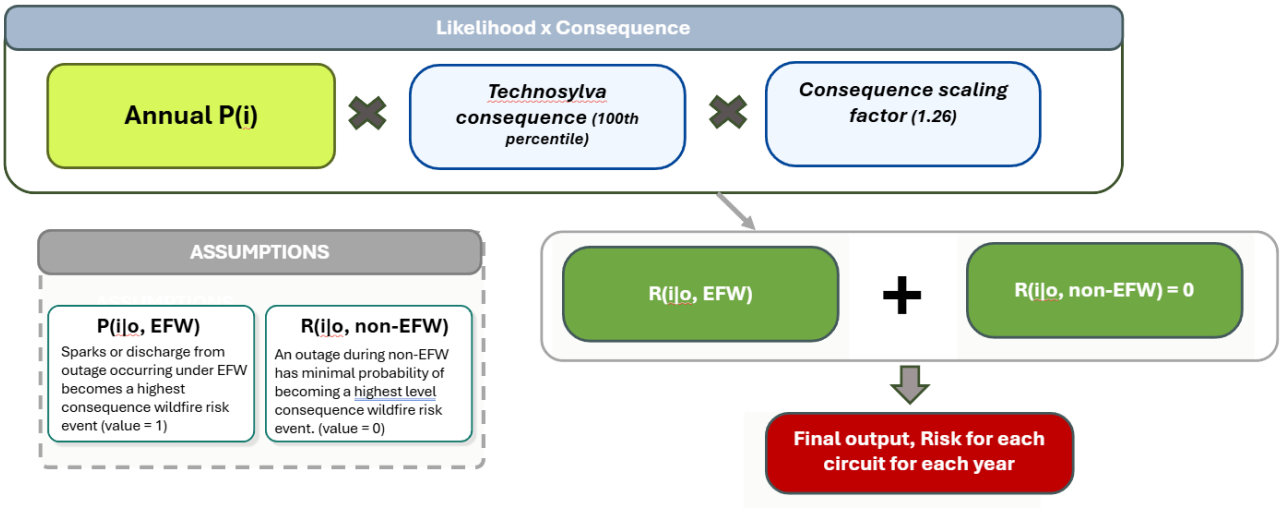
Structures destroyed are likely correlated with these factors. Therefore, Liberty adopts the same approach as other California IOUs and uses structures destroyed in its proxy ratio for fatalities and serious injuries. In its 2026-2028 WMP, SCE publishes the proxy ratios it uses in its wildfire consequence model: 1 fatality per 256 structures destroyed and 1 serious injury per 107 structures destroyed. Liberty adopts these ratios in its wildfire consequence framework, and the fatality ratio aligns with the average in LU Table 5-3 (1 fatality per 261 structures destroyed) using historical wildfires within 100 miles of Liberty's service territory.

Beyond the financial and safety consequences described above, Liberty recognizes that wildfire consequences are multi-dimensional, and many components are not currently or readily monetized. Liberty does not currently assess additional insured losses (AIL), which may include financial impacts from wildfire smoke and ash to structures that are not directly destroyed or damaged by a fire, as well as disruptions to local business and economic activity. Liberty also does not monetize the public health impacts associated with wildfire smoke exposure, which have been shown to exceed the value of structure losses.[31] Nor does Liberty monetize ecological impacts or damages to ecosystem services beyond the per-acre restoration cost included in the model. These may include impacts on water quality and clarity, wildlife habitat, forest health, or other impacts on cultural and historical resources. Liberty also acknowledges that low-intensity fire can provide ecological benefits; however, this assessment of wildfire risk is primarily focused on wildfires occurring under extreme fire weather.

The calculation of wildfire consequences and wildfire risk is provided in the equations and Figure 5-8 below.

[31] Wang, D., Guan, D., Zhu, S. *et al.* Economic footprint of California wildfires in 2018. *Nat Sustain* **4**, 252–260 (2021)

Figure 5-8: Calculation of Wildfire Risk



$$R_i^{\mathrm{WF}} = P_{\mathrm{ignition}}(i) \times C_i^{\mathrm{WF}} \times S$$

$$C_i^{\mathrm{WF}} = K_B\, B_i + K_A\, A_i + \mathrm{VSL}\left(F_i + \frac{1}{4} SI_i\right)$$

$$R_{\mathrm{total}}^{\mathrm{WF}} = \sum_i R_i^{\mathrm{WF}} = \sum_i P_{\mathrm{ignition}}\,(i) \times C_i^{\mathrm{WF}} \times S$$

Where:

- $K_B = \$1{,}000{,}000$ per structure destroyed
- B_i: the number of structures destroyed under Technosylva's 100th percentile simulation at circuit *i*
- $K_A = \$2{,}336$ per acre burned
- A_i: the number of acres burned under Technosylva's 100th percentile simulation at circuit *i*
- F_i: the number of estimated fatalities, calculated as $\frac{1}{256} \times B_i$
- SI_i: the number of estimated serious injuries, calculated as $\frac{1}{107} \times B_i$
- VSL = the California-adjusted value of a statistical life
- S: the consequence scaling factor, derived using monetized log losses, $10^{1.26} \approx 18.2$
- $P_{\mathrm{ignition}}(i) = P_{\geq 1}^{EFW}(i)$: the probability of an ignition occurring under extreme fire weather conditions
- R_i^{WF}: circuit-level estimate of wildfire risk

- R_{total}^{WF}: system-level estimate of wildfire risk

Wildfire hazard intensity:

Wildfire hazard intensity is captured through Technosylva's wildfire simulation outputs, which quantifies rate of spread, flame length, crown fire potential, among other hazard metrics. Areas with faster rates of spread and longer flame lengths correspond to greater wildfire hazard intensity, and these impacts lead to greater modeled consequences such as structures destroyed.

Wildfire exposure potential:

Liberty assesses wildfire exposure potential using Technosylva's wildfire simulation outputs, specifically structures destroyed and acres burned. Population impacted is also provided as a Technosylva output, although Liberty anchors fatalities and serious injuries to structures destroyed, as discussed previously. Additional dimensions of wildfire exposure potential are not included in Liberty's current risk model, including public health and ecological impacts, as discussed previously.

Vulnerability:

Liberty's wildfire risk model primarily addresses vulnerability through physical vulnerability in the form of structure loss. Liberty draws on Technosylva's dynamic building loss factor and urban conflagration modeling, which involve a machine-learning model trained on empirical wildfire structure damages.

Physical vulnerability is distinct from social vulnerability. Social vulnerability includes a community's capacity to anticipate, cope with, and recover from a wildfire event. Liberty does not currently address social vulnerability in its wildfire risk model, but future refinements will prioritize quantification of egress capacity at a granular level throughout Liberty's service territory. Liberty has identified egress modeling in the RAI plan as an opportunity item for the next WMP cycle.

PSPS Consequence:

PSPS consequence is expressed as the reliability, safety, and financial consequences of a proactive de-energization event. As with wildfire consequences, it is inherently difficult to measure PSPS consequence. Specifically, the value customers place on electric service varies substantially by customer type, time of day, outage duration, end-use of electricity to power medical devices, and the specific circumstances of the event such as a winter storm or rapidly

evolving wildfire. Even after accounting for such factors, there remains substantial variation in customer preferences for reliability.[32]

Notwithstanding the challenges of valuing reliability, Liberty adopts a value-of-service framework using estimates of the value of lost load ("VoLL"), consistent with the industry-standard approach of applying the Lawrence Berkeley National Laboratory Interruption Cost Estimator ("ICE") Calculator (v2.2).[33] Liberty inputs system-specific data into the ICE calculator to derive a monetized cost per customer-minute interrupted, including SAIFI, SAIDI, customer counts by customer class, load data by customer class, weekend versus weekday outage distribution, time-of-day outage distribution, and electric rate tariffs. The results of the ICE Calculator are shown in LU Table 5-5.

LU Table 5-5: Monetized Reliability Risk Parameters Outputs From ICE Calculator

Customer Class	$/Customer Minute Interrupted
Residential	$0.08
Non-Residential	$23.47
System Average	$2.63

Table Notes: Calculated using Berkeley Lab's ICE Calculator v2.2

Liberty's historical data indicates an average PSPS outage duration of approximately 13 hours, ranging from a minimum of seven hours to a maximum of 17 hours. Liberty adopts a 17-hour PSPS duration based on anticipated resource constraints with patrolling and re-energizing the system during a multi-circuit PSPS event. Muller and Topaz circuits experience similar fire weather conditions, and it is reasonably expected that a PSPS event would affect both circuits simultaneously. A benchmarking analysis of other California IOUs finds that assumed PSPS durations range from eight to 24 hours,[34,35] with Liberty's assumed duration of seventeen hours falling within the benchmarks.

Therefore, Liberty calculates the reliability component of PSPS consequence (*V*) as:

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[32] Gorman, Will. "The quest to quantify the value of lost load: A critical review of the economics of power outages." *The Electricity Journal* 35, no. 8 (2022): 107187.
[33] Larsen, Peter H. "ICE Calculator 2 Final Report for Phase 1 and 2 of the National Initiative to Update the Interruption Cost Estimate (ICE) Calculator." Lawrence Berkeley National Laboratory. February 2026.
[34] SDG&E assumes 24-hour duration: 2026-2028 Wildfire Mitigation Plan, San Diego Gas & Electric, September 2025
[35] SCE assumes 8-hour duration: 2026-2028 Wildfire Mitigation Plan, Southern California Edison, May 2025

$$V_{i,j} = 17 \times 60 \times n_{i,j} \times \rho_j$$

Where:

- $V_{i,j}$: PSPS reliability consequence for circuit *i* and customer class *j* in dollars
- 17 is the assumed duration of PSPS event in hours
- 60 is the conversion from hours to minutes
- $n_{i,j}$: the customer count for customer class *j* at circuit *i*
- ρ_j: the monetized reliability consequence parameter for customer class *j*, expressed in $/customer minute interrupted

Circuit level PSPS consequence is the sum of PSPS consequence across residential and non-residential customer classes.

$$V_i = \sum_{j \in \{res, nonres\}} = V_{i,res} + V_{i,nonres}$$

While reliability consequences represent the largest share of PSPS consequence, Liberty also models safety and financial components to PSPS consequence. Applying ratios from SCE's 2026-2028 WMP, Liberty estimates fatality and serious injuries resulting from PSPS events assuming 1 fatality per approximately 35 million customers de-energized and 1 serious injury per approximately 8 million customers de-energized. Liberty applies the same monetary parameters (VSL and one-quarter of the VSL) to fatalities and serious injuries estimated in the PSPS consequence calculation. Liberty also adopts SCE's approach to the financial PSPS consequences by applying $450 per customer de-energized.

$$C_i^{\text{PSPS}} = \underbrace{V_i}_{\text{Reliability}} + \underbrace{n_i \, \text{VSL}\left(\alpha_F + \frac{1}{4}\alpha_{SI}\right)}_{\text{Safety}} + \underbrace{\$450 \, n_i}_{\text{Financial}}$$

Where:

- α_F: the proportion of fatalities per customer de-energized (n_i)
- α_{SI}: the proportion of serious injuries per customer de-energized (n_i)

PSPS Exposure Potential and PSPS Vulnerability:

As discussed in the above PSPS consequence section, Liberty models PSPS exposure potential primarily along residential and non-residential dimensions for reliability risk. Health and safety are also considered in the form of estimated fatalities and serious injuries. The financial parameter accounts for economic losses that customers may face from loss of power. Liberty

plans to incorporate additional dimensions of PSPS exposure in future risk modeling efforts, specifically factoring in the inclusion of critical facilities into PSPS consequences.

In terms of PSPS vulnerability, Liberty's operational PSPS protocols directly account for Access and Functional Needs (AFN) customers during PSPS events. Liberty's modeling of PSPS consequence currently does not apply unique weights or valuations to AFN customers that may face loss of power. Liberty has included refinement of AFN and medical baseline customers in its PSPS consequence modeling as part of its RAI plan.

PEDS Outage Consequence, Exposure Potential, and Vulnerability:

Liberty is not currently quantifying PEDS outage risk within its 2027 WMP risk model. At present, the availability and quality of PEDS outage data from Liberty's SRP program are not sufficient to develop a robust PEDS outage risk model. Liberty has identified development of a PEDS outage risk model as a priority in its RAI plan.

However, Liberty affirms that it is approaching PEDS outage consequences in a similar conceptual way to PSPS consequence. For example, PEDS-related Customer Minutes Interrupted (CMI) will be evaluated using a value-of-lost-load framework and the ICE Calculator. In 2024 and 2025, Liberty customers experienced seven outages that occurred during SRP-enablement for approximately 350 thousand CMI. Applying Liberty's customer-class blended monetized reliability parameter of $2.63 per CMI yields SRP-related outage risk for 2025 of approximately $900 thousand. This represents approximately one percent of Liberty's annual baseline wildfire risk pre-mitigation.

5.2.2.3 Risk

The electrical corporation must discuss how it calculates each risk, and the resulting overall utility risk defined in Section 5.2.1. The discussion in this section must include at least the following:

- Overall utility risk
- Wildfire risk
- Outage program risk
- PSPS risk
- PEDS outage reliability risk

Overall utility risk:

Liberty calculates each risk component in monetized dollars, rather than unitless scores. Expressing wildfire, PSPS, and PEDS risk on a consistent monetary scale allows them to be summed cleanly, and this directly responds to RN-LU-26-01, which found Liberty's prior model involved averaging outage program risk and wildfire risk.

All calculations are performed at the circuit level (*i*), and then summed across circuits to calculate systemwide risk. Risk is expressed as an annual value. However, Liberty has identified in its RAI plan that it will move toward a calculation of risk over a time horizon (*e.g.*, 60 years) and then risk in future years according to a net present value framework.

$$R_{\text{system}} = \sum_i R_i = \sum_i \left(R_i^{\text{WF}} + R_i^{OP}\right)$$

Where:

- R_i^{WF}: Wildfire risk ($) at circuit *i*
- R_i^{OP}: Outage program risk ($) at circuit *i*

Wildfire risk:

$$R_i^{\text{WF}} = P_{\text{ignition}}(i) \times C_i^{\text{WF}} \times S$$

See previous details on the calculation of wildfire risk and definition of terms in Section 5.2.

Outage program risk:

$$R_i^{OP} = R_i^{\text{PSPS}} + R_i^{\text{PEDS}}$$

PSPS risk:

$$R_i^{\text{PSPS}} = P_{\text{PSPS}}(i) \times C_i^{\text{PSPS}}$$

See previous details on the calculation of PSPS risk and definition of terms in Section 5.2.

PEDS risk:

At present, PEDS risk is set to zero. Quantification of PEDS outage risk is a high-priority element of the RAI plan. A preliminary approximation of SRP-related outage risk is discussed previously in Section 5.2.

When quantified, reliability risk will calculated using a similar value-of-service framework as PSPS reliability risk, where *D* represents the duration of a PEDS outage event in hours and $P_{\text{PEDS}}(i)$ represents PEDS likelihood at circuit (or circuit-segment) *i*.

$$R_i^{\text{PEDS}} = P_{\text{PEDS}}(i) \times \sum_{j \in \{\text{res,non}\}} D_{\text{PEDS}} \times 60 \times n_{i,j} \times \rho_j$$

5.2.3 Key Assumptions and Limitations

Because the individual elements of risk assessment are interdependent, the interfaces between the various risk models and initiative activities must be internally consistent. In this section of the WMP, the electrical corporation must discuss key assumptions, limitations, and data standards for the individual elements of its risk assessment.31 This must include the following:

- **Key modeling assumptions** made specific to each model to represent the physical world and to simplify calculations.
- **Data standards**, which must be consistently defined (e.g., weather model predictions at a 30-ft [10-m] height must be converted to the correct height for fire behavior predictions, such as mid-flame wind speeds).
- **Consistency of assumptions and limitations** in each interconnected model, which must be traced from start to finish, with any discrepancies between models discussed.
- **Stability of assumptions in the program**, including historical and projected changes.
- **Monetization of attributes**, if utilized, including (if applicable) the selected value of statistical life, dollar value of injury prevention, and dollar value of reliability risk.

More mature programs regularly monitor and evaluate the scope and validity of modeling assumptions. Monitoring and evaluation categories may include:

- **Adaptation of weather history** to current and forecasted climate conditions.
- **Availability of suppression resources** including type, number of resources, and ease of access to incident location.
- **Height of wind driving fire spread** including any wind adjustment factor calculations.
- **General equipment failure rates** based on historical trends for equipment type, equipment age, overdue maintenance, and any wind speed functional dependences.
- **General vegetation contact rates** based on historical trends for vegetation species, vegetation height, and environmental factors such as wind speed functional dependences.
- **Height of electrical equipment** in the service territory.

- **Stability of the atmosphere** and resulting calculation of near-surface winds.
- **Vegetative fuels** including models that account for fuel management activities by other land managers (e.g., thinning, prescribed burns).
- **Combination of risk components and weighting of attributes** and resulting impacts.
- **Wind load capacity for electrical equipment** in the service territory.
- **Number, extent, and type of community assets at risk** in the service territory.
- **Proxies for estimating impact on customers and communities** in the service territory.
- **Extent, distribution, and characteristics of vulnerable populations** in the service territory.

The electrical corporation must document each assumption in Table 5-1. The electrical corporation must summarize assumptions made within models in accordance with the model documentation requirements in Appendix B.

The primary risk modeling assumptions and limitations are provided in Table 5-1.

Table 5-1: Primary Risk Modeling Assumptions and Limitations

Applicable Model	**Assumption**	**Justification**	**Limitation**
Wildfire Spread Model	The physical framework development is based on an idealized situation in steady state spread, which may not fit some extreme behavior of fires	The model is semi-empirical and as a result does not capture all possible wildfire scenarios	The model may not represent unique weather cases
Wildfire Spread Model	Fuels are assumed to be continuous and uniform for the scale of the input (typically 10-to-30-meter resolution)	This is the highest resolution data available across the service territory, and the standard for fuels mapping for fire agencies and IOUs in the US	Real fuels are more granular and thus not captured by the fire spread modeling
Wildfire Spread Model	Fire characteristics at a point consider only the conditions at that point (point-functional model)	Point-functional models are much faster to solve than non-local ones	Several non-local effects, such as radiation concentration from different parts of the front, are not considered
Wildfire Spread Model	Fire spread is assumed to be elliptical, although several variations exist (double ellipse, oval, egg-shape)	Fire perimeters obtained in constant wind and slope conditions are known to have a pseudo-elliptical shape; the difference between existing fire shape models is small	This approach only captures a macroscopic shape of the perimeter
Wildfire Spread Model	Weather is given hourly and assumed to remain constant during that time	Computing sub-hourly wind speeds is expensive, not standard among fire agencies or IOUs, and sub-hourly data is not readily available	Winds change more rapidly than at the hour level and thus are not captured by the fire spread model

Applicable Model	Assumption	Justification	Limitation
Wildfire Spread Model	Reliability of weather inputs in the mid-range forecast (2 to 5 days)	Weather forecasts become less accurate further out in time; however, WRF models are proven accurate in reflecting past weather scenarios and predicting short-term future scenarios	Fire spread models are impacted due to imperfect weather
Wildfire Spread Model	Fire is not coupled with the atmosphere in any way	It is not technically feasible to run millions of simulations considering the coupling effect given current science and technology	Fire-atmosphere interactions are not captured
Wildfire Spread Model	Fire is assumed to be fully developed; fire acceleration, flashover, and decay are not considered	Fire acceleration only affects the initial time of fire expansion, and its effect on an 8-hour simulation may not be significant	Models are not valid for short-duration fires
Wildfire Spread Model	Atmospheric instability, which may have a deep impact on rate of spread, is not considered	Capturing atmospheric instability is challenging with the forecast data presently available	There is a significant range of fire behavior that may not be considered in the model
Wildfire Spread Model	Gusts are not considered in the model	Gust duration is highly unpredictable and could affect the fire very differently	Fire behavior at a lower scale is not expected to follow a simple symmetrical behavior with respect to wind and slope.

Applicable Model	Assumption	Justification	Limitation
Wildfire Spread Model	No interaction between slope and wind other than creating an effective or equivalent wind	The slope-wind effect is known to be significantly symmetrical in fires under control conditions, and few non-physical models describe it non-symmetrically	Fire behavior at a lower scale is not expected to follow a simple symmetrical behavior with respect to wind and slope
Wildfire Spread Model	Fuel array description of the vegetation may not perfectly describe fuel characteristics	There are no perfect fuel datasets available at the territory scale; additional custom fuel models have been developed for WUI, agricultural, and timber areas	Fuel characteristics are not captured perfectly by the fire spread model
Wildfire Spread Model	Spotting is only considered in surface fires	Calculating crown spotting would require an accurate tree inventory (height, species, width)	Wildfire spread for crown fires is impacted
Risk Model Architecture	Risk is calculated at the circuit level, and all inputs are aggregated to the circuit level and assumed representative of the entire circuit	Circuit-level analysis matches the granularity and maturity of Liberty's currently available datasets	Wildfire risk is not homogeneous along a circuit, especially given varying circuit lengths
Risk Model Architecture	The model is developed on 45 circuits over a four-year outage record	This represents the set of Liberty's modeled distribution circuits with high-quality outage data available	Small sample size constrains statistical power, and model outputs may be sensitive to the addition of new data

Applicable Model	Assumption	Justification	Limitation
Probability of Outage	Outages with no determinable cause are excluded from training	Unknown events cannot be reliably attributed to a failure mode and would introduce label noise	May under-represent failure modes that are inherently difficult to diagnose in the field, if such modes correlate with "unknown cause"
Probability of Outage	Planned outages and loss of supply are excluded	Planned outages are within Liberty's operational control and likely account for minimal wildfire risk	The model may under-represent wildfire risk from planned outages that could lead to an ignition
Probability of Outage	Circuits with zero primary overhead conductor miles are excluded		
Probability of Outage	Training uses a balanced (50/50) outage/non-outage sample, and raw probabilities are rescaled per circuit before use	Balancing is standard practice to prevent the classifier from being biased toward the much larger non-outage class	Raw model output cannot be interpreted as a real-world probability directly and rescaling is required for usability in the risk model
Probability of Outage	Circuits with no recorded historical outages are assigned a scaling factor of 0.0005 rather than zero	Represents a very low baseline outage frequency (fewer than one expected outage in four years) while preventing an absence of historical outages from producing a zero risk estimate	The assigned floor is a modeling convention, not an empirically derived rate
Probability of Outage	Where a VPD/wind bin contains no modeled circuit-days, the bin's mean probability is assigned 0.0005	Avoids an undefined value in the weighted bin aggregation	

Applicable Model	Assumption	Justification	Limitation
Probability of Outage	Weather stations more than 50 km from a circuit are excluded and elevation differences are not used in station weighting		Circuits without a nearby station may have less representative weather features, and elevation-driven weather effects in complex terrain are not separately captured
Probability of Outage	Historical weather observations from 2022–2025 are assumed representative of future weather conditions	Represents the full period over which consistent station observations and cause-coded outage records overlap	No adjustment is applied for projected climate change in current outage model
Probability of Outage	Transmission outage likelihood uses a different data source (lockout/operations logs) and is not cause-code filtered	Transmission events are relatively rare and tracked through a different operational system from distribution outages	
Probability of Ignition	EFW is defined as VPD ≥ 2 kPa and maximum wind gust ≥ 50 mph occurring together	The VPD threshold was selected against a 12-year regional record of wildfires ≥5,000 acres using Peirce and Heidke skill scores, and VPD was selected over maximum temperature for physical interpretability despite a marginally lower skill score	A single fixed threshold is not varied by circuit, season, or local terrain
Probability of Ignition	The wind gust component of the EFW threshold is derived from Liberty's historical PSPS operational experience rather than fitted to fire-occurrence data		

Applicable Model	Assumption	Justification	Limitation
Probability of Ignition	Wildfire records used to calibrate the VPD threshold are regional (within 100 miles) and not limited to utility-caused ignitions	Liberty's own utility-caused ignition record and wildfire history is too sparse	The threshold reflects regional wildfire conditions generally rather than utility-specific ignitions within Liberty's service territory
Probability of Ignition	EFW occurrence at the circuit-level is estimated using 2022–2025 data only	Matches the period of overlapping weather station and outage data used to train the model	Four years is a short time horizon to estimate the combined frequency of VPD and wind gusts across the service territory
Probability of Ignition	The conditional probability of ignition given an outage under EFW conditions is set equal to 1, and outages outside EFW conditions are assumed to contribute zero wildfire ignition risk	Liberty's historical ignition record is too sparse to support an empirical ignition model	Assigns zero wildfire risk to outages below the EFW threshold
Probability of Ignition	Ignition likelihood and burn likelihood are produced as a single blended value rather than as two separately calculated components	Liberty's historical ignition record is too sparse to support an empirical ignition model and measure of burn likelihood	Specifying separate likelihood model components for (1) outages, (2) ignitions, and (3) wildfires, allows for additional modeling of response times, situational awareness, and other measures to contain ignitions

Applicable Model	Assumption	Justification	Limitation
Wildfire Consequence	The 100th-percentile Technosylva consequence scenario is used as a fixed conditional severity value	The rarity of catastrophic outcomes is captured by ignition likelihood and EFW, and the specific weather conditions associated with each Technosylva percentile are not available	Consequence is not represented probabilistically, more deterministically with a binary flag for outages occurring under EFW
Wildfire Consequence	A scaling factor is applied to Technosylva consequence values to correct for underprediction	Benchmarking against USFS and CAL FIRE datasets and CAL FIRE historical incident data showed Technosylva simulated fire sizes roughly an order of magnitude below observed regional wildfires, attributable to Technosylva's 8-hour fire-spread simulation duration	The scaling factor is derived from historical California wildfires, rather than Liberty-specific events.
Wildfire Consequence	Technosylva consequence estimates are applied at the circuit level	Matches the current unit of analysis of the risk model	A single consequence value per circuit does not reflect within circuit variation in risk
Wildfire Consequence	Technosylva consequence modeling uses a projected 2030 fuelscape	Reflects anticipated future fuel conditions over the planning horizon	Differs in time basis from the backward-looking 2022–2025 weather record used on for likelihood calculations
Wildfire Consequence	Consequence monetization parameters (structure value, per-acre cost, VSL) are adopted from peer California utilities rather than independently derived	Peer values are documented and established	Values are not anchored directly to Liberty's service territory, for example suppression or restoration costs

Applicable Model	Assumption	Justification	Limitation
Wildfire Consequence	Smoke and ash damage to structures, public health impacts of smoke exposure, ecological impacts, as well as other forms of insured losses, are not monetized in the consequence framework	No established valuation methodology has been adopted for these categories currently	Total wildfire consequence is likely understated
Wildfire Vulnerability	Physical structure vulnerability is assessed via Technosylva's Urban Conflagration and Dynamic Building Loss Factor ("dBLF") methodology	dBLF is a machine-learning model trained on 16 years of post-fire structure damage inspection data, primarily from CAL FIRE	Validation is concentrated in Southern California WUI, which differs from Liberty's service territory, and urban conflagration is inherently challenging to model
Wildfire Vulnerability	Social vulnerability is not quantified within the risk model	Liberty does addresses AFN populations in its PSPS operational protocols	Community capacity to anticipate, cope with, and recover from a wildfire event is not reflected in modeled risk
PSPS Likelihood	PSPS likelihood is assigned as 1.0 event per year for the ten highest-risk feeders and 0.5 events per year for all other feeders	Reflects Liberty's operational experience that PSPS exposure is concentrated on a limited number of circuits	Frequencies are not empirically fitted to circuit-specific PSPS fire weather

Applicable Model	Assumption	Justification	Limitation
PSPS Consequence	PSPS event duration is assumed to be 17 hours	Liberty's historical average is approximately 12 hours; 17 hours reflects anticipated resource constraints when patrolling and re-energizing more than two simultaneously de-energized circuits. Benchmarked against other California utilities' assumptions of 8 to 24 hours	The figure is an operational judgment rather than a fitted value, and the model does not vary the PSPS length by circuit
PSPS Consequence	Reliability consequence is monetized using ICE Calculator v2.2 $/CMI values applied by circuit-level residential/non-residential customer mix		ICE estimates are model-derived rather than observed for Liberty's specific customers, and do not vary by event circumstance or time of year
PSPS Vulnerability	PSPS vulnerability is not quantified within the risk model	AFN populations are addressed through separate PSPS operational protocols	Varying levels of vulnerability of medical baseline, critical facility, and AFN customers are not reflected in estimated PSPS risk

5.3 Risk Scenarios

In this section of the WMP, the electrical corporation must provide a high-level overview of the scenarios to be used in its risk analysis in Section 5.2. These must include at least the following:

- **Design basis scenarios** that will inform the electrical corporation's long-term wildfire mitigation initiatives and planning.
- **Extreme-event scenarios** that may inform the electrical corporation's decisions to provide added safety margin and robustness.

The risk scenarios described in Sections 5.3.1 and 5.3.2 below are the minimum scenarios the electrical corporation must assess in its wildfire risk and outage program risk analysis. The electrical corporation must also describe and justify any additional scenarios it evaluates.

Each scenario must consider:

- **Local relevance:** Heterogeneous conditions (*e.g.*, assets, equipment, topography, vegetation, weather) that vary over the landscape of the electrical corporation's service territory at a level sufficiently granular to permit understanding of the risk at a specific location or for a specific circuit segment. For example, statistical wind loads must be calculated based on wind gusts considering the impact of nearby topographic and environmental features, such as hills, canyons, and valleys.
- **Statistical relevance:** Percentiles used in risk scenario selection must consider the statistical history of occurrence and must be designed to describe a reasonable return interval/probability of occurrence. For example, designing to a wind load with a 10,000-year return interval may not be desirable as most conductors in the service territory would be expected to fail (*i.e.*, the scenario does not help discern which areas are at elevated risk).

Liberty's wildfire consequence modeling continues to rely on Technosylva's WFA platform, unchanged from the prior risk model. Technosylva's WFA platform includes design-based scenarios, as described below. In contrast, Liberty's probability of outage model adopts a probabilistic approach, as described previously, rather than relying on discrete scenarios.

5.3.1 Design Basis Scenarios

Fundamental to any risk assessment is the selection of one or more relevant design basis scenarios (design scenarios). These scenarios will inform long-term initiative activities and planning. In this section, the electrical corporation must identify the design scenarios it has

prioritized from a comprehensive set of possible scenarios. The scenarios identified must be based on the unique wildfire risk and reliability risk characteristics of the electrical corporation's service territory and achieve the primary goal and stated plan objectives of its WMP. At a minimum, the following design scenarios representing statistically relevant weather, and vegetative conditions must be considered throughout the service territory.

For wind loading on electrical equipment, the electrical corporation must use at least four statistically relevant design conditions. It must calculate wind loading based on locally relevant 3-second wind gusts over a 30-year wind speed history during fire season in its service territory. The conditions are the following:

- **Wind Load Condition 1**: Baseline: The baseline wind load condition the electrical corporation uses in design, construction, and maintenance relative to GO 95, Rule 31.1.
- **Wind Load Condition 2: Very High**: 95th-percentile wind gusts based on maximum daily values over the 30-year history. This corresponds to a probability of exceedance of 5 percent on an annual basis (i.e., 20-year return interval) and is intended to capture annual high winds observed in the region (e.g., Santa Ana winds).
- **Wind Load Condition 3: Extreme**: Wind gusts with a probability of exceedance of 5 percent over the three-year WMP cycle (i.e., 60-year return interval).
- **Wind Load Condition 4**: Credible Worst Case: Wind gusts with a probability of exceedance of 1 percent over the three-year WMP cycle (i.e., 300-year return interval).

The data and/or models the electrical corporation uses to establish locally relevant wind gusts for these design conditions must be documented in accordance with the weather analysis requirements described in Appendix B.

For weather conditions used in calculating fire behavior, the electrical corporation must use probabilistic scenarios based on a 30-year history of fire weather. This approach must consider a range of wind speeds, directions, and fuel moistures that are representative of historic conditions. In addition, the electrical corporation must discuss how this weather history is adapted to align with current and forecasted climate conditions. The electrical corporation must consider the following two conditions:

- **Weather Condition 1: Anticipated Conditions**: The statistical weather analysis is limited to fire seasons expected to be the most relevant to the next three years of the WMP cycle.

- **Weather Condition 2: Long-Term Conditions**: The statistical weather analysis is representative of fire seasons covering the full 30-year history.

The electrical corporation must state how it defines "fire weather" and "fire season" for the calculations of these probabilistic scenarios.

One possible approach to the statistical weather analysis for fire behavior is Monte- Carlo simulation of synthetic fire seasons in accordance with approaches presented by the United States Forest Service.[36] However, the electrical corporation must justify the selection of locally relevant data for use in this approach (i.e., Remote Automated Weather Systems data or historic weather reanalysis must be locally relevant). The data and/or models the electrical corporation uses to establish locally relevant weather data for these designs must be documented in accordance with the weather analysis requirements described in Appendix B.

For vegetative conditions not including short-term moisture content, the electrical corporation must use design scenarios including the current and forecasted vegetative type and coverage. The conditions it must consider include the following:

- **Vegetation Condition 1: Existing Fuel Load**: The wildfire hazard must be evaluated with the existing fuel load within the service territory, including existing burn scars and fuel treatments that reduce the near-term fire hazard.
- **Vegetation Condition 2: Short-Term Forecasted Fuel Load**: The wildfire hazard must be evaluated considering the changes in expected fuel load over the three-year Base WMP cycle. At a minimum, this must include regrowth of previously burned and treated areas.
- **Vegetation Condition 3: Long-Term Extreme Fuel Load**: The wildfire hazard must be evaluated considering the long-term potential changes in fuels throughout the service territory. This must include, at a minimum, regrowth of previously burned and treated areas and changes in predominant fuel types.

The data and/or models the electrical corporation uses to establish locally relevant fuel loads for these designs must be documented in accordance with the vegetation requirements described in Appendix B.

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[36] M. A. Finney, I. C. Grenfell, C. W. McHugh, R. C. Seli, D. Trethewey, R. D. Stratton, and S. Brittain, 2011, "A Method for Ensemble Wildland Fire Simulation," Environmental Modeling & Assessment 16(2):153–167.

M. A. Finney, C. W. McHugh, I. C. Grenfell, K. L. Riley, and K. C. Short, 2011, "A Simulation of Probabilistic Wildfire Risk Components for the Continental United States," Stochastic Environmental Research and Risk Assessment 25:973–1000.

The electrical corporation must provide a brief narrative on the design basis scenarios used in its risk analysis. If the electrical corporation includes additional design scenarios, it must describe these scenarios and their purpose in the analysis. In addition, the electrical corporation must provide a table summarizing the following information:

- Identification of each design basis scenario (e.g., Scenario 1, Scenario 2)
- Components of each scenario (e.g., Weather Condition 1, Vegetation Condition 1)
- Purpose of each scenario

Technosylva's model considers weather, fire risk/consequence and population risk/consequence. Table 5-2 summarizes the design basis scenarios utilized in Technosylva's WFA suite. Refer to Appendix B for more detail regarding Technosylva design scenarios.

Table 5-2: Liberty Summary of Design Basis Scenarios

Scenario ID	Design Scenario	Purpose
WLC1	Wind Load	Baseline wind load used in design, construction, and maintenance.
WLC2	Wind Load	95th percentile wind gusts based on maximum daily values over a 30-year history.
WLC3	Wind Load	Wind gusts with a probability of exceedance of five percent over the three-year WMP cycle (i.e. 60-year return interval)
WLC4	Wind Load	Wind gusts with a probability of exceedance of one percent over the three-year WMP cycle (i.e. 300-year return interval).
WLC5	Wind Load	WFA models wind speeds to identify at what point a specific transmission or distribution circuit may fail in windy conditions. The results are based on three-hour aggregated probabilities based on the maximum wind gust during that three-hour period.
WC1	Weather Condition	Anticipated weather conditions over the next three years. This is based on historical weather days that best represents the days when weather and fuel conditions can lead to increased risk of ignition.
WC2	Weather Condition	Long-term conditions. Technosylva has calculated the historical weather days that best represent the days when weather and fuel conditions can

Scenario ID	Design Scenario	Purpose
		lead to increased risk of ignition based on their Weather Research and Forecast (WRF) Model. WRF is calculated annually to capture new days that should be incorporated into the historical weather days to account for changing conditions in locations.
VC1	Vegetation Condition	Modeling of current vegetation conditions to identify where current vegetation fuels risk.
VC2	Vegetation Condition	Modeling of vegetation conditions to identify potential mid-range vegetation fuels risk.
VC3	Vegetation Condition	Modeling of projected 2030 vegetation conditions to identify potential long-range vegetation fuels risk.

5.3.2 Extreme-Event/High Uncertainty Scenarios

In this section, the electrical corporation must identify extreme-event/high-uncertainty scenarios that it considers in its risk analysis. These generally include the following types of scenarios:

- Longer-term scenarios with higher uncertainty (e.g., climate change impacts, population migrations, extended drought)
- Multi-hazard scenarios (e.g., ignition from another source during a PSPS)
- High-consequence but low-likelihood ("Black Swan") events (e.g., acts of terrorism, 10,000-year weather)
- While the primary risk analysis is intended to be based on the design scenarios discussed in Section 5.3.1, the potential for high consequences from extreme events may provide additional insight into the mitigation prioritization described in Section 6. The electrical corporation must provide a brief narrative on the extreme-event scenarios used in its risk analysis. The electrical corporation must describe these scenarios, their purpose in the analysis, and identify the modeling method used (e.g. power law distribution). In addition, the electrical corporation must provide a table summarizing the following information:
- Identification of each extreme-event risk scenario (e.g., Scenario 1, Scenario 2)
- Components of each scenario (e.g., Weather Condition 1, Vegetation Condition 1)
- Purpose of the scenario

A central mechanism of Liberty's risk model, as described previously, is the treatment of extreme fire weather (EFW). The risk model's ignition likelihood component is linked to EFW, defined as the overlap between vapor pressure deficit greater than or equal to 2 kPa and maximum wind gust greater than or equal to 50 miles per hour. While Liberty does not directly model an additional extreme event scenario, in effect the use of EFW in the risk model demonstrates how Liberty is primarily focused on quantifying the risk associated with extreme weather that has historically been attributed to catastrophic wildfire outcomes.

Table 5-3: Summary of Extreme-Event Scenarios

Scenario ID	Extreme-Event Scenario	Purpose
EFW	Extreme Fire Weather VPD >= 2 kPa and Wind Gust >= 50 mph	To account for conditions when a utility-caused ignition is likely to spread rapidly and dangerously

5.4 Summary of Risk Models

In this section, the electrical corporation must summarize the calculation approach for each risk and risk component identified in Section 5.2.1. This documentation is intended to provide a quick summary of the models used. The electrical corporation must provide the following information:

- Identification (ID): Unique shorthand identifier for the risk or risk component.
- Risk component: Unique full identifier for the risk or risk component.
- Design scenario(s): Reference to design scenarios evaluated with the model to calculate the risk or risk component. These must be defined in Section 8.3.
- Key inputs: List of key inputs used to evaluate the risk or risk component. These can be in summary form (e.g., the electrical corporation may list "equipment properties" rather than listing out equipment age, maintenance history, etc.).
- Sources of data inputs: List of sources for each input parameter. These must include data sources (such as LANDFIRE) and modeling results (such as wind predictions) as relevant to the calculation of the risk or risk component. If the inputs come from multiple sources, each source should be on a new line.
- Key output results: List of outputs calculated for the risk or risk component.

- Units: List of the units associated with the key outputs.

The electrical corporation must provide a summary of each model in Appendix B.

Table 5-4 summarizes the utility risk models.

Table 5-4: Summary of Fire Risk Model and PSPS Risk Model

Liberty's Overall Utility Risk Model

ID	Risk Component	Design Scenario(s)	Key Inputs	Source of Inputs (Data and/or Models)	Key Outputs	Units
R^{System}	Overall Utility Risk		Wildfire Risk Outage Program Risk	Previous modeling steps	Annual system and circuit-level overall utility risk	Dollars ($)
R^{WF}	Wildfire Risk		Probability of Ignition Wildfire Consequence	Previous modeling steps	Annual system and circuit-level wildfire risk	Dollars ($)
R^{OP}	Outage Program Risk		PSPS Risk PEDS Risk	Previous modeling steps	Annual system and circuit-level outage program risk	Dollars ($)
R^{PSPS}	PSPS Risk		PSPS Likelihood PSPS Consequence	Previous modeling steps	Annual system and circuit-level PSPS risk	Dollars ($)
R^{PEDS}	PEDS Risk		PEDS Likelihood PEDS Consequence	Not currently quantified	Not currently quantified	Not currently quantified
P(i)	Probability of Ignition		Probability of Outage Probability of Extreme Fire Weather	Previous modeling steps	Annual probability of ignition at the circuit-level	Probability, annual expected ignition frequency
P(EFW)	Probability of Extreme Fire Weather		Weather data Historical fire perimeters	GRIDMET gridded weather data product CAL FIRE annual Redbooks	Circuit-level frequency of meeting EFW threshold	Days per year meeting EFW threshold

ID	Risk Component	Design Scenario(s)	Key Inputs	Source of Inputs (Data and/or Models)	Key Outputs	Units
P(o)	Probability of Outage		Weather data	GRIDMET and Western Weather station data	Daily and annual outage probability at the circuit-level	Probability, daily and annual
			Asset and load data	Internal Liberty Data		
			Vegetation conditions	LiDAR		
			Inspection findings	Internal Liberty Data		
C^{WF}	Wildfire Consequence		Simulated structures destroyed	Technosylva WFA	Monetized wildfire consequence at the circuit-level	Dollars ($)
			Simulated acres burned			
C^{PSPS}	PSPS Consequence		Historical PSPS events	Historical PSPS events	Monetized PSPS consequence at the circuit-level	Dollars ($)
			Residential and non-residential customer counts, load	Customer data		
P(PSPS)	PSPS Likelihood		Historical PSPS events	Historical PSPS events	Two groupings of circuits based on PSPS likelihood (higher and lower likelihood)	PSPS events per circuit-year

5.5 Risk Analysis Results and Presentation

In this section of the WMP, the electrical corporation must present a high-level overview of the risks calculated using the approaches discussed in Section 5.2 for the scenarios discussed in Section 5.3.

The risk presentation must include the following:

- Summary of electrical corporation-identified high fire risk areas in the service territory.
- Geospatial map of the top risk areas within the High Fire Risk Area (HFRA) (*i.e.*, areas that the electrical corporation has deemed at high risk from wildfire independent of HFTD designation).
- Narrative discussion of proposed updates to the HFTD.
- Tabular summary of top risk-contributing circuits across the service territory.
- Tabular summary of key metrics across the service territory.

The following subsections expand on the requirements for each of these.

5.5.1 Top Risk Areas within the HFRA

In this section, the electrical corporation must identify top risk areas within its self-identified HFRA, compare these areas to the CPUC's current HFTD, and discuss how it plans to submit its proposed changes to the CPUC for review.[37]

5.5.1.1 Geospatial Maps of Top-Risk Areas within the HFRA

The electrical corporation must evaluate the outputs from its risk modeling to identify top risk areas within its HFRA (independent of where they fall with respect to the HFTD). The electrical corporation must provide geospatial maps of these areas in accordance with the mapping requirements in the WMP Process Guidelines and Appendix C.

The maps must fulfill the following requirements:

- **Risk levels:** Levels must be selected to show at least three distinct levels, with the values based on the following:
    - Top 5 percent of overall utility risk values in the HFRA
    - Top 5 to 10 percent of overall utility risk values in the HFRA

[37] Pub. Util. Code § 8386(c)(17).

  - Top 10 to 15 percent of overall utility risk values in HFRA
  - Top 15 to 20 percent of overall utility risk values in the HFRA
  - Bottom 80 percent of overall utility risk values in the HFRA
- **Colormap:** The colormap of the risk levels must meet accessibility requirements (recommended colormap is Viridis)
- **County lines:** The map must include county lines as a geospatial reference
- **HFTD tiers:** The map must show a comparison with existing HFTD Tiers 2 and 3 regions.

Figure 5-9 is a map of utility fire risk in California counties, and Figure 5-10 is an analogous map with Tier 2 and Tier 3 HFTD polygons.

Figure 5-9: Liberty Risk Map

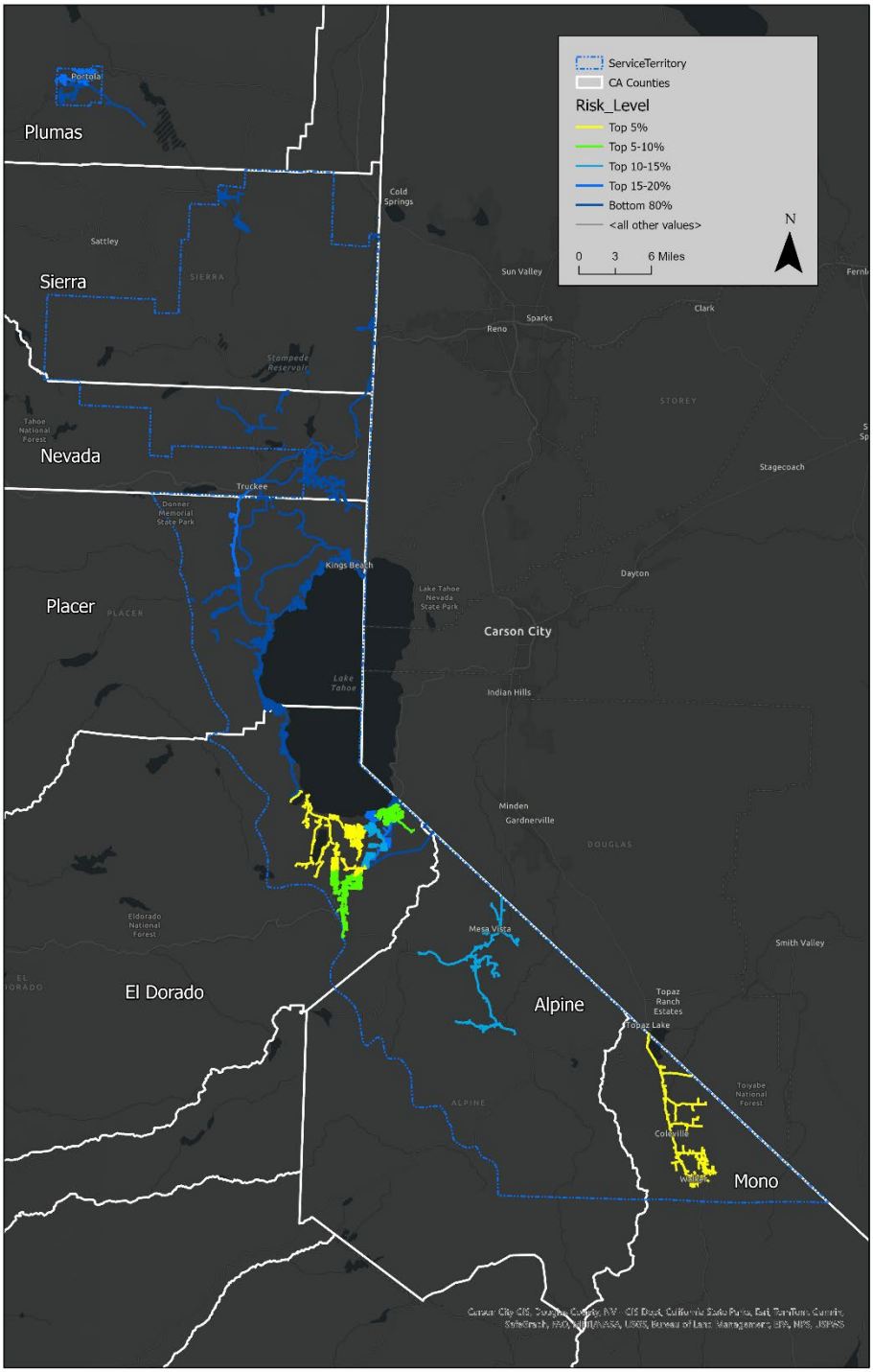
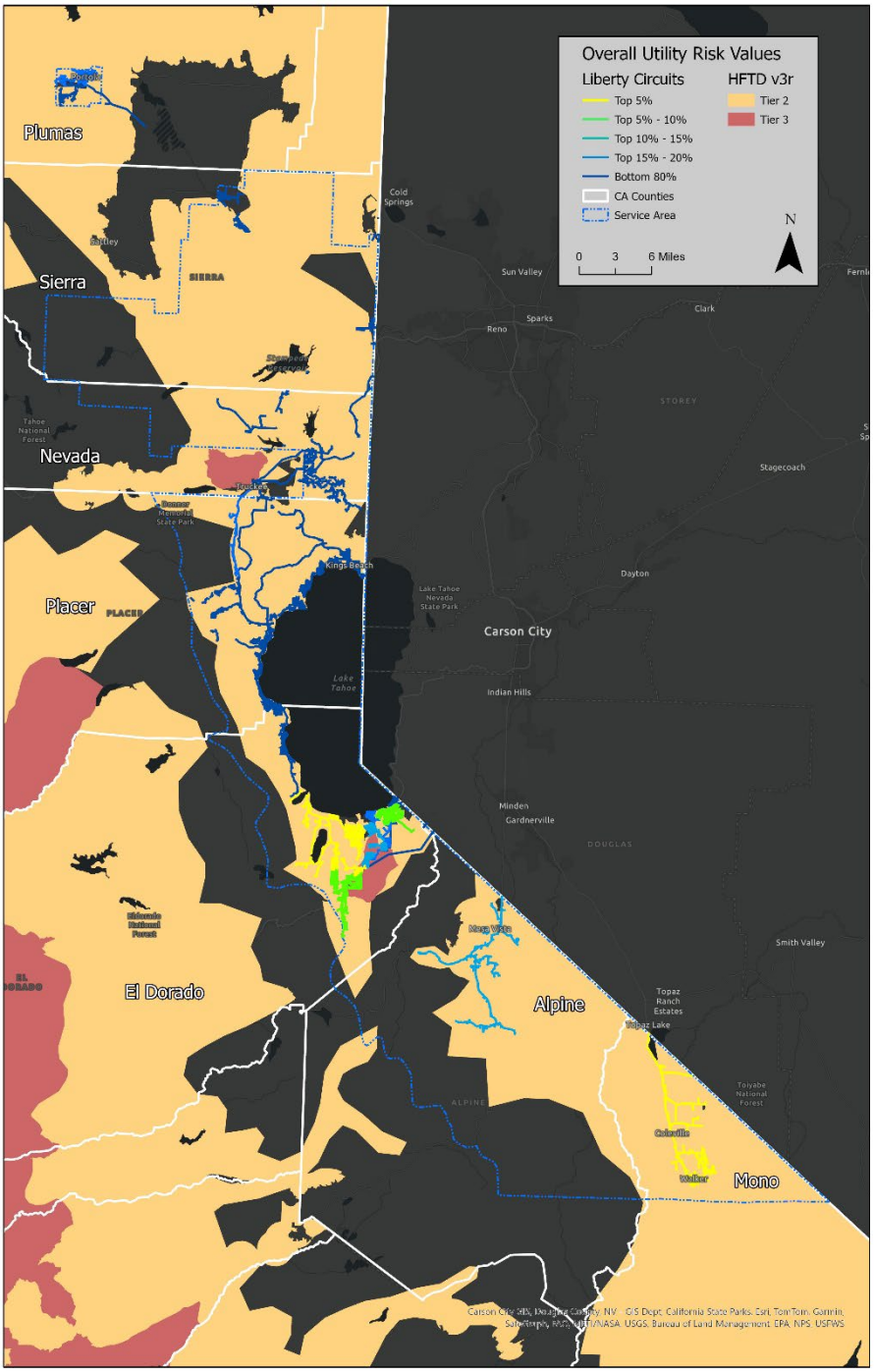


Figure 5-10: Liberty Fire Risk Map with HFTD Polygons



5.5.1.2 Proposed Updates to the HFTD

In this section, the electrical corporation must discuss the differences between the electrical corporation-identified top-risk areas within the HFRA and the existing CPUC-approved HFTD.36 The HFRA must be comprised of areas identified by the electrical corporations that its risk analysis indicates are at a higher risk than indicated in the current HFTD. Any proposed changes to the HFTD must be mapped in accordance with the requirements in the previous sub-section.

This discussion at a minimum must include:

- A discussion of how the electrical corporation analyzed additional areas in HFRA compared to HFTD.
- What criteria electrical corporations used to incorporate additional areas into the HFRA.
- Associated mitigation changes expected, as applicable.
- A description of the electrical corporation's process for submitting proposed changes to the HFTD to the CPUC, if such changes are desired.

Currently, Liberty does not have any proposed updates to the CPUC-defined HFTD areas. In the CPUC-approved HFTD risk maps, most of Liberty's service territory is designated as Tier 2, with a single Tier 3 designation for the Meyers area in South Lake Tahoe.

Although Liberty does not currently propose updates to the CPUC-approved HFTD areas, Liberty intends to actively participate in future rulemakings addressing HFTD mapping and will provide input at that time. In accordance with CPUC requirements, if Liberty identifies areas in its service territory that should be added to or removed from the HFTD, Liberty will submit those proposed modifications to the CPUC via the appropriate regulatory filing, which would, at a minimum, provide a unique identifier for each area to be modified, define the area's geographic boundaries, and present rationale for why Liberty believes the modification is warranted.

5.5.2 Top Risk-Contributing Circuits/Segments/Spans

The electrical corporation must provide a summary table showing the highest-risk circuits, segments, or spans[38] within its service territory. The table should include the following information about each circuit:

[38] For the section, the electrical corporation may use either circuits, segments, or spans, whichever is more appropriate considering the granularity of its risk model(s).

- **Circuit, Segment, or Span ID:** Unique identifier for the circuit, segment, or span
- **Overall utility risk scores:** Numerical value for each risk
- **Top risk contributors:** The risk components that lead to the high risk on the circuit

The electrical corporation must rank its circuits, segments, or spans by circuit-mile-weighted overall utility risk score and identify each circuit, segment, or span that significantly contributes to risk. A circuit/segment/span significantly contributes to risk if it:

1. Individually contributes more than 1 percent of the total overall utility risk; or
2. Is in the top 5 percent of highest risk circuits/segments/spans when all circuits/segments/spans are ranked individually from highest to lowest risk.

The electrical corporation must include each circuit, segment, or span that significantly contributes to risk in Table 5-5.[39] If this table is longer than two pages once populated, the electrical corporation must append the table.

Table 5-5 provides Liberty's top risk-contributing circuits, defined based on annual overall utility risk denominated in dollars. Twenty circuits account for at least one percent of Liberty's total estimated overall utility risk. Liberty includes primary and secondary risk sub-drivers for each circuit, informed by historical outage causes.

Using its wildfire risk model, Liberty finds that TPZ1202 faces the greatest overall utility risk, accounting for nearly one-fifth of Liberty’s total overall utility risk. This finding aligns with Liberty’s understanding of risk in its service territory, given TPZ1202’s proximity to the Mountain View Fire . In addition, TPZ1202 is one of only two Liberty circuits that have experienced a PSPS event.

Circuits serving customers in South Lake Tahoe and Meyers make up another large share of Liberty’s overall utility risk. MEY3400 ranks second in aggregate risk, and approximately 90% of MEY3400's risk is wildfire-driven, rather than outage-program-driven.

This finding directly addresses RN-LU-26-01, which identified that Liberty’s previous risk model found outage program risk orders of magnitude larger than wildfire risk for MEY3400 and that MEY3400 alone accounted for 87% of Liberty's total utility risk. Under the revised model, MEY3400 accounts for an estimated one-tenth of total risk, demonstrating that risk is no longer unrealistically concentrated on a single circuit.

[39] This table is a summary of information provided in the applicable data submission. As such, information included in this table must align with the data submission.

This same wildfire-driven pattern (approximately 90% of overall utility risk) holds across all twenty of Liberty's top risk-contributing circuits, not only MEY3400.

Table 5-5: Liberty Top-Risk Circuits

Rank	Circuit ID	Wildfire Risk ($)	Outage Program Risk ($)	Overall Utility Risk ($)	% of Risk	Primary Risk Sub-Driver	Secondary Risk Sub-Driver	Version of Risk Model
1	TPZ1202	139,889,565	3,303,175	143,192,740	18	Equipment	Wind	1.0
2	MEY3400	78,143,003	9,393,758	87,536,761	11	Equipment	Vegetation	1.0
3	MEY3200	65,185,834	18,119,288	83,305,122	10	Equipment	Vegetation	1.0
4	MEY3300	58,075,016	5,645,445	63,720,461	8	Equipment	Vegetation	1.0
5	STL3501	45,416,407	8,162,810	53,579,217	7	Equipment	Vegetation	1.0
6	STL3101	46,128,236	6,028,378	52,156,614	6	Equipment	Vegetation	1.0
7	MEY3500	43,485,679	7,332,014	50,817,694	6	Equipment	Vegetation	1.0
8	MULLER1296	45,370,802	2,580,408	47,951,211	6	Equipment	Wind	1.0
9	MEY3100	26,556,037	5,262,375	31,818,412	4	Equipment	Vegetation	1.0
10	POR3200	15,436,074	3,974,838	19,410,911	2	Equipment	Animal	1.0
11	TRK7202	14,395,453	459,853	14,855,306	2	Equipment	Vegetation	1.0
12	CAL2501	14,452,063	122,594	14,574,657	2	Equipment	Vegetation	1.0
13	GLS7400	13,486,792	801,507	14,288,299	2	Equipment	Vegetation	1.0
14	CEM41	13,713,025	473,489	14,186,513	2	Equipment	Wind	1.0
15	TAH5201	7,986,404	5,728,889	13,715,293	2	Equipment	Vegetation	1.0
16	POR3100	11,971,751	1,375,891	13,347,642	2	Equipment	Vegetation	1.0
17	STL2300	8,953,187	1,902,300	10,855,487	1	Equipment	Vegetation	1.0
18	TAH7300	4,433,396	4,616,767	9,050,163	1	Equipment	Vegetation	1.0
19	640	8,453,105	0	8,453,105	1	Equipment	Animal	1.0
20	KBH5200	4,797,599	3,576,355	8,373,954	1	Equipment	Vegetation	1.0

In addition, in LU Table 5-6, Liberty provides estimates of overall utility risk normalized per overhead mile to address the WMP requirement that calls for "circuit-mile-weighted" overall utility risk. Liberty finds that MEY3200, which is ranked third in terms of aggregate risk, has the highest risk per mile among Liberty's top risk-contributing circuits. The highest ranked circuit in terms of aggregate risk, TPZ1202, is ranked sixth when adjusting for circuit length.

This shift in risk rankings is expected because longer circuits feature more assets, more vegetation risk, and ultimately more risk exposure. From a risk modeling perspective, it is important to understand whether modeled risk is driven simply by a greater quantity of assets or by the underlying likelihood and consequence model components. As discussed in the RAI plan, Liberty plans to move toward more granular units of analysis (circuit segment), which can

better disentangle the effects of circuit length in the risk model. For example, TAH7300, Liberty's longest circuit, falls to the bottom of the risk ranking when expressed per mile. However, breaking out the circuit into segments and re-estimating the risk model may find that certain segments face greater risk than a circuit-level model would estimate.

LU Table 5-6: Overall Utility Risk by Circuit Normalized per mile

Rank	Circuit ID	Overhead Miles	Overall Utility Risk	% of Risk	Risk per Overhead Mile
1	MEY3200	22	83,305,122	10	3,852,411
2	STL3501	14	53,579,217	7	3,849,669
3	STL2300	3	10,855,487	1	3,657,636
4	STL3101	16	52,156,614	6	3,349,176
5	CAL2501	5	14,574,657	2	3,119,242
6	TPZ1202	55	143,192,740	18	2,607,577
7	CEM41	6	14,186,513	2	2,436,865
8	MEY3500	27	50,817,694	6	1,855,403
9	MEY3100	18	31,818,412	4	1,795,070
10	MEY3400	54	87,536,761	11	1,607,843
11	TRK7202	12	14,855,306	2	1,222,122
12	MEY3300	53	63,720,461	8	1,208,991
13	MULLER1296	44	47,951,211	6	1,098,233
14	640	8	8,453,105	1	1,055,355
15	POR3100	13	13,347,642	2	999,284
16	POR3200	21	19,410,911	2	925,550
17	TAH5201	21	13,715,293	2	640,701
18	GLS7400	33	14,288,299	2	433,832
19	KBH5200	23	8,373,954	1	358,902
20	TAH7300	58	9,050,163	1	157,198

5.6 Quality Assurance and Control

The electrical corporation must document the procedures it uses to confirm that the data collected and processed for its risk assessment are accurate and comprehensive.39 This includes but is not limited to model, sensor, inspection, and risk event data used as part of the electrical corporation's WMP program. In this section of the WMP, the electrical corporation must describe the following:

- **Independent review:** Role of independent third-party review in the data and model quality assurance.
- **Model controls, design, and review:** Overview of the quality controls in place on electrical corporation risk models and sub-models.

Liberty's risk model is built from two independent vendor components and internal modeling expertise. Filsinger Energy Partners (FEP) developed the outage and ignition likelihood components, while Technosylva provides estimates of wildfire consequences. Internally, Liberty's own subject matter experts review, validate, and stress-test the risk model methodology and outputs.

5.6.1 Independent Review

The electrical corporation must report on its procedures for independent review of data collected (e.g., through sensors or inspections) and generated (e.g., through risk models and software) to support decision making. In this section of the WMP, the electrical corporation must provide the following:

- **Independent reviews:** The electrical corporation's procedures for conducting independent reviews of data collection and risk models.
- **Additional review triggers:** The electrical corporation's internal procedures to identify when a third-party review is required beyond the routinely scheduled reviews.
- **Results, recommendations, and disposition:** The results and recommendations from the electrical corporation's most recent independent review of its data collection and risk models. This includes the electrical corporation's disposition of each comment.
- **Routine review schedule:** The electrical corporation's routine review schedule.

The electrical corporation must enter each accepted recommendation from independent review into its action tracking system for resolution (assignment of responsibility, development of technical plan, schedule for development and deployment, etc.) in accordance with the requirements discussed in Section 8.

Liberty performs internal reviews of the data used in risk modeling and provides the data to vendors as risk model inputs. Additionally, Liberty reviews all WMP data provided as part of its quarterly data reporting to Energy Safety. Below is a list of data used in risk modeling and a description of the independent review process.

Independent review of Liberty and vendor data:

- **Liberty outage data**: Liberty currently uses Schneider ADMS as its outage management system ("OMS") to collect outage data. Liberty engineers review and validate outage data based on cause codes, dispatch remarks, outage times, restoration times, and restoration steps provided from OMS to present accurate outage data. Liberty uses the data collected to document where outages occur, the outage cause, and the impact on customers. Liberty uses outage data to understand how Liberty's system is performing, to collect SAIDI/SAIFI metrics, and to perform risk analysis. Liberty subject matter experts and managers review data and refine it to improve its effectiveness for these uses. For example, Liberty attempts to minimize outage data that has an unknown cause by training field staff who collect data in the field and through post-processing freeform text fields.
- **Liberty ignition data**: Liberty tracks and records ignitions through its Fulcrum system. The information in Liberty's ignition database includes ignition causes and investigation results per observations in the field in correlation with local fire municipalities. Dependent on specific factors related to the ignition, Liberty may supply the information from Liberty's ignition database to CAL FIRE or other fire municipalities upon request for additional review.
- **Operations data**: Liberty's asset inspection results are independently reviewed through its Asset Inspection QA/QC Program detailed in Section 8.5. Additionally, Liberty SMEs and data analysts review inspection data, work order data, and repair data prior to each quarterly data submission to Energy Safety and as necessary to support operations. This review includes data pipeline quality checks.
- **Vegetation data**: Liberty's vegetation data is independently reviewed as detailed in Section 9.
- **Technosylva wildfire risk modeling outputs**: In addition to historical reviews, Technosylva improves the accuracy and performance of the published fire models to better adjust results to observed fire behavior. This includes a better definition of the fuel types, improved forecast of live fuel moisture content, modifications to the crown fire modeling initialization scheme, and automatic fire adjustment based on data assimilation techniques using a rate of spread ("ROS") adjustment factor. In addition, Technosylva has implemented more than 20 additional fuel models into the WFA platform to enhance accuracy and address known limitations of published fire models. These improvements include crown fire analysis, ember and spotting, urban / non-burnable area encroachment, and consequence and impact quantification. Improvement of the fire modeling platform of choice necessitates not only

improvements in mathematical algorithms but substantial improvements in the accuracy and resolution of input data sources. These work in concert to enhance the modeling and outputs to match observed and expected fire behavior. A robust operationalization of fire models requires constant and ongoing research, testing, validation, and implementation of both models and data sources.

- **Technosylva independent review**: Ongoing fire model validations are performed both internally and during operational scenarios in California in collaboration with CAL FIRE. Technosylva assessed the performance of fire spread models for initial attack incidents (either surface or crown) currently used in operational environments in California through the analysis of the rate of spread (ROS) of 1,853 wildfires. The work has been published in the International Journal of Wildland Fire.[40] The paper states that the fire spread model's performance for California is in line with previous studies developed in other regions and the models are accurate enough to be used in real-time operations to assess initial attack fires. Technosylva identified how some environmental variables may bias the ROS predictions, especially in timber areas where the Scott and Burgan (2005) fuel models underestimated ROS. New improvements in the fuel families and crown fire spread models have further improved the accuracy and performance of the fire models to better adjust the results to observed fire behavior.
- **Annual WMP Independent Evaluation**: As part of the OEIS WMP process, Liberty selects an Independent Evaluator ("IE") to review and assess its level of compliance with its WMP. This independent evaluation process requires Liberty to provide all requested data related to its prior year's WMP initiatives for independent review and verification.

Beyond reviewing Liberty and vendor data, Liberty has implemented new reviews of key model components to promote the integrity of Liberty's revised risk model.

FEP benchmarking of Technosylva's consequence datasets: FEP evaluated Technosylva's wildfire consequence outputs against the U.S. Forest Service Wildfire Risk to Communities dataset and CAL FIRE's statewide risk assessment, using historical CAL FIRE incident data as the point of reference. The review found Technosylva's simulated fire sizes were smaller than the historical dataset, and this finding is the basis for the consequence scaling factor described previously. This example shows how core modeling methodology is tested, validated, and adjusted accordingly.

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[40] https://www.publish.csiro.au/WF/WF22128.

Liberty independent replication of FEP's delivered model outputs: RN-LU-26-02 explains that Liberty had relied on its vendor's own characterization of the previous risk model, rather than developing internal expertise and knowledge of the model mechanics. To address this, Liberty independently replicated FEP's risk and benefit-cost calculations. The replication was performed by a Liberty risk analyst who was not involved in prior development of the Liberty risk model. The replication was performed in a separate programming language from FEP's risk model environment, and the replication was able to validate FEP's calculation steps and circuit-level outputs.

Model validation performed by FEP: FEP performs formal statistical validation of the Probability of Outage model, documented in Appendix B. Performance metrics are calculated using 5-fold out-of-fold cross-validation to evaluate every sample using a model that was not trained using that sample. The diagnostic outputs generated are a confusion matrix, a Receiver Operating Characteristic (ROC) curve, a calibration curve, a feature importance ranking, and SHAP feature contribution plots, each referenced to the established statistical literature. FEP separately compares historical against model-estimated annual outage rates and circuit rankings as an additional validation exercise. See previous discussion of the probability of outage model and Appendix B.

External review of Liberty's risk model by state and local agencies: Upon completion of the development of the risk model, Liberty conducted an external technical review of its wildfire risk model through a stakeholder engagement session. The meeting included subject matter experts in wildfire prevention and risk modeling from the California Tahoe Conservancy, Lake Valley Fire Protection District, USFS Lake Tahoe Basin Management Unit, and Tahoe Resource Conservation District. Liberty presented the model's architecture, data inputs, utility-caused ignition probability methodology, wildfire consequence calculations, risk monetization framework, benefit-cost calculations, and use of model outputs to inform mitigation prioritization and capital planning. Attendees reviewed the model assumptions and found Liberty's approach reasonable and appropriately focused on evaluating utility-related wildfire risk. Suggested opportunities for improvement noted during the meeting included enhanced modeling to address access/egress and the ongoing tree mortality observed in the Tahoe Basin. Liberty has included these suggestions as part of its RAI plan outlined in Section 5.7.

Liberty internal review: Liberty formalized its internal review by approving a Risk Focus Group Charter in May 2026. The primary purpose of the Risk Focus Group ("RFG") is to provide cross-functional governance and oversight of Liberty's wildfire risk management program, including, but not limited to, wildfire risk modeling, mitigation and investment decisions, enhancements to operational practices, and continuous improvement. The RFG serves as the primary decision-

making forum for overseeing the wildfire risk management program. It supports the overall mission of Liberty's wildfire risk management program: to reduce wildfire risk in an efficient and consistent manner, while addressing critical issues and areas of continuous improvement identified by the Office of Energy Infrastructure Safety ("OEIS"), Liberty, and third-party assessments of Liberty's Risk-Informed Decision-Making ("RIDM") Framework.

To address RN-LU-26-02, Liberty provides detailed information on the RFG:

LU Table 5-7: Summary of Risk Focus Group Meetings

Date	Topics covered	Results, including risk model methodology changes
17-Mar	Kickoff. Opening comments on the Draft Decision, Charter development, FEP engagement, Firescape proposal	Charter drafting assigned, target of May 29. Site visit set with FEP. No motions, pre-Charter
2-Apr	Final decision denying the 2026-2028 WMP, workplan, monthly Energy Safety cadence	Workplan adopted as the tracking basis. FEP asked to bucket improvements into immediate, pre-filing, and long term. No motions, pre-Charter
16-Apr	Data requests, benchmarking metrics, EFD pilot, tail adjustments	Tail risk adjustment identified as a key methodology decision. No motions, pre-Charter
23-Apr	Data requests, physics and machine learning models, Technosylva clarifications, meeting cadence	FEP confirmed both a physics model and a Liberty-specific machine learning model with documentation for each. Cadence moved to weekly. No motions, pre-Charter
30-Apr	Data requests, fragility curves, tree mortality, LiDAR, EFD, risk spend efficiency	Data gaps assigned to owners. No motions, pre-Charter
7-May	Charter, high impedance fault detection pilot, FEP model development	Charter adopted. FEP to bring model variables forward weekly for approval
14-May	Action items, data requests, model progress	Egress, climate change, and tree mortality discussed
21-May	Consequence, reliability, and financial variables, risk informed decision making framework	California adjusted value of statistical life adopted for safety monetization. ICE 2.2, $1M per structure, and SCE acres burned recommended, held for vote after quorum was lost
28-May	Model granularity and data quality, May 21 variables, PSPS likelihood	Circuit level granularity retained. ICE 2.2, $1M per structure, and $2,336 per acre burned adopted. Simplified PSPS likelihood adopted, historical events plus a minimum threshold for circuits with no PSPS history, with a climate change adjustment
4-Jun	PSPS consequence, PEDS outage risk, Gridscope business case	Adopted SCE ratios for serious injuries per customer de-energized, a 17-hour PSPS duration, and $550 per event per customer. PEDS risk deferred to the improvement plan, with a question to Energy Safety on excluding it for 2027. Gridscope pilot approved
9-Jun	Risk scaling, Mountain View Fire, expected against tail risk	Scaling of Technosylva outputs to observed fire costs identified as a needed methodology change, vote scheduled
11-Jun	Consequence scaling vote, Technosylva QA/QC	Consequence scaling factor of 1.27 approved (later refined to 1.26 on 6/18). Technosylva, CalFire, and USFS outputs compared, field validation recommended where the three diverge

Date	Topics covered	Results, including risk model methodology changes
16-Jun	Mitigation effectiveness analysis and assumptions	Benchmarking adopted as the effectiveness approach. Covered conductor confirmed as 3-ply, with the same cause code effectiveness for existing and proposed assets. ICE 2.2 produced a combined $2.63 per CMI for review
18-Jun	CMI approval, financial unit costs, initial mitigation effectiveness	$2.63 per CMI approved. Financial unit costs approved. Scaling factor revised from 1.27 to 1.26. PG&E identified as the closest benchmarking match
23-Jun	Probability of failure, machine learning and statistical	Model structure reviewed, probability of outage and probability of ignition, extreme fire weather derived from fire history, weather, and Liberty PSPS events. Asset Health Index reviewed. Deeper technical review scheduled
26-Jun	Mitigation effectiveness framework	PG&E confirmed as the benchmark, with cause code alignment to Energy Safety and PG&E drivers and sub-drivers. Overhead and covered conductor to yield a circuit specific score, PSPS and EPSS to be programmatic
30-Jun	Initial risk results, benefit-cost ratio framework	BCR framework reviewed
2-Jul	WMP outline, hardened circuit and SAIDI analysis	Section 5, 6, 8, Appendix B, and Appendix D drafting assigned, drafts due July 31. Distribution set as the impact focus, with a separate score for transmission
7-Jul	Traditional hardening against covered conductor, remaining model variables, BCR results	Real discount rate of 4.51% approved. Inflation set at 2.93% and WACC at 7.44%. Maturity adjustment strategy approved, using IWRMC maturity model scores, giving PSPS 75% and SRP 56%
9-Jul	Traditional hardening analysis, risk and BCR results, Section outline	Underground effectiveness strategy approved, PG&E values excluding secondary with a maturity adjustment. Asset life rounding approved, 60 years for overhead and underground. Dashboard access issued to Liberty for scenario testing
14-Jul	Overhead effectiveness value, SRP circuit confirmation	Overhead hardening effectiveness of 23% approved, derived empirically from Liberty pole replacement and outage data using a treatment and control comparison, applied to asset drivers only
16-Jul	Risk and BCR review, risk model improvement plan	Residential $0.08 and non-residential $23.47 per CMI approved, replacing the blended $2.63 value. One PSPS event per feeder per year confirmed as an assumption, with circuit specific likelihood routed to the improvement plan. Present value of benefits confirmed as excluded, to be disclosed in the WMP. Improvement plan items sorted into short- and long-term commitments
21-Jul	Risk modeling overview, fire partner meeting preparation	Overhead hardening unit costs reviewed
23-Jul	Energy Safety presentation status, fire partner collaboration	Presentation structured around the five critical issues and where each is addressed in the 2027 WMP
30-Jul	Overhead infrared finding prioritization, 2027 initiatives, fire partner meeting review	C2 Group thermal priority levels approved. Fire partner feedback on wind thresholds and tree mortality taken up, with interest in aligning thresholds to PEDS and PSPS device settings
6-Aug	Capital plan, risk ranking and circuit prioritization	Pole replacement target of 300 per year approved, 5 in favor and 1 opposed. Covered conductor target of 8 miles and four projects approved unanimously, MEY3400, MEY3300, CAL2501, and TPZ1202. Prioritization screens approved unanimously, circuits above 5% of total overall utility risk and above $2M per mile of overhead risk

5.6.2 Model Controls, Design, and Review

An electrical corporation's risk modeling approaches are complex, with several layers of interaction between models and sub-models. If these models are designed as a single unit, it can be difficult to evaluate the propagation of small changes in assumptions or inputs through the models. The requirements in this section are designed to facilitate the review of models by the stakeholders and Energy Safety, and to allow for more comprehensive retrospective analysis of failures in the system.

The electrical corporations must report on its risk modeling software's model controls, design, and review in the following areas:

- **Modularization:** The electrical corporation must report on the degree to which its software architecture is sufficiently modular to track and control changes and enhancements over time. At a minimum, the electrical corporation must report if it has separate modules to evaluate each of the following:
    - Weather analysis
    - Fire behavior analysis
    - Seasonal vegetation analysis
    - Equipment failure
    - Exposure and vulnerability analysis
- **Reanalysis:** The electrical corporation must describe its capability to provide the results of its risk model based on the operational version of the software (including code and data) on a specific historic day.
- **Version control:** The electrical corporation must report on how it conforms to industry standard practices in version controlling its risk model and sub-models. At a minimum, the electrical corporation is expected to report on:
    - Models and software version controls aligned with industry standard programs, procedures, and protocols
    - Version control of model input data, including geospatial data layers
    - Procedures for updating technical, verification, and validation documentation.

Modularization:

Currently, the wildfire risk element of Liberty's risk model has two key modules: ignition likelihood and wildfire consequence. These two modules are primarily developed by FEP and Technosylva, respectively.

Version Control and Reanalysis: Technosylva provides documentation on updates and data deliveries to Liberty. For example, Technosylva notifies Liberty as fuel layers are updated seasonally and it provides clear communication when updates are made to key consequence metrics in FireSight.

FEP has provided one initial delivery of the risk model and outputs to Liberty in advance of this WMP cycle. Thus, version control at present is straightforward with one single model version (1.0).

Looking ahead in terms of growing maturity and continued progress, Liberty has migrated the risk model to a network directory and has implemented best practices for version control. This includes tracking changes to the model structure and code in a repository (*e.g.*, Git), such that prior model versions can be replicated and team members can collaborate effectively on model development. This also promotes internal institutional knowledge and effective external auditing of the model by independent evaluators or other third parties. Given the complexity and cross-functional nature of wildfire risk modeling, Liberty is making it a renewed priority to implement these modeling best practices, namely uploading all model components and calculation steps to a Git repository.

5.7 Risk Assessment Improvement Plan

improvement. In this section, the electrical corporation must provide a high-level overview of its plan to improve both programmatic and technical aspects of its risk assessment in at least four key areas:

- **Risk assessment methodology**: Wildfire and PSPS risk assessment methodology and its documentation, including both quantitative and qualitative approaches.
- **Design basis**: Justification of design basis scenarios used to evaluate the risk and its documentation.
- **Risk presentation**: Presentation of risk to stakeholders, including dashboards and statistical assessments.
- **Risk event tracking**: Tracking and reconstruction of risk events and integration of lessons learned.

The overview must consist of the following information, in tabulated format:

- **Key area:** One of the four key areas identified above
- **Title of proposed improvement:** Brief heading or subject of the improvement
- **Type of improvement:** Technical or programmatic

- **Anticipated benefit:** Summary of anticipated benefit and any other impacts of the proposed improvement
- **Timeframe and key milestones:** Total timeframe for undertaking the proposed improvement and any key milestones

In addition, the electrical corporation must provide a concise narrative of its proposed improvement plan (maximum of five pages per improvement) summarizing::

- **Problem statement:** Description of the current state of the problem to be addressed
- **Planned improvement:** Discussion of the planned improvement, including any new/novel strategies to be developed and the timeline for their completion
- **Anticipated benefit:** Detailed description of the anticipated benefit and any other impacts of the proposed improvement
- **Region prioritization (where relevant):** Reference to risk-informed analysis (*e.g.*, local validation of weather forecasts in the HFTD) demonstrating that high-risk areas are being prioritized for continued improvement
- **Supporting documentation (as necessary)**

Liberty's approach to risk modeling has changed substantially since its previous WMP submission and revision notice. The likelihood side of the wildfire risk model was rebuilt with FEP, overall utility risk is now calculated as the sum of wildfire and outage program risk, PSPS risk is monetized using a value of lost load framework, and a chartered Risk Focus Group now governs risk modeling decisions. These improvements directly address the critical issues related to risk methodology; however, Liberty has identified additional areas where continued modeling maturity is paramount.

The RAI plan is organized around four key areas, and it distinguishes improvements Liberty intends to complete for the 2028-2031 Base WMP from those targeted for later WMP Updates.

Liberty’s overall goal is to advance the newly rebuilt risk model toward a best-in-class, independently verified, and operationally practical decision-making tool. Liberty also seeks to improve the empirical basis of all the modeling parameters and decision, which includes robust economic modeling and measurement, as well as improvements to the underlying data input quality.

Liberty’s 2026-2028 WMP contained a seven-item improvement plan. Before discussing Liberty’s new RAI plan, a summary of the previous improvement plan, including status, is provided below.

LU Table 5-8: Tracking of Liberty's Previous RAI Plan Commitments

Prior ID	Prior Commitment	Status
RA-1	Establish a process to continually test data quality and data input to improve the results of the tool	FEP performed two structured data quality reviews in 2026: independent benchmarking of Technosylva's consequence datasets against USFS and CAL FIRE data, and a QA/QC review of Liberty's asset spatial data. Additional data quality improvements are discussed in the updated RAI plan.
RA-2	Establish a process to continually test the risk modeling methodology and benchmark with peer utilities. Include wildfire and PSPS risk assessment documentation, including both quantitative and qualitative approaches	Liberty overhauled the risk modeling methodology: the likelihood side of the wildfire risk model was rebuilt with FEP. Peer benchmarking against PG&E, SCE, and SDG&E methodologies is documented in this section and further discussed related to mitigation effectiveness. Liberty additionally performed a full independent replication of the vendor model.
RA-3	Establish a feedback loop with subject matter experts to continually test and improve the results of the risk tool. This should include presentation of risk, including dashboards and assessments	The Risk Focus Group, chartered May 7, 2026, is the standing cross-functional forum for reviewing model results and assumptions. FEP delivered a risk model dashboard as part of the Liberty risk model.
RA-4	Establish a process to track and reconstruct risk events for the purpose of integrating lessons learned and improvement	With Liberty's new risk model, this item is no longer relevant for the WMP cycle. For validation purposes, Liberty's previous risk model identified reconstruction of risk events as a roadmap item. Liberty's new probability of outage model uses machine-learning techniques, including cross-validation, to predict risk events. Liberty will continue to cross-validate and update its probability of outage model with new outage data.
RA-5	Establish a cadence to present and deliver the results with business planners and operators to be incorporated into the decision-making and design process. This should include justification for design basis scenarios	The Risk Focus Group provides the standing cadence, and its recorded motions demonstrate risk model outputs driving mitigation and investment decisions
RA-6	Assign a dedicated resource the responsibility of improving and delivering risk-based results for better decision making. Place an emphasis on data quality, methodology, and subject matter expert and industry tested results	Lead Risk Analyst was onboarded June 2026 and has performed reviews and replication of the risk model, as well as writing and documenting key risk modeling methodological decisions.
RA-7	Evaluate and improve the calculation and scaling of outage risk including, but not limited to, the items included in RN-LU-26-01	Overall utility risk is now calculated as the sum of wildfire and outage program risk, denominated in dollars. The third-party model was replaced. Scaling and weighting were re-calculated based on peer benchmarks from PG&E, SCE, and SDG&E.

Table 5-6: Liberty Utility Risk Assessment Improvement Plan

ID	Key Area	Title of proposed improvement	Type	Anticipated benefit	Timeframe and key milestones
RA-1	Risk assessment methodology	Refine risk model to circuit-segment unit of analysis	Technical	Enables segment-level likelihood, consequence, BCR, and scoped hardening projects. Yields a more accurate characterization of risk, given variation in risk along a circuit that can span tens of miles.	Scoping Q3 2026 - Q2 2027; develop Q3 2027 - Q4 2027; apply model Q1 2028
RA-2	Risk assessment methodology	Develop PEDS risk model quantifying likelihood and consequence	Technical	Addresses limitation of current risk model that excludes PEDS outage risk and understates outage program risk	Formalize SRP data quality assessment Q4 2026; formalize thresholds to inform SRP likelihood Q4 2026; apply model Q1 2027
RA-3	Risk assessment methodology	Probabilistic assessment of extreme fire weather and ignition likelihood	Technical	Replaces the binary EFW threshold proxy with a continuous probabilistic treatment	Develop the methodology Q2 2027; apply the methodology Q3 2027
RA-4	Risk assessment methodology	Develop egress model and incorporate into wildfire consequence	Technical	Captures an important driver of wildfire consequence that is underrepresented in the current model	Scoping Q3 2026; apply Q4 2026
RA-5	Risk assessment methodology	Develop tree-mortality predictive model for wildfire consequence	Technical	Incorporates heavy fuel loading from tree mortality	Scoping Q3 2026; apply Q4 2026
RA-6	Risk assessment methodology	Refine calibration of Technosylva 8-hour fire spread outputs to actual losses	Technical	Reduces reliance on a scaling factor derived from historical fires, and places less weight on calibration in the risk model	Scoping Q2 2028 - Q3 2028; apply and re-estimate risk Q4 2028
RA-7	Risk assessment methodology	Evaluate additional wildfire consequence categories (e.g., additional insured losses, ecosystem services)	Technical	Extends the risk model to capture additional dimensions of wildfire damages, given a focus on structures burned, acres burned, and safety may underrepresent the potential damages from wildfire	Scoping Q1 2029 - Q3 2029; apply Q4 2029
RA-8	Risk assessment methodology	Incorporate climate change analysis into likelihood and consequence model components, including PSPS likelihood	Technical	More accurately characterizes risk that may arise from future climate change trajectories, including increased frequency of PSPS	Scoping Q3 2026 - Q4 2026, apply and re-estimate risk Q1 2027

ID	Key Area	Title of proposed improvement	Type	Anticipated benefit	Timeframe and key milestones
RA-9	Risk assessment methodology	Refine treatment of critical facilities, medical baseline, and AFN customers in PSPS and PEDS consequence	Technical	Addresses PSPS vulnerability, currently underrepresented in the risk model	Merging data availability and customer counts into risk model Q4 2026; apply and re-estimate outage program risk Q1 2027
RA-10	Risk assessment methodology	For transmission-level, incorporate outage causes and risk sub-drivers into outage likelihood model	Technical	Allows for more targeted transmission-system mitigations based on outage cause	Investigate viability and sample size of transmission outage logs Q2 2028; implement Q3 2028
RA-11	Risk assessment methodology	Incorporate blended mitigation effectiveness values (e.g., covered conductor + SRP + grid monitoring)	Technical	Reflects that mitigations are deployed in combination. Supports evaluation of multiple layers of mitigations	Benchmarking peer utilities for combined mitigation effectiveness; incorporating into risk model Q1 2027; expanded mitigations and capability Q1 2028
RA-12	Risk assessment methodology	Expand variable mitigation effectiveness parameters by risk sub-driver beyond overhead hardening with covered conductor	Technical	More realistically represents the effect of mitigations and how they vary by fault cause	Benchmark Q4 2026, apply for undergrounding and overhead hardening without covered conductor Q1 2027; expanded mitigations Q1 2028
RA-13	Risk assessment methodology	Develop empirical assessments of Liberty's mitigation activities on outage probabilities	Technical	Replaces benchmarked effectiveness values with Liberty-specific empirical evidence	Overhead hardening without covered conductor Q1 2027; refine estimate of overhead hardening without covered conductor Q1 2028; explore additional mitigations with sufficient data (e.g., covered conductor, vegetation management) Q1 2029
RA-14	Risk assessment methodology	Develop circuit or circuit-segment level BCR estimation for vegetation management projects	Technical	Brings vegetation management into the same benefit-cost framework as hardening programs. Allows more direct linkage of risk model to vegetation management program prioritization.	Scoping vegetation management data and activity types Q2 2027; test and validate approaches to modeling economics of vegetation management Q3-Q4 2027; apply model Q1 2028; explore additional BCR estimation for activity types, such as fuel treatments

ID	Key Area	Title of proposed improvement	Type	Anticipated benefit	Timeframe and key milestones
RA-15	Risk assessment methodology	Include additional mitigations in BCR estimation	Technical	Widens the set of mitigations that can be compared on a consistent benefit-cost basis	See previous milestones for vegetation management; fuse replacement Q1 2027; grid monitoring technologies Q1 2028
RA-16	Risk assessment methodology	Incorporate circuit or circuit-segment specific unit costs	Technical	Replaces system-average unit costs, improving BCR accuracy for variable terrain, permitting, and other cost challenges	Apply at the circuit-level Q1 2027; scope for circuit-segment level Q3 2029 - Q4 2029; apply to circuit-segment model Q1 2030
RA-17	Risk assessment methodology	Refine BCR calculation including O&M savings/costs and NPV method	Technical	More accurately characterizes cost modeling of grid hardening mitigations	Explore and benchmark O&M costs Q4 2026, apply at the circuit-level Q1 2027
RA-18	Risk assessment methodology	Establish model and input data version control; establish reanalysis capability	Programmatic	Allows clear documentation and version control as model inputs and calculations are edited and refined over time	Establish repository Q3 2026
RA-19	Risk assessment methodology	Establish external independent review of risk model	Programmatic	Provides external critique of risk model methodology. Allows improvement over time as risk model advances	Select reviewer Q2 2027; engage and complete review Q3-Q4 2027
RA-20	Risk event tracking	Standardize assignment of outage cause and sub-cause	Programmatic	Improves the cause taxonomy used to report and classify outages and risk events. Leads to a more cohesive set of sub-drivers that aligns clearly with mitigation effectiveness modeling	Review with operations and field teams Q4 2026 - Q1 2027
RA-21	Risk event tracking	Set targets for reduction in unknown outage causes	Programmatic	Reduces the share of outage records excluded from model training	Baseline and targets set Q4 2026; re-evaluate targets Q4 2027
RA-22	Risk event tracking	Establish a review process for outage cause determinations	Programmatic	Allows for data quality improvement in the risk model	Document the process Q4 2026
RA-23	Risk event tracking	Standardize the process for recording and investigating ignitions including root cause	Programmatic	Allows for data quality improvement in the risk model. Creates a foundational dataset for measuring ignition likelihood and mitigation effectiveness, empirically	Document the process Q4 2026
RA-24	Risk event tracking	Expand capture of ignition photographs and field data beyond reportable ignitions only	Programmatic	Allows for data quality improvement in the risk model. Creates a foundational dataset for measuring ignition likelihood and mitigation effectiveness, empirically	Document the process Q4 2026

6. Wildfire Mitigation Strategy Development

In this section of the WMP, the electrical corporation must provide a high-level overview of the risk evaluation processes that inform its selection of a portfolio of initiative activities, as well as its overall wildfire mitigation strategy.40 The electrical corporation's processes and strategy must be designed to achieve maximum feasible risk reduction and meet the goal(s) and plan objectives stated in Sections 3.1–3.2. Sections 6.1 and 6.2 below provide detailed instructions.

6.1 Risk Evaluation

6.1.1 Approach

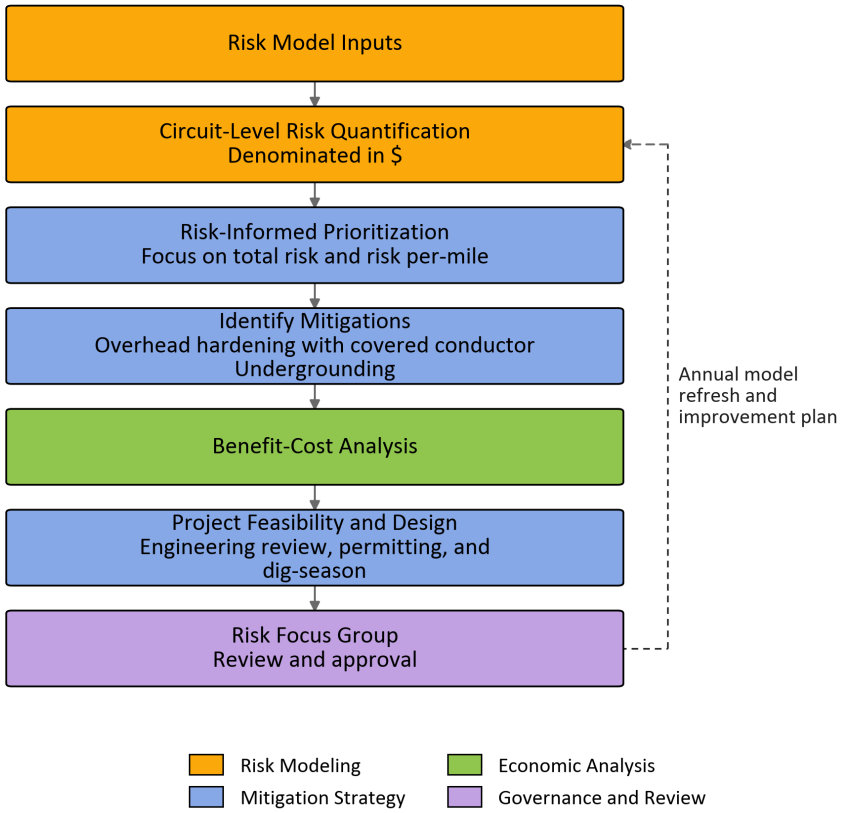
In this section of the WMP, the electrical corporation must provide a brief narrative of its risk evaluation approach, based on the risk analysis outcomes presented in Section 5. This narrative helps inform the development of a wildfire mitigation strategy that meets the goal(s) and plan objectives stated in Sections 3.1–3.2. The electrical corporation must indicate and describe in the narrative whether its risk evaluation approach meets or uses any industry-recognized standards (e.g., ISO 31000), best practices, and/or research.

The electrical corporation must describe the risk evaluation approach in a maximum of two pages, inclusive of all narratives, bullet point lists, and any graphics.

Liberty's approach to risk evaluation translates circuit-level risk calculations presented in Section 5 into a prioritized portfolio of mitigation projects. The approach takes a series of steps, visualized in Figure 6-1.

1. Quantify risk at the circuit-level
2. Rank circuits by overall utility risk and risk per-mile to identify where risk is concentrated within the service territory
3. Evaluate mitigation alternatives on those circuits using benefit-cost analysis, comparing estimated risk reduction against the modeled costs of the alternatives
4. Apply feasibility constraints, such as permitting, terrain, access, and seasonal work windows
5. Review and approval of proposed projects by the Risk Focus Group

Figure 6-1: Liberty's Risk Informed Decision-Making Process



Expressing risk in dollars underpins Liberty's approach to risk evaluation. Because wildfire risk and outage program risk are denominated in common units, it is possible to compare different types of projects that deliver varying degrees of benefits and costs across Liberty's system. Overhead hardening with covered conductor and undergrounding are the two key mitigations that Liberty currently evaluates in its benefit-cost analysis. Looking ahead, Liberty plans to add additional mitigations to its benefit-cost analysis and incorporate the impacts of mitigations on outage program risk in addition to wildfire risk (see RAI plan).

Liberty's risk model and its risk evaluation operate at the circuit level. This is a meaningful constraint on how mitigation projects are identified and scoped. The benefit-cost analysis presumes that a mitigation project is deployed to the entire length of the circuit. However, Liberty's circuits can extend dozens of miles, while actual construction projects are considerably smaller

In addition, a circuit-level estimate of risk does not indicate where along a circuit a mitigation should be located. It cannot distinguish between a circuit whose risk is concentrated in a short section from one whose risk is distributed evenly along its length. Liberty's RAI plan identifies

refinement of the risk model to a circuit-segment unit of analysis (*e.g.*, protected zone) as a top priority, which would allow mitigation projects to be scoped and evaluated at the resolution that more closely matches how they are constructed.

Liberty's current benefit-cost calculation compares a mitigation's expected annual risk reduction against the capital cost of the project. Liberty is refining its benefit-cost methodology to include a net present value framework and the incorporation of operations and maintenance costs and savings (see RAI plan), aligned with CPUC methodology on benefit-cost analysis.[41]

6.1.2 Risk-Informed Prioritization

In making decisions involving risk mitigation, the electrical corporation must identify and evaluate where it can make investments and take actions to reduce its overall utility risk. The electrical corporation must develop a prioritization list based on overall utility risk.

In this section, the electrical corporation must:

- Describe how it selects circuit segments of its service territory at risk from wildfire for potential initiative activities, including, at a minimum, the following:

  o Geographic scale used in prioritization (i.e., regional, circuit, circuit segment, span, asset)

  o Statistical approach used to select prioritized areas (e.g., circuit segments in top 20 percent for risk, circuit segments in top 20 percent for consequences)

  o Feasibility constraints (e.g., limitations on data resolution, jurisdictional considerations, accessibility)

Present a list that identifies, describes, and prioritizes circuit segments of its service territory at risk from wildfire for potential initiative activities based solely on overall utility risk, including the associated risk drivers. Associated risk drivers must be ranked in order of most impactful to risk.

Liberty's mitigation investment prioritization starts at the circuit-level, using overall utility risk discussed in Table 5-5. As discussed previously, circuit-level risk estimates present challenges due to project scopes being typically much smaller than an entire distribution or transmission

[41] Staff White Paper on Benefit-Cost Ratio Methodology, California Public Utilities Commission, CPUC Senate Bill 884 Application 26-02-005, April 2026

circuit. Liberty applies two screening criteria in its risk-informed prioritization process to address the circuit-level modeling constraint.

The first screen is absolute risk. Liberty identifies circuits accounting for five percent or more of total overall utility risk across its service territory. Eight circuits meet this threshold, accounting for more than 70 percent of Liberty's overall utility risk. These circuits are typically longer circuits with high outage rates in high wildfire consequence locations and are therefore also subject to higher PSPS risk.

The second screen is risk per overhead mile. Of the circuits that account for at least one percent of overall utility risk, Liberty identifies circuits where risk per overhead mile is at least two million dollars. This screen captures circuits that are typically shorter in length where risk is more concentrated. Given the capital costs to deploy mitigations, the screening criteria of two million dollars of risk per overhead mile means that circuits that meet these criteria are likely to be cost-efficient candidates for mitigation. Three circuits qualify on this basis without meeting the absolute threshold, each of them under six overhead miles.

Liberty applies both screens to address the challenges of a circuit-level risk model. Ranking on absolute risk favors long circuits because a longer circuit has more assets and more vegetation exposure and therefore will have more risk by definition in the model. Ranking on risk per mile alone would prioritize shorter circuits that may have highly cost-effective projects but whose share of system risk is low. Applied together, the two screens identify eleven circuits accounting for approximately 76 percent of Liberty's overall utility risk.

Liberty faces feasibility constraints that affect the planning and execution of mitigation activities. These include complex permitting processes and environmental conditions that limit access to project areas. Despite its relatively small service territory, Liberty must coordinate with a wide array of jurisdictional agencies including two U.S. Forest Service Regions, four National Forests, State land, Caltrans, the Tahoe Regional Planning Agency, and various other local, state and federal agencies. This jurisdictional complexity contributes to a lengthy and resource-intensive permitting process.

Much of Liberty's service territory is situated within the Sierra Nevada, encompassing rugged, mountainous terrain that presents significant operational and logistical challenges. The region features steep slopes, dense forests, high elevations, and remote areas with limited or no road access, often requiring specialized equipment or aerial support to reach infrastructure assets. Additionally, the region is prone to severe winter weather, which significantly shortens the annual work window for mitigation activities. Snow accumulation and icy conditions during the winter months limit accessibility and constrain the volume of work that can be completed each

year. These geographic and climatic factors must be carefully considered in the planning and execution of wildfire mitigation and system reliability efforts.

Table 6-1: Circuit Prioritization List Based on Overall Utility Risk

Rank	Circuit ID	Overhead Miles	Wildfire Risk ($)	Overall Utility Risk ($)	% of Risk	Risk per Overhead Mile ($)	Qualifying Screen	Associated Risk Drivers
1	TPZ1202	55	139,889,565	143,192,740	18	2,607,577	Both	Equipment, Wind
2	MEY3400	54	78,143,003	87,536,761	11	1,607,843	Absolute risk	Equipment, Vegetation
3	MEY3200	22	65,185,834	83,305,122	10	3,852,411	Both	Equipment, Vegetation
4	MEY3300	53	58,075,016	63,720,461	8	1,208,991	Absolute risk	Equipment, Vegetation
5	STL3501	14	45,416,407	53,579,217	7	3,849,669	Both	Equipment, Vegetation
6	STL3101	16	46,128,236	52,156,614	6	3,349,176	Both	Equipment, Vegetation
7	MEY3500	27	43,485,679	50,817,694	6	1,855,403	Absolute risk	Equipment, Vegetation
8	MULLER1296	44	45,370,802	47,951,211	6	1,098,233	Absolute risk	Equipment, Wind
9	CAL2501	5	14,452,063	14,574,657	2	3,119,242	Risk per mile	Equipment, Vegetation
10	CEM41	6	13,713,025	14,186,513	2	2,436,865	Risk per mile	Equipment, Wind
11	STL2300	3	8,953,187	10,855,487	1	3,657,636	Risk per mile	Equipment, Vegetation

The prioritized list of circuits is consistent with Liberty's operational understanding of its territory and system. The highest ranked circuit serves the area affected by the Mountain View Fire, and a substantial share of the remaining prioritized risk falls on circuits serving South Lake Tahoe and Meyers, where the greatest concentration of customers and structures coincides with the only Tier 3 HFTD designation in Liberty's service territory. The TPZ1202 and the MULLER1296 circuits are also the only two circuits to have experienced a public safety power shutoff.

6.1.3 Activity Selection Process

After the electrical corporation creates a list of top-risk contributing circuits/segments/spans (Section 5.5.2) and prioritized circuit segments based on overall utility risk (Section 6.1.2), the electrical corporation must then identify potential mitigation strategies. It must also evaluate the benefits and drawbacks of each strategy at different scales of application (e.g., circuit, circuit segment, system-wide). In this section of the WMP, the electrical corporation must provide the basis for its decisions regarding which initiative activities to pursue.

The electrical corporation must consider appropriate initiative activities depending on the local conditions, physical setting, and the risk components that create the high-risk conditions. There may be a wide variety of potential initiative activities, such as:

- Engineering changes to grid design
- Discretionary inspection and/or maintenance of existing assets
- Vegetation clearances beyond minimum regulatory requirements
- Alternative operational policies, practices, and procedures
- Improved emergency planning and coordination

The electrical corporation must also evaluate mitigating risk through a portfolio of combined multiple initiative activities.

The electrical corporation is expected to use its procedures discussed in Section 5 to:

- Develop potential initiative activities approaches to address each risk
- Characterize the potential initiative activities to provide internal decision makers with information required to support decision making (e.g., costs, material availability), including an assessment of uncertainties.
- Document the results of the evaluation

The electrical corporation must develop a proposed schedule for implementing each initiative activities and proposed metrics to monitor implementation and effectiveness of the initiative activities. The following subsections provide specific requirements.[42]

6.1.3.1 Identifying and Evaluating Initiative Activities

The electrical corporation must describe how it identifies and evaluates options for mitigating wildfire and outage program risk at various analytical scales, consistent with the CPUC

[42] Annual information included in this section must align with the applicable data submission.

guidelines associated with the Risk-Based Decision-Making Framework (RDF) established in the RDF Proceeding.[43] The electrical corporation must present the risk mitigation identification procedure it plans on using during the course of the three years filed in the Base WMP. If the electrical corporation is required to submit a RAMP filing to the CPUC, the risk mitigation procedure provided must be consistent with either its most recent RAMP filing or its upcoming RAMP filing. The electrical corporation must describe the following:

- The procedures for identifying and evaluating initiative activities (comparable to Risk-Based Decision-Making Framework, row 26[44]), including the use of risk buy-down estimates (e.g., risk-spend efficiency) and evaluating the benefits and drawbacks of mitigations.
- To the extent possible, multiple potential locally relevant initiative activities that address local wildfire risk drivers (see Risk-Based Decision-Making Framework, row 29).[45]
- The approach the electrical corporation uses to characterize uncertainties and how the electrical corporation's evaluation and decision-making process incorporates these uncertainties (see Risk-Based Decision-Making Framework, rows 29 and 30).[46]
- Two or more potential initiative activities or initiative portfolios for each risk driver included in the list of prioritized circuit segments (Table 6-1 in Section 6.1.2), including the following information:

o The initiatives and activities

o Expected risk reduction and impact on individual risk components

o Where mitigations can be feasibly deployed in combination, the electrical corporation must compare these portfolios of mitigations (e.g., covered conductor, vegetation management, asset inspections, and protective device

[43] The CPUC initially adopted its Risk-Based Decision-Making Framework in D.18-12-014 (see S-MAP, step 3, rows 15–25), https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M250/K281/250281848.pdf. The CPUC updated its Risk-Based Decision-Making Framework in December 2022 in D.22-12-027, https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M500/K014/500014668.PDF. This Decision changed the risk evaluation framework from Multi-Attribute Value Function (MAVF) to Cost-Benefit Analysis (CBA).

[44] Risk-Based Decision-Making Framework, Appendix A to D.22-12-027, California Public Utilities Commission, December 2022 at A-16: https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M500/K043/500043720.PDF.

[45] Risk-Based Decision-Making Framework, Appendix A to D.22-12-027, California Public Utilities Commission, December 2022 at A-20: https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M500/K043/500043720.PDF.

[46] Risk-Based Decision-Making Framework, Appendix A to D.22-12-027, California Public Utilities Commission, December 2022 at A-20 to: https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M500/K043/500043720.PDF.

and equipment settings vs undergrounding, secondary hardening, and asset inspections).

o Estimated implementation costs

o Where mitigations can be feasibly deployed in combination, the utility must compare these portfolios of mitigations (e.g., covered conductor, vegetation management, and protective device and equipment settings versus undergrounding and secondary hardening).

o Relevant uncertainties and associated potential impacts, including solutions on how to reduce the potential impacts

o Implementation schedule

- How the electrical corporation uses multi-attribute value functions (MAVFs), cost-benefit analysis (CBA), and/or other specific risk factors (as identified in relevant CPUC Decisions) in evaluating different mitigation alternatives.
- How the electrical corporation defines different aspects of risk considerations, including: Risk Attitude, Risk Tolerance, Uncertainty, and Tail Risk in its risk mitigation strategies.[47]

o Must break out each by safety and reliability (PSPS and PEDS), as applicable

o Must include a discussion of how each aspect impacts mitigation selection and prioritization.

Liberty identifies and evaluates initiative activities using benefit-cost analysis, which serves as Liberty's risk buy-down estimate. Liberty calculates benefit-cost ratios according to the following formula, consistent with CPUC guidelines:[48,49]

$$BCR = \frac{\text{Risk Reduction} + \text{O\&M Savings}}{\text{Capital Cost} + \text{O\&M Costs}}$$

[47] Ordering Paragraph 4, D.22-12-027 at 65.
[48] Staff White Paper on Benefit-Cost Ratio Methodology, California Public Utilities Commission, CPUC Senate Bill 884 Application 26-02-005, April 2026
[49] D.22-12-027 Phase II Decision Adopting Modifications, Risk-Based Decision-Making Framework, California Public Utilities Commission, December 21, 2022.

Where:

- Risk reduction: the mitigation's projected reduction in overall utility risk, expressed annually in dollars
- O&M savings: reduction in operations and maintenance costs attributable to the mitigation ($)
- Capital cost: the mitigation's installed capital cost, expressed annually in dollars
- O&M costs: the incremental operations and maintenance costs attributable to the mitigation

At Liberty's current risk model maturity, Liberty estimates a BCR for two mitigations: (1) overhead hardening with covered conductor and (2) undergrounding. Incremental O&M savings and costs are not presently modeled, so both terms are set to zero. In addition, the two modeled mitigations are not assumed to have any impact on outage program risk nor any impact on outages that occur outside of PSPS and PEDS programs. Therefore, the risk reduction in the BCR calculation currently reflects a wildfire risk reduction.

Specifying a baseline in the BCR calculation:

Liberty measures risk reduction as a marginal change in benefits and costs relative to a defined baseline. Conceptually, Liberty quantifies two key baselines in its risk model. The first is an "unmitigated baseline" that describes wildfire risk under the assumption that no mitigations are actively reducing risk. The second baseline is a "no-build" baseline that reflects a snapshot of Liberty's current state of mitigations, including the use of PSPS and Liberty's SRP program. Liberty measures the risk reduction of its two candidate hardening mitigations against the no-build baseline, accounting for the risk reduction already in place from the use of PSPS and SRP.

A subset of existing overhead hardening work is also accounted for in Liberty's "no-build" baseline scenario. Further below in Section 6.1.3.1, Liberty presents an initial empirical estimate of the mitigation effectiveness of its overhead hardening program without covered conductor. Liberty identified a sample of circuits from which to derive this estimate of mitigation effectiveness, and the "no-build" baseline applies the mitigation effectiveness estimate to this sample of circuits. It is worth noting that other hardening activities are not yet directly factored into the "no-build" baseline, such as existing covered conductor and fuse replacements. To some degree, these existing mitigations are indirectly accounted for because they are present in the model training data used to estimate underlying outage probabilities.

Mitigation costs:

Liberty uses RFG-approved unit costs in its benefit-cost analysis. To formalize Liberty's cost parameters, the RFG explored and analyzed historical project cost data. FEP performed a third-

party review of historical project costs to compare estimated and actual unit costs. Going forward, Liberty has identified in its RAI plan that it plans to introduce circuit or zone-specific capital costs per mitigation to reflect varying environmental, terrain, and permitting challenges across its service territory. Ultimately, the RFG agreed upon the following default cost parameters per circuit-mile:

- Overhead hardening with covered conductor = $1,850,000 per mile in capital cost
- Undergrounding = $5,100,000 per mile in capital cost

Mitigation effectiveness:

While two mitigations are modeled in the benefit-cost analysis, Liberty specifies effectiveness parameters for five mitigations in its overall estimation of risk reduction. The five mitigations are overhead hardening with covered conductor, undergrounding, overhead hardening without covered conductor, PSPS, and SRP.

A motivating goal of Liberty's risk modeling efforts is to measure and establish effectiveness values from its own datasets and deployments. However, with one exception, Liberty does not yet have enough post-mitigation data to measure causal effects of mitigations on risk outcomes. To fill this gap, Liberty compiled effectiveness values from peer utilities including PG&E, SCE, SDG&E, and Portland General Electric. Ultimately, Liberty adopted values from PG&E because PG&E shares similar operating conditions to Liberty in the Central and Northern Sierra Nevada. Another advantage of PG&E's effectiveness values is that they are clearly broken out by risk drivers and sub-drivers.

Overhead hardening with covered conductor is the only mitigation that Liberty currently varies by risk sub-driver. Its values range from 0.60 for equipment failure to 0.77 for animal contact. Undergrounding, PSPS, and SRP all rely on a single effectiveness value across all sub-drivers, while overhead hardening without covered conductor is only applied to the asset-related risk driver (includes equipment failure primarily).

PSPS and SRP effectiveness are based on PG&E benchmarking; however, Liberty applies maturity adjustments, given the operational nature of these programs and Liberty's shorter relative program experience. Liberty calculates maturity adjustments using IWRMC survey results related to PSPS and equipment settings categories. The maturity adjustments are approximately 80%, yielding effectiveness parameters for PSPS and SRP of 0.75 and 0.56, respectively.

Overhead hardening without covered conductor is the exception to the benchmarking approach. Liberty derives its effectiveness value of 0.23 empirically from Liberty's outage

events, comparing circuits that received substantial investment against circuits that received minimal investment. More on the empirical analysis is addressed in the section below.

LU Table 6-1: Mitigation Effectiveness Parameters

Mitigation	Category	Effectiveness	Applies to	Source
Overhead hardening with covered conductor	Hardening	Ranges from 0.60 to 0.77 by sub-driver	Wildfire risk	PG&E overhead hardening values by risk driver, Joint IOU Grid Hardening Working Group Report
Undergrounding	Hardening	0.95 for all sub-drivers	Wildfire risk	PG&E underground-primary with overhead-secondary values, Joint IOU Grid Hardening Working Group Report
Overhead hardening without covered conductor	Hardening	0.23 for asset-related driver only	Wildfire risk	Empirical analysis of outage counts on Liberty distribution circuits
PSPS	Operational	0.75 for all sub-drivers	Wildfire risk	PG&E 2026-2028 WMP, Table 6-3, adjusted for program maturity
Equipment settings to reduce wildfire risk (SRP)	Operational	0.56 for all sub-drivers	Wildfire risk	PG&E 2026-2028 WMP, Table 6-3, adjusted for program maturity

For overhead hardening with covered conductor, Liberty's mitigation effectiveness parameters ranging from highest to lowest are 0.77 for animal contact, 0.72 for vegetation contact, 0.70 for third-party contact, 0.64 for vehicle contact, and 0.60 for equipment failure.

The benchmarking exercise to derive these parameters that vary by sub-driver involves creating a crosswalk from PG&E's wildfire distribution risk model to Liberty's sub-driver taxonomy. Liberty mapped each PG&E driver to the corresponding Liberty sub-driver and averaged PG&E's values. For example, PG&E's risk model operates at a more granular driver-level than Liberty's, so Liberty's assumed equipment failure parameter of 0.60 is an average of PG&E's eleven equipment-related failure values.

Liberty uses mitigation effectiveness parameters to calculate residual risk, as follows:

$$R_{residual} = R_{baseline} \times (1 - EF)$$

Where:

- $R_{residual}$: the risk remaining after the mitigation is modeled or deployed

- $R_{baseline}$: the risk that the mitigation is applied to. For PSPS, SRP, and overhead hardening without covered conductor, the baseline currently refers to the unmitigated baseline. For undergrounding and overhead hardening with covered conductor, the baseline currently refers to the "no-build" baseline, after existing mitigations have been accounted for.
- EF: the mitigation effectiveness parameter

Empirical analysis of overhead hardening without covered conductor:

Given Liberty's experience and deployments with respect to overhead hardening, Liberty investigated the relationship between such hardening activities and outage counts. To test a potential effect, Liberty leveraged the outage dataset relied upon for training the probability of outage model, which includes outage records for the four-year period 2022-2025.

To derive the mitigation effectiveness parameter of 0.23, Liberty conducted a straightforward differences-in-differences calculation. The calculation compares outage counts on circuits that received overhead hardening investment against circuits that received minimal hardening investment.

Liberty classified each circuit by the number of poles replaced on the circuit by the end of 2025. Circuits with at least ten percent of poles replaced were considered in the "treatment" group, and circuits with less than ten percent considered the "control" group. Circuits with at least five percent covered conductor installed were dropped from the analysis to avoid biasing the measurement. Liberty then counted asset-related outages on the treatment and control group, excluding planned outages and major event days. The analysis found that outages rose by roughly 54 percent on the treatment circuits between 2022-2023 and 2024-2025, while outages rose at a higher rate of 77 percent on the control feeders over the same period. The difference between the two yields the estimate of 23 percent, which reflects the avoided growth in outages on the treatment circuits associated with the hardening activity.

Liberty acknowledges this is a simplified estimate, while still acknowledging the advantages of the calculation, namely that it uses actual Liberty deployment and outage data, and it controls for common wildfire risk trends that affected Liberty's service territory throughout the period. Going forward, Liberty plans to improve the robustness of the measurement through the use of more detailed measurement methods, such as regression-based frameworks with fixed effects.

Liberty recognizes its set of mitigation effectiveness parameters is a starting point. Liberty's RAI plan identifies three areas for improvement. First, Liberty plans to extend variable mitigation effectiveness beyond covered conductor to undergrounding, overhead hardening without covered conductor, and SRP. Second, Liberty plans to develop blended effectiveness values for mitigations deployed in combination because stacked mitigations do not reduce risk additively,

and the current sequential treatment means the first mitigation applied to the unmitigated baseline is credited with the largest risk reduction. Third, an overarching goal of Liberty's risk modeling efforts is to replace benchmarked values with Liberty's own empirical estimates as more post-mitigation data is collected.

Sensitivity analysis:

A central challenge of utility wildfire risk modeling rests with the measurement and communication of uncertainty. There are two key sources of uncertainty in utility wildfire risk models: (1) model uncertainty and (2) parameter uncertainty. Liberty defers quantification of model uncertainty in its current version of the risk model, which would involve alternate specifications of the probability of outage model or the use of other wildfire spread models beyond Technosylva's provided outputs. Liberty can provide examples of parameter uncertainty, which includes inputting alternative mitigation effectiveness or cost parameters and comparing the results to the default parameter choices.

Risk considerations:

Liberty defines different aspects of risk considerations as follows:

- Risk Attitude: Liberty adopts a risk-averse posture, prioritizing mitigations that address high-consequence, low-likelihood events.
- Risk Tolerance: Liberty maintains a low tolerance for wildfire-related risk by implementing its wildfire mitigation strategy across all parts of the system.
- Uncertainty: Liberty accounts for uncertainty through sensitivity analyses and scenario modeling.

Tail Risk: Liberty's risk model focuses on extreme fire weather and 100th percentile modeled consequences from its vendor's wildfire spread model.

Initiative activities:

Liberty provides the output of its risk modeling and mitigation effectiveness in the table below. For the circuits in the priority list, the table contains the estimated aggregate risk reduction and estimated implementation costs for the two candidate hardening mitigations.

It is worth underscoring, as stated previously, that the risk model operates at the circuit-level, so the table below provides estimates under the assumption that the hardening initiative is applied to the entire circuit. This modeling simplification further assumes Liberty faces no feasibility constraints or is not limited by the amount of hardening activity it can complete annually. In other words, LU Table 6-2 does not reflect Liberty's capital plan, but rather it

reflects the current maturity of Liberty's risk model to compare the annual costs and risk reduction of two candidate hardening mitigations.

LU Table 6-2: Initiative Activities for Risk Drivers of Prioritized Circuits

		Risk Reduction ($ millions-yr)		Risk Reduction (% of Baseline)			
Initiative	**Estimated Cost ($ millions-yr)**	**Wildfire**	**Outage Program**	**Unmitigated Baseline**	**No-Build Baseline**	**Schedule**	**Risk Driver**
Overhead hardening with covered conductor	9	43	-	5%	18%	See Section 8	Equipment, Vegetation, Wind
Undergrounding	25	69	-	9%	30%	Not proposed for this WMP cycle	Equipment, Vegetation, Wind

6.1.3.2 Initiative Activity Prioritization

The electrical corporation must seek to implement the best integrated portfolio of initiative activities using its project prioritization framework to meet its plan objectives, optimize its resources, and maximize risk reduction. Objectives may be based on quantified risk assessment results (see Section 5), or other values prioritized by the electrical corporation or broader stakeholder groups (e.g., Tribal interests, environmental protection, public perception, resilience, cost). The electrical corporation must do the following:

- Evaluate its potential initiative activities. This evaluation will yield a prioritized list of initiatives. The objective is for the electrical corporation to identify the preferable initiatives for specific geographical areas. (Comparable to Risk Based Decision-making Framework, rows 12 and 29).48
- Identify the best initiative activities for all geographical areas at a location-specific level to create a portfolio of projects expected to provide maximal benefits within known limitations and constraints. (Comparable to Risk Based Decision-making Framework, rows 12 and 29).49 Explain when subject matter expertise is used as a part of initiative selection, including the process used by subject matter experts (SMEs) to provide their judgement.
- Explain how the electrical corporation is optimizing its resources to maximize risk reduction. Describe how the proposed initiative activities are an efficient use of

electrical corporation resources and focus on achieving the greatest risk reduction with the most efficient use of funds and workforce resources.

- Discuss the interrelationships between different initiative activities, in terms of how initiative activities influence and impact implementation and respective effectiveness for risk reduction, and how the electrical corporation evaluates trade-offs between initiative activities.
- The electrical corporation must describe how it prioritizes initiative activities to reduce both wildfire and PSPS risk. This discussion must include the following:
- A high-level schematic showing the procedures and evaluation criteria used to evaluate potential initiative activities. At a minimum, the schematic must demonstrate the roles of quantitative risk assessment, resource allocation, evaluation of other plan objectives (e.g., cost, timing) identified by the electrical corporation, and SME judgment. Where specific local factors, which vary across the service territory, are considered in the decision-making process (e.g., the primary risk driver in a region is legacy equipment), they must be indicated in the schematic. The electrical corporation must explain why those local conditions are part of the decision process (i.e., there should not be simply one box in the schematic that is labeled "local conditions," which is then connected to the rest of the process).
- Summary description (no more than five pages) of the procedures and evaluation criteria for prioritizing initiative activities, including the three minimum requirements listed above in this section.

Liberty's approach to prioritizing mitigations along its highest risk circuits takes three steps. First, for candidate hardening mitigations, Liberty calculates benefits, costs, and benefit-cost ratios, as described previously. Second, Liberty evaluates the feasibility of implementing the candidate hardening mitigations, alongside scoping the actual mitigation projects. Third, Liberty reviews proposed mitigation projects with the Risk Focus Group and ultimately approves projects.

Because Liberty's risk model operates at the circuit-level and because permitting, terrain, and seasonal work constraints pose substantial challenges, subject matter expertise must enter the framework. Engineering and operational judgment is required to assess the feasibility of proposed projects, especially because project scopes are typically shorter than full circuit lengths. In addition, the RFG is the forum for which projects are ultimately approved, and subject matter experts from a range of utility functions provide input, including engineering, operations, vegetation management, data science, and wildfire prevention.

In terms of resource optimization, Liberty's benefit-cost analysis operates within a budget-constrained framework. While many projects may pass the conventional benefit-cost threshold of 1.0, Liberty cannot complete all such projects due to financial and resource constraints and the upward pressure that level of deployed investment would place on customers. Instead, Liberty optimizes resources by ranking and prioritizing circuits, as described previously, and then proposing projects that satisfy the budget.

Liberty develops its integrated portfolio of initiative activities through a structured project prioritization framework designed to meet WMP objectives, optimize resources, and maximize wildfire and PSPS risk reduction. This framework incorporates quantitative risk modeling, subject matter expertise, and location-specific constraints for mitigation activities that are both effective and feasible. Liberty will evaluate initiative activities using a combination of risk model outputs for cost-benefit analysis, construction complexity and feasibility, and maintenance and reliability implications to produce a prioritized list of initiatives.

Liberty is developing its location-specific initiative selection process by considering associated risk drivers for each prioritized circuit, accessibility and permitting constraints, and seasonal work windows. Subject matter experts ("SMEs") play a critical role in this process. SMEs review risk model outputs, validate assumptions, and apply operational knowledge to refine initiative selection. Their input is especially valuable in areas where data is limited or where local conditions significantly influence risk. Liberty optimizes its resources by leveraging multi-benefit projects that address multiple risk drivers within a localized area. Initiative trade-offs can be assessed using risk model outputs, SME input, and benefit-cost ratios to determine the appropriate mitigations for each area. Liberty is advancing its initiative activity selection processes to prioritize activities that reduce both wildfire and PSPS risk. This will be accomplished by targeting high-risk circuits identified through the risk model and evaluating the impact of each activity on wildfire and PSPS risk.

6.1.3.3 Activity Scheduling

The electrical corporation must report on its schedule for implementing its portfolio of initiative activities. The electrical corporation must describe its preliminary schedules for each initiative and its iterative processes for modifying initiative activities (Section 6.1.3.1).

Initiative activities may require several years to implement. For example, relocating transmission or distribution capabilities from overhead to underground may require substantial time and resources. Since initiative activities are undertaken in high-risk regions, the electrical corporation may need interim initiative activities to mitigate risk while working to implement long-term strategies. Some examples of interim initiative activities include more frequent

inspections, fire detection and monitoring activities, and PSPS usage. If the electrical corporation's initiative activities require more than one year to implement, the electrical corporation must evaluate the need for interim initiative activities, as discussed in Section 6.2.2.

In its WMP submission, the electrical corporation must provide a summary description of the procedures it uses in developing and deploying initiative activities. This discussion must include the following:

- How the electrical corporation schedules initiative activities.
- How the electrical corporation incorporates the amount of time it takes to implement the initiative activities when determining initiative effectiveness and prioritization. This must include evaluations of cumulative risk exposure while the initiative is being implemented, as well as interim initiatives.
- How the electrical corporation evaluates whether an interim initiative activity is needed and, if so, how an interim initiative activity is selected (see Section 6.2.2).
- How the electrical corporation monitors its progress toward its targets within known limitations and constraints. This should include descriptions of mechanisms for detecting when an activity is off track and for bringing it back on track.
- How the electrical corporation measures the effectiveness of initiative activities (e.g., tracking the number of PEDS deenergizations that had the potential to ignite a wildfire due to observed damage/contact prior to re-energization). The mitigation initiative sections of these Guidelines (Sections 8-12) include specific requirements for each initiative activities.

Liberty schedules initiative activities based on key planning constraints. These constraints include permitting lead time, seasonal work windows, and crew and contractor availability. Permitting lead time is often a substantial constraint because much of Liberty's work involves authorization from federal and state agencies. The exact timing of when a project is able to start is frequently determined by permitting decisions.

Seasonal access also plays a large role in scheduling. The Tahoe Regional Planning Agency (TRPA) is the regional environmental agency in the Tahoe Basin. The TRPA reviews and approves projects within the Tahoe Basin and typically provides construction approval only during the build season, May 1 – October 15, to help protect Tahoe's water clarity and prevent soil erosion. Further, significant annual snowfall in Liberty's service territory, ice buildup, and thawing periods constrain the window during which Liberty can complete projects. Liberty's work, therefore, is subject to this form of capacity constraint, in which necessary resources and labor are compressed into a seasonal window.

Liberty monitors implementation progress through its RFG governance and reporting mechanisms. Progress is reported to Energy Safety through Liberty's quarterly data submissions and is reviewed internally by the RFG. A target is treated as off track when completed units fall behind planned units, or when it becomes clear that a permit or resource constraint may prevent a project from moving ahead on schedule.

Liberty distinguishes modeled effectiveness from measured effectiveness in its risk modeling. Modeled effectiveness is the set of benchmarked values in LU Table 6-1 that drive benefit-cost ratios. Measured effectiveness is the observed change in outage and ignition performance on circuits after treatment. Liberty currently has modeled effectiveness for four mitigations and measured effectiveness for one, overhead hardening without covered conductor, as described previously. Liberty is committed to refining its measured effectiveness for overhead hardening without covered conductor, as well as establishing new measures of effectiveness for mitigations in which Liberty collects additional post-mitigation data.

6.1.3.4 Key Stakeholders for Decision-Making

In this section, the electrical corporation must identify all key stakeholder groups that are part of the decision-making process for developing and prioritizing initiative activities. Table 6-2 provides an example of the required information and format. At a minimum, the electrical corporation must do the following:

- Identify each key stakeholder group (*e.g.*, electrical corporation executive leadership, the public, state/county public safety partners).
- Identify the decision-making role of each stakeholder group (*e.g.*, decision-maker, consulted, informed).
- Identify method of engagement (*e.g.*, meeting, workshop, written comments).
- Identify engagement methods that describe how it communicates decisions to key stakeholders.
- Identify what type of mitigation initiative activity (i.e. system hardening, vegetation management) the stakeholder is engaged with.
- Identify the level of engagement (i.e. local, tribal, federal) for mitigation initiative activities for any projects that are within stakeholder jurisdictions.

As part of Liberty's RFG, members meet regularly to prioritize analysis and decisions related to risk modeling and mitigation projects. In addition, quarterly sessions are held to discuss budgets, decision-making, and progress of WMP initiatives and risk indicators. Liberty engages with its Public Safety Partners ("PSPs") to strengthen relationships and coordinate emergency

action plans. To communicate with Liberty's customers, an ad campaign through various news and social outlets runs monthly May through October.

Liberty provides its key stakeholder groups that are part of the WMP decision-making process in Table 6-2.

Table 6-2: Liberty Stakeholder Roles and Responsibilities in the Decision-Making Process

Stakeholder	Stakeholder Point of Contact	Electrical Corporation Point of Contact	Stakeholder Role	Engagement Methods	Activity	Level of Engagement Activity
Liberty Executive Leadership	Chief Executive Officer; Chief Operating Officer	Liberty President	Informed; Consulted	Quarterly Meetings; Emails; Phone Calls	All WMP activities	Local, state, federal, tribal
Board Level Safety Committee	Board of Directors	Liberty President	Informed; Consulted	Quarterly Meetings	All WMP activities, plus safety culture	Local, state, federal, tribal
Liberty Risk Focus Group ("RFG")	Liberty President	Liberty President	Informed, Consulted, Decision-maker	Weekly Meetings	All WMP activities, WMP risk modeling and risk-based decision-making	Local, state
County	County Supervisor	Senior Manager, Customer Solutions; Emergency Manager	Informed	Meetings, exercises, workshops	System hardening, vegetation management, emergency preparedness	Local
Tahoe Regional Planning Agency	Special Projects Manager, Associate Environmental Specialist, Forester	Manager, Vegetation Management; Environmental Specialist	Decision-maker, consulted	Planning and prioritizing all WF mitigations	System hardening, vegetation management	Local
Sheriff's Department	Sheriff, Office of Emergency Services	Manager, Emergency Management	Informed, decision-maker	Meetings, exercises, workshops	Emergency preparedness	Local
Cal Fire	Battalion Chief, Assistant Chief	Fire Protection Specialist; System Forester; Manager, Emergency Management	Informed, consulted, decision-maker	Meetings, emails, phone calls, exercises	Vegetation management, emergency preparedness, community outreach	Local, state
California Tahoe Conservancy	Public Land Management Specialist, Associate Environmental Planner	Manager, Vegetation Management; Environmental Specialist	Decision-maker; consulted	Meetings, emails, phone calls	System hardening; vegetation management	Local, state
California State Parks	Senior Environmental Scientist, California State Parks - Sierra District	Manager, Vegetation Management; Environmental Specialist	Decision-maker; consulted	Meetings, emails, phone calls	System hardening, vegetation management	Local, state
City	City Manager	Senior Manager, Customer Solutions; Emergency Manager	Informed, consulted, decision-maker	Meetings, emails, phone calls	System hardening, vegetation management, emergency preparedness, community outreach	Local

Stakeholder	Stakeholder Point of Contact	Electrical Corporation Point of Contact	Stakeholder Role	Engagement Methods	Activity	Level of Engagement Activity
US Forest Service	Recreation Management Specialist, Lands and Special Uses	Manager, Vegetation Management; Environmental Specialist	Decision-maker, consulted	Meetings, emails, phone calls, operating plans	System hardening, vegetation management	Local, federal
Cal Trans	District Permit Engineer	Manager, Vegetation Management; Manager, Lands	Decision-maker, consulted	Meetings, emails	System hardening, vegetation management	Local, state
Fire Department	Fire Chief	Fire Protection Specialist; Manager, Emergency Management; System Forester	Decision-maker, informed, consulted	Meetings, emails, exercises	Vegetation management, emergency preparedness, community outreach	Local
Public; customers	Varies; Manager, Communications	Varies	Informed	Workshops, outreach events, bill inserts, social media	System hardening, vegetation management, emergency preparedness	Local
Washoe Tribe	Emergency Manager, California Tribal Historic Preservation Officer	Key Account Manager, Emergency Manager, Environmental Specialist	Decision-maker, consulted, informed	Meetings, emails, phone calls	Emergency preparedness, community outreach, cultural consultation and monitoring	Tribal
Key Accounts; Critical Facilities	Varies	Key Account Manager; Sr. Manager Customer Solutions	Informed, consulted	Meetings, emails, phone call	System hardening, vegetation management, emergency preparedness, community outreach	Local
Bureau of Land Management	Sierra Front Office - Assistant Field Manager	Environmental Specialist	Decision-maker, consulted	Meetings, emails, phone calls	System hardening, vegetation management	Federal
NV Energy	Emergency Manager, Principal Meteorologist	Manager, Emergency Management; Sr. Manager, Wildfire Prevention	Decision-maker, consulted, informed		Emergency preparedness	Local
Community Based Organizations	Varies	Key Account Manager; Sr. Manager Customer Solutions	Informed, consulted	Workshops, outreach events, meetings, emails, phone calls	Emergency preparedness, community outreach	Local

6.2 Wildfire Mitigation Strategy

Each electrical corporation must provide an overview of its proposed wildfire mitigation strategies based on the evaluation process identified in Section 6.1.[50]

6.2.1 Anticipated Risk Reduction

In this section, the electrical corporation must present an overview of the expected risk reduction of its wildfire mitigation initiative activities. The electrical corporation must provide:

- Projected overall risk reduction
- Projected risk reduction on highest-risk circuits over the three-year WMP cycle

6.2.1.1 Projected Overall Risk Reduction

In this section, the electrical corporation must provide a figure showing the projected overall utility risk in its service territory as a function of time, assuming the electrical corporation meets the planned timeline for implementing the initiatives. The figure is expected to cover at least 10 years, consistent with the electrical corporation's submitted ten-year plan. If the electrical corporation proposes risk reduction strategies for a duration longer than ten years, this figure must show that corresponding time frame.

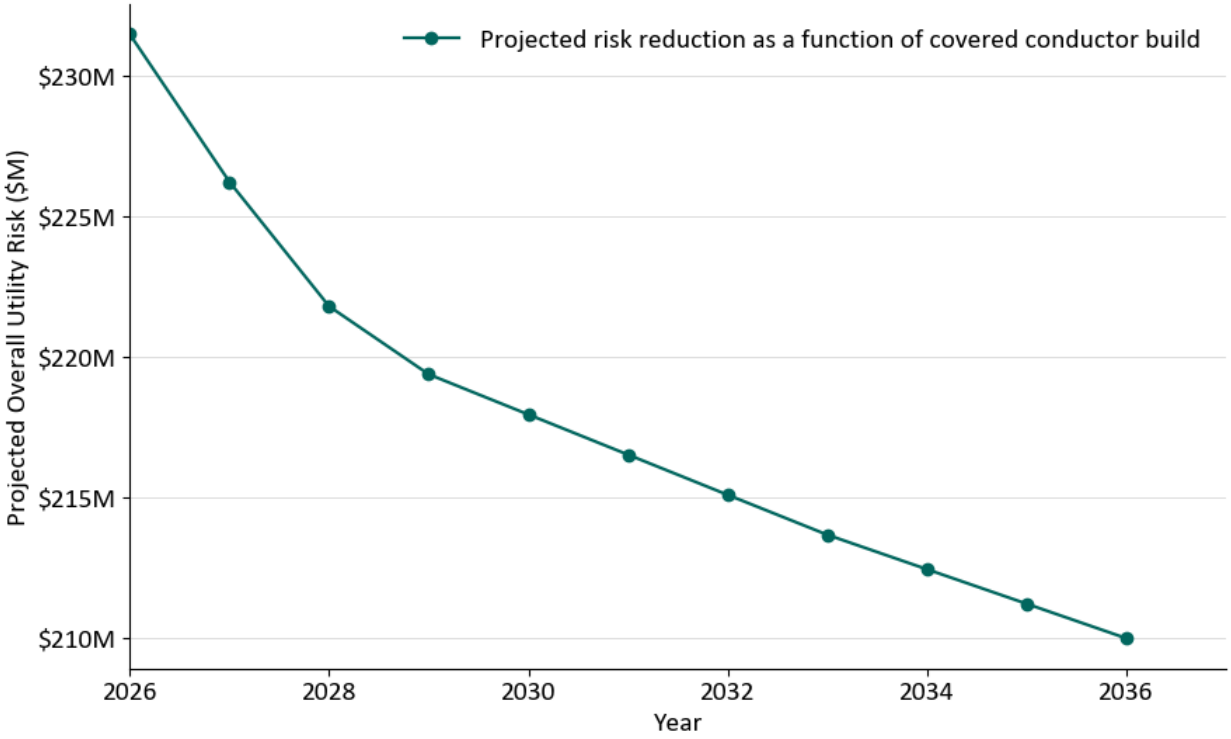
As discussed previously, Liberty's risk model is currently not expressed in a time-series structure. Rather, it expresses risk and costs in an annualized structure. Because of this, the outputs of the risk model are not readily translated into a figure that demonstrates risk reduction as a function of time. Nevertheless, Liberty has provided Figure 6-2 to demonstrate projected risk reduction over time due to covered conductor installation. It is worth underscoring the limitations of the figure and accompanying methodology. In addition, Liberty has identified moving toward a time-series and present value methodology as a high-priority opportunity in its RAI plan.

Figure 6-2 shows Liberty's projected overall utility risk over ten years from 2027 to 2036. Importantly, the changes in projected overall utility risk are solely a function of overhead hardening with covered conductor and do not capture Liberty's full mitigation portfolio. Vegetation management, asset inspections, non-exempt fuse replacement, and Liberty's other initiatives all reduce wildfire risk, so the risk reduction Liberty expects to achieve over this period is larger than the figure shows. Overhead hardening with covered conductor is

[50] Pub. Util. Code § 8386(c)(3).

presented on its own because it is the mitigation Liberty currently prioritizes methodologically in its risk model and benefit-cost analysis.

Figure 6-2: Projected Overall Utility Risk and Estimated Reduction Due to Covered Conductor Scenario



Another important framing of the figure is that the starting point is the "no-build" baseline, rather than the unmitigated baseline. As described previously, the no-build baseline accounts for the risk reduction already available through the use of PSPS and SRP, as well as some of Liberty's overhead hardening without covered conductor. Liberty's estimated risk reduction is substantially larger when compared to the unmitigated baseline and the use of PSPS and SRP, as shown in Figure 6-3.

The projection also assumes that hardening does not reduce outage program risk. Liberty's risk model does not currently credit hardening activities with any reduction in PSPS or SRP-related risk, so the outage program component of overall utility risk is flat across the figure. To the extent that a hardened circuit is in practice less likely to be de-energized, either through an unplanned or PSPS outage, the projected risk reduction is underestimated. In addition, the projection factors in an estimated build rate year of eight miles per year, which is a high-level planning assumption tied to initiative targets. Liberty also notes that the hardening investment will provide risk reduction over the course of more than the ten years shown in the figure.

Liberty has not yet implemented model components related to climate change and tree mortality, which would likely lead to greater anticipated risk in future years, therefore leading the presently shown projections of risk reductions to be underestimated.

The figure and its use of an assumed build rate per year highlight a key tension in Liberty's wildfire mitigation strategy. The risk reduction associated with capital-intensive grid hardening investments is limited by the ability to deploy them at scale across Liberty's system. In contrast, mitigations that can be deployed across large portions of the system deliver more immediate risk reduction. SRP is a clear example of this, and it helps Liberty manage risk that cannot be addressed rapidly by capital-intensive measures. Nevertheless, SRP delivers a reliability and outage program risk to customers, which Liberty identifies as a priority item for model refinement in its RAI plan.

Risk model dashboard:

While Liberty acknowledges the maturity of its risk modeling capabilities is still growing, Liberty is confident in a new tool that it has developed for this WMP. Members of Liberty's RFG have access to Liberty's risk model dashboard, which is a new tool in Power BI. The dashboard provides a clear visualization of risk along Liberty's system, as calculated by the risk model. It breaks out risk at different stages of the risk model so Liberty team members can understand the differences between wildfire risk, outage program risk, and different risk baselines pre- and post-mitigation. A sample figure from the dashboard is provided below; however, Liberty notes that the full dashboard is confidential.

Figure 6-3: Waterfall Diagram of Liberty's Risk Model

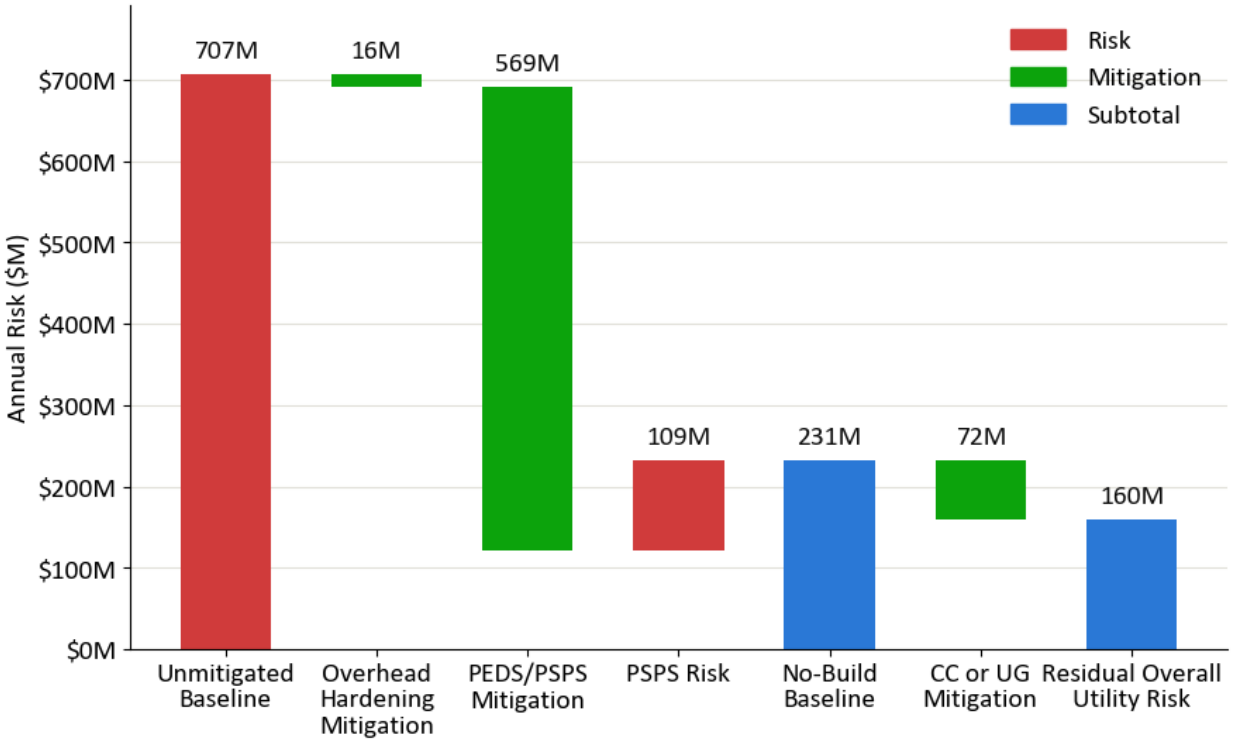


Figure Notes: The risk reduction modeled by "CC or UG Mitigation" assumes all circuits with a BCR greater than or equal to one are hardened. This differs from estimated risk reductions shown previously, which are limited to Liberty's list of prioritized circuits and/or introduce constraints in the form of expected build rates per year.

A key feature of the dashboard is its usability. Consequence values, mitigation effectiveness parameters, unit costs, and other core parameter choices can be changed directly in the dashboard, and the resulting effect on risk and BCRs is quickly updated in the dashboard. This means team members do not have to open underlying risk model code and re-run models when a parameter choice requires further investigation. In terms of version control, the model can easily default or refresh to base parameter choices, so the user does not lose sight of the primary risk model outputs.

Another valuable feature of the dashboard is that it provides tabular summaries at the circuit level, showing the exact values of estimated wildfire and outage program risk, as well as modeled hardening costs, risk reductions, and BCRs. Dashboard users can sort the data by different model components. For example, the user can sort circuits by overall utility risk or sort circuits where estimated covered conductor BCRs are highest. This provides key cross-functional value across Liberty's wildfire risk team members by providing risk modeling analysts with a shared platform to communicate model outputs to operations and engineering team members as they scope mitigation projects.

Liberty acknowledges its risk modeling capabilities are still limited in terms of quantifying anticipated risk reductions for all its initiatives. However, Liberty plans to build upon this valuable risk model dashboard and enhance its features in step with Liberty's growing risk modeling maturity.

6.2.1.2 Risk Impact of Activities

The electrical corporation must calculate the overall expected effectiveness for risk reduction of each of its initiative activities. The overall expected effectiveness is the expected percentage for the average amount of risk reduced by the initiative activity. This must be calculated for overall utility risk, being a summation for wildfire risk and outage program risk, as well as wildfire risk and outage program risk respectively.

The electrical corporation must provide the cost benefit score, broken out by overall utility risk, wildfire risk, and outage program risk. The score should be calculated for the activity overall based on overall average initiative effectiveness and average unit costs.

The electrical corporation must calculate the expected % HFRA covered for each of its initiative activity targets over the WMP cycle. The expected % HFRA covered is the percentage of HFRA being worked on by the given initiative from the first year of the Base plan to the last year of the Base plan. This could include the number of circuit miles or the number of assets. For example:

For covered conductor installations, the expected installations from Jan. 1, 2026, through Dec. 31, 2028 = 600 circuit miles

The total number of miles within the HFRA = 4,250 circuit miles

The expected % HFRA covered for the covered conductor installations initiative from 2026 to 2028 is:

$$\frac{\text{units of initiative}}{\text{units within HFRA}} \times 100$$

$$\frac{600}{4.250} \times 100 = 14.12\%$$

The electrical corporation must calculate the expected % risk reduction of each of its initiative activity targets over the WMP cycle. The expected % risk reduction is the expected percentage risk reduction for the last day for Base WMP implementation compared to the first day for Base WMP implementation. For example:

For protective devices and sensitivity settings, the risk on Jan. 1, 2026 = 2.59×10^{-1}

After meeting its planned initiative activity targets for protective devices and sensitivity settings, the risk on Jan. 1, 2026 = 1.29×10^{-1}

The expected % risk impact for the protective devices and sensitivity settings initiative in 2026 is:

$$\frac{\text{risk before} - \text{risk after}}{\text{risk before}} \times 100$$

$$\frac{2.59 \times 10^{-1} - 1.29 \times 10^{-1}}{2.59 \times 10^{-1}} \times 100 = 50\%$$

The expected % risk reduction numbers must be reported for each planned mitigation initiative activity, when required, in the specific mitigation initiative sections of Sections 8-12 (see example tables in these Sections). Table 6-3 provides an example of a summary of reporting on the risk reduction of initiative activities.

The electrical corporation must also provide a step-by-step calculation showing how it derived the values provided below, similar to the examples shown above.

Liberty provides a detailed set of equations to explain calculations of effectiveness, benefit-cost ratios, HFTD/HFRA coverage, and anticipated risk reduction in 2027. The effectiveness of overhead hardening with covered conductor (*E)* varies by outage cause:

$$E_i = \frac{\sum_k n_{i,k} \; e_k}{\sum_k n_{i,k}}$$

Where:

- $n_{i,k}$: recorded outages on circuit *i* by sub-driver *k*
- e_k: covered conductor effectiveness against sub-driver *k*
- E_i: weighted-average covered conductor effectiveness at circuit *i*

The risk reduction from hardening an entire circuit is calculated as:

$$\Delta_i = E_i \times R_i^{WF,res}$$

Where:

- $R_i^{WF,res}$: the no-build baseline wildfire risk, after PEDS and PSPS have been accounted for

The hardening activity only is assumed to reduce wildfire risk and does not reduce overall utility risk, which includes outage program risk.

Liberty's hardening projects are scoped to portions of circuits, not the entire circuit, so the estimated risk reduction at the circuit-level is scaled linearly by project mileage. This assumes risk is evenly distributed across the circuit. In practice, projects at the sub-circuit level are likely targeting higher risk locations of the circuit.

$$s_i = \frac{m_i}{L_i} \qquad \delta_i = s_i \, \Delta_i$$

Where:

- m_i: project miles of overhead hardening with covered conductor installed in 2027
- L_i: total overhead miles of circuit *i*
- s_i: share of circuit treated with project mileage
- δ_i: the annual estimated risk reduction associated with the portion of the circuit hardened, strictly less than the entire circuit level estimated risk reduction Δ_i

Effectiveness for the hardened projects must be compared to the baseline measure of risk for the equivalent portion of the circuit that is hardened, not the full circuit. In other words, if a project is two miles in length, it must be compared to baseline risk for those two miles, not all twenty miles of the circuit.

In addition, the next step sums up the risk reductions across all projects to represent an average effectiveness. Averaged across project circuits, the calculations for wildfire risk effectiveness (E^{WF}) and overall utility risk effectiveness (E^{System}) are below. Overall utility effectiveness accounts for outage program risk (*OP*) into the denominator:

$$E^{WF} = \frac{\sum_i \delta_i}{\sum_i s_i \, R_i^{WF,res}}$$

$$E^{System} = \frac{\sum_i \delta_i}{\sum_i s_i \left(R_i^{WF,res} + R_i^{OP}\right)}$$

Benefit-cost ratios are then calculated as:

$$\text{BCR} = \frac{Y \sum_i \delta_i}{\alpha \sum_i m_i}$$

- Y: the lifetime of the hardening asset
- α: the per-mile capital cost of the hardening project

Because overhead hardening with covered conductor is not modeled to provide a benefit in terms of outage program risk, the wildfire risk-related BCR equals the same as the overall utility risk BCR.

Liberty designates its entire service territory as a HFRA. Therefore, 100% of its wildfire mitigation initiatives are considered to occur within HFRA zones. HFTD/HFRA coverage is calculated as:

$$\%\ HFRA = \frac{\sum m_i}{\sum L_i}$$

Table 6-3 provides a summary of the expected risk reduction percentage of WMP activities.

Table 6-3: Risk Impact of WMP Activities

Activity	Activity ID#	Activity Effectiveness – Overall Risk	Activity Effectiveness – Wildfire Risk	Activity Effectiveness – Outage Program Risk	Cost-Benefit Score – Overall Risk	Cost-Benefit Score – Wildfire Risk	Cost-Benefit Score – Outage Program Risk	% HFTD/ HFRA Covered	Expected % Risk Reduction	Model used to Calculate Risk Impact
Covered conductor installation	WMP-GDOM-GH-01	54% (^)	63%	No impact	10.8	10.8	-	2%	2%	1.0
Undergrounding of electric lines and/or equipment	WMP-GDOM-GH-02	No projects proposed	No projects proposed	No projects proposed	No projects proposed	No projects proposed	-	0%	0%	1.0
Distribution pole replacements and reinforcements	WMP-GDOM-GH-03	12% (^)	23%	No impact	-	-	-	2%	<1%	1.0
Equipment settings to reduce wildfire risk	WMP-GDOM-GO-01	-	56%	(+)	-	-	-	100%	(*)	1.0
PSPS	WMP-GDOM-GO-01	65%	75%	(+)	-	-	-	100%	(*)	1.0
Grid monitoring systems	WMP-SA-02	-	-	-	-	-	-	100%	-	-
Non-exempt fuse replacement	WMP-GDOM-GH-12b	-	-	-	-	-	-	10%	-	-
Open wire/grey wire	WMP-GDOM-GH-12e	-	-	-	-	-	-	33%	-	-
Vegetation Management Inspection Program - Detailed	WMP-VM-INSP-01	-	-	-	-	-	-	33%	-	-
Wood and Slash Management	WMP-VM-VFM-02	-	-	-	-	-	-	100%	-	-
Quality Assurance and Quality Control	WMP-VM-QAQC-01	-	-	-	-	-	-	33% (#)	-	-
Clearance	WMP-VM-VFM-05	-	-	-	-	-	-	100%	-	-
Fall-In Mitigation	WMP-VM-VFM-06	-	-	-	-	-	-	33% (#)	-	-
Detailed inspections of distribution electric lines and equipment	WMP-GDOM-AI-01	-	-	-	-	-	-	19%	-	-
Tree attachment removals	WMP-GDOM-GH-12a	-	-	-	-	-	-	3%	-	-
Vegetation Inspection - LiDAR	WMP-VM-INSP-03	-	-	-	-	-	-	100%	-	-
Pole Clearing – PRC 4292 Required	WMP-VM-VFM-01-R	-	-	-	-	-	-	100%	-	-
Pole Clearing – Discretionary	WMP-VM-VFM-01-D	-	-	-	-	-	-	2%	-	-

Activity	Activity ID#	Activity Effectiveness – Overall Risk	Activity Effectiveness – Wildfire Risk	Activity Effectiveness – Outage Program Risk	Cost-Benefit Score – Overall Risk	Cost-Benefit Score – Wildfire Risk	Cost-Benefit Score – Outage Program Risk	% HFTD/ HFRA Covered	Expected % Risk Reduction	Model used to Calculate Risk Impact
Patrol inspections of distribution electric lines and equipment	WMP-GDOM-AI-03	-	-	-	-	-	-	81%	-	-
Intrusive pole inspections	WMP-GDOM-AI-02	-	-	-	-	-	-	11%	-	-
Other discretionary asset inspections: Drone inspections	WMP-GDOM-AI-04	-	-	-	-	-	-	7%	-	-

Table Notes: As discussed, Liberty's current risk model calculates BCRs for two mitigations, overhead hardening with covered conductor, and undergrounding. With Liberty's current risk model maturity, Liberty provides BCRs for actual proposed covered conductor projects in the above table. Liberty does not provide BCRs for undergrounding projects because no proposed projects are part of Liberty's 2027 WMP.

(-): Not quantified as part of Liberty's current risk model.

(^): Liberty does not currently quantify any improvements to outage program risk that hardening activities likely provide. Therefore, the effectiveness for overall utility risk shown is likely to be underestimated.

(+): PSPS and equipment settings (SRP) provide an increase in outage program risk. Liberty quantifies this increase in outage program risk for PSPS, as reflected in the overall effectiveness percentage. Liberty has not yet quantified the increase in outage program risk from PEDS/SRP/equipment settings.

(*): Liberty primarily measures risk reduction against the "no-build" baseline, which already factors in the reduction in wildfire risk from PSPS and PEDS/SRP/equipment settings. The risk reduction from PSPS and PEDS/SRP/equipment settings is calculated against the unmitigated baseline, as shown in Figure 6-3. Together, these two initiatives provide an estimated 70% reduction in overall utility risk, as shown in Figure 6-3. However, it is worth noting that the estimate is likely lower once additional outage program risk from PEDS is quantified in the risk model.

(#): See Table 9-6 for more detail on vegetation management initiatives and coverage. For example, for quality assurance and control, 33% of line-miles are sampled. However, additional areas of the HFTD are covered by the program beyond the 33% of line-miles due to additional samples being drawn for quality assurance.

6.2.1.3 Projected Risk Reduction on Highest-Risk Circuits in 2027

The objective of the service territory risk reduction summary is to provide an integrated view of wildfire risk reduction across the electrical corporation's service territory. The electrical corporation must provide the following information:

- Tabular summary of numeric risk reduction for each high-risk circuit within the top 20-percent of overall utility risk, showing risk levels before and after the implementation of initiative activities. This must include the same circuits, segments, or span IDs presented in Section 5.5.2. The table must include the following information for each circuit:
    - **Circuit, Segment, or Span ID:** Unique identifier for the circuit, segment, or span.
        - If there are multiple initiatives per ID, each must be listed separately, using an extender to provide a unique identifier
    - **Overall Utility Risk:** Numerical value for the overall utility risk before and after each mitigation initiative.
    - **Mitigation initiatives by implementation year:** Mitigation initiatives the electrical corporation plans to apply to the circuit in each year of the WMP cycle.

Refer to Table 6-4.

Table 6-4: Summary of Risk Reduction for Top Circuits

Circuit	Unmitigated Overall Utility Risk ($)	No-Build Overall Utility Risk ($)	2027 Activities	2027 Overall Utility Risk ($)
TPZ1202	143,192,740	18,691,027	Grid hardening, including covered conductor, pole replacement, VM, PSPS, and SRP	17,671,982
MEY3400	87,536,761	17,989,488	Grid hardening, including covered conductor, pole replacement, VM, detailed inspections, PSPS, and SRP	17,623,171
MEY3200	83,305,122	25,289,730	Grid hardening, including pole replacement, VM, PSPS, and SRP	25,223,957
MEY3300	63,720,461	12,033,697	Grid hardening, including covered conductor, pole replacement, VM, PSPS, and SRP	11,883,354
STL3501	53,579,217	12,828,333	Grid hardening, including pole replacement, VM, PSPS, and SRP	12,785,867
STL3101	52,156,614	10,841,438	Grid hardening, including pole replacement, VM, PSPS, and SRP	10,797,177
MEY3500	50,817,694	11,911,379	Grid hardening, including pole replacement, VM, PSPS, and SRP	11,869,679
MULLER1296	47,951,211	7,143,409	Grid hardening, including pole replacement, VM, PSPS, and SRP	7,101,393
MEY3100	31,818,412	8,020,830	VM, PSPS, and SRP	8,020,830
POR3200	19,410,911	5,672,806	VM, PSPS, and SRP	5,672,806
TRK7202	14,855,306	9,457,011	VM, PSPS, and SRP	9,457,011

Circuit	Unmitigated Overall Utility Risk ($)	No-Build Overall Utility Risk ($)	2027 Activities	2027 Overall Utility Risk ($)
CAL2501	14,574,657	9,155,133	Grid hardening, including covered conductor, pole replacement, VM, PSPS, and SRP	6,654,544
GLS7400	14,288,299	4,510,375	VM, PSPS, and SRP	4,510,375
CEM41	14,186,513	4,244,570	Grid hardening, including pole replacement, VM, PSPS, and SRP	4,209,798
TAH5201	13,715,293	7,675,885	VM, PSPS, and SRP	7,675,885
POR3100	13,347,642	4,668,123	VM, PSPS, and SRP	4,668,123
STL2300	10,855,487	6,860,229	Grid hardening, including pole replacement, VM, PSPS, and SRP	6,815,111
TAH7300	9,050,163	5,835,951	VM, PSPS, and SRP	5,835,951
640	8,453,105	5,283,191	VM, PSPS, and SRP	5,283,191
KBH5200	8,373,954	4,895,695	VM, PSPS, and SRP	4,895,695

Table Notes: Estimated reductions in risk between the no-build baseline and the 2027 column are primarily driven by modeled overhead hardening with covered conductor projects. Marginal risk reductions are also informed by overhead hardening without covered conductor, which are based on initiative targets for pole replacement distributed across Liberty's prioritized list of circuits. Actual pole replacement work may differ from estimates captured in the table. Risk reduction from vegetation management is not currently quantified.

6.2.2 Interim Activities

For each initiative activity that will require more than one year to implement,54 the electrical corporation must evaluate the need for interim initiative activities that will reduce risk until the primary or permanent initiative activity is in place. In this section of its WMP, the electrical corporation must provide a description of the following:

- The electrical corporation's procedures for evaluating the need for interim risk reduction
- The electrical corporation's procedures for determining which interim mitigation initiative(s) to implement
- The electrical corporation's characterization of each interim risk management/reduction action and evaluation of its specific capabilities to reduce risks, including:
    - Potential consequences of risk event(s) addressed by the improvement/mitigation
    - Frequency of occurrence of the risk event(s) addressed by the improvement/mitigation
- The electrical corporation's procedures for evaluating and implementing any changes in initiative effectiveness and prioritization based on time for implementation and use of interim initiative activities, including:
    - The cumulative risk exposure of its initiative activity portfolio, accounting for the time value of risk as part of initiative comparisons.

Each interim initiative activity planned by the electrical corporation for implementation on high-risk circuits must be listed as an initiative activity in Sections 8 – 12. In addition, the electrical corporation must discuss interim initiative activities in the relevant mitigation initiative sections of the WMP and include the activities in the related target tables.

Grid-hardening measures, while effective at reducing risk, cannot be scaled as quickly as other wildfire mitigation measures, such as grid monitoring and changes to equipment settings that reduce ignition likelihood. Interim mitigations are foundational to Liberty's wildfire mitigation strategy, and they represent an effect way to manage risk while grid hardening projects are being evaluated, scoped, and ultimately deployed.

Liberty's primary interim mitigation strategy is SRP and PSPS. Liberty acknowledges such interim mitigation strategies create outage program risk for customers, and such mitigation strategies are not practical in the long-term without grid hardening and vegetation management initiatives. While Liberty's risk model is not currently configured in a dynamic way to account for trade-offs between interim and long-term wildfire mitigation strategies, Liberty's

RAI plan has made it a priority to move toward a time-series and present value framework that would allow for quantification of such trade-offs.

7. Public Safety Power Shutoff

In this section,[51] the electrical corporation must provide an overview narrative of planned initiative actions to reduce the impacts of PSPS events.[52] Impacts include:

- Duration
- Frequency
- Scope – number of customers

The narrative must summarize how the electrical corporation will reduce the need for, and impact of, future PSPS implementation on circuits that have been frequently deenergized, as listed in Table 4-3 in Section 4.3.

Furthermore, the narrative should describe any lessons learned for PSPS events occurring since the electrical corporation's last WMP submission and overall impacts to mitigation methodology in terms of reducing PSPS events in the future:

Liberty may temporarily de-energize portions of its service territory during extreme weather conditions to prevent electric infrastructure from becoming a potential source of ignition. PSPS is used as a measure of last resort to protect public safety.

Liberty understands that losing power is disruptive for customers; therefore, efforts are taken to reduce the likelihood, duration, and scope of PSPS events. Planned initiative actions to reduce PSPS impacts focus on covered conductor installation, distribution pole replacements and reinforcements, enhanced situational awareness and segment level PSPS zones, protective equipment and device settings, and installation of sectionalizing devices. These efforts are implemented on the Muller 1296 circuit, identified in Table 4-3, as well as the Topaz 1202 circuit, and other circuits across Liberty's service territory.

To reduce the impact of PSPS events, Liberty utilizes enhanced situational awareness, which is triggered when weather models forecast extreme weather conditions indicating a potential PSPS event. When this occurs, additional research into specific PSPS zones is conducted to narrow down the location, scope, and duration of the period of concern and area of impact. Once the area of impact and period of concern are identified, increased monitoring of weather stations in the affected area is conducted. This can include creating custom reports generated by the incoming weather station data, setting alarms to be alerted to any exceedance of trigger values, and activating 30-second interval weather station data reporting. Increased monitoring

[51] Annual information included in the following section must align with the applicable data submission.
[52] Pub. Util. Code, § 8386(c)(8).

of weather stations provides the ability to compare actual observations with the forecasted conditions so that PSPS decisions are based on real-time weather data. As the period of concern approaches, personnel may be staged to report observed conditions in the field such as the presence of blowing debris or precipitation. Field personnel may also use anemometers to take additional wind speed measurements within the area of concern.

Liberty also utilizes protective equipment device settings, including Sensitive Relay Profile ("SRP") based on fire weather conditions throughout the fire season to respond to changing conditions. The onset of fire season is generally determined using fuel moisture data and energy release component ("ERC") calculations. When ERC percentiles are between 60% and 80%, circuits will be placed into Fire Mode ON, which disables automatic reclosing. As fire danger increases, circuits will be placed into Extreme Fire Mode ON, which enables SRP settings.

The use of SRP in combination with enhanced situational awareness can reduce the need for PSPS during periods of elevated fire danger that fall below de-energization criteria. Prior to the implementation of SRP, when forecast conditions approached but did not exceed PSPS thresholds, PSPS may have been initiated due to uncertainty and need to mitigate wildfire risk. SRP introduces an additional layer of operational flexibility by enabling circuits to remain energized under elevated risk conditions, while maintaining fire risk mitigation. When combined with enhanced situational awareness, such as real-time weather data, field observations, and predictive analytics, Liberty can better assess evolving conditions. This approach allows for more informed, real-time decision-making, potentially delaying or avoiding PSPS events when actual conditions do not warrant them. Ultimately, this strategy reflects a more adaptive, data-driven, and risk-informed approach that reduces unnecessary customer impacts while continuing to prioritize public safety.

Weather conditions monitored to determine the need to enable SRP or initiate PSPS include National Fire Danger Rating System indices, National Weather Service products, and other Fire Potential Indices including:

- Fuel moisture;
- Relative humidity;
- Wind gust;
- High Wind Warning;
- Red Flag Warning;
- Energy Release Component;
- Fosberg Fire Weather Index;

- Severe Fire Danger Index; and
- Composite Risk Index (see Section 10.6).

Sectionalizing devices are used, when possible, to reduce the number of customers impacted during a PSPS event. Sectionalizing is considered an alternative to de-energization where an alternate source downstream of the determined area of impact can safely feed the remaining portion of the circuit that does not reside within the PSPS zone. Devices can also be used to sectionalize portions of a circuit where ignition risk is highest while maintaining power to upstream customers. Additionally, sectionalizing devices are used to re-energize circuits in phases during the restoration process. This can reduce the duration for some customers while patrols continue or necessary repairs are being made to other portions of the circuit.

Liberty initiated PSPS de-energization four times during the 2023-2025 WMP cycle, with three de-energizations occurring in November 2024 and one de-energization occurring in November 2025. Following each event, Liberty conducted after-action reviews ("AARs") with the Incident Management Team ("IMT"). Both PSPS exercise and event AARs are documented in Homeland Security Exercise and Evaluation Program ("HSEEP") format. Liberty documented de-energization lessons learned and improvement items from the PSPS events that occurred in its service territory in 2024 and 2025 in LU Table 7-1.

LU Table 7-1: Lessons Learned from Liberty PSPS Events in 2024 and 2025

Observation	Corrective Action	Status of Corrective Action
Medical Baseline (MBL) customer tags on meters needed to be updated.	Perform field audit of all MBL meters on the system to confirm proper tags are in place.	Completed
Improved communication is needed between regulatory liaisons and other members of the IMT to record event information more efficiently, such as customer impact counts and communications with Public Safety Partners ("PSPs").	Implement improvements to the incident tracking spreadsheet.	Completed
Improved logistics are needed to support the Washoe CRC location, which is relatively remote. More affordable options for lunch items at the CRC and more timely transport and distribution of	Put contracts in place with vendors for CRC lunches. Stage repair materials in Liberty's CONEX boxes for use in the Walker and Coleville areas.	Completed

Observation	Corrective Action	Status of Corrective Action
repair supplies to the Walker and Coleville areas are needed.		
During 2024 PSPS events, Liberty's Community Outreach team took responsibility for notifying PSPs, community officials, and key accounts instead of the PSP liaison, who has multiple duties.	Officially assign PSP notification responsibility to the community outreach team.	Completed
Use different template for State Executive Briefing after de-energization has occurred	Use the correct template for future State Executive Briefings	Completed
CalOES form entry for customers potentially impacted should go to 0 once those customers are actually impacted	Discuss this issue with CalOES and have clarity on guidance moving forward	Completed
Track positive feedback received from stakeholders in internal event tracker during event	Include this information in the event tracker for future events	Completed
Include estimated time of restoration on all notifications during event; include CRC services available and where to access electricity during the hours the CRC is closed on customer notifications	Adapt notification templates to include estimated time of restoration and CRC services available; Liberty is assessing the requirement to include information on where to access electricity during the hours CRCs are closed	Completed
Internal cost tracking codes were not sufficiently explained until after the PSPS event	Publish cost tracking codes with explanations in Incident Action Plan prior to or in the beginning of the event	Completed
In-event customer numbers were different from post-event reporting due to duplicate and de-activated customer accounts included in in-event reporting	Update PSPS playbook to document process for removing duplicate and de-activated customer accounts for in-event reporting	Completed
Recent staffing changes have impacted list of CRC leads	Reassess list of CRC leads to address recent staffing changes	Planning
There were no signs at the CRC locations	Put up signs outside CRC locations during future PSPS events	Completed

Observation	Corrective Action	Status of Corrective Action
Liberty has a vacancy for the Emergency Manager position	Fill the Emergency Manager Position	Completed
A couple customers requested larger sized bottles of water for toilet flushing	Determine if there is a reasonable solution to better prepare customers using well water	Implementing

8. Grid Design, Operations, and Maintenance

Each electrical corporation's WMP must include plans for grid design, operations, and maintenance programmatic areas:[53]

8.1 Targets

In this section, the electrical corporation must provide qualitative and quantitative targets for each year of this three-year cycle. The electrical corporation must provide at least one qualitative or quantitative target for the following initiatives:

- Grid Design and System Hardening (Section 8.2)
- Asset Inspections (Section 8.3)
- Equipment Maintenance and Repair (Section 8.4)
- Work Orders (Section 8.6)
- Grid Operations and Procedures (Section 8.7)
- Workforce Planning (Section 8.8)

Quantitative targets are required for Quality Assurance (QA) and Quality Control (QC). See Section 8.5, for detailed quantitative target requirements for QA and QC. Reporting of QA and QC quantitative targets is only required in section 8.5.

8.1.1 Qualitative Targets

The electrical corporation must provide qualitative targets for its three-year plan for implementing and improving its grid design, operations, and maintenance,[54] including the following:

- Identification of which initiative(s) in the WMP the electrical corporation is implementing to achieve the stated target, including Tracking IDs and the Tracking ID(s) used in past WMPs ("Previous Tracking ID"), if applicable.
- A target completion date.
- Reference(s) to the WMP section(s) or appendix, including page numbers, where the details of the target(s) are documented and substantiated.

Refer to Table 8-1.

[53] Pub. Util. Code §§ 8386(c)(3), (10), (14).
[54] Annual information included in this section must align with the applicable data submission.

8.1.2 Quantitative Targets

The electrical corporation must list all quantitative targets it will use to track progress on its grid design, operations, and maintenance in its three-year plan, broken out by each year of the WMP cycle. Electrical corporations will show progress toward completing quantitative targets in subsequent reports, including data submissions and WMP Updates.[55] For each target, the electrical corporation must provide the following:

- Identification of which initiative(s) in the WMP the electrical corporation is implementing to achieve the stated target, including Tracking IDs and the Tracking ID(s) used in past WMPs ("Previous Tracking ID"), if applicable.
- Projected targets and totals for each of the three years of the WMP cycle and relevant units for the targets.
- For inspections, quarterly targets for [Year 1] of the WMP cycle, yearly % of HFRA coverage, and totals for projected year targets.[56]
- The expected % risk reduction for each of the three years of the WMP cycle.[57]

The electrical corporation's quantitative targets must provide enough detail to effectively inform efforts to improve the performance of the electrical corporation's grid design, operations, and maintenance initiatives. Each initiative activity must have distinct, trackable targets associated with the activity, even if the electrical corporation tracks targets internally with activities combined. Only inspection-related activities are required to have quarterly targets, with all other activities only requiring end of year total targets. At its discretion, the electrical corporation may provide further granularity as available.

Refer to Table 8-1.

Liberty clarifies the definitions of two of the below initiatives given the nuanced use of the programs as they relate to Liberty's new risk model and associated initiative targets:

- Distribution pole replacements and reinforcements (GH-03)
- Traditional overhead hardening (GH-05)

Traditional overhead hardening involves the replacement of at-risk poles and hardware on a line segment or group of assets, along with new bare conductor, more easily measured in line miles. While *pole replacement and reinforcement* include the replacement of poles along with

[55] Annual information included in this section must align with applicable data submission.
[56] Guidelines for WMP Update will provide additional instructions on future quarterly rolling target reporting.
[57] The expected % risk reduction is the expected percentage risk reduction per year, as described in Section 6.2.1.2.

all new hardware and equipment, but without the replacement of conductor. And for this reason, it is more easily measured in units of poles replaced. However, Liberty often replaces multiple poles across consecutive spans, and the work becomes more effectively a line rebuild including new poles, crossarms, and hardware, among others. This work can include new overhead bare conductor or retain the existing conductor.

Liberty sets initiative targets, unit costs, and modeled mitigation effectiveness at the *pole replacement and reinforcement* initiative level. Liberty's risk model is not at a level that it can model the risk associated with individual components, such as insulators and crossarms, so the *pole replacement and reinforcement* initiative is the more appropriate match for Liberty's modeling maturity.

The same scope and qualifications apply to Liberty's covered conductor initiative (GH-01). In practice, covered conductor installation rarely involves insulated conductor alone. More frequently, covered conductor installation involves similar installation of new poles, crossarms, and other components as needed. Throughout the risk modeling and grid hardening sections, Liberty refers to "overhead hardening with covered conductor" and "overhead hardening without covered conductor," and these definitions can be interpreted in reference to GH-01 and GH-03, respectively.

Table 8-1: Liberty Grid Design, Operation and Maintenance Targets by Year, 2027[58]

WMP Initiative Category	Quantitative or Qualitative Target	WMP Initiative Activity	WMP Initiative Tracking ID	Target Unit	2027 Target / Status	% Planned in HFTD/HFRA for 2027	% Risk Reduction for 2027	Section; Page Number
Grid Design, Operations, and Maintenance	Quantitative	Covered conductor installation	WMP-GDOM-GH-01	Circuit miles	8.0	100%	2%	8.2.1; pp.157-162
Grid Design, Operations, and Maintenance	Quantitative	Undergrounding of electric lines and/or equipment	WMP-GDOM-GH-02	Circuit miles	0	0	0	8.2.2; pp. 162-164
Grid Design, Operations, and Maintenance	Quantitative	Distribution pole replacements and reinforcements[59]	WMP-GDOM-GH-03	Poles	300	100%	<1%	8.2.3; pp. 164-165
Grid Design, Operations, and Maintenance	Quantitative	Transmission pole/tower replacements and reinforcements	WMP-GDOM-GH-04	Poles	N/A	N/A	N/A	8.2.4; pp. 165-166
Grid Design, Operations, and Maintenance	Quantitative	Traditional overhead hardening	WMP-GDOM-GH-05	Circuit miles	0	0%	0	8.2.5; pp. 166-167
Grid Design, Operations, and Maintenance	Quantitative	Emerging grid hardening technology installations and pilot progress	WMP-GDOM-GH-06	No target unit identified	0	0	0	8.2.6; p. 167
Grid Design, Operations, and Maintenance	Quantitative	Microgrids	WMP-GDOM-GH-07	Microgrids	0	0	0	8.2.7; pp. 167-168
Grid Design, Operations, and Maintenance	Quantitative	Installation of system automation equipment	WMP-GDOM-GH-08	Automatic reclosers	3	100%	0	8.2.8; pp. 168-169
Grid Design, Operations, and Maintenance	Quantitative	Line removal (in HFTD)	WMP-GDOM-GH-09	Circuit miles	0	0	0	8.2.9; p. 169
Grid Design, Operations, and Maintenance	Quantitative	Other technologies and systems not listed above:	WMP-GDOM-GH-12[60]	N/A	N/A	N/A	N/A	8.2.12; p. 170
Grid Design, Operations, and Maintenance	Quantitative	Tree attachment removals	WMP-GDOM-GH-12a	Tree attachments	60	100%	Not calculated	8.2.12.1; pp. 170-171
Grid Design, Operations, and Maintenance	Quantitative	Non-exempt fuse replacement	WMP-GDOM-GH-12b	Non-exempt Fuses	1000	100%	Not calculated	8.2.12.2; pp. 171-172
Grid Design, Operations, and Maintenance	Quantitative	Animal guards	WMP-GDOM-GH-12c	Animal guards	0; initiative is complete	0	0	8.2.12.3; pp. 172-173
Grid Design, Operations, and Maintenance	Quantitative	Open wire/grey wire	WMP-GDOM-GH-12e	Circuit miles	7	100%	Not calculated	8.2.12.5; p. 173

[58] WMP initiatives with qualitative targets have N/A values for % Planned in HFTD/HFRA columns because those targets are not directed to specific locations.
[59] Liberty does not have a separate WMP initiative for transmission pole and tower replacements. Liberty captures pole replacements on its transmission system within WMP-GDOM-03.
[60] Refer to WMP initiatives WMP-GDOM-GH-12a, WMP-GDOM-GH-12b, WMP-GDOM-GH-12c, WMP-GDOM-GH-12e for relevant information related to these initiatives. WMP initiative WMP-GDOM-12 does not have a specified target as it is a combination of the aforementioned initiatives and therefore values in this row are N/A.

WMP Initiative Category	Quantitative or Qualitative Target	WMP Initiative Activity	WMP Initiative Tracking ID	Target Unit	2027 Target / Status	% Planned in HFTD/HFRA for 2027	% Risk Reduction for 2027	Section; Page Number
Grid Design, Operations, and Maintenance	Quantitative	Detailed inspections of distribution electric lines and equipment[61]	WMP-GDOM-AI-01	Circuit miles	198.5	99%	Not calculated	8.3.1; pp. 177-178
Grid Design, Operations, and Maintenance	Quantitative	Intrusive pole inspections	WMP-GDOM-AI-02	Poles	2238	97%	Not calculated	8.3.2; pp. 178-179
Grid Design, Operations, and Maintenance	Quantitative	Patrol inspections of distribution electric lines and equipment[62]	WMP-GDOM-AI-03	Circuit miles	568.8	93%	Not calculated	8.3.3; p. 179
Grid Design, Operations, and Maintenance	Quantitative	Other discretionary inspections of distribution electric lines and equipment: Drone inspections	WMP-GDOM-AI-04	Assets inspected	1,769	7%, but 100% HFTD-3	Not calculated	8.3.4; pp. 180-181
Grid Design, Operations, and Maintenance	Quantitative	Quality assurance / quality control of inspections	WMP-GDOM-AI-05	% of detailed inspections	12%	TBD – based on QA/QC sample	Not calculated	8.5; pp. 192-199
Grid Design, Operations, and Maintenance	Quantitative	Substation inspections	WMP-GDOM-AI-06	Substations	44	100%	Not calculated	8.3.5; pp. 181-182
Grid Design, Operations, and Maintenance	Qualitative	Equipment Maintenance and Repair	WMP-GDOM-MR-01	Utilization of Asset Tracking Application	All Asset Inspections and Repairs recorded in Asset Tracking	N/A	Not calculated	8.4; pp. 183-191
Grid Design, Operations, and Maintenance	Quantitative	Equipment settings to reduce wildfire risk	WMP-GDOM-GO-01	# of circuits with SRP	0	100%	(*)[63]	8.7.1; pp. 203-205
Grid Design, Operations, and Maintenance – Grid Operations and Procedures	Quantitative	Equipment settings to reduce wildfire risk	WMP-GDOM-GO-01	SRP circuit settings	Review settings of 1/3 of SRP circuits	83%	Not calculated	8.7.1; pp. 203-205
Grid Design, Operations, and Maintenance	Quantitative	Work Orders (Asset Management)	WMP-GDOM-AI-07	Past due work orders	0	N/A	Not calculated	8.6; pp. 200-202
Grid Design, Operations, and Maintenance	Qualitative	Workforce Planning	WMP-GDOM-GO-06	Inspector Training Program – Standards for Development	Implement Inspector Training Program	N/A	Not calculated	8.7.4; pp.209-212

[61] Liberty does not have a separate program for transmission inspections. Liberty has approximately 75 miles of 60kV lines and 19 miles of 120kV lines that are included in the distribution inspection program.
[62] Liberty does not have a separate program for transmission inspections. Liberty has approximately 75 miles of 60kV lines and 19 miles of 120kV lines that are included in the distribution inspection program.
[63] (*): Liberty primarily measures risk reduction against the "no-build" baseline, which already factors in the reduction in wildfire risk from PSPS and PEDS/SRP/equipment settings. The risk reduction from PSPS and PEDS/SRP/equipment settings is calculated against the unmitigated baseline, as shown in Figure 6-3. Together, these two initiatives provide an estimated 70% reduction in overall utility risk, as shown in Figure 6-3. However, it is worth noting that the estimate is likely lower once additional outage program risk from PEDS is quantified in the risk model.

8.2 Grid Design and System Hardening

In this section the electrical corporation must discuss how it is designing its system to reduce overall utility risk and what it is doing to strengthen its distribution, transmission, and substation infrastructure to reduce the risk of utility-related ignitions resulting in catastrophic wildfires.[64]

The electrical corporation is required to discuss grid design and system hardening for each of the following individual initiative activities:

1. Covered conductor installation
2. Undergrounding of electric lines and/or equipment
3. Distribution pole replacements and reinforcements
4. Transmission pole/tower replacements and reinforcements
5. Traditional overhead hardening
6. Emerging grid hardening technology installations and pilots
7. Microgrids
8. Installation of system automation equipment
9. Line removal (in the HFTD)
10. Other grid topology improvements to minimize risk of ignitions
11. Other grid topology improvements to mitigate or reduce PSPS events
12. Other technologies and systems not listed above
13. Status updates on additional technologies being piloted

In Sections 8.2.1 – 8.2.13, the electrical corporation must provide a narrative including the following information for each grid design and system hardening initiative activity:

- **Tracking ID**.
- **Overview of the activity**: A brief description of the activity including reference to related objectives and targets. Additionally, the overview must identify whether the activity is a program, project, pilot, or study.
- **Impact of the activity on wildfire risk**.

o The expected percent wildfire risk reduction/effectiveness, with level of granularity included, (e.g., service territory, HFTD, circuit segment, etc.) for the activity, including an explanation of the calculation, a list of assumptions, and justifications for each

[64] Pub. Util. Code §§ 8386(c)(3), (6), (14)-(15).

assumption. A risk reduction/effectiveness of 100% means no risk remains after the electrical corporation completes the activity.

o A trend analysis showing how implementation of the activity has reduced risk over time for each relevant risk and/or risk driver (e.g. vegetation contact for covered conductor installation).

o A discussion of how the activity impacts the likelihood and consequence of ignitions.

- **Impact of the activity on outage program risk**.

o The expected percent reliability risk reduction/effectiveness for the activity, including an explanation of the calculation, a list of assumptions, and justifications for each assumption. A risk reduction/effectiveness of 100% means no risk remains after the electrical corporation completes the activity.

o A discussion of how the electrical corporation considers and evaluates the hardened status of upstream circuits/segments/spans to determine the impact of the activity on reliability risk.

o A discussion of how the activity impacts the likelihood and consequence of outage program events, including whether an area would still be subject to PSPS events after the electrical corporation completes the activity.

o A discussion of how the activity impacts overall reliability, including how trends are being observed. This must include evaluation of number of outages occurring, the duration for those outages, and the number of customers affected during those outages.

- **Updates to the activity**:

o A list of the changes the electrical corporation made to the activity since its last WMP submission.

o Justification for each of the changes, including references to lessons learned.

o A list of planned future improvements and/or updates to the activity, including a timeline for implementation.

o As applicable, a discussion of the status of any undergrounding work plans and progress, as required by Public Utilities Code section 8388.5(f)(2).

- **Compatible initiatives**:

o A list of initiatives the electrical corporation uses in combination with the activity to increase risk reduction effectiveness, including the section number and a link to the corresponding WMP section.

If the electrical corporation does not undertake one or more of the 13 initiative activities listed above, the electrical corporation must provide a brief narrative for each activity, explaining why it does not undertake that initiative activity.

8.2.1 Covered Conductor Installation

Tracking ID: WMP-GDOM-GH-01

Overview of Activity:

Since 2020, Liberty has implemented covered conductor installation as a targeted wildfire mitigation and grid-hardening activity. Covered conductor consists of overhead conductor with a protective insulation layer that is designed to reduce the likelihood that incidental contact will result in a fault or ignition. Covered conductor primarily addresses risk associated with vegetation contact, animal contact, contact from other objects, and conductor-to-conductor contact during high-wind events.

Liberty deploys covered conductors as part of a layered mitigation strategy that may also include pole replacements and additions, equipment and hardware replacement, non-exempt fuse replacement, vegetation management, and asset inspections. Liberty is evaluating early fault detection and may start including it as part of covered conductor installation as well. Liberty refers to this initiative as overhead hardening with covered conductor.

Liberty evaluates covered conductor alongside overhead hardening without covered conductor (which encompasses pole replacements and reinforcements), undergrounding, and other mitigation alternatives. Liberty uses the BCR described in Section 6 as the starting point for comparing potential mitigation projects. The BCR provides a consistent quantitative measure of the expected risk reduction relative to project cost. Liberty then conducts operational and strategic reviews to determine how candidate projects should be incorporated into its capital plan.

In 2027, Liberty plans to complete 8 circuit miles of covered conductor installation across four projects. The current scopes of the Spring Creek, Rainbow Tract, Verdi Phase 2, and Topaz projects total approximately 9.1 circuit miles. These projects include multiple phases and smaller work segments that may be completed in different sequences based on material availability, permitting, environmental requirements, site access, outage scheduling, and construction conditions. Liberty therefore established an accountable annual target of 8.0

circuit miles while maintaining approximately 9.1 circuit miles in its planned project portfolio to address execution risk and provide sufficient work to achieve the annual target. See LU Table 8-1.

LU Table 8-1: Planned Covered Conductor Projects[65]

Circuit	Project	Planned Circuit Miles	Circuit Level CC BCR	Circuit Level UG BCR
MEY3400	Spring Creek	0.9	3.9	1.7
MEY3300	Rainbow Tract	1.2	2.8	1.3
CAL2501	Verdi Phase 2	2.0	34.5	21.4
TPZ1202	Topaz	5.0	5.6	3.1
Total	**N/A**	**9.1**	**N/A**	**N/A**

Liberty selected these projects through the risk-informed decision-making process described in Sections 5 and 6. Strategic and operational reviews were completed as well. The planned work is located on four circuits identified as significant contributors to Liberty's modeled overall utility risk. Based on the results presented in Table 5-5:

- TPZ1202 is Liberty's highest-ranked circuit by overall utility risk;
- MEY3400 is Liberty's second-highest ranked circuit by overall utility risk;
- MEY3300 is Liberty's fourth-highest ranked circuit by overall utility risk; and
- CAL2501 is Liberty's highest-ranked circuit by risk per overhead mile, outside of the South Lake Tahoe area.

Together, these four circuits represent approximately 38 percent of Liberty's modeled overall utility risk. This percentage represents the combined circuit-level risk and not the risk associated solely with the 9.1 miles planned for treatment. Because Liberty's current risk model operates at the circuit level, Liberty supplements model results with engineering strategic and operational reviews, field conditions, outage history, permitting requirements, construction feasibility, customer and community needs.

Impact of the Activity on Wildfire Risk: Overhead hardening with covered conductor primarily reduces wildfire risk by decreasing outage and ignition likelihood for the risk sub-drivers that

[65] Project mileage reflects current engineering estimates and totals approximately 9.1 circuit miles. Liberty's 2027 target is 8 circuit miles. The additional planned scope provides flexibility to address project phasing, material availability, permitting, construction constraints, and other execution risks

the conductor covering is designed to mitigate. Under the methodology described in Section 5, Liberty calculates wildfire risk as the product of ignition likelihood and wildfire consequence. Probability of asset failure and exposure to vegetation, animals, wind-driven contact, and other external objects are reflected in the model's outage and ignition-likelihood components.

Liberty's current risk model evaluates covered conductor at the circuit level. For each evaluated circuit, Liberty establishes a baseline scenario without the mitigation ("no-build baseline"). Wildfire risk reduction is then calculated by applying the mitigation effectiveness parameters contained in Table 6-2 .

For the projects planned in 2027, Liberty estimates that installation of approximately 9.1 circuit miles of covered conductor will reduce overall utility risk by two percent annually relative to the "no-build" baseline. This value represents the modeled risk reduction attributable to the 2027 covered conductor work plan at the service-territory level, after accounting for risk reductions from the use of PSPS and SRP.

The two percent annual risk-reduction value is distinct from the covered conductor effectiveness assumptions described in Section 6. The effectiveness assumptions describe how covered conductor affects specific modeled sub-drivers. The two percent value represents the resulting change in overall utility risk after considering the location and amount of covered conductor work planned for 2027. As described below and in previous sections, the risk model does not include any improvements to outage program risk that overhead hardening with covered conductor likely provides, so the estimated two percent reduction in overall utility risk is purely driven by reductions in wildfire risk, and therefore likely underestimates the reduction in overall utility risk.

Covered conductor primarily affects the likelihood component of wildfire risk. Liberty does not model covered conductor as reducing wildfire consequence once an ignition has occurred. Accordingly, the modeled wildfire consequence associated with an affected circuit remains unchanged unless another project component affects a consequence-related input.

Refer to ection 6 for the mitigation-effectiveness assumptions, cost assumptions, modeled risk reduction, BCR calculations, and supporting justification.

Trend Analysis

Since 2020, Liberty has installed approximately 40 circuit miles of covered conductor across its service territory. Liberty evaluates the performance of completed grid-hardening projects using available outage, reliability, inspection, and ignition information.

Liberty's current operating history does not yet support a statistically robust, Liberty-specific estimate of covered conductor effectiveness by risk sub-driver. Liberty therefore currently relies on peer-utility benchmarking, engineering judgment, and Risk Focus Group review for the effectiveness assumptions used in the model.

Liberty will compare observed results with its modeled effectiveness assumptions. Material differences will be reviewed through Liberty's risk-model governance process, and Liberty will update the applicable assumptions when supported by sufficient operational evidence.

Impact of the Activity on Outage Program Risk:

Covered conductor is expected to improve reliability by reducing faults associated with vegetation contact, animal contact, conductor-to-conductor contact, and contact from other objects. Reducing these faults likely decreases outage frequency; however, Liberty's current risk model does not separately calculate the outage program risk reduction attributable specifically to the covered conductor portions of each project. The model does not yet isolate the activity's effect on PSPS likelihood after accounting for upstream and downstream hardened status, untreated facilities, sectionalizing capability, fire-weather conditions, and operational de-energization thresholds.

Covered conductor does not automatically remove a circuit or circuit segment from PSPS consideration. A treated segment may remain subject to de-energization if upstream facilities or other portions of the circuit remain unhardened, the treated segment cannot be isolated, or forecast conditions exceed Liberty's operational thresholds.

Following installation, Liberty will monitor outage frequency, outage duration, outage causes, customers affected, customer minutes interrupted, and relevant SAIFI and SAIDI trends on the affected circuits. As Liberty develops more granular circuit-segment and PSPS risk modeling, Liberty will evaluate whether a covered-conductor-specific reduction in outage program risk can be calculated.

Updates to the Activity:

Since Liberty's previous WMP submission, Liberty has integrated its revised risk methodology and BCR analysis into the evaluation and prioritization of covered conductor projects.

The updated process consists of the following steps:

1. **Risk identification:** Liberty uses the methodology described in Sectio 5 to quantify circuit-level wildfire risk, outage program risk, and overall utility risk.

2. **Risk ranking:** Liberty ranks circuits using overall utility risk and risk normalized by overhead circuit mile.
3. **Mitigation evaluation:** Liberty evaluates the effectiveness, cost, risk reduction, and BCR of covered conductor and applicable alternative mitigations.
4. **Operational review:** Liberty evaluates permitting, environmental considerations, terrain, access, construction complexity, seasonal limitations, agency coordination, workforce availability, materials, and outage requirements.
5. **Strategic review:** Liberty evaluates WMP commitments, regulatory obligations, compliance requirements, customer and community impacts, system-planning needs, and opportunities to coordinate with other utility or public projects.
6. **Capital Plan development:** Liberty integrates the quantitative risk results with the operational and strategic reviews to establish an executable capital plan.

This updated approach recognizes that the project with the highest modeled BCR may not always be the first project that can reasonably be completed. A high-BCR project may face extensive permitting, environmental, access, or construction constraints. Conversely, a lower-ranked project may need to proceed first to satisfy a regulatory commitment, address an immediate compliance or reliability concern, reduce significant community impacts, or take advantage of a time-sensitive joint-construction opportunity.

For 2027, this process resulted in the selection of the Spring Creek, Rainbow Tract, Verdi Phase 2, and Topaz covered conductor projects. These projects are located on four of Liberty's top risk-contributing circuits and collectively include approximately 9.1 circuit miles of planned installation.

Liberty plans the following future improvements:

- Use circuit-segment risk results to refine future project boundaries when that capability becomes available;
- Develop Liberty-specific empirical estimates of covered conductor effectiveness;
- Evaluate combined mitigation effectiveness for covered conductor, SRP, EFD, and other compatible activities;
- Refine the evaluation of upstream and downstream hardened status;
- Evaluate project-level effects on PSPS and outage program risk;
- Incorporate circuit-specific and project-specific cost assumptions into BCR calculations;

- Compare modeled benefits with observed post-installation performance; and
- Further formalize documentation of operational and strategic project-selection decisions.

Compatible Initiatives: Distribution Pole Replacements and Reinforcements (WMP-GDOM-GH-03), Section 8.2.3; Traditional Overhead Hardening (WMP-GDOM-GH-05), Section 8.2.5; Detailed Asset Inspections (WMP-GDOM-AI-01), Section 8.3.1; Intrusive Pole Inspections (WMP-GDOM-AI-02), Section 8.3.2.

8.2.2 Undergrounding of Electric Lines and/or Equipment

Tracking ID: WMP-GDOM-GH-02

Overview of Activity:

Undergrounding electric lines and equipment is one grid-hardening alternative Liberty considers for reducing wildfire risk and improving system resilience. Undergrounding can substantially reduce exposure to overhead ignition drivers, including vegetation contact, animal contact, conductor-to-conductor contact, and wind-driven contact from other objects. However, undergrounding does not eliminate all equipment-failure, ignition, or outage risk.

Liberty evaluates undergrounding on a case-by-case basis, typically in comparison with overhead hardening with and without covered conductor. Considerations include expected risk reduction, cost, terrain, permitting and environmental requirements, construction complexity, customer impacts, long-term maintenance, and restoration requirements considering the notable snow accumulation in parts of the service territory. Undergrounding presents particular challenges in Liberty's mountainous and heavily forested service territory. Projects may require extensive agency coordination, environmental review, challenging excavation through intense granite, conversion of customer services, and construction in areas with limited access. Permit, snow and high-elevation weather also generally limit Liberty's primary construction season to approximately May through October. Underground equipment may present additional maintenance and restoration challenges related to snow and ice-covered facilities, water intrusion, fault location, and access during winter conditions.

As discussed in Section 6, Liberty's section analysis estimates an average undergrounding cost of approximately $5.1 million per circuit mile, compared with approximately $1.85 million per circuit mile for overhead hardening with covered conductor. Actual project costs vary based on project scope, terrain, environmental restrictions, customer-service conversions, and construction requirements. Liberty considered undergrounding through the risk-informed mitigation evaluation described in Section 6. Based on the current comparison of risk reduction,

cost, constructability, reliability, and implementation timing, Liberty did not select undergrounding for its 2027 work plan. Accordingly, Liberty's 2027 plan does not include any undergrounding projects.

Impact of the Activity on Wildfire Risk:

Undergrounding reduces wildfire risk primarily by removing overhead conductor exposure and reducing the likelihood of faults or ignitions associated with vegetation, animals, conductor contact, wind-driven objects, and certain weather-related events. Liberty's current risk model applies a 95 percent mitigation-effectiveness assumption to the applicable risk sub-drivers when evaluating undergrounding. This value represents the modeled reduction in the affected portion of outage or ignition likelihood. Undergrounding primarily affects the likelihood component of wildfire risk. Liberty does not model undergrounding as reducing wildfire consequence after an ignition occurs. The actual risk reduction from a project would depend on the baseline risk of the affected circuit, the location and length of facilities placed underground, the risk drivers addressed, and the risk remaining on untreated facilities. Because Liberty has no undergrounding projects planned for 2027, the expected 2027 risk reduction for this activity is zero percent. This value reflects the absence of planned undergrounding work, not the effectiveness of undergrounding as a mitigation.

Impact of the Activity on Outage Program Risk: Undergrounding can reduce outages caused by vegetation contact, animal contact, conductor contact, and wind-driven objects. However, underground failures may be more difficult to locate and may take longer to repair, particularly where significant snow, ice, terrain, water intrusion, or limited access affects maintenance and restoration.

Undergrounding does not automatically remove a circuit from PSPS consideration when upstream facilities, aboveground equipment, or other portions of the circuit remain exposed. Because Liberty has no undergrounding projects planned for 2027, based on BCR results, this activity has no projected effect on outage program risk for the year.

Updates to the Activity:

Since its previous WMP submission, Liberty has incorporated its revised risk methodology and benefit-cost analysis into its evaluation of undergrounding. This allows Liberty to compare undergrounding with overhead hardening with and without covered conductor alternatives using consistent assumptions for mitigation effectiveness, risk reduction, and cost.

When evaluating the riskiest circuits, Liberty did not identify an undergrounding project for 2027 that provided the preferred balance of risk reduction, cost, constructability, reliability, and

implementation timing. Liberty will continue to consider undergrounding for future projects where project-specific conditions support its use, including locations where overhead construction is impractical, existing underground infrastructure is available, or a joint-trench opportunity materially reduces cost or community disruption.

Compatible Initiatives: Covered Conductor Installation (WMP-GDOM-GH-01), Section 8.2.1; Traditional Overhead Hardening (WMP-GDOM-GH-05), Section 8.2.5.

8.2.3 Distribution Pole Replacements and Reinforcements

Tracking ID: WMP-GDOM-GH-03

Overview of Activity: Liberty conducts pole replacements and reinforcements to minimize the risk of faults due to pole and associated hardware failure and to maintain system reliability. Poles are identified for replacement or repair through routine patrol and detailed inspections performed in accordance with G.O. 165, drone inspections, **and** Liberty's Intrusive Pole Inspection Program, which identifies poles with internal decay or other structural issues.

In addition to condition-based replacements, Liberty may proactively replace poles as part of wildfire mitigation projects, including overhead hardening with or without covered conductor. Poles damaged by storms, fires, or other external events are also replaced as needed to maintain safe and reliable operations.

For 2027, Liberty plans to replace at least 300 distribution poles, with 100 percent of the planned work located within the HFTD and Liberty's HFRA. Liberty estimates that the 2027 target will reduce overall utility risk by less than one percent. The target includes poles identified through Liberty's inspection and maintenance programs. This program falls under the overhead hardening without covered conductor umbrella and is measured in poles replaced.

Impact of the Activity on Wildfire Risk:

In 2027, Distribution Pole Replacements and Reinforcements are estimated to reduce system overall utility risk by less than one percent. An analysis of Liberty's highest risk circuits (Table 5-6) identified equipment failure as a primary risk driver for all listed circuits. As poles approach their estimated service life, the likelihood of failure and consequent wildfire risk increase. Proactively replacing poles and all the associated hardware and equipment, identified by asset inspections and through scheduled upgrades, reduces wildfire risk effectively.

Refer to Table 6-3 for the impact of Pole Replacements and Reinforcements on wildfire risk.

Impact of the Activity on Outage Program Risk:

Replacing or reinforcing structurally deficient poles and associated equipment and hardware is expected to reduce non-wire related overhead failures and associated unplanned outages. This may reduce outage frequency and customer minutes interrupted.

Liberty's current risk model quantifies outage program risk at the circuit level but does not separately calculate the reduction attributable specifically to distribution pole replacements and reinforcements. Correcting a pole deficiency also does not automatically remove a circuit or circuit segment from PSPS consideration because other facilities and risk drivers may remain exposed.

Liberty will monitor outages related to poles and associated equipment and hardware, outage duration, customers affected, customer minutes interrupted, and relevant SAIFI and SAIDI trends. As Liberty develops more granular risk modeling, Liberty will evaluate whether an activity-specific reduction in outage program risk can be calculated.

Updates to the Activity: Liberty continues to implement an active pole replacement program, with a strong focus on poles identified through inspections and as part of broader system hardening effort. From 2023-2025, over 1800 poles have been replaced as Liberty heads toward a steady state of pole replacements. This work supports Liberty's wildfire mitigation goals by addressing structural risks across the system, particularly in high fire threat areas. Pole replacement, including associated equipment and hardware, remains a high-priority, high-impact activity due to its efficiency and broad applicability across various project types. It is also one of the few programs that includes soil disturbance that Liberty can execute during the winter months for the Tahoe area due to the build season moratorium implemented by the Tahoe Regional Planning Agency to protect water clarity.

Compatible Initiatives: Covered Conductor Installation (WMP-GDOM-GH-01), Section 8.2.1; Traditional Overhead Hardening (WMP-GDOM-05), Section 8.2.5; Detailed Asset Inspections (WMP-GDOM-AI-01), Section 8.3.1; Intrusive Pole Inspections (WMP-GDOM-AI-02), Section 8.3.2.

8.2.4 Transmission Pole/Tower Replacements and Reinforcements

Tracking ID: WMP-GDOM-GH-04

Liberty does not have a separate WMP initiative for transmission pole and tower replacements. Liberty's transmission system is either 60 or 120-kilovolts, and therefore does not include towers as would be expected for voltages above 200 or 300-kilovolts. Because Liberty's transmission voltages are either 60 or 120-kilovolts, the assembly includes transmission poles,

versus towers. Liberty treats its transmission poles the same as its distribution poles. Transmission poles are inspected, replaced, and repaired in the same manner as primary distribution poles. The poles being replaced or repaired on these lines are included in the pole replacement program discussed in Section 8.2.3.

8.2.5 Traditional Overhead Hardening

Tracking ID: WMP-GDOM-GH-05

Overview of Activity: Liberty uses traditional overhead hardening to support both wildfire risk reduction and system reliability improvements. This activity involves replacing aging infrastructure with new components that meet current standards and are better suited to withstand extreme weather conditions.

Traditional overhead hardening includes the replacement of at-risk poles and hardware on a line segment or group of assets, along with new bare conductor, and is measured in line miles of circuit segments that are rebuilt. Additionally, traditional overhead hardening may include new poles to decrease span length and reduce sag, wider crossarms to increase phase spacing, and hardware upgrades, such as brackets, crossarms, insulators, fuses, and arrestors, so that the segment conforms to current engineering and construction standards. This initiative falls under the overhead hardening without covered conductor umbrella and is measured in miles.

Impact of the Activity on Wildfire Risk:

Liberty's risk model is specified at the circuit level, rather than at an individual component or asset level. Because traditional hardening may involve a variety of hardware replacements and upgrades, Liberty's current risk model is unable to quantify the risk reduction of the initiative. As discussed in Liberty's RAI plan, Liberty's goal is to move toward a circuit-segment level risk model.

Impact of the Activity on Outage Program Risk: As described above, reliability improvements attributed to traditional overhead hardening projects would also have a beneficial impact on outage program risk.

Updates to the Activity: Liberty previously used traditional overhead hardening to address locations where replacement of aging overhead facilities could improve wildfire safety and reliability. Since 2020, Liberty has completed approximately 10 circuit miles of this work.

For 2027, Liberty evaluated traditional overhead hardening alongside covered conductor, undergrounding, and other mitigation alternatives through the methodology described in

Sections 5 and 6. Liberty did not identify a traditional overhead hardening project for inclusion in the 2027 work plan.

Liberty will continue to consider traditional overhead hardening in future planning cycles if project-specific risk, reliability, cost, or constructability conditions support its selection. Any future project would be evaluated through Liberty's risk-informed mitigation review and incorporated into the applicable WMP target before implementation.

Compatible Initiatives: Distribution Pole Replacements and Reinforcement (WMP-GDOM-GH-03), Section 8.2.3; Non-exempt Fuse Replacements (WMP-GDOM-GH-12b); Section 8.2.12.2; Open Wire/Grey Wire (WMP-GDOM-GH-12e), Section 8.2.12.5.

8.2.6 Emerging Grid Hardening Technology Installations and Pilot Progress

Tracking ID: WMP-GDOM-GH-06

Liberty keeps in close contact with other utilities, vendors, and consultants familiar with wildfire mitigation through working groups, conferences, and periodic meetings. Through these channels, Liberty identifies emerging grid hardening technologies worthy of pursuit. Liberty is not currently piloting additional grid hardening technologies at this time and does not have new emerging grid hardening technologies to report in its 2027 WMP.

8.2.7 Microgrids

Tracking ID: WMP-GDOM-GH-07

Overview of Activity: Liberty considers the use of microgrids as an alternative in all applicable projects and has experienced success with Liberty's Sagehen microgrid. By allowing for the de-energization or removal of distribution lines, a microgrid can reduce wildfire risk and eliminate the possibility of infrastructure ignition events on lines that are removed or taken out of service. While microgrids can provide for the elimination of distribution lines, they typically require some distribution from the microgrid to customers. Microgrids can be a reliable local power source that can eliminate or defer the need to invest in replacing major sections of a distribution line. Thus, in areas that have long spans of distribution primary that feeds a concentrated and small load, microgrids can be a cost-effective alternative.

Impact of the Activity on Wildfire Risk: Liberty does not have any planned microgrids for 2027 and therefore there is no impact of wildfire risk for 2027.

Impact of the Activity on Outage Program Risk: Liberty does not have any planned microgrids for 2027 and therefore does not have the impact of this activity on outage program risk during 2027.

Updates to the Activity: At this time, Liberty does not have any planned microgrids during 2027. Liberty will continue to assess microgrids and line removals as an option in the future.

Compatible Initiatives: Line Removal (WMP-GDOM-GH-09), Section 8.2.9.

8.2.8 Installation of System Automation Equipment

Tracking ID: WMP-GDOM-GH-08

Overview of Activity: Liberty installs smart reclosers to help with sectionalization, opportunities for distribution automation, and opportunities for grid topology improvement to reduce the size and number of customers affected by faults on the system, or PSPS. Reclosers also help Liberty more quickly identify and restore power to affected customers. As part of Liberty's SRP Program, which utilizes protection settings to reduce the duration of fault currents that lead to ignition risk, Liberty installs additional reclosers on selected lines to help with sectionalization and line coverage from the protection relays. Liberty's existing reclosers and sectionalizing devices have enabled Liberty to increase its PSPS zones from 49 to 79, allowing the zones to more closely align with individual circuit segments. This increased granularity supports more targeted operational decision-making and enables Liberty to isolate smaller portions of the system when de-energization is necessary.

Impact of the Activity on Wildfire Risk: In 2027, Liberty plans to install three automatic reclosers to enhance SRP capabilities and add Liberty owned and operated protective devices to those feeders currently protected by NV Energy. Automatic reclosers can reduce wildfire risk by detecting qualifying faults and interrupting electrical current more rapidly. When operated with SRP settings, a recloser can reduce fault duration and fault energy, decreasing the likelihood that certain faults will result in an ignition. Reclosers also divide circuits into smaller protective zones, allowing Liberty to apply sensitive protection settings more selectively and focus SRP coverage to additional circuit segments.

Liberty's current risk model does not separately quantify the wildfire or overall utility risk reduction attributable to the three planned recloser installations. Liberty therefore reports the expected 2027 risk reduction as not calculated rather than assigning an unsupported percentage. Liberty will evaluate whether installation-specific risk reduction can be calculated as it develops more granular risk modeling and incorporates the final device locations, protective zones, and settings.

Impact of the Activity on Outage Program Risk: Liberty's current risk model does not separately quantify the change in outage program risk attributable to the three planned installations. Following installation, Liberty will monitor device operations, outage frequency, customer interruptions, customer minutes interrupted, and relevant SAIFI and SAIDI trends. These results will inform future recloser placement, protection settings, and outage program risk analysis.

Updates to the Activity: Liberty will continue to perform its review of one-third of its circuits annually and look for opportunities to improve and expand the program. Liberty plans to install three reclosers in 2027. Liberty will select locations based on protection coordination, expected improvement in SRP coverage, sectionalization and reliability benefits, equipment configuration, with the goal of expanding the system and reducing reliance on NV Energy's protective devices.

Compatible Initiatives: Equipment Settings to Reduce Wildfire Risk (WMP-GDOM-GO-01), Section 8.7.1.

8.2.9 Line Removal (in HFTD)

Tracking ID: WMP-GDOM-GH-09

Overview of Activity: Line removal eliminates the risk of infrastructure-caused ignitions in the area where a line is removed. The installation of microgrids is the primary initiative that allows for the removal of distribution lines.

Impact of the Activity on Wildfire Risk: Liberty does not have any planned line removals throughout 2027 and therefore does not have the impact of this activity on wildfire risk in 2027.

Impact of the Activity on Outage Program Risk: Liberty does not have any planned line removals in 2027 and therefore does not have the impact of this activity on outage program risk in 2027.

Updates to the Activity: Liberty does not have any planned line removals in 2027.Liberty will continue to assess microgrids and line removal as an option in the future. Liberty has no idle or abandoned transmission lines in its service territory.

Compatible Initiatives: Microgrids (WMP-GDOM-GH-07), Section 8.2.7.

8.2.10 Other Grid Topology Improvements to Minimize Risk of Ignitions

Tracking ID: WMP-GDOM-GH-10

Liberty does not undertake this WMP initiative at this time.

8.2.11 Other Grid Topology Improvements to Mitigate or Reduce PSPS Events

Tracking ID: WMP-GDOM-GH-11

Liberty does not undertake this WMP initiative at this time.

8.2.12 Other Technologies Not Listed Above

8.2.12.1 Tree Attachment Removals

Tracking ID: WMP-GDOM-GH-12a

Overview of Activity: Liberty removes secondary distribution that is attached to trees and resets the lines to new utility poles with updated hardware and clearances. These removals reduce wildfire ignition risk by eliminating the potential for conductor-tree contact, which can lead to faults, arcing, or fire during wind events or tree movement. As part of this activity, Liberty installs new poles, wire, and associated equipment that meet current construction and clearance standards and includes insulated secondary conductor.

This initiative supports both wildfire risk reduction and infrastructure modernization, especially in areas where historical tree attachments were used due to access limitations or legacy construction practices. In 2027, Liberty plans to complete 60 tree attachment removals. 100% of the planned removals are located within the HFTD and Liberty's HFRA.

Impact of the Activity on Wildfire Risk: Tree attachment removals currently appear to have minimal impact on network risk. This may be due to the assumed random age range of 5 to 50 years, which could underestimate the actual risk associated with older attachments. The risk associated with tree attachments is likely exponential over time. Running longer simulations could provide more insight into how this risk evolves. There is limited available data for secondary conductors, which may constrain the accuracy of related risk assessments.

Impact of the Activity on Outage Program Risk: In 2027, tree attachment removal is not projected to have an impact on outage program risk.

Updates to the Activity: Historically, Liberty's tree attachment removals were largely customer-driven, with projects initiated in response to requests from property owners or developers. As a result, volumes varied significantly across past WMP cycles. In recent years, Liberty has improved its ability to identify, track, and prioritize tree attachments across its service territory through inspection programs and GIS data enhancements. This has allowed Liberty to initiate proactive removals, helping to offset fluctuations in customer demand and improve wildfire mitigation coverage. Going forward, this initiative will remain an important tool in addressing legacy risks on a targeted basis.

Compatible Initiatives: Detailed Asset Inspections (WMP-GDOM-AI-01), Section 8.2.5.

8.2.12.2 Non-Exempt Fuse Replacements

Tracking ID: WMP-GDOM-GH-12b

Overview of Activity: As part of its wildfire mitigation strategy, Liberty is actively replacing traditional non-exempt expulsion fuses with CAL FIRE exempt fuses that generate significantly less energy during fault events. Unlike non-exempt fuses, which can emit hot gases and particles capable of igniting nearby vegetation, CAL FIRE exempt fuses are designed to limit energy release, reducing the risk of ignition in high fire threat areas.

Liberty has established a long-term goal of eliminating all non-exempt fuses from its electric system, prioritizing replacements based on fire risk, fault history, and proximity to vegetation.

Impact of the Activity on Wildfire Risk: Liberty's current circuit-level risk model does not separately quantify the wildfire or overall utility risk reduction attributable to the 1,000 planned fuse replacements. Liberty therefore reports the expected 2027 risk reduction for this activity as not calculated rather than assigning an unsupported percentage.

Impact of the Activity on Outage Program Risk: The primary purpose of replacing non-exempt fuses with CAL FIRE exempt fuses is to reduce ignition potential associated with fuse operation. The activity is not expected to eliminate the faults that cause protective devices to operate.

Liberty will select and coordinate CAL FIRE exempt fuse ratings to maintain appropriate system protection and avoid unintended reliability impacts. The activity's effect on outage frequency and customer interruptions will depend on device coordination and the characteristics of the underlying fault.

Liberty's current risk model does not separately quantify the change in outage program risk attributable to this activity. Liberty therefore does not claim a specific outage program risk reduction for the 2027 target. Following implementation, Liberty will monitor fuse operations,

equipment failures, customer interruptions, and protection-coordination issues to identify material reliability effects.

Updates to the Activity: Since Liberty's previous WMP submission, Liberty has developed revised construction standards for transitioning applicable lateral-line installations from legacy T-Link fuses to CAL FIRE exempt fuses. The revised standards apply to lateral lines.

For 2027, Liberty plans to replace 1,000 legacy T-Link fuses with CAL FIRE exempt fuses. The target will measure completed replacement of an eligible legacy T-Link fuse with an approved CAL FIRE exempt fuse. Routine replacement of one exempt fuse with another exempt expulsion fuse will not count toward the target.

Implementation remains dependent on final approval of the revised construction standard, material procurement, equipment availability, protection-coordination requirements, and field conditions. Liberty will incorporate the approved standard into applicable design, construction, inspection, and maintenance practices once finalized.

Compatible Initiatives: Traditional Overhead Hardening (WMP-GDOM-05), Section 8.2.5; Detailed Asset Inspections (WMP-GDOM-AI-01), Section 8.3.1.

8.2.12.3 Animal Guards

Tracking ID: WMP-GDOM-GH-12c

Overview of Activity This initiative focuses on reducing wildfire ignition risk by installing insulating animal guards—specifically, custom-fitted "Green Jackets"—on exposed substation equipment. These jackets are field-measured and custom-designed for each application, ensuring coverage of energized components where animals or foreign objects could otherwise make contact. Once installed, the guards effectively eliminate exposed energized surfaces, minimizing the chance of animal-caused faults or equipment flashovers that could result in fire or outages. This initiative targets substations located in or near High Fire Threat Districts where wildlife intrusion is a known risk.

Impact of the Activity on Wildfire Risk: Liberty does not have any planned animal guard installations throughout 2027 and therefore does not have the impact of this activity on wildfire risk during 2027.

Impact of the Activity on Outage Program Risk: Liberty does not have any planned animal guard installations throughout 2027 and therefore does not have the impact of this activity on outage program risk during 2027.

Updates to the Activity: Liberty has made substantial progress completing this initiative, with all identified high-priority substations already outfitted. There are no further installations planned for 2027 unless new substations or risk conditions emerge.

Compatible Initiatives: Substation Inspections (WMP-GDOM-AI-06), Section 8.3.5.

8.2.12.4 CAL FIRE Exempt Hardware

Tracking ID: WMP-GDOM-GH-12d

Liberty does not undertake this WMP initiative at this time.

8.2.12.5 Open Wire / Grey Wire

Tracking ID: WMP-GDOM-GH-12e

Overview of Activity: This initiative targets the replacement of legacy open wire and grey service wire with modern service conductor that meets current design and insulation standards. Older service wire types may have deteriorated insulation or lack preferred clearance and support, increasing the risk of arcing, faults, or contact with vegetation or structures. By replacing this service wire, Liberty reduces the risk of ignition and service interruptions, particularly in wildland-urban interface areas where homes and vegetation are in close proximity to overhead infrastructure. In 2027, Liberty plans to replace 7.0 circuit miles of open wire and grey wire. 100% of the planned work is located within the HFTD and Liberty's HFRA.

Impact of the Activity on Wildfire Risk: There is currently limited data available for evaluating this initiative. Due to the absence of detailed information on the type of secondary conductor throughout the system, a placeholder was used based on subject matter expert input. It is assumed that 25% of the network consists of grey wire.

Impact of the Activity on Outage Program Risk: In 2027, open wire/grey wire replacement is not projected to have an impact on outage program risk.

Updates to the Activity: Liberty continues to replace open and grey service wire as part of planned construction, hardening projects, and reactive maintenance. This work is typically bundled with broader overhead upgrades or performed when asset inspections identify conductor types requiring replacement. The initiative is ongoing, with replacements prioritized in high fire threat areas and locations with visible wire degradation or clearance issues.

Compatible Initiatives: Traditional Overhead Hardening (WMP-GDOM-05), Section 8.2.5; Detailed Asset Inspections (WMP-GDOM-AI-01), Section 8.3.1.

8.2.13 Status Updates on Additional Technologies Being Piloted

Liberty is not pursuing additional emerging technology pilots as part of this WMP cycle. Liberty is prioritizing its efforts and resources on high-impact wildfire mitigation initiatives that have demonstrated effectiveness and strong risk-spend efficiency, such as covered conductor installation, pole replacement, and overhead system hardening. Focusing on these proven strategies can allow Liberty to maximize near-term wildfire risk reduction and maintain operational efficiency while continuing to assess the feasibility of emerging technologies for future WMP cycles. That said, Liberty will continue to monitor emerging technologies through vendor and utility events and publications.

8.3 Asset Inspections

In this section, the electrical corporation must provide an overview of its procedures for inspecting its assets.[66]

The electrical corporation must first summarize details regarding its asset inspections in Table 8-2. The table must include the following:

- **Type of inspection**: i.e., distribution, transmission, or substation.
- **Inspection program name**: Identify various inspection programs within the electrical corporation.
- **Frequency or trigger**: Identify the frequency or triggers, such as inputs from the risk model. Indicate differences in frequency or trigger by HTFD Tier, if applicable.
- **Method of inspection**: Identify the methods used to perform the inspection (e.g., patrol, detailed, aerial, climbing, and LiDAR).
- **Governing standards and operating procedures**: Identify the initiative construction standards and the electrical corporation's procedures for addressing them, and other internal protocols for work described.
- **% of HFRA and HFTD Covered Annually by Inspection Type**: Determine the percentage of either circuit mileage or number of assets covered annually by the inspection type within the HFRA and HFTD.
- **Find Rate**: Identify the find rate of level 1, 2, and 3 conditions over the three calendar years prior to the base WMP submission. The find rate must be expressed as the percentage of inspections resulting in findings and identify the inspection unit.
- **Clarifying information**: Provide electrical corporation-specific risk informed triggers used for asset inspections and electrical corporation-specific definitions of the different methods of inspection.

Liberty summarizes details regarding its asset inspections in Table 8-2.

[66] Pub. Util. Code § 8386(c)(10).

Table 8-2: Liberty Asset Inspection Frequency, Method and Criteria

Type [67]	Inspection Activity (Program)	Frequency or Trigger (Note 1)	Method of Inspection (Note 2)	Governing Standards & Operating Procedures	Cumulative Quarterly Target 2027, Q1	Cumulative Quarterly Target 2027, Q2	Cumulative Quarterly Target 2027, Q3	Cumulative Quarterly Target 2027, Q4	% of HFRA and HFTD Covered Annually by Inspection Type	Condition Find Rate Level 1	Condition Find Rate Level 2	Condition Find Rate Level 3
Distribution	Detailed Inspections	5-year cycle for OH; 3-year cycle for UG	Ground and some Aerial	G.O. 165	20 circuit miles	50 circuit miles	150 circuit miles	198.5 circuit miles	20%	0.03% (Assets)	4.59% (Assets)	26.06% (Assets)
Distribution	Intrusive Pole Inspections	10-year cycle	Ground	G.O. 165	0 poles	0 poles	2,238 poles	2,238 poles	10%	Level findings not applicable for this type of inspection	Level findings not applicable for this type of inspection	Level findings not applicable for this type of inspection
Distribution	Patrol Inspections	Annually	Ground and some Aerial	G.O. 165	200 circuit miles	568.8 circuit miles	568.8 circuit miles	568.8 circuit miles	80%	0.02% (Assets)	0.08% (Assets)	0.03% (Assets)
Distribution	Other Discretionary Inspections: Drone inspections	Annually for HFTD 3	Aerial	G.O. 165	0 assets	1,769 assets	1,769 assets	1,769 assets	7%, but 100% HFTD-3	0.4%	15.26%	24.62%
Substation	Substation Inspections	Quarterly	Ground	G.O. 174	10 substations	22 substations	34 substations	44 substations	100%	Level findings not applicable for this type of inspection	Level findings not applicable for this type of inspection	Level findings not applicable for this type of inspection

Note 1: The electrical corporation must provide electrical corporation-specific risk-informed triggers used for asset inspections.

Note 2: The electrical corporation must provide electrical corporation-specific definitions of the different methods of inspection.

[67] Liberty does not have a separate program for transmission inspections. Liberty has approximately 75 miles of 60kV lines and 19 miles of 120kV lines that are included in the distribution inspection program.

8.3.1 Detailed Inspections of Distribution Electric Lines and Equipment

Tracking ID: WMP-GDOM-AI-01

8.3.1.1 Process

In this section, the electrical corporation must provide an overview of the individual asset inspection program, including inspection criteria and the various inspection methods used for each inspection program.

Include relevant visuals and graphics depicting the workflow and decision-making process the electrical corporation uses for the inspection program.

Detailed inspections of distribution and transmission lines and equipment are performed in accordance with General Order ("G.O.") 165 guidelines to mitigate the risk of equipment failure by identifying aging and deteriorating equipment in the field. When a qualified electrical worker ("QEW") identifies an issue in the field that needs remediation or repair, work orders are generated to address the issue. As equipment failure can lead to electrical system faults and has the potential to cause ignition events, Liberty's detailed inspection programs play a vital role in reducing risk. Liberty inspects approximately 20% of its system annually, which results in the entire system being inspected every five years before starting the cycle again. As this program has a set schedule to maintain compliance, there is currently no risk analysis performed for regional prioritization.

8.3.1.2 Frequency or Trigger

In this section, the electrical corporation must identify the frequency (including how frequency may differ by HFTD Tier or other risk designation[s]) or triggers used in the inspection program, such as inputs from the risk model.

If the inspection program is schedule-based, the electrical corporation must explain how it uses risk prioritization in the scheduling of the inspection program to target high-risk areas. If the electrical corporation does not use risk prioritization in the scheduling of the inspection program, it must explain why.

Asset inspection frequency follows the requirements set forth in G.O. 165 and G.O. 174, including the following for detailed inspections:

1. Detailed inspections of overhead poles, devices, and conductors are conducted on a five-year schedule.

2. Detailed inspections of underground structures and devices are conducted on a three-year schedule.
3. Detailed inspections of padmount devices are conducted on a five-year schedule.

8.3.1.3 Accomplishments, Roadblocks and Updates

In this section, the electrical corporation must discuss:

- How the electrical corporation measures success for the inspection program (excluding routine inspections).
- Roadblocks the electrical corporation has encountered while implementing the inspection program and how the electrical corporation has addressed the roadblocks.
- Changes/updates to the inspection program since the last WMP submission, including known future plans (beyond the current year) and new/novel strategies the electrical corporation may implement in the next 5 years, including references to and strategies from pilot projects and research.

Liberty measures the success of its asset inspection programs by performing inspections in accordance with G.O. 165 and G.O. 174 guidelines to mitigate the risk of equipment failure by identifying aging and deteriorating equipment in the field. Liberty has begun comparing find rates between ground based and aerial based inspection. Liberty does not have roadblocks or other updates to this WMP initiative at this time.

8.3.2 Intrusive Pole Inspections

Tracking ID: WMP-GDOM-AI-02

8.3.2.1 Process

Intrusive pole inspections are a G.O. 165 mandated program for the testing and treatment of wood poles that begin to deteriorate and degrade over time. Poles that are thoroughly inspected and/or proactively treated to extend the service life of the asset significantly reduce safety risk to the system and public. In addition to extending the life of existing poles, the program also helps to identify those assets that need to be replaced before they fail. The intrusive pole inspection program tests the integrity of wood poles both visually and through internal examination of the poles to identify damage, decay, and approximate shell thickness. A report identifies poles that pass inspection as well as those that need to be replaced or need remediation, such as c-truss or treatment application. This program can reduce replacement costs, extend the life of poles, and increase the safety and reliability of the overall system.

8.3.2.2 Frequency or Trigger

Asset inspection frequency follows the requirements set forth in G.O. 165 and G.O. 174, including that wood poles over 15 years old must have intrusive pole inspections done a maximum of every ten years. Intrusive pole inspections are currently performed throughout Liberty's service territory annually on a 10-year cycle.

8.3.2.3 Accomplishments, Roadblocks and Updates

Liberty measures the success of its asset inspection programs by performing inspections in accordance with G.O. 165 and G.O. 174 guidelines to mitigate the risk of equipment failure by identifying aging and deteriorating equipment in the field. Liberty does not have roadblocks or other updates to this WMP initiative at this time.

8.3.3 Patrol Inspections of Distribution Electric Lines and Equipment

Tracking ID: WMP-GDOM-AI-03

8.3.3.1 Process

Patrol inspections are performed throughout Liberty's service territory in accordance with the schedules outlined in G.O. 165. Patrol inspections are conducted annually except for circuits undergoing a detailed inspection in the same year. During patrol inspections, a QEW patrols the electric system looking for issues with overhead structures or obvious hazards that impact the safety and reliability of the system.

8.3.3.2 Frequency or Trigger

Asset inspection frequency follows the requirements set forth in G.O. 165 and G.O. 174, including that patrol inspections are conducted annually except for circuits undergoing a detailed inspection in the same year.

8.3.3.3 Accomplishments, Roadblocks and Updates

Liberty measures the success of its asset inspection programs by performing inspections in accordance with G.O. 165 and G.O. 174 guidelines to mitigate the risk of equipment failure by identifying aging and deteriorating equipment in the field. Liberty does not have roadblocks or other updates to this WMP initiative at this time.

8.3.4 Other Discretionary Inspections of Distribution Electric Lines and Equipment: Drone inspections

Tracking ID: WMP-GDOM-AI-04

8.3.4.1 Process

In 2026, Liberty implemented an annual drone inspection program for distribution and transmission circuits within its HFTD-3 zone, which the California Public Utilities Commission designates as having extreme wildfire risk. The program supplements Liberty's G.O. 165 inspection activities by using high-resolution aerial imagery to inspect assets from multiple viewing angles, including locations that are difficult to access from the ground. Inspection results are reviewed and classified as Level 1, Level 2, or Level 3 conditions in accordance with G.O. 95, and identified conditions are entered into Liberty's asset management and corrective work processes for validation, prioritization, and remediation. The HFTD-3 program area includes approximately 127 circuit miles and approximately 1,769 poles across Liberty's distribution and transmission systems.

8.3.4.2 Frequency or Trigger

The drone inspection program is performed annually on all distribution and transmission circuits within Liberty's HFTD-3 zone. The 2026 inspection was substantially completed by mid-august, with final data validation and closeout scheduled for completion in late-August 2026. Beginning in 2027, Liberty plans to complete the annual inspection by the end of the second quarter, ahead of peak fire season. Liberty will use inspection results, field validation, and evolving risk assessments to evaluate whether future program scope should remain focused on HFTD-3 or expand to other higher-risk assets or locations.

8.3.4.3 Accomplishments, Roadblocks and Updates

During the 2023–2025 WMP cycle, Liberty spoke with other utilities, drone vendors, and evaluated infrared, LiDAR, and drone inspection technologies. Those discussions and pilots demonstrated that drones could support detailed inspections, outage response, and inspection of remote or difficult-to-access facilities. Building on those results, Liberty selected a full-service drone inspection approach and completed the first system-scale HFTD-3 pilot in 2026.

- The 2026 pilot covered the planned HFTD-3 inspection area and was substantially complete at the time of this filing. Preliminary results include 1,769 recorded inspection observations. Of these, 719 were assigned condition priorities:
    - 7 Level-1,

  - 303 Level-2, and
  - 517 Level-3.

  Final totals remain subject to data validation and closeout.

- The most frequently identified condition categories were hardware issues, with 281 findings; conductor issues, with 129; woodpecker holes, with 110; insulators needing replacement, with 80; high-voltage sign problems, with 60; and tagging or label issues, with 44. Other findings included crossarm, guy or guard, grounding, clearance, vegetation, foreign-object, oil-leak, idle-hardware, and climbing-space conditions.
- The 2026 pilot also included thermal inspections of applicable electrical equipment to identify abnormal heat signatures and potential hot spots that may not be visible through standard imagery. Liberty developed the thermal inspection criteria with its drone inspection vendor after reviewing and comparing the overhead infrared finding limits used by PG&E and SCE. Liberty adopted a hybrid approach that incorporated applicable elements of both utilities' frameworks and was tailored to Liberty's system and program needs. The proposed criteria were reviewed by Liberty's Risk Focus Group and formally adopted for use in the program. The 2026 thermal review did not identify any abnormal heat signatures or thermal issues requiring corrective action. Liberty will use lessons learned from the pilot to further refine thermal inspection criteria, review thresholds, and the equipment types included in future annual drone inspections.
- The pilot confirmed that drone inspections can provide useful asset views and identify conditions across the HFTD-3 system while reducing the need to access hazardous or remote terrain solely for initial visual inspection. Liberty is reviewing the results, validating priority classifications, and routing actionable findings through its established corrective work process.
- Program success will be measured through completion of the planned annual scope, quality and completeness of imagery and inspection records, timely validation and disposition of findings, and the program's ability to identify actionable conditions before peak fire season. Liberty will use the 2026 results to refine inspection criteria, data quality controls, QA/QC procedures, and vendor performance expectations.

Liberty does not have roadblocks or other updates to this WMP initiative at this time.

8.3.5 Substation Inspections

Tracking ID: WMP-GDOM-AI-06

8.3.5.1 Process

Liberty conducts its substation inspections in accordance with its current G.O. 174 Substation Inspection Plan. Per Liberty's substation inspection program provides inspections should be completed on a quarterly basis for 10 of Liberty's 12 substations. Hobart Mills and Stampede Substations will be inspected annually in quarter two or three as weather permits. Substation inspections can identify issues before they become serious problems. This includes inspection of batteries, DC circuitry, relays, and breakers for proper fault identification and clearing. It also includes inspection of assets such as transformers and regulators to proactively address concerns to reduce the likelihood of failure.

8.3.5.2 Frequency or Trigger

Liberty conducts its substation inspections in accordance with its current G.O. 174 Substation Inspection Plan. Most Liberty substations that are accessible year-round are inspected on a quarterly basis. Substations that are not accessible for normal daily operations are inspected on an annual basis.

8.3.5.3 Accomplishments, Roadblocks and Updates

Liberty measures the success of its asset inspection programs by performing inspections in accordance with G.O. 165 and G.O. 174 guidelines to mitigate the risk of equipment failure by identifying aging and deteriorating equipment in the field. Liberty does not have roadblocks or other updates to this WMP initiative at this time.

8.4 Equipment Maintenance and Repair

In this section, in addition to the information described above regarding distribution, transmission, and substation inspections, the electrical corporation must provide a brief narrative of maintenance programs.[68] As a narrative, the electrical corporation must include its strategy for maintenance, such as whether the electrical corporation replaces or upgrades facilities/equipment proactively (for example, an electrical corporation may monitor dissolved gases in its transformers to detect potential transformer failures to alert engineering and maintenance personnel or component lifecycle management) or if it runs its facilities/equipment to failure. The narrative must include, at minimum, the following types of equipment:

1. Capacitors
2. Circuit breakers
3. Connectors, including hotline clamps
4. Conductor, including covered conductor
5. Fuses, including non-exempt fuses
6. Distribution pole
7. Lightning arrestors
8. Reclosers
9. Splices
10. Transmission poles/towers
11. Transformers
12. Non-exempt[69] equipment
13. Pre-GO 95 legacy equipment
14. Other equipment not listed

For equipment types 12 – 14 above, the electrical corporation must include sub-categories for each relevant equipment type. For each equipment type, the electrical corporation must include sections for the following information:

- **Condition monitoring**: a description of how the electrical corporation monitors the condition of the equipment (e.g., human visual inspection, automated visual inspection, human sensor readings, automated sensor readings).

[68] Pub. Util. Code §§ 8386(c)(3), (10).
[69] "Non-exempt" in this instance pertaining to equipment that must comply with clearances specified within Public Resource Code (PRC) § 4292 and PRC § 4293.

- **Maintenance strategy**: identification and brief description of the maintenance strategy (e.g. reactive, preventative, predictive, reliability-centered).
- **Replacement/repair condition**: a description of how equipment is identified for repair or replacement (e.g., time interval, inspection finding, sensor reading, predictive maintenance, data analytics, machine learning).
- **Timeframe for remediation**: a list of possible conditions and findings, including the priority level and associated timeframes for remediation of each.
- **Failure rate**: the number of total failures attributed to the given equipment type in the HFTD and HFRA[70] during the three calendar years prior to the base WMP submission, broken out by distribution, transmission, and substation. The failure rate must include the likelihood of failure based on the ratio of number of failures to the number of total assets in-field within the HFTD/HFRA for the equipment type.
- **Ignition rate**: the total number of CPUC-reportable ignitions attributed to the equipment type in the HFTD and HFRA during the 10 calendar years prior to the base WMP submission, broken out by distribution, transmission, and substation. The ignition rate must include evaluation of the likelihood that an equipment failure will propagate into an ignition based on the ratio of the number of failures to the number of ignitions attributed to the equipment type.
- **Failure and ignition causes**: A narrative describing root cause analyses performed for failures and associated CPUC ignitions within the HFTD and HFRA, including any lessons learned and solutions implemented to decrease ignition rates.

Tracking ID: WMP-GDOM-MR-01

Overview of the Activity: The following describes Liberty's maintenance programs for the specified types of equipment:

8.4.1 Equipment Condition Monitoring, Maintenance Strategies, Replacement/Repair Condition, and Timeframe for Remediation

- Capacitors:
    - Condition monitoring: Human Visual Inspection during patrol and detailed inspections. Thermal hot spot or visual from drone inspections.

[70] Equipment that falls in both the HFTD and HFRA should not be counted twice. The number of failures should include all equipment that is in the HFTD Tier 2 and 3 and all equipment that is in the utility defined HFRA beyond the HFTD.

  - Maintenance strategy: Reliability-centered. Maintenance is performed on distribution capacitor banks on an as-needed basis when concerns are identified. Maintenance follows applicable manufacturer's guidelines. If components are failed, they are replaced.
  - Replacement/repair condition: Inspection findings. Failed capacitors are replaced per engineered documentation and a pole loading calculation is completed for all pole replacements, in compliance with G.O. 95. standards and capacitors are commissioned per manufacturer's recommendation by a QEW.
  - Timeframe for remediation: No priority level is assigned to this. Critical infrastructure is prioritized and executed as engineered documentation and equipment availability allow. Non-critical infrastructure is evaluated by engineering to determine the system need and scheduled as part of the annual capital planning or removed from the system and time and resources allow.

- Circuit breakers:
  - Condition monitoring: Substation circuit breakers are visually inspected regularly as part of Liberty's G.O. 174 process.
  - Maintenance strategy: Preventative maintenance is performed as necessary in accordance with the particular breaker's operation manual. Oil circuit breakers ("OCB") have been targeted for replacement throughout Liberty's system.
  - Replacement/repair condition: Inspection findings. Circuit breakers are primarily identified for replacement or repair based on visual and functional inspection results. Additional factors such as asset age, operation count, or manufacturer recommendations may also be considered. Oil circuit breakers may be prioritized for earlier replacement due to elevated operational and environmental risks.
  - Timeframe for remediation: Identified replacements or repairs are prioritized based on risk and system considerations.

- Connectors:
  - Condition monitoring: Connectors are visually inspected regularly as part of Liberty's G.O. 165 process and logged in Fulcrum.
  - Maintenance strategy: Visually inspect during G.O. 165 annual Patrols and Detailed Inspections for preventative and predictive replacement. Visual from drone inspection. Reactive replacements made due to quality issues when found.
  - Replacement/repair condition: Inspection findings. Connectors found to be defective or inappropriate for the specific installation are scheduled for

replacement immediately. Excessive connectors in a span of wire are also identified, scheduled, and replaced as resources allow.

- Timeframe for remediation: Liberty follows G.O. 95 Rule 18 requirements, which establishes the following timelines for remediation:
  - Level 1: Take action immediately, either by fully repairing the condition, or by temporarily repairing and reclassifying the condition to a lower priority.
  - Level 2: Take action to correct within specified time period (fully repair, or by temporarily repairing and reclassifying the condition to a lower priority). Time period for correction to be determined at the time of identification by a qualified company representative, but not to exceed: (1) six months for nonconformances that create a fire risk located in Tier 3 of the High Fire-Threat District; (2) 12 months for nonconformances that create a fire risk located in Tier 2 of the High Fire-Threat District; (3) 12 months for nonconformances that compromise worker safety; and (4) 59 months for all other Level 2 nonconformances.

    Further, in 2026, Liberty introduced a Level 2, 7-day and Level 2, 30-day as part of its new incremental drone inspection program. This allowed inspectors to prioritize certain Level 2 concerns based on risk and subject matter expertise. Liberty will be evaluating the expansion of this Level 2 prioritization classification system during 2027.
  - Level 3: Take action (re-inspect, re-evaluate, or repair) as appropriate.

- Conductor, including covered conductor: Liberty acknowledges that covered conductor has some unique failure characteristics that other conductor types do not. These additional inspection items have been added and are logged in Liberty's asset tracker system, Fulcrum, to identify and address potential failure points in a timely manner.
  - Condition monitoring: Visual Inspection. Conductor is inspected regularly as part of Liberty's G.O. 165 process and logged in Fulcrum.
  - Maintenance strategy: Reactive, preventative.
  - Replacement/repair condition: Damaged conductor(s) are identified and ranked on severity before being scheduled for repair/replacement.
  - Timeframe for remediation: Liberty follows G.O. 95 Rule 18 requirements, which establish the timelines for remediation identified in the Connector's equipment bullet above.

- Fuses, including non-exempt fuses: Refer to Section 8.2.12.2.
    - Condition monitoring: Visual inspection. Fuses, including non-exempt fuses, are inspected regularly as part of Liberty's G.O. 165 process and logged Fulcrum.
    - Maintenance strategy: Reactive, reliability-centered.
    - Replacement/repair condition: Inspection findings. Blown T-link fuses are replaced with ELF fuses for transformer protection. Damaged porcelain fuse cutouts are also identified, logged and a follow-up work order is generated for scheduled replacement.
    - Timeframe for remediation: Failures are replaced immediately. Planned system upgrade for T-link replacements with ELF fuses are scheduled annually.
- Distribution poles:
    - Condition monitoring: Distribution poles are visually inspected regularly as part of Liberty's G.O. 165 process and logged in Fulcrum. Per G.O. 165 guidelines, Liberty performs three types of inspection:
        - *Intrusive pole inspections*: Liberty has adopted a 10-year intrusive pole inspection cycle exceeding that of G.O. 165 requirements. This inspection is defined as one involving movement of soil, taking samples for analysis, and/or using more sophisticated diagnostic tools beyond visual inspections or instrument reading. Poles found to fail this inspection are referred to engineering for replacement.
        - *Detailed inspections*: Liberty maintains a five-year cycle for OH and pad mounted equipment inspections and three-year cycle for UG inspections in accordance with G.O. 165. Plus, Liberty performs incremental aerial inspection for its HFTD-3. Detailed inspections are defined as one where individual pieces of equipment and structures are carefully examined, visually and through use of routine diagnostic test, as appropriate, and (if practical and if useful information can be so gathered) opened, and the condition of each rated and recorded.
        - *Patrols*: Liberty maintains a five-year cycle for system patrols which include all assets not being detail inspected in a given year. Patrol inspections are defined as a simple visual inspection, of applicable utility equipment and structures, that is designed to identify obvious structural problems and hazards. Patrol inspections may be carried out in the course of other company business. Any equipment identified as needing

repairs or replacement based on a QEW's assessment is identified and a follow-up work order is generated with timeline for replacement or repair based on G.O. 165 guidelines. A pole loading calculation is completed for all pole replacements, in compliance with G.O. 95.

  - Maintenance strategy: Preventative, reliability-centered.
  - Replacement/repair condition: Inspection finding. Using methods described above in condition monitoring, poles are identified for replacement, prioritized and scheduled annually as part of the Liberty Capital plan.
  - Timeframe for remediation: Liberty follows G.O. 95 Rule 18 requirements, which establishes the timelines for remediation identified in the Connectors equipment bullet above.

- Lighting arrestors:
  - Condition monitoring: Lightning arrestors are visually inspected regularly as part of Liberty's G.O. 165 process and logged in Fulcrum. Visual from drone inspections.
  - Maintenance strategy: Reactive, reliability-centered. Lightning arrestors are replaced if found in a failed state during inspection or routine work. Liberty currently does not include CalFire compliant lightning arrestors as part of their construction standards. Pole clearing is performed in compliance with Public Resources Code section 4292 as described in section 9.4 of this document.
  - Replacement/repair condition: Inspection findings.
  - Timeframe for remediation: Arrestors are placed immediately following identification of failure.

- Reclosers:
  - Condition monitoring: Reclosers are visually inspected regularly during G.O. 165 inspections and during normal operations. Thermal hot spot detection or visual from drone inspection.
  - Maintenance strategy: Reactive. Liberty addresses recloser issues as they arise. In addition, Sensitive Relay Profile ("SRP") settings for reclosers are re-evaluated on a three-year cycle.
  - Replacement/repair condition: Issues are reported to Liberty's substation department and are scheduled for maintenance and repair. Liberty recently completed replacement of all oil filled reclosers with vacuum type reclosers.

  - Timeframe for remediation: Recloser issues are addressed as soon as possible once identified. Liberty does not maintain a formal timeline for remediation. Prioritization is based on criticality of the affected circuit and operational impact.

- Splices:
  - Condition monitoring: Splices are visually inspected regularly as part of Liberty's G.O. 165 process. Visual from drone inspection.
  - Maintenance strategy: Reactive, reliability-centered.
  - Replacement/repair condition: Inspection findings. Defective splices are identified during inspections, partial power calls or outages.
  - Timeframe for remediation: Defective splices are repaired or replaced immediately upon identification of the issue.

- Transmission poles/towers: Like distribution poles, transmission poles are inspected regularly as part of Liberty's G.O. 165 process and logged in Fulcrum. Per G.O. 165 guidelines, Liberty performs the same three types of inspection for transmission poles as it performs for distribution poles.
  - Condition monitoring: Transmission poles are visually inspected regularly as part of Liberty's G.O. 165 process and logged in Fulcrum. Per G.O. 165 guidelines, Liberty performs three types of inspection:
    - *Intrusive pole inspections*: Liberty has adopted a 10-year intrusive pole inspection cycle exceeding that of G.O. 165 requirements. This inspection is defined as one involving movement of soil, taking samples for analysis, and/or using more sophisticated diagnostic tools beyond visual inspections or instrument reading. Poles found to fail this inspection are sent to engineering for replacement.
    - *Detailed inspections*: Liberty maintains a five-year cycle for OH and padmounted equipment inspections and three-year cycle for UG inspections in accordance with G.O. 165. Plus, Liberty performs incremental aerial inspection for its HFTD-3. Detailed inspections are defined as one where individual pieces of equipment and structures are carefully examined, visually and through use of routine diagnostic test, as appropriate, and (if practical and if useful information can be so gathered) opened, and the condition of each rated and recorded.
    - *Patrols*: Liberty maintains a five-year cycle for system patrols which include all assets not being detail inspected in a given year. Patrol

inspections are defined as a simple visual inspection, of applicable utility equipment and structures, that is designed to identify obvious structural problems and hazards. Patrol inspections may be carried out in the course of other company business. Any equipment identified as needing repairs or replacement based on a QEW's assessment is identified and a follow-up work order is generated with timeline for replacement or repair based on G.O. 165 guidelines. A pole loading calculation is completed for all pole replacements, in compliance with G.O. 95.

- Maintenance strategy: Preventative, reliability-centered.
- Replacement/repair condition: Inspection findings. Using methods described above in condition monitoring, poles are identified for replacement, prioritized and scheduled annually as part of the Liberty Capital plan.

- Timeframe for remediation: Liberty follows G.O. 95 Rule 18 requirements, which establish the timelines for remediation identified in the Connectors equipment bullet above.

- <u>Transformers</u>:
  - Condition monitoring: Transformers are visually inspected regularly as part of Liberty's G.O. 165 for OH or G.O. 174 for Substations. Thermal hot spot detection or visual from drone inspections. Results are logged in Fulcrum.
  - Maintenance strategy: Preventative. Substation transformers are sampled for Dissolved Gas Analysis ("DGA") by exception (e.g., if the substation team feels a transformer should be tested due to a differential lockout). These substation transformers are inspected as part of Liberty's G.O. 174 process. Any maintenance or repair is completed in accordance with the transformer manufacturer's recommendations.
  - Replacement/repair condition: Inspection findings. If transformers are identified as needing maintenance, repair or replacement, a work order is generated, and the work is scheduled to be replaced based on resource and equipment availability.
  - Timeframe for remediation: Liberty follows G.O. 95 Rule 18 requirements, which establishes the timelines for remediation identified in the Connectors equipment bullet above.
- <u>Non-exempt equipment, pre-GO 95 legacy equipment, and other equipment not listed</u>: To the extent Liberty has this equipment, maintenance protocols are the same as listed above for the specified type of equipment.

- Condition monitoring: Non-exempt equipment, pre-GO 95 legacy equipment, and other equipment not listed are visually inspected regularly as part of Liberty's G.O. 165 process and logged in Fulcrum.
- Maintenance strategy: Reactive, reliability-centered.
- Replacement/repair condition: Replaced/repaired as needed.
- Timeframe for remediation: Liberty follows G.O. 95 Rule 18 requirements, which establishes the timelines for remediation identified in the Connectors equipment bullet above.

8.4.2 Equipment Failure Rate, Ignition Rate, and Failure/Ignition Cause Analyses

Failure rate: Liberty's outage management system records equipment failures but does not currently record failures by equipment type. Additionally, Liberty does not have an exact count of all listed assets, such as connectors or splices, in the field. Using the available data, including all equipment failures and all inventoried assets, the likelihood of failure is 0.42% for all equipment types.

Ignition rate: Liberty performs investigations of all ignitions. In the past ten years, there have been five ignitions attributed to equipment failures. All these ignitions have been on the distribution system. This yields a distribution system ignition rate of approximately one ignition every two years. Dividing by total assets yields an ignition rate of approximately 0.2 per every 10,000 assets or put differently 0.002%.

Failure and ignition cause analyses: Liberty captures and reviews all known equipment failures and CPUC-reportable ignition causes. In recent years, such instances have been minimal and not statistically significant enough to warrant additional resources or programmatic changes. At this time, there are no identifiable trends requiring remediation, and the existing maintenance and monitoring processes remain appropriate and effective for Liberty's current risk profile.

8.5 Quality Assurance and Quality Control

8.5.1 Overview, Objectives, and Targets

In this section, the electrical corporation must provide an overview of each of its quality assurance (QA) and quality control (QC) programs for grid design, asset inspections and maintenance.[71] This overview must include the following for each program:

- Initiative/activity being audited (each initiative/activity name must correspond to an initiative/activity described in Sections 8.2 through 8.4)
- Tracking ID from Table 8-1 or 8-2.
- Quality program type (QA or QC).
- Objective of each QA and QC program.

At a minimum, Table 8-3 must include the following types of activities: new construction, corrective repair work, asset inspections (as described in Section 8.3), and any additional asset maintenance. The electrical corporation must also provide the following tabular information for each QA and QC program:

- Initiative/activity being audited (each initiative/activity name must correspond to an initiative/activity described in Sections 8.2 through 8.4)
- Type of audit (e.g. desktop or field)
- Population[72]/sample unit
- Population size for each audited initiative/activity for each year of the three-year WMP cycle
- Sample size for each audited initiative/activity for each year of the three-year WMP Cycle
- Percent of sample in the HFTD for each audited initiative/activity for each year of the three-year WMP cycle
- Confidence level and Margin of Error (MOE)
- Target pass rate for each audited initiative/activity for each year of the three-year WMP cycle

[71] Pub. Util. Code §§ 8386(c)(10), (22).
[72] In this section, a population may be the number of circuit miles inspected, the number of assets inspected, etc.

At a minimum, Table 8-4 must include the following types of activities: new construction, corrective repair work, asset inspections (as described in Section 8.3), and any additional asset maintenance.

Liberty provides information on its grid hardening and asset inspection QA and QC programs in Table 8-3 and Table 8-4.

Table 8-3: Grid Hardening and Asset Inspection QA and QC Program Objectives

Initiative/Activity Being Audited	**Tracking ID**	**Quality Program Type**	**Objective of the Quality Program**
New construction in Grid Hardening WMP initiatives (*i.e.*, Covered Conductor Installation)	(*i.e.*, WMP-GDOM-GH-01)	Post-construction inspections	Confirm new construction meets applicable standards. New construction follows Liberty's construction standards and best practices in construction.
Detailed Inspections of Distribution Electric Lines and Equipment	WMP-GDOM-AI-01	QC	Perform a statistical sampling of detailed asset inspections to verify acceptable quality level and conformance rate of the program.
Intrusive Pole Inspections	WMP-GDOM-AI-02	QC	Perform a statistical sampling of intrusive pole inspections to verify acceptable quality level and conformance rate of the program.
Equipment Settings to Reduce Wildfire Risk	WMP-GDOM-GO-01	QA/QC	Relay settings are peer reviewed before being issued to the field. In-service settings are reviewed on a three-year cycle.

Table 8-4: Grid Hardening and Asset Inspection QA and QC Activity Targets

Initiative/ Activity Being Audited	Type of Audit	Population/ Sample Unit	2027: Population Size	2027: Sample Size	Percent of Sample in the HFTD	Confidence level / MOE	2027: Pass Rate Target
New construction in Grid Hardening WMP initiatives (*i.e.*, Covered Conductor Installation)	Field	Completed new construction	All new construction completed in 2027	100% of new construction completed by contractors and 10% of new construction completed by Liberty	100%	Unknown – population and sample sizes vary year to year	95%
Detailed Inspections of Distribution Electric Lines and Equipment	Field	Detailed inspections completed in 2027	142 circuit miles	12% OH, 16% UG	100%	95/10	90%
Intrusive Pole Inspections	Field	Intrusive Pole inspections completed in 2027	2,238 poles	1%	100%	99/7	99%
Other Discretionary Inspections of Distribution Electric Lines and Equipment: Drone Inspections	Field/Desktop	Drone Inspections completed in 2027	Under Development	Under Development	100%	Under Development	Under Development

8.5.2 QA and QC Procedures

In this section, the electrical corporation must list the applicable procedure(s), including the version(s) and effective date(s), used for each grid design, operation, and maintenance QA and QC program listed in Table 8-3.

For asset inspections accuracy sampling, Liberty utilizes its Asset Inspection Quality Assurance/Quality Control Program implemented in 2023. This method validates newly constructed and previously inspected assets meet construction and industry standards. This work is performed in accordance with the established program and conducted in the third quarter of each year. Any work found not be to standard is scheduled for repair and re-inspected upon completion.

For new construction, Liberty's set of standards for both internally scheduled construction and customer based new business meets Liberty's stringent guidelines, which meet or exceed industry standards and regulatory compliance standards for the State of California.

LU Table 8-2: QA/QC Procedures

Document Name and ID	Version	Effective Date
Asset Inspection QA-QC 2026 Final	2.0	8/20/2026
Underground Electric Standards	02	11/2027
Overhead Electric Standards	01	09/2019

8.5.3 Sampling Plan

In this section, the electrical corporation must describe how it determines the sample for each QA and QC program listed in Table 8-4. This must include how HFTD tier or other risk designations affect the sampling plan, and how the electrical corporation ensures samples are representative of the population.

Quality Control inspections are completed through statistical sampling and appropriate sample sizes to gauge acceptable quality levels ("AQL") and conformance levels ("CL") based on the selected margin of error ("MoE"). The procedure includes personnel qualification requirements, sampling methodology, sample size by priority, process assessment (QA), results evaluation (QC), description of post inspection verification (*i.e.*, desktop review, field review), and types of QC inspections (*i.e.*, overhead poles, devices and conductors, underground structures and devices, padmount devices, intrusive pole inspections). HFTD tier does not affect the sampling plan. Liberty uses industry-accepted protocols/calculations to determine statistically valid

sample sizes of work types that are to be reviewed. Figure 8-1 provides an example of how the statistically valid sample sizes are determined.

Figure 8-1: Liberty Asset Inspection QA/QC Program Sample Size Calculation Example

Sample Size Calculation Example

Common Confidence Levels:

CL	Z-Score
99%	2.576
95%	1.96
90%	1.645

Standard Deviation (Std Dev): 50% *Remains Constant*

Margin of Error (MoE): 5% *Can Vary 1-10%*

Population Size: 2,500

Sample - Underlying Calculations:

$$\text{Sample Size} = \frac{[\text{Z-Score}^2 \times \text{Standard Deviation} \times (1 - \text{Standard Deviation}) / \text{Margin of Error}^2]}{[(\text{Z-Score2} \times \text{Standard Deviation} \times (1 - \text{Standard Deviation}) / \text{Margin of Error2} \times \text{Population Size})) + 1]}$$

Sample Size = $[2.576^2 \times 0.5 \times (1 - 0.5) / 0.05^2] / [(2.576^2 \times 0.5 \times (1 - 0.5) / 0.05^2 \times 2500)) + 1]$

Sample Size = 663.578 / 1.2654

Sample Size = 524

8.5.4 Pass Rate Calculation

In this section, the electrical corporation must describe how it calculates pass rates. This description must include:

- The sample unit that generates the pass rate for each QA and QC program (e.g., for detailed distribution inspections, the sample unit that generates the pass rate may be a single inspection that passes or fails a QC audit).
- The pass and failure criteria for each activity/initiative listed in table 8-3, including a discussion of any weighted contributions to the pass rate.

Liberty employs internal and external processes as part of its overall QA/QC strategy:

- *Internal*: A post inspection documentation review, or desktop review, is performed by Liberty to assess if all required information has been submitted by the assigned Inspector. Liberty also conducts a post inspection validation review, or field review, on an as-needed basis to confirm all QC inspections are being performed as described in the specification.
- *External*: QC inspections shall be conducted on transmission and distribution facilities to provide reasonable assurance of reliable, high-quality, and safe operation of the electric

facilities. Overhead facilities shall meet the requirements of G.O. 95 and underground facilities shall meet the requirements of G.O. 128.

Third-party quality control field inspections are performed by appropriately trained and qualified entities whose function and organizational reporting is independent of the electric operations organization. A statistically valid sample of the assets inspected shall be re-inspected by a third party, using QEWs. Liberty provides its asset inspection QA/QC program sample sizes and units in LU Table 8-3.

LU Table 8-3: Liberty Asset Inspection QA/QC Program Sample Size and Units

Inspection Type	Cycle	Total Circuit Miles	Total Units	Annual Circuit Miles	Annual Units	Statistical Sampling		
						CL/MoE	%	Annual Sample Units
OH Poles, Devices, and Conductors	5-year	707	Units N/A	142	Units N/A	95/10	12%	17 miles
Intrusive Pole	10-year	N/A	24,700	N/A	2,470	99/7	1%	34 poles

8.5.5 Other Metrics

In this section, the electrical corporation must list metrics used by the electrical corporation to evaluate the effectiveness of its QA and QC programs and procedures (e.g. audit pass rates, outage rate within 6 months of inspection attributed to equipment condition or failure, new construction rework rate).

Liberty does not use additional metrics outside of what is discussed in Section 8.5.4 to evaluate the effectiveness of its QA and QC programs and procedures.

8.5.6 Documentation of Findings

In this section, the electrical corporation must describe how it documents its QA and QC findings and incorporates lessons learned from those findings into corrective actions, trainings, and procedures. This must include a description of how the electrical corporation accounts for and documents the following when improving its inspections and maintenance QA and QC processes:

- The number of inspections reviewed.
- The number of new issues identified.
- The number of repairs with a shortened deadline.

- The number of repairs with a longer deadline.
- The number of recommended repairs cancelled.

QA/QC findings are documented through established inspection/re-inspection procedures using Fulcrum, Liberty's asset tracking system. Once sampling has been identified for a specific initiative as part of this procedure and new event is created in Fulcrum for each asset. The assigned Inspector will go to each location to validate the work was completed per standards and Engineered documentation and fill out the information in Fulcrum, take pictures of the structure being re-inspected and complete the new event checklist including the name of the Inspector, date of re-inspection and a pass or fail status is entered. Items found to not be satisfactory are then identified by a red pin within Fulcrum and a work order is created in SAP for follow-up corrective work. Following the corrective work, the asset is re-inspected again following the same procedure until the status of pass is accomplished. All repairs are treated as urgent and scheduled in a timely manner.

8.5.7 Changes to QA and QC Since Last WMP and Planned Improvements

In this section, the electrical corporation must describe:

- A list of changes the electrical corporation made to its QA and QC procedure(s) since its last WMP submission.
- Justification for each of the changes including references to lessons learned as applicable.
- A list of planned future improvements and/ or updates to QA and QC procedure(s) including a timeline for implementation.

Liberty improved the documentation and traceability of its asset inspection QA/QC activities by creating a dedicated "QAQC Inspection" record type in Fulcrum. The record allows the reviewing inspector to compare the QA/QC inspection with the original inspection, document condition codes that were missed or categorized differently, capture supporting photographs, and record a pass or fail result. This structure provides a clearer audit trail, improves tracking of newly identified conditions and corrective actions, and supports more consistent calculation of inspection pass and conformance rates. Liberty will use the results to identify recurring inspection or documentation issues and inform targeted guidance, training, and process updates for internal inspectors and contractors.

Liberty is also developing a two-stage QA/QC process for its annual drone inspection program. As a quality assurance measure, Liberty's internal qualified inspectors will review the vendor's proposed Level-1 and Level-2 condition codes before the vendor enters the final findings into

Fulcrum. This pre-entry review is intended to confirm that observed conditions are supported by the imagery, consistently classified under Liberty's inspection criteria, and assigned the appropriate priority before they enter the system of record and corrective work process. Questions or disagreements will be resolved with the vendor before final entry, providing timely feedback and reducing the likelihood of misclassified, duplicate, or incomplete records.

As a quality control measure, Liberty plans to conduct a post-inspection desktop review of a sample of drone photographs and associated inspection records after findings have been entered into Fulcrum, whether the inspector was a vendor or internal inspector. The review will evaluate whether the required asset views were captured, photographs are clear and associated with the correct asset, visible conditions were identified, condition codes and priority levels are accurate, and the record contains sufficient documentation to support corrective action. The final sample size and selection methodology have not yet been established. Liberty will use the 2026 pilot population and lessons learned to develop a representative sampling approach for 2027 that considers the number of inspected assets and images, condition priority, circuit or geographic coverage, equipment type, and vendor inspector. Liberty will document the selected methodology, pass and failure criteria, review results, and any resulting corrective actions or vendor feedback as the program matures.

8.6 Work Orders

In this section, the electrical corporation must provide an overview of the procedures it uses to manage its open work orders resulting from inspections that prescribe asset management activities.[73] This overview must include a brief narrative that provides:

- Reference to procedures documenting the work order process. The electrical corporation must provide a summary of these procedures or provide a copy in the supporting documents location on its website.
- A description of the plan for correcting any past due work orders (i.e., open work orders that have passed remediation deadlines), if applicable including the estimated date past due work orders in HFTD will be completed.
- A description of how work orders are prioritized based on risk.
- A description of procedures the electrical corporation uses for monitoring and/or reinspecting open work orders.
- A discussion of how past trends of open work orders have informed the electrical corporation's current procedures and prioritization for addressing work orders. This must include analysis of the following:
  - o Types of findings within the backlog
  - o Equipment types for the findings within the backlog
  - o Reinspection frequency for findings
  - o Outcomes of reinspection, including changes to prioritization or expected due dates
  - o Prioritization level within the backlog[74]

In addition, each electrical corporation must provide an aging report for work orders past due.[75]

Tracking ID: WMP-GDOM-AI-07

Liberty utilizes Fulcrum to track its asset inspections and resulting work orders. Fulcrum includes both desktop and mobile application functions and allows Liberty to track, organize and report on asset management activities. Through Fulcrum, Liberty tracks the status (*i.e.*, pass/fail) and asset information for each asset inspected. Additionally, there are specified

[73] Pub. Util. Code §§ 8386(c)(10), (14).
[74] ECs must include the associated GO 95 Rule 18 level. If the EC uses a different prioritization level system, this must be included in addition to the GO 95 levels, with an explanation as to why the EC is using a different system.
[75] A past due work order is any work order that remains open beyond the shorter of two timeframes: the one required by the electrical corporation, or the one required by GO 95.

condition codes and priority levels (*i.e.*, Levels 1, 2, 3 per G.O. 165 and non-G.O. infractions) for each type of failed condition and fields for completed work. Additional information about assets (*e.g.*, grey wire service, fuse type, open wire secondary, etc.) are also inventoried during detailed inspections. The data that is recorded in Fulcrum is uploaded into Liberty's GIS database for mapping and WMP reporting.

How work orders are prioritized based on risk: Liberty assigns priority codes based on G.O. 165 Table 18, Level 1, 2, or 3 for each maintenance or capital work order. This information is tracked in the Fulcrum application. In 2026, Liberty introduced a Level 2, 7-day and Level 2, 30-day as part of its new incremental drone inspection program. This allowed inspectors to prioritize certain Level 2 concerns based on risk and subject matter expertise. Liberty will evaluate the expansion of this Level 2 prioritization classification system during 2027.

Plan for eliminating any backlog of work orders (*i.e.*, open work orders that have passed remediation deadlines), if applicable: Liberty plans to achieve a cadence of inspections and repairs that creates zero past due work orders. Liberty has instituted a new inspection schedule to distribute detailed asset inspections equally over the five-year inspection cycle. Liberty has also created a Repairs Tracker Power BI Dashboard to monitor open work orders and their due dates as inspections are completed.

The Repairs Tracker Dashboard is a self-service analytics tool used by General Foremen to accomplish Liberty's plan of zero past due work orders. General Foremen observe trends in open work orders and assign packets based on locations with work coming due. Open and past due work order metrics are also calculated in Liberty''s SQL database and reported to executive leadership for monthly oversight.

Plan for eliminating any backlog of work orders (*i.e.*, open work orders that have passed remediation deadlines), if applicable: Liberty provides aging reports for work orders past due in Table 8-5 and Table 8-6 as of July 1, 2026.

Table 8-5: Number of Past Due Asset Work Orders Categorized by Age

HTFD Area	0-30 Days	31-90 Days	91-180 Days	181+ Days
Non-HFTD	0	0	0	0
HFTD Tier 2	0	0	0	2*
HFTD Tier 3	0	0	0	1*

Table 8-6: Number of Past Due Asset Work Orders Categorized by Age for Priority Levels[76]

Priority Level	0-30 Days	31-90 Days	91-180 Days	181+ Days
Priority 1	0	0	0	0
Priority 2	0	0	0	2*
Priority 3	0	0	0	1*

Table 8-5 and 8-6 Note: *****These past due repairs are waiting on permits. One is in a protected marsh in South Lake Tahoe, and the other is near a falcon's nest on west shore. The pole in the protected marsh has two Level 2 concerns. The pole near the falcon's nest has one Level 3. Liberty expects permits in Q4 and Q3 respectively and expects to perform repairs before year's end.

Trends with respect to open work orders: Priority 2 work orders comprise 6% of total open work orders, with Priority 3 work orders accounting for the remaining 94%. Priority 2 work orders are 25% hardware and pole replacement issues, 16% ground molding issues, and conductor, crossarms, and insulators making up most of the rest. Priority 3 work orders are 25% tagging/labels, 18% guys/guards, and high voltage signs, idle hardware, and foreign objects making up most of the rest. Poles comprise 88% of all open work orders.

Liberty currently has 3 past due work orders on a total of 2 poles that are waiting on approved permits. One of these work orders is scheduled to be completed in September and has been delayed due to a falcon nesting in the area. The second pole, which is in a marsh, will be replaced as part of the Spring Creek Tract covered conductor project, which has ongoing permit work. Liberty's operations and data analytics teams meet regularly to discuss trends in open work orders.

[76] Priority levels as defined by GO 95 Rule 18.

8.7 Grid Operations and Procedures

8.7.1 Equipment Settings to Reduce Wildfire Risk

In this section, the electrical corporation must discuss the ways in which it operates its system to reduce wildfire risk.[77] The equipment settings discussion must include the following:

- PEDS
- Automatic recloser settings
- Settings of other emerging technologies (e.g., rapid earth fault current limiters)
- For each of the above, the electrical corporation must provide a narrative that includes the following, as applicable:
- Settings used to reduce wildfire risk.
- Analysis of reliability/safety impacts for settings the electrical corporation uses. This must include the following:

o Analysis of the most impacted circuits, including how the electrical corporation determined which circuits were most impacted.

o The total number of outages that have occurred on the most impacted circuits when settings were enabled.

o The cumulative customer-minutes associated with outages on the most impacted circuits.

o How the electrical corporation has worked to alleviate future reliability/safety impacts along the most impacted circuits.

o Deenergization protocols must consider impact on critical first responders, health and communication infrastructure, and medical baseline customers.[78]

- The impacts via tabular data for the top ten most impacted circuits from the previous three years:
- Criteria for when the electrical corporation enables the settings.
- Operational procedures for when the settings are enabled, including monitoring for re-energization.
- The number of circuit miles capable of these settings, including the percentage of circuit miles in the HFTD and HFRA covered by these settings.

[77] Pub. Util. Code §§ 8386(c)(3), (6), (14).
[78] Pub. Util. Code §§ 8386(c)(6)(A),(B),(C)

- The percentage of time settings were enabled for the past three years based on the amount of times enablement criteria thresholds were met and led to activation, and the associated number of circuit miles encompassed by activation at that time.
- An estimate of the effectiveness of the settings for reducing wildfire risk, including the calculation used for determining the effectiveness, a list of assumptions, and justification for these assumptions. The estimate must also include the number of ignitions that still occurred while sensitivity settings were enabled.

Tracking ID: WMP-GDOM-GO-01

Liberty implemented its SRP program in 2024 to use fast trip settings and add more fault indicators to reduce wildfire risk during high fire threat days. Fast trips are a means to trip the circuit faster at the substation breaker/recloser or line recloser device, which reduces the energy released at the fault location and greatly reduces the time to clear the fault. Historically, Liberty performed collaborative studies with the University of Nevada, Reno ("UNR") Electrical Engineering Department, to determine the appropriate fast trip settings. Now that the initial implementation phase is complete, Liberty will start reviewing a third of the circuits every three years to check that the settings remain optimized to reduce wildfire risk. Liberty will continue to evaluate opportunities to install additional line reclosers to better sectionalize and have protective devices closer to the fault locations.

Analysis of reliability/safety impacts for fast trip settings: Refer to Liberty's response to ACI LU-25U-07 for Liberty's analysis of the reliability impacts of its SRP Program throughout the 2023-2025 WMP cycle. There are no safety impacts to using fast tripping of which Liberty is aware.

Criteria for when Liberty enables fast trip settings: Liberty uses multiple criteria for determining when to enable fast trip settings. One criterion is Severe Fire Danger Index ("SFDI"). SFDI is a daily rating which merges Energy Release Component percentile and Burning Index percentile into a single metric that has five classes; Low, Moderate, High, Very High, and Severe. When the SFDI is Severe, Liberty will enable fast trip settings. In addition, Red Flag Warnings issued by the National Weather Service could warrant enabling fast trip settings.

Liberty works with weather and fire science experts to make decisions regarding the enablement of fast trip settings. Liberty management will take pertinent data into consideration before implementing a settings change for wildfire mitigation with the understanding of the possible effects on reliability to its customers. Criteria that are monitored when determining to enable fast trip settings in addition to SFDI and Red Flag Warnings include

High Wind Warning, maximum wind gust, Fosberg Fire Weather Index, Composite Risk Index, Relative Humidity, and Fuel Moisture. A combination of conditions that lead to increased risk of extreme fire weather are evaluated and used to determine if enabling fast trip settings is warranted to mitigate wildfire risk.

Operational procedures for when fast trip settings are enabled: Personnel performing line patrols while fast trip settings are implemented are instructed to patrol all overhead lines, including lateral lines, because the device will trip faster than a fuse can be operated. The enhanced use of fault indicators and early fault detection devices should help to locate the fault area more quickly.

Estimate of the effectiveness of fast trip settings: Although Liberty does not have sufficient operational data at this point to quantitatively define the effectiveness of fast trip settings, no ignition events have occurred on circuits with fast tripping enabled. Liberty monitors and shares information with other utilities that are deploying similar approaches. As discussed in Section 6, Liberty's risk model relies on a mitigation effectiveness parameter of 0.56 for SRP/fast-trip settings, derived through a benchmarking analysis of peer utilities and the use of a maturity adjustment.

Liberty shows the most impacted circuits from its SRP Program implementation in 2024 and 2025 in Table 8-7.

Table 8-7: Top Impacted Circuits from SRP Program in 2024 and 2025

Circuit/Circuit Segment ID	**Circuit/Circuit Segment Name**	**Circuit/Circuit Segment Length (overhead circuit miles)**	**Number of Outages in Past Three Years**	**Cumulative Outage Duration**	**Cumulative Number of Customers Impacted by Outages**
TPZ1202	Topaz 1202	55.6	4	557.16	2179
TRK7203[79]	Truckee 7203	9.8	1	182.59	1710
CEM41	Cemetery 41	5.8	1	166.57	273
MEY3300	Meyers 3300	52.6	1	128.58	19

[79] Truckee 7203 is protected by a circuit breaker owned by NV Energy. This outage occurred under NV Energy's Fast-Trip Fire Mode which is analogous to SRP.

8.7.2 Grid Response Procedures and Notifications

The electrical corporation must provide a narrative on operational procedures it uses to respond to faults, ignitions, or other issues detected on its grid that may result in a wildfire including how the electrical corporation:

- Locates the issues.
- Prioritizes the issues, including how operational models inform potential prioritization based on risk.
- Notifies relevant personnel and suppression resources to respond to issues.
- Minimizes/optimizes response times to issues.

Tracking ID: WMP-GDOM-GO-02

Locating issues: Many issues requiring grid response procedures are located with the assistance of customer calls during an outage or witnessing an abnormal event (*e.g.*, loud bang, flash, arcing, etc.). Fault indicators and operated fuses also help to direct personnel to the right location. On a larger scale, recloser or breaker trips can indicate issues downstream of that device.

Prioritization of issues: Liberty prioritizes issues requiring grid response procedures by:

- Safety to the public and employees
- Wildfire risk
- Critical customer impact
- Customer count

Notifications to relevant personnel and suppression resources: Liberty will call System Control to quickly de-energize a circuit if deemed an immediate safety or wildfire risk. Liberty will call emergency services (*i.e.*, 911) for suppression resources if personnel onsite are unable to suppress immediately.

Minimizing and optimizing response time: Liberty dispatch operations tracks the location of personnel in the field so that they can be more efficiently sent to the location of the issue.

8.7.3 Personnel Work Procedures and Training in Conditions of Elevated Fire Risk

The electrical corporation must provide a narrative on the following:

- The electrical corporation's procedures that designate what type of work the electrical corporation allows (or does not allow) personnel to perform during operating conditions of different levels of wildfire risk, including:
  - o What the electrical corporation allows (or does not allow) during each level of risk.
  - o How the electrical corporation defines each level of wildfire risk.
  - o How the electrical corporation trains its personnel on those procedures.
  - o How it notifies personnel when conditions change, warranting implementation of those procedures.
- The electrical corporation's procedures for deployment of firefighting staff and equipment (e.g., fire suppression engines, hoses, water tenders, etc.) to worksites for site-specific fire prevention and ignition mitigation during on-site work.

Tracking ID: WMP-GDOM-GO-03

Liberty has designated the type of work activities that may be performed in its service territory under certain Fire Potential Index ("FPI") Operating Conditions (*e.g.*, low, moderate, high, very high, and severe or Red Flag Warning condition). As conditions increase in severity, activities that present an increased risk of ignition have additional mitigation requirements. Where risk cannot be mitigated, work activity will cease. Work procedures and proper training help mitigate the risk of an ignition while performing at-risk activities that are necessary to maintain and operate the Liberty electric system.

The following summarizes the work activity guidelines for each of Liberty's Operating Conditions:

- *Low Fire Risk*: Low or "Normal" Fire Risk is defined as periods during which the potential for wildfires and associated ignition risks are low but may sometimes still exist within Tier 2 or 3 of the HFTD. Some O&M activities may have stipulations and additional fire mitigation activities may be required. The Low Fire Risk status is the default operational state and the FPI is indicated as "Blue."
- *Moderate Fire Risk*: Moderate Fire Risk is defined as periods during which the potential for wildfires and associated ignition risks are not elevated but still exist within Tier 2 or 3 of the HFTD. Some O&M activities may have stipulations and additional fire mitigation activities may be required. The FPI is indicated as "Green."
- *High Fire Risk*: High Fire Risk is defined as periods of increasing risk of wildfires and associated ignition risks within Tier 2 or 3 of the HFTD. Many O&M activities have

stipulations and additional fire mitigation activities are sometimes required. The High Fire Risk status is indicated as “Yellow.”

- *Very High Fire Risk*: Very High Fire Risk is defined as periods of increasing risk of wildfires and associated ignition risks within Tier 2 or 3 of the HFTD. Many O&M activities have stipulations and additional fire mitigation activities are required. The Very High Fire Risk status is indicated as “Orange.”
- *Extreme Fire Risk*: Extreme Fire Risk is defined as periods of significant risk of wildfires and the associated ignition risks within Tier 2 or 3 of the HFTD. All O&M activities have stipulations, and significant fire mitigation activities are required. Most overhead work activities will cease, except where not performing the work would create a greater risk than performing the work. In cases where at-risk work needs to be performed, a Liberty Fire Safety Monitor or Leader is assigned, and additional mitigation steps are implemented. The Extreme Fire Risk status is indicated as “Red.”

The safety of Liberty’s customers, personnel, and cooperating agencies is considered during the development and subsequent refinements of Liberty’s work procedures and training. Liberty’s Fire Prevention Plan (“FPP”) requires that employees, contractors, and consultants who conduct activities in the wildland areas of the service territory receive this training on an annual basis. The training includes definitions of at-risk work, wildland areas, FPI, and a matrix that can be used to determine the minimum fire prevention requirements for at-risk activities. Information is also provided related to working on or adjacent to wildland fires, reporting wildland fires, and guidance for taking fire suppression action.

Liberty has refined and updated its FPI Operating Conditions since 2020 and plans to continue to conduct training on fire prevention and emergency actions at any ignition found. Liberty will continue refining procedures designed to prevent ignitions from Liberty equipment or activities throughout our service area. Liberty continues to explore other opportunities to improve FPI Operating Conditions and safety training processes to train personnel to be prepared to work in elevated fire risk conditions. Procedures and training are reviewed annually, and feedback from attendees, other IOUs/agencies, and from public safety partners is incorporated into future training.

Liberty’s fire weather dashboard provides seven-day forecasts for multiple zones and regions within the service territory for FPI and PSPS weather thresholds. The forecast is updated every six hours and can be accessed 24 hours per day. Liberty crews follow the FPP operating procedures based on current conditions. Additionally, Liberty provides regular weather updates, discusses current and forecast fire weather conditions, and communicates the weekly forecast to all operations field crews. In 2023, Liberty developed a safety tailboard application

that automatically populates the current FPI forecast and FPP operating conditions based on crew location, thereby enhancing situational awareness and supporting adherence to operating restrictions in the areas where crews are deployed.

Liberty's Fire Prevention Plan describes work restrictions for certain at-risk activities based on FPI conditions. Depending on the FPI fire risk rating, some activities will require the designation of a Fire Safety Monitor or a Fire Safety Leader.

- *Fire Safety Monitor*: Designated field supervisor or crew member responsible for fire safety requirement oversight during Elevated Fire Risk working conditions.
- *Fire Safety Leader*: Designated field supervisor or crew member who has a dedicated role for fire safety requirement oversight during Extreme Fire Risk working conditions.

Additionally, Liberty's field crews are equipped with fire prevention and suppression tools throughout all areas of the service territory.

8.7.4 Workforce Planning

In this section, the electrical corporation must provide an overview of personnel, including qualifications, and training practices, related to workers in roles associated with asset inspections, grid hardening, and risk event inspection.[80]

Tracking ID: WMP-GDOM-GO-06

Liberty provides its asset inspections, grid hardening and risk event inspection workforce qualifications and training practices in LU Table 8-4.

LU Table 8-4: Liberty Workforce Planning, Asset Inspections, Grid Hardening and Risk Event Inspection

Worker Title	Minimum Qualifications	Training Practices
Inspector Foreman	• Journeyman lineman • Minimum two years journeyman lineman experience • Class A Driver's License • Expert knowledge of G.O. 95 and company's construction standards.	• Fulcrum application and database training • FPP training • On-the-job training of company standards and G.O. 95

[80] Pub. Util. Code §§ 8386(c)(16), (19).

Worker Title	Minimum Qualifications	Training Practices
Inspector	• Journeyman lineman • Minimum one year journeyman lineman experience • Class A Driver's License • General knowledge of G.O. 95 and company's construction standards	• Fulcrum application and database training • FPP training • On-the-job training of company standards and G.O. 95
Qualified Electrical Worker ("QEW")	• Journeyman lineman or Journeyman Electrician • Minimum one-year journeyman lineman experience • Class A Driver's License • General knowledge of G.O. 95 and Liberty's construction standards	• Fulcrum application and database training • FPP training • On-the-job training of company standards and G.O. 95
Lineman	• Journeyman lineman • Class A Driver's license	• On-the-job training of company standards and G.O. 95 • FPP training • On-the-job training of covered conductor
Lineman Working Foreman	• Journeyman lineman • Minimum two years' experience as Journeyman • Lineman • Class A Driver's license	• On-the-job training of company standards and G.O. 95 • FPP training • Hendrix training of covered conductor installation (ACS and Tree Wire)
Engineer IV	• Must possess a Bachelor of Science in Electrical Engineering or an equivalent engineering degree from an accredited four-year college or university • Must hold PE certification	• SEL, GIS, CAD, OCalc, Quadra, OSI PI, Aspen Oneliner, company standards

Worker Title	Minimum Qualifications	Training Practices
Capital Administrator	• Associates or Bachelor's degree in Construction Administration, Accounting or a related field or a minimum of three years of technical experience with a utility or other related field • Working knowledge of accounting, project management and construction management practices	• SAP Job Cost Training, FERC Code Training, SOX Policy Training, Capital Expenditure Policy Training, Cost Control training, Excel Training
Project Manager	• Associates or Bachelor's degree in Project Management, Construction Administration, Engineering in a related field or a PMP certification and a minimum of five years of technical experience with a utility or other related field. Must have a demonstrated working knowledge of project management and construction management practices.	• PM Basics, Capital Expenditure Policy Training, SAP training, GIS training, Excel Training, Electrical Distribution 101, OH & UG Const Training
Substation Electrician	• Journeyman Electrician • Must be qualified to perform switching	• On-the-job training of substation equipment maintenance and replacement • FPP training • On-the-job training of company standards
Substation Electrician Foreman	• Journeyman Electrician • Minimum two years' experience as journeyman electrician • Must be qualified to perform switching.	• On-the-job training of substation equipment maintenance and replacement • FPP training • On-the-job training of company standards

Worker Title	Minimum Qualifications	Training Practices
Relay Technician	• Journeyman Electrician or equivalent combination of education and experience in system protection • Must be qualified to perform switching.	• On-the-job training of substation equipment maintenance and replacement. • FPP training • On-the-job training of protective relaying and controls
Job Facilitator	• Journeyman lineman • Minimum two years' experience as journeyman lineman • Class A Driver's License	• On-the-job training of company standards and G.O. 95 • On-the-job training of covered conductor installation (ACS and Tree Wire) • FPP training • On-the-job training of internal QA/QC process • Fulcrum application and database training

9. Vegetation Management and Inspections

Each electrical corporation's WMP must include plans for vegetation management.[81]

9.1 Targets

In this section, the electrical corporation must provide qualitative and quantitative targets for vegetation management and inspections for each year of the three-year WMP cycle. The electrical corporation must provide at least one qualitative or quantitative target for the following initiatives:

- Wood and Slash Management (Section 9.5)
- Defensible Space (Section 9.6)
- Integrated Vegetation Management (Section 9.7)
- Workforce Planning (Section 9.13)

Quantitative targets are required for vegetation management inspections and pole clearing; see Section 9.1.2, below, for detailed requirements.

Quantitative targets are required for QA and QC. See Section 9.11.1 for detailed quantitative target requirements for QA and QC. Reporting of QA and QC quantitative targets is only required in section 9.11

9.1.1 Qualitative Targets

The electrical corporation must provide qualitative targets for implementing and improving its vegetation management and inspections,[82] including the following:

- Identification of which initiative(s) and activity/activities in the WMP the electrical corporation is implementing to achieve the stated target, including Tracking IDs and the Tracking ID(s) used in past WMPs ("Previous Tracking ID"), if applicable.
- A completion date for when the electrical corporation will achieve the qualitative target.
- Reference(s) to the WMP section(s) or appendix, including page numbers, where the details of the target(s) are documented and substantiated.

Refer to Table 9-1 and Table 9-2.

[81] Pub. Util. Code §§ 8386(c)(3), (9).
[82] Annual information included in this section must align with the applicable data submission.

9.1.2 Quantitative Targets

The electrical corporation must provide quantitative targets it will use to track progress on its vegetation management and inspections for the three years of the Base WMP.[83] Every inspection activity program described in Section 9.2 must have at least one quantitative target. Targets for inspection activities (programs) of overhead electrical assets must use circuit miles as the unit. Pole clearing performed in compliance with Public Resources Code section 4292 must have a quantitative target. The electrical corporation may define additional pole clearing targets (e.g., pole clearing performing in the Local Responsibility Area). For each quantitative target, the electrical corporation must provide the following:

- Identification of which initiative(s) and activity/activities in the WMP the electrical corporation is implementing to achieve the stated target, including Tracking IDs and the Tracking ID(s) used in past WMPs ("Previous Tracking ID"), if applicable.
- Projected targets and totals for each of the three years of the WMP cycle, e.g., [Year 1] end of year total, [Year 2] total, and [Year 3] total, three-year total and the associated units for the targets.
- For inspections and pole clearing targets in Table 9-2, cumulative quarterly targets for each year of the WMP cycle,55 and the percentage of total overhead circuit miles in the HFTD covered by the [Year 1] target (e.g., 100 circuit miles of patrol inspections in [Year 1] divided by 300 overhead circuit miles in the HFTD equals 33 percent coverage).
- The expected % risk reduction for each of the three years of the WMP cycle.[84]
- The timeline in which clearance and removal work prescribed by the inspection program will be completed (inspections and pole clearing only).

Refer to Table 9-1 and Table 9-2.

[83] Annual information included in this section must align with the applicable data submission.
[84] The expected % risk reduction is the expected percentage risk reduction per year, as described in Section 6.2.1.2.

Table 9-1: Liberty Vegetation Management Targets, 2027 (Non-inspection Targets)

Initiative	Quantitative or Qualitative	Activity (Tracking ID)	Target Unit	2027 Target/Status	x% Risk Impact 2027	Section; Page Number
Integrated Vegetation Management	Qualitative	WMP-VM-VFM-04	N/A	Maintain Tree Line USA / Complete by December 31, 2027	Not calculated	9.7; pp. 233-235
Workforce Planning	Qualitative	WMP-VM-WFP-01	N/A	Liberty will continue to report annually on its recruitment, retention, and training of vegetation management and inspection personnel / Complete by December 31, 2027	Not calculated	9.13; pp. 257-261
Wood and Slash Management	Quantitative	WMP-VM-VFM-02	Acres	280	Not calculated	9.5; pp. 229-231
Substation Defensible Space	Qualitative	WMP-VM-VFM-03	N/A	Perform routine inspections and treat vegetation as needed to maintain substation defensible space / Complete by December 31, 2027	Not calculated	9.6; pp. 231-233
Clearance	Quantitative	WMP-VM-VFM-05	Circuit miles	700	Not calculated	9.3; pp.225-227
Fall-In Mitigation	Quantitative	WMP-VM-VFM-06	Circuit miles	220	Not calculated	9.3; pp. 225-227

Table 9-2: Liberty Vegetation Management Inspections and Pole Clearing Targets, 2027

Activity (Program)	Tracking ID	Target Unit	Cml. Quarterly Target 2027, Q1	Cml. Quarterly Target 2027, Q2	Cml. Quarterly Target 2027, Q3	Cml. Quarterly Target 2027, Q4	% HFTD Covered in 2027	% Risk Reduction 2027	Activity Timeline Target	Section; Page Number
Vegetation Management Inspection Program - Detailed	WMP-VM-INSP-01	Circuit miles	45	110	175	233	33%	Not calculated	365 days	9.2.1; pp. 217-222
Vegetation Management Program - LiDAR	WMP-VM-INSP-03	Circuit miles	0	0	700	700	100%	Not calculated	Approx. 90 days for acquisition to data delivery	9.2.3; pp. 223-225
Pole Clearing – PRC 4292 Required	WMP-VM-VFM-01-R	Poles	0	1,500	3,000	4,500	100%	Not calculated	Approx. 150 days	9.4; pp. 227-229
Pole Clearing – Discretionary	WMP-VM-VFM-01-D	Poles	0	133	266	400	100%	Not calculated	Approx. 150 days	9.4; pp. 227-229

9.2 Vegetation Management Inspections

In this section, the electrical corporation must provide an overview of its vegetation management inspection activities (programs) for overhead electrical assets. This section must not include pole clearing activities or vegetation management around substations; see Section 9.4 for pole clearing and Section 9.6 for vegetation management around substations.

The electrical corporation must first summarize details regarding its vegetation management inspections for overhead electrical assets in Table 9-3. The table must include the following:

- **Type of inspection**: distribution or transmission
- **Inspection program name**: Identify various inspection activities (programs) within the electrical corporation (e.g., routine, enhanced vegetation, off-cycle)
- **Area inspected**: Identify the area that the inspection activity (program) covers (e.g., territory wide, HFTD only, Areas of Concern, etc.)
- **Frequency**: Identify the frequency of the inspection (e.g., annual, quarterly, three-year cycle)

The electrical corporation must then provide a narrative overview of each vegetation inspection activity (program) identified in Table 9-3. Section 9.2.1. provides instructions for the overviews. The sections must be numbered Section 9.2.1 to Section 9.2.n (i.e., each vegetation inspection activity [program] is detailed in its own section) with the name of the inspection activity (program) as the section title. The electrical corporation must include inspection activities (programs) it is discontinuing, has discontinued since the last WMP submission, or has consolidated into another activity (program), and explain why it is discontinuing or has discontinued the activity (program).

Liberty summarizes the details regarding its vegetation management inspection activities (programs) in Table 9-3.

Table 9-3: Vegetation Management Inspection Frequency, Method, and Criteria

Inspection Type	Inspection Activity (Program)	Area Inspected	Frequency
Transmission and Distribution	Vegetation Management Program - LiDAR	Territory	Annual
Transmission and Distribution	Vegetation Management Program – Detailed	Territory	Three-year cycle
Transmission and Distribution	Vegetation Management Program – Patrol	Territory	As needed

9.2.1 Vegetation Management Inspection Program – Detailed Inspections

9.2.1.1 Overview and Area Inspected

In this section, the electrical corporation must provide an overview of the inspection program. This overview must describe where the electrical corporation performs the inspection programs (e.g., territory-wide, HFTD only, Areas of Concern, etc.).

Detailed inspections are ground-based inspections performed territory-wide on a three-year cycle to prescribe pruning and removal of vegetation as a safeguard against grow-ins or fall-ins and to comply with required laws and regulations.

9.2.1.2 Procedures

In this section, the electrical corporation must provide a list of the procedures, including the version(s) and effective date(s), for the inspection program.

Refer to LU Table 9-1.

LU Table 9-1: Vegetation Management Detailed Inspection Procedures

Document Name and ID	Version	Effective Date
Vegetation Management Plan (VM-02)	3	4/10/2025
Hazard Tree Management Plan (VM-03)	1	4/28/2021
Post Work Verification Procedure (VM-04)	3	2/17/2026
Vegetation Threat Procedure (VM-05)	2	6/3/2022
Vegetation Management Notification and Refusal Resolution Policy (VM-06)	1	1/1/2024
Vegetation Management Inspection Manual (VM-07)	1	8/25/2023

9.2.1.3 Clearance

In this section, the electrical corporation must describe how clearances are determined and prescribed through this inspection program (e.g., GO 95 Table 1, GO 95 Appendix E, ANSI A-300, etc.). As applicable, the electrical corporation must describe how it differently prescribes clearances to high-risk species of vegetation.

Liberty prescribes vegetation management work during detailed inspections for conditions that meet the following criteria:

Regulation Clearance Distance (RCD) – Clearance distance between conductors and vegetation that is mandated by regulations.

Maintenance Action Threshold (MAT) – Clearance distance that triggers the work scheduling process to prevent vegetation from encroaching into the RCD. The MAT is based on the RCD with a safety margin multiplier of 1.5 (MAT = RCD * 1.5).

Maintenance Clearance Distance (MCD) – Clearance distance to be achieved at time of work. Minimum clearances based on GO 95, Rule 35, Appendix E.

LU Table 9-2: Radial Clearance Requirements PRC 4293; GO 95, HFTD (Case 14)

Voltage	Regulation Clearance Distance ("RCD")	Maintenance Action Threshold ("MAT")	Maintenance Clearance Distance ("MCD")
12kV - 25kV	4'	6'	12'-15'
60kV	4'	6'	12'-15'
120kV	10'	15'	30-35'

LU Table 9-3: Radial Clearance Requirements; GO 95, Rule 35, Non-HFTD (Case 13)

Voltage	Regulation Clearance Distance ("RCD")	Maintenance Action Threshold ("MAT")	Maintenance Clearance Distance ("MCD")
12kV - 25kV	1.5'	6'	12'-15'
60kV	1.5'	6'	12'-15'
120kV	1.7'	15'	30-35'

Note: MAT and MCD for Non-HFTD are the same as those in the HFTD.

In addition to the above clearances, Liberty shall prescribe mitigation of vegetation encroachments on circuits or portions of circuits energized operating at 750 volts or less, such

as open wire secondary, coated triplex or quadruplex cable (including service drops), and guy wires:

- *Open Wire Secondary*: Trees scheduled for pruning for open wire secondary will be inventoried based on tree growth characteristics to avoid tree line contact with conductors.
- *Coated Aerial Cable*: Trees scheduled for pruning will be identified as showing evidence of strain or abrasion with wires.
- *Guy and Support Wires*: Trees scheduled for pruning will be for strain or abrasion and to avoid vegetation in contact with guy or support wires above the guy strain insulator.

9.2.1.4 Fall-in Mitigation

In this section, the electrical corporation must describe how it identifies fall-in risks, such as hazard trees, during the inspection (e.g., Level 1, Level 2, etc.). As applicable, the electrical corporation must of describe how it differently prescribes removal of high-risk species of vegetation.

The following details Liberty's risk assessment levels, work priority levels, and mitigation actions.

Levels of Assessment: Identification of trees that pose a high risk of failure are typically performed by completing the following levels of assessment:

- *Level 1*: A Limited Visual Tree Risk Assessment, per ANSI A300 (Part 9) Tree Risk Assessment, and in accordance with Liberty's Hazard Tree Management Plan. This is accomplished by conducting an assessment from one side of the tree (side nearest the electric facilities) and can be ground-based, vehicle-based, or aerial-based, as appropriate for the site conditions, type of infrastructure, and tree population being considered. A Level 1 assessment focuses on identifying obvious tree defects that are observable from the side of the tree nearest to the electric facilities. If a condition of concern is identified during the Level 1 assessment, recommendations are developed regarding possible mitigation. If the Level 1 assessment cannot sufficiently determine the severity of the condition, a Level 2 assessment is conducted.
- *Level 2*: A Basic Tree Risk Assessment of an individual tree and its surrounding site. A Level 2 assessment may include walking completely around the tree—looking at the site, buttress roots, trunk, and branches. Many trees that pose a potential risk to electric facilities are located on private property and beyond the edge of the utility easement of right-of-way, which may restrict access. Severe terrain or other obstacles may also

prevent access. As such, there may be limited opportunity or ingress to do a 360-degree assessment of an individual tree.

Structural and site conditions that indicate a possible hazardous condition and could pose a risk to electric facilities are listed below in LU Table 9-4 and LU Table 9-5. These are considered when performing a tree risk assessment.

LU Table 9-4: Hazard Tree Attributes

Hazard Tree Attributes
Basal wound
Bleeding or resinous
Bulges and/or swellings
Cankers, including bleeding and gall rust
Cavities
Codominant or multiple stems from base or higher on trunk
Conks indicating heart rot, root rot, sap rot or canker rot
Cracks including shear
Dead branches and/or top
Dieback of twigs and/or branches
Embedded wires or cables
Excessive lean toward electrical facilities or excessive bow
Fire damage
Foliage – off color, flagging or loss
Hazard beam
History of limb failure(s) on tree
Included bark
Insect activity such as frass from termites, bark beetles or carpenter ants
Lightning damage
Live crown ration below 30%
Mistletoe – dwarf or broad-leaf
Nesting holes – birds, mammals, insects
Past poor pruning practices
Roots injured, exposed, undermined, or uplifted
Seam
Species failure patterns
Unnatural or structurally unsound canopy weight distribution
Weak, unsound branch attachments

LU Table 9-5: Vegetation Management Site Attributes

Site Attributes
Areas known to be affected by introduced tree pathogens
Areas of recent clearing/new edge
Change in drainage
Change in grade
Construction – including trenching, paving or road construction
Cultural disturbance to landscape – natural or unnatural
Diseased center – dead tree in middle and dying trees around it
High stand density with single species composition
High winds (fire watch)
History of failure(s) at site
History of repeated outages on circuit
Fire damage
Recent thinning or logging
Slope (by grade or percentage)
Soils prone to slides
Specific conditions like high winds
Storm damage

9.2.1.5 Scheduling

In this section, the electrical corporation must describe how the inspection program is scheduled. This must include the frequency (e.g., annual, quarterly, three-year cycle) and/or triggers (e.g., severe weather events, risk model outputs) of the inspection program. It must also identify how the frequency and/or trigger might differ by HFTD tier or other risk designation.

If the inspection program is based on a fixed frequency (e.g., annual, three-year cycle), the electrical corporation must explain how it uses risk prioritization in the scheduling of the inspection program to target high-risk areas). If the electrical corporation does not use risk prioritization in the scheduling of the inspection program, it must explain why.

Liberty performs detailed inspections to comply with applicable regulations and governing standards. Detailed inspections are intended to be implemented on a three-year maintenance cycle schedule. Liberty maintains a three-year detailed inspection cycle schedule and creates the annual work plan based off the current cycle year of the three-year cycle. Detailed inspection cycles may vary to account for vegetation growth rates, site characteristics, environmental conditions, or other factors that can affect the timing of corrective actions.

Liberty may implement patrol inspections, as needed, to address vegetation conditions that arise off-cycle on a given circuit or portions of circuits (see Section 9.2.2).

9.2.1.6 Updates

In this section, the electrical corporation must discuss changes/updates to the inspection program since its last WMP submission, including known future plans (beyond the current year) and new/novel strategies the electrical corporation may implement in the next five years (e.g., references to and strategies from pilot projects and research). The electrical corporation must include lessons learned as applicable.

Liberty has not made any changes to its Vegetation Management Inspection Program – Detailed Inspections since its last WMP submission.

9.2.2 Vegetation Management Inspection Program – Patrol Inspections

9.2.2.1 Overview and Area Inspected

Liberty conducts patrol inspections, as needed, based on environmental conditions or other factors. Liberty may perform additional hazard tree inspections, as needed, to address tree mortality or after major storms, high wind events, or fires. The need for these inspections is determined based on the severity of the event and the resulting possibility of damaged trees.

9.2.2.2 Procedures

See Section 9.2.1.2.

9.2.2.3 Clearance

Patrol inspections are implemented to identify evident fall-in risk to overhead distribution and transmission conductors in response to environmental factors. Vegetation identified during patrol inspections that is within regulated clearance distances (“RCD”) or beginning to encroach the RCD will be prescribed vegetation management work to achieve the necessary maintenance clearance distance (“MCD”). See Section 9.2.1.3.

9.2.2.4 Fall-in Mitigation

See Section 9.2.1.4.

9.2.2.5 Scheduling

Liberty performs patrol inspections to locate and remove obvious hazard trees. These inspections are performed on an as-needed basis on specific circuits or line segments and are triggered by known local conditions, vegetation health data derived from remote sensing, vegetation conditions reported by the public or line-operations, or storm, wildfire or other events that can bring changes to normal vegetation conditions.

9.2.2.6 Updates

Liberty has not made any changes to its Vegetation Management Inspection Program – Patrol Inspections since the last WMP submission, and no updates are anticipated.

9.2.3 Vegetation Management Inspection Program – LiDAR Inspections

9.2.3.1 Overview and Area Inspected

Remote sensing technology such as Light Detection and Ranging ("LiDAR") has been established by the industry as an effective inspection method to measure vegetation to conductor distances, tree height, and proximity to overhead lines. System-wide LiDAR inspections of vegetation along overhead transmission and distribution lines are completed on an annual basis to assess compliance with applicable vegetation-to-conductor clearance regulations and to identify any vegetation concerns.

9.2.3.2 Procedures

Refer to LU Table 9-6.

LU Table 9-6: Vegetation Management LiDAR Inspection Procedures

Document Name and ID	Type	Version	Effective Date
Vegetation Management Plan (VM-02)	Plan	3	4/10/2025
Vegetation Threat Procedure (VM-05)	Process	2	6/3/2022
Vegetation Management Inspection Manual (VM-07)	Process	1	8/25/2023

9.2.3.3 Clearance

LiDAR inspections are performed to identify vegetation-to-conductor clearances and to conform to required laws and regulations. Liberty conducts a grow-in analysis from LiDAR data to categorize vegetation detections based on the distances to conductors and voltages. Refer to LU Table 9-7. Vegetation identified within Liberty's maintenance action thresholds ("MAT")

through LiDAR inspections is prescribed vegetation management work (see LU Table 9-2, Radial Clearance Requirements PRC 4293; GO 95, HFTD (Case 14) in Section 9.2.1.3). Liberty implements an increased MAT of 8 feet in some regions with predominantly fast-growing tree species. Vegetation identified through LiDAR inspections within the adjusted MAT on these circuits are mitigated accordingly.

LU Table 9-7: Vegetation Grow-In Zones, LiDAR Grow-In Analysis

Category	12kV - 25kV	60kV	120kV
Grow-In Zone 1	0 - 1.5 feet	0 - 1.5 feet	0 - 4 feet
Grow-In Zone 2	1.5 – 4 feet	1.5 – 4 feet	4 - 10 feet
Grow-In Zone 3	4 – 6 feet	4 – 6 feet	10 - 15 feet
Grow-In Zone 4	6 – 12 feet	6 – 12 feet	15 - 30 feet

9.2.3.4 Fall-in Mitigation

Liberty conducts a fall-in analysis from LiDAR data to categorize vegetation detections based on tree height and distance to conductors to use as a tool in determining strike potential during ground-based inspections. Refer to LU Table 9-8.

LU Table 9-8: Vegetation Fall-In Zone Categories, LiDAR Fall-In Analysis

Zone Category	Criteria
Fall-In Zone 1	Overstrike over 6 feet
Fall-In Zone 2	Strike/overstrike less than 6 feet
Fall-In Zone 3	Fall within 6 feet of wire

Liberty also identifies vegetation overhanging transmission lines operating at 60kV and 120kV through LiDAR analysis and prescribes vegetation management to avoid fall-in risk from vegetation overhanging transmission lines.

9.2.3.5 Scheduling

Liberty performs LiDAR inspections of vegetation around electrical infrastructure on an annual basis. LiDAR inspections are typically scheduled in the summer after the initial vegetation growing season and to avoid interference from weather, snowpack, and air conditions to increase effectiveness of remote sensing technology.

9.2.3.6 Updates

Liberty has not made any changes to its Vegetation Management Inspection Program – LiDAR Inspections since its last WMP submission.

9.3 Pruning and Removal

9.3.1 Overview

In this section, the electrical corporation must provide an overview of the subsequent pruning, removal, and other vegetation management activities that are performed as a result of inspections.

In the pruning and removal section, Liberty provides information on its Vegetation Management Clearance initiative (WMP-VM-VFM-05), and Fall-in Mitigation initiative (WMP-VM-VFM-06). Liberty's VM Program is designed to improve the reliability of Liberty's Transmission and Distribution systems and to comply with regulatory requirements established in CPUC G.O. 95, California PRC, and Title 14 CCR by establishing maintenance and inspection procedures. Additionally, Liberty has developed a Hazard Tree Management Plan (VM-03) for the purpose of identifying, documenting, and mitigating trees that are located within the utility strike zone and are expected to pose a risk to electric facilities based on the tree's observed structural condition and site considerations. The plan includes an overview of tree risk associated with electric lines and equipment, inspection types, risk assessment levels, work priority levels, and mitigation actions.

9.3.2 Procedures

In this section, the electrical corporation must provide a list of the procedures, including the version(s) and effective date(s), for subsequent pruning, removal, and other vegetation management activities that are performed as a result of inspections.

Refer to LU Table 9-9.

LU Table 9-9: Vegetation Management Pruning and Removal Procedures

Document Name and ID	Type	Version	Effective Date
Vegetation Management Plan (VM-02)	Plan	3	4/10/2025
Hazard Tree Management Plan (VM-03)	Plan	1	4/28/2021
Post Work Verification Procedure (VM-04)	Process	3	2/17/2026
Vegetation Threat Procedure (VM-05)	Process	2	6/3/2022
Vegetation Management Notification and Refusal Resolution Policy (VM-06)	Process	1	1/1/2024

9.3.3 Scheduling

In this section, the electrical corporation must describe how subsequent pruning, removal, and other vegetation management activities that are performed as a result of inspections are scheduled. This must include the timeline(s) in which clearance and removal work prescribed by an inspection program will be completed and how the timeline differs by HFTD tier or other risk designation.

Clearance (WMP-VM-VFM-05):

Liberty maintains clearance around its entire overhead distribution and transmission electrical infrastructure on an annual basis. Liberty mitigates vegetation encroachments identified by LiDAR inspections (described Section 9.2.3) within maintenance action thresholds (“MAT”) before the next fire season after inspections.

Additionally, Liberty performs clearance work identified by ground-based inspections (described in Sections 9.2.1and 9.2.2) such as clearance on secondary lines and vegetation found within the MAT.

Fall-in Mitigation (WMP-VM-VFM-06):

Liberty conducts vegetation maintenance to prevent fall-ins to electrical infrastructure annually for hazard trees identified by ground-based inspections (described in Sections 9.2.1 and 9.2.2). Liberty determines its annual fall-in mitigation work on circuits based off the current cycle year of the detailed three-year inspection cycle and patrol inspections that are implemented on an as needed basis. Liberty sequences fall-in mitigation to occur after circuit inspections, notifications, and permitting are completed and within established mitigation timelines determined by tree and site characteristics throughout the work year (See Section 9.12.1 for mitigation timelines).

9.3.4 Updates

In this section, the electrical corporation must discuss changes/updates to pruning and removal activities since the last WMP submission, including known future plans (beyond the current year) and new/novel strategies the electrical corporation may implement in the next five years (e.g., references to and strategies from pilot projects and research). The electrical corporation must include lessons learned as applicable.

Liberty has not made any changes to its pruning and removal activities since its last WMP submission.

9.4 Pole Clearing

9.4.1 Overview

In this section, the electrical corporation must provide an overview of pole clearing, including:

- Pole clearing performed in compliance with Public Resources Code section 4292
- Pole clearing outside the requirements of Public Resources Code section 4292 (e.g., pole clearing performed outside of the State Responsibility Area).

In the pole clearing section, Liberty provides information on its Vegetation Management Pole Clearing initiative (WMP-VM-VFM-01). Liberty owns approximately 23,000 wood poles that support distribution and transmission facilities. Most of Liberty's service territory is located on land that is under the jurisdiction of the State of California or the federal government for fire protection services. Liberty conducts pole clearing in State ("SRA") and Federal Responsibility Areas ("FRA").

Pole clearing activities are performed in both SRA and FRA and are categorized as follows:

<u>PRC 4292 Requirements (SRA):</u>

Liberty clears approximately 4,500 poles annually located within SRA in accordance with Public Resources Code (PRC) Section 4292. These poles are subject to mandatory vegetation clearance requirements around poles supporting electrical equipment, such as transformers and fuses, to reduce ignition risk. Clearing includes removal of flammable material within a 10-foot radius and up to 8 feet vertically from the ground.

<u>Discretionary Pole Clearing (FRA, Non-PRC 4292):</u>

Liberty clears approximately 400 poles annually located within FRA. While these poles are not subject to PRC 4292 requirements, Liberty performs discretionary pole clearing in these areas

to proactively reduce wildfire risk and maintain defensible space around electrical infrastructure.

9.4.2 Procedures

In this section, the electrical corporation must list applicable electrical corporation procedure(s), including the version(s) and effective date(s), used to execute pole clearing.

Refer to LU Table 9-10.

LU Table 9-10: Vegetation Management Pole Clearing Procedures

Document Name and ID	Type	Version	Effective Date
Vegetation Management Plan (VM-02)	Plan	3	4/10/2025
Post Work Verification Procedure (VM-04)	Process	3	2/17/2026
Vegetation Management Notification and Refusal Resolution Policy (VM-06)	Process	1	1/1/2024
Vegetation Management Inspection Manual (VM-07)	Process	1	8/25/2023

9.4.3 Scheduling

In this section, the electrical corporation must describe how pole clearing is scheduled. This must include how the schedule is affected by HFTD tier or other risk designation.

Most of Liberty's service area is in Tier 2 or Tier 3 designated HFTD. As such, Liberty treats all pole clearing activities as high-priority wildfire mitigation work. Generally, pole clearing work occurs from April through July.

Scheduling is influenced by seasonal access and fire risk. Pole clearing typically begins in lower elevation areas earlier in the season, as these areas are most accessible and subject to drier fuel conditions earlier, while higher elevation terrain holds winter snowpack. As access conditions improve, crews shift to the Tahoe Basin and other high-elevation areas during late spring and summer months, prioritizing poles within Tier 3 HFTD first.

Poles identified through the QC process requiring re-work are re-cleared as needed throughout the fire season. Liberty conducts QC inspections of poles cleared under the initiative, including a sample of at least 12% of all poles cleared annually. As part of this methodology, Liberty prioritizes poles located in Tier 3 HFTD and performs increased QC inspections in these areas as scheduling and resources allow.

9.4.4 Updates

In this section, the electrical corporation must describe changes to pole clearing since the last WMP submission and a brief explanation as to why those changes were made. Discuss any planned improvements or updates to pole clearing and the timeline for implementation.

Liberty has not made any changes to its pole clearing initiative since its last WMP submission.

9.5 Wood and Slash Management

9.5.1 Overview

In this section, the electrical corporation must provide an overview of how it manages all downed wood and slash generated from vegetation management activities.

In the wood and slash management section, Liberty provides information on its Vegetation Management Wood and Slash Management initiative (WMP-VM-VFM-02). Liberty recognizes the need for additional efforts to reduce accumulation of woody debris that can ignite or contribute to fire spread and intensity. Liberty has implemented a Fuel Management Program as a precautionary measure, where feasible, to reduce wildfire risks by removing wood and treating brush and slash after vegetation maintenance is performed. Additional treatments that reduce surface fuels from previous activities and those that further reduce fuel loads are also implemented.

Liberty's Wood and Slash Management Specifications:

All limbs and brush less than 12 inches in diameter shall be treated to minimize the accumulation of surface fuels at the work location. All limbs, brush and debris located within 100 feet of equipment accessible roads shall be chipped and broadcasted or chipped and hauled off-site. When brush and limbs cannot be chipped and broadcasted or chipped and hauled off-site, the clean-up method may be lop-and-scatter or otherwise specified. Broadcasted chip depths shall not exceed four inches from the ground surface. Lopped and scattered debris shall not exceed depths of 18 inches from the ground surface. Liberty shall have the right to determine other disposal means or slash treatment methods.

Where possible and requested by the property owner, Liberty will dispose of large woody biomass generated by VM activities. When the clean-up method is 100% removal, the contractor shall be responsible for the treatment and disposal of all woody debris.

Wood and Slash Management Acres Treated Methodology:

Liberty's annual tree removal program averages approximately 3,350 trees, with about 51% (1,709 trees) requiring wood management. To estimate its annual acreage target, Liberty uses two methods:

- Residential areas: Based on lot size, up to 0.25 acres per parcel.
- Cross-country areas: Calculated using an average span length of 186 feet and a 30-foot right-of-way width, equating to 0.12 acres per span treated.

Liberty's overhead electric system is roughly split between roadside/residential (52%) and cross-country environments (48%). Using historical wood management data and factoring in accessibility, terrain, and other variables, Liberty sets an annual treatment target of approximately 280 acres.

Acres treated are tracked based on completed work orders where the cleanup method includes either 100% removal or cutting wood into firewood lengths and leaving it onsite at the landowner's request. For small parcels, up to 0.25 acres, the entire lot size is counted toward the target. For larger parcels, Liberty calculates acres treated using the total power line span length multiplied by a 30 ft. wide right of way, then divided by the number of square feet per acre (43,560). For example, a large parcel with power lines that span a total length of 726 ft. would be calculated as: (726*30)/43,560 = 0.5 acres treated.

Liberty also calculates acres treated from partnership-based projects, such as mastication, forest thinning, or other fuel reduction activities performed by its crews, toward the annual target. Refer to Section 9.8 on VM partnerships.

9.5.2 Procedures

In this section, the electrical corporation must list applicable electrical corporation procedure(s), including the version(s) and effective date(s), used to manage wood and slash.

Refer to LU Table 9-11.

LU Table 9-11: Vegetation Management Wood and Slash Management Procedures

Document Name and ID	Type	Version	Effective Date
Vegetation Management Plan (VM-02)	Plan	3	4/10/2025
Post Work Verification Procedure (VM-04)	Process	3	2/17/2026

9.5.3 Scheduling

In this section, the electrical corporation must describe how wood and slash management is scheduled. This must include how the schedule is affected by HFTD tier or other risk designation.

Wood and slash management activities are a component of tree pruning and removal work and take place after vegetation has been pruned or removed. Liberty coordinates with its vendors for wood and slash management to take place at time of tree pruning or removal operations to the extent feasible.

9.5.4 Updates

In this section, the electrical corporation must describe changes to wood and slash management since the last WMP submission and a brief explanation as to why those changes were made. Discuss any planned improvements or updates to pole clearing and the timeline for implementation.

Since its last WMP submission, Liberty updated its wood and slash management specifications to increase treatment of vegetation debris generated from tree pruning and removal activities from 4 inches and less to 12 inches and less. This update resulted in increased vegetation debris being chipped across the service territory.

9.6 Defensible Space

9.6.1 Overview

In this section, the electrical corporation must provide an overview of its action taken to reduce wildfire risk to substations, generation facilities, and other electrical facilities in accordance with Public Resources Code section 4291, other defensible space codes and regulations, or in exceedance of these requirements.

In the defensible space section, Liberty provides information on its Substation Defensible Space initiative (WMP-VM-VFM-03). Liberty performs routine inspections, vegetation management, and other maintenance activities for 12 substations. Control methods include manual, mechanical, and chemical methods. Work occurs at regular intervals to maintain accessibility,

safety, and adherence to all appropriate governmental regulations and Liberty policies. Herbicides, insecticides, and rodenticides are specified in and are to be applied as per the Pest Control Recommendations ("PCRs"), the Pest Control Advisor ("PCA") and pesticide container labels. The PCA will provide recommendations based on the ability to meet program objectives and minimize negative impacts on the community and environment.

Herbicide applications and vegetation management activities will occur under the direction of the PCA. Additional cycle visits may be required for sites that do not receive herbicide applications.

- *Facility Interiors*: Substations are to be kept free of vegetation and debris by performing routine maintenance, which includes weed, vegetation, and debris removal prior to and in conjunction with herbicide treatments.
- *Facility Perimeters*: Routine maintenance includes weed and vegetation removal prior to and in conjunction with herbicide treatments. This includes a minimum five foot (5') wide clearance, measured horizontal, along the outside of the perimeter fence and a minimum height clearance of 10 feet above ground level along the outside of the perimeter fence.

9.6.2 Procedures

In this section, the electrical corporation must list applicable electrical corporation procedure(s), including the version(s) and effective date(s), used to create and maintain defensible space.

Refer to LU Table 9-12.

LU Table 9-12: Vegetation Management Defensible Space Procedures

Document Name and ID	Type	Version	Effective Date
Vegetation Management Plan (VM-02)	Plan	3	4/10/2025
Vegetation Management Inspection Manual (VM-07)	Process	1	8/25/2023

9.6.3 Scheduling

In this section, the electrical corporation must describe how creation and maintenance of defensible space are scheduled. This must include how the schedule is affected by HFTD tier or other risk designation.

A minimum of 12 substation inspections will occur each year. Generally, two site visits will occur per facility per year. Herbicide applications and vegetation management activities will occur under the direction of the PCA. The first cycle visit will occur any time between October 1

and December 31 each year. The second cycle will occur any time between June 1 and September 30 each year.

9.6.4 Updates

In this section, the electrical corporation must describe changes to how it creates or maintains defensible space since the last WMP submission and a brief explanation as to why those changes were made. Discuss any planned improvements or updates to pole clearing and the timeline for implementation.

Liberty has not made any changes to its substation defensible space initiative since its last WMP submission.

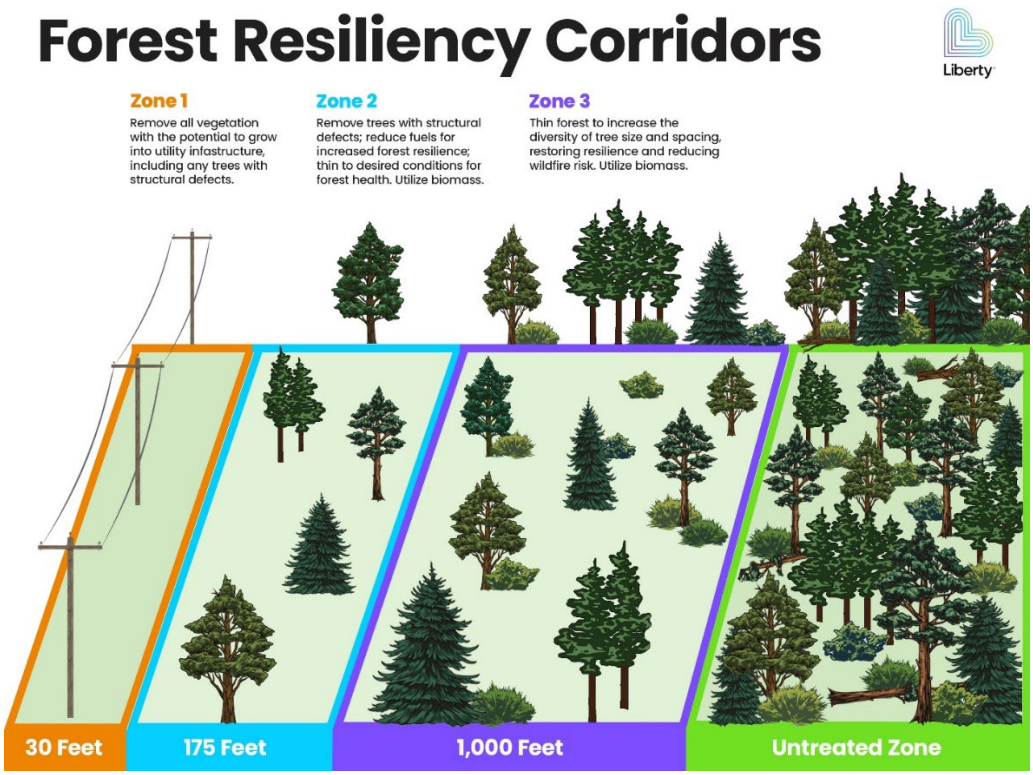
9.7 Integrated Vegetation Management

9.7.1 Overview

In this section, the electrical corporation must provide an overview of its actions taken for activities not covered in previous sections and are performed in accordance with Integrated Vegetation Management principles. This may include, but is not limited to, the following activities: the strategic use of herbicides, growth regulators, or other chemical controls; tree-replacement programs; promotion of native shrubs; prescribed fire; or other fuel treatment activities.

In the integrated vegetation management section, Liberty provides information on its Fire-Resilient Rights-of-Way initiative (WMP-VM-VFM-04). Liberty continues to work with the National Forests on enhanced right-of-way maintenance projects, to target encroaching and hazardous trees and to preventatively remove incompatible tree species from the right-of-way. The enhanced maintenance projects reduce future maintenance entries, protect infrastructure, increase fire-resiliency and are the initial step of the integrated vegetation management ("IVM") program. Refer to Figure 9-1. Liberty's provides details on the partnership to implement this work in section 9.8.1.

Figure 9-1: Liberty Utilities Forest Resilience Corridor Specifications



The Liberty IVM program continues to be developed with the intent of promoting a stable, low-growing community of compatible shrub species. Liberty VM staff and contractors are trained to identify and collect data to document native and culturally significant shrub species.

Liberty also implements an annual tree-replacement program that launched in June 2022, with the intent of distributing compatible plant species, in conjunction with the Arbor Day Foundation.

9.7.2 Procedures

In this section, the electrical corporation must list applicable electrical corporation procedure(s), including the version(s) and effective date(s), used for integrated vegetation management.

Refer to LU Table 9-13.

LU Table 9-13: Vegetation Management IVM Procedures

Document Name and ID	Type	Version	Effective Date
Vegetation Management Plan (VM-02)	Plan	3	4/10/2025
Hazard Tree Management Plan (VM-03)	Plan	1	4/28/2021
Post Work Verification Procedure (VM-04)	Process	3	2/17/2026
Vegetation Threat Procedure (VM-05)	Process	2	6/3/2022
Vegetation Management Notification and Refusal Resolution Policy (VM-06)	Process	1	1/1/2024
Vegetation Management Inspection Manual (VM-07)	Process	1	8/25/2023

9.7.3 Scheduling

In this section, the electrical corporation must describe how integrated vegetation management activities are scheduled. This must include how the schedule is affected by HFTD tier or other risk designation.

Due to work specifications, seasonality, and requirements of implementing enhanced right-of-way work on Federal Lands, scheduling is dynamic and coordinated with applicable stakeholders. Liberty attempts to align fire-resilient rights-of-way projects that overlap with planned system rebuilds, detailed inspections, and routine maintenance work wherever feasible.

9.7.4 Updates

In this section, the electrical corporation must describe changes to its integrated vegetation management activities since the last WMP submission and a brief explanation as to why those changes were made. Discuss any planned improvements or updates to integrated vegetation management and the timeline for implementation.

Liberty has maintained Tree Line USA Recognition since 2025 as part of its IVM Program development and maturation.

9.8 Partnerships

In this section, the electrical corporation must provide information on its partnerships with other entities in vegetation management. This may include partnerships with government agencies, non-profit organizations, or coalitions, such as Regional Forest and Fire Capacity

Program grantees and local forest collaboratives.[85] For this section, "partnership" is defined as the combining of resources, expertise, and efforts to accomplish agreed upon objectives related to wildfire risk reduction achieved through vegetation management. The electrical corporation must provide the following summary information in table format for current partnerships and future partnerships the electrical corporation plans to enter during the three years of the WMP cycle:

- Names of all agencies, organizations, or coalitions in the partnership.
- Vegetation management activities performed pursuant to or under the partnership (e.g., thinning, prescribed fire, mastication, invasive plant removal, woody debris management, etc.).
- The objective of the activities performed pursuant to or under the partnership .
- Electrical corporation's role in the coordination or partnership (e.g., funding, labor, landowner, etc.).
- Anticipated accomplishments of partnership projects during the three years of the WMP cycle, including work done by the electrical corporation and work done by the partnering agency/organization (e.g. number of acres treated, number of trees planted, number of personnel trained, etc.).

The electrical corporation must also provide a narrative overview of, in order: 1) each current and future vegetation management partnership identified in Table 9-3 and 2) vegetation management partnerships it is discontinuing or has discontinued since the last WMP submission and explain why it is discontinuing or has discontinued the vegetation management partnership. Section 9.8.1. provides instructions for the overviews. The sections must be numbered Section 9.8.1 to Section 9.8.n (i.e., each vegetation management partnership is detailed in its own section) with the names of the partnering agencies or organizations as the section title.

For information on Liberty's partnerships in Vegetation Management, refer to Table 9-4.

[85] Regional Forest and Fire Capacity Program (https://www.conservation.ca.gov/dlrp/grant-programs/Pages/Regional-Forest-and-Fire-Capacity-Program.aspx)

Table 9-4: Liberty Partnerships in Vegetation Management

Partnering Agency/Org.	Activities	Objectives	Liberty Role	Anticipated Accomplishments
National Forest Foundation and Lake Tahoe Basin Management Unit	Implementation of the Forest Resilience Corridor Project on National Forest Land adjacent to Liberty electrical infrastructure.	Forest Resiliency Corridors, ROWs	Liberty provides funding and in-kind contributions for project work. Liberty is a key stakeholder and involved in the planning and implementation process.	1,138 acres along 28 miles of overhead powerlines on National Forest Land treated.
Arbor Day Foundation	Coordinate Tree Replacement Program in Liberty's service territory	Tree Replacement Program	Client	5,000 compatible plants distributed since the project began in 2022. Maintain Tree Line USA recognition.
Truckee Meadows Fire Protection District	Mastication, chipping, fuels removal, pole grubbing, fire standby, community outreach	Fuel Management, Asset Protection	Client	Implement fuel reduction projects and provide fire standby services to exempt PAL or other restricted operations during fire season.
Truckee Fire Protection District	Fuel management, forest thinning, community outreach.	Fuel reduction and wildfire mitigation work in Truckee Fire Protection jurisdiction and Liberty service area overlap.	Liberty develops specifications and implements fuels and thinning work around powerlines within Truckee Fire Protection District project footprints. Liberty has participated in joint utility and fire agency collaboration and ordinance review as a	Continue collaboration on additional joint projects in the Truckee area.

Partnering Agency/Org.	Activities	Objectives	Liberty Role	Anticipated Accomplishments
			result of this partnership.	
Local Fire, Forestry, Resource Conservation, and Special Interest Groups	Coordination of fuels reduction and wildfire mitigation efforts; knowledge sharing	Wildfire risk reduction.	Participates in meetings and coordinates with representatives from agencies and organizations invested in wildfire mitigation efforts in the Tahoe Basin. Liberty may implement work based on feedback or to meet the mutual objectives of stakeholders.	Leverage opportunities to implement joint projects aimed at mitigating wildfire risk.

9.8.1 VM Partnership with National Forest Foundation and the Lake Tahoe Basin Management Unit

9.8.1.1 Overview

The Liberty Utilities Resilience Corridors Project Decision Memo was signed into effect by the US Forest Service in 2019. The multi-year project involves implementation of enhanced fuel treatments along Liberty's electrical infrastructure on National Forest Land. Liberty entered into a Master Partnership Agreement with the National Forest Foundation ("NFF") to establish a framework of cooperation and to clarify respective roles and responsibilities in the planning, preparation, and implementation of forest and fuels treatments on land managed by the US Forest Service ("FS").

9.8.1.2 Partnership History

Liberty established the partnership agreement with the NFF in 2022. Liberty provides funding to the NFF to provide project preparation and administration for this work on behalf of the FS Lake Tahoe Basin Management Unit ("LTBMU"). Liberty also supports the project by providing in-kind contributions including vegetation treatments in the utility corridor, hazard tree mitigation, and surveys in project areas. Liberty works closely with the NFF and the LTBMU to plan, coordinate, and implement resilience corridor work. As of 2026 approximately 1,400 acres

of forest land has been treated along 37 miles of Liberty electrical infrastructure through this partnership.

9.8.1.3 Future Projects

Coordination among the partnership is ongoing to implement Zone 1 and 2 treatments within project areas. Liberty plans to leverage this partnership to explore opportunities to implement Zone 3 treatments for the project.

9.8.2 VM Partnership with Arbor Day Foundation

9.8.2.1 Overview

Liberty works with the Arbor Day Foundation to implement its tree replacement program. Liberty provides the Arbor Day Foundation funding for coordinating tree inventory, logistics for method of delivery of trees, support in planning Arbor Day celebrations, marketing tools, a participant survey, and a web-portal used to track program metrics.

9.8.2.2 Partnership History

Liberty began working with the Arbor Day Foundation in 2022 to implement its tree replacement program annually. In 2024 and 2025, Liberty coordinated with the Arbor Day Foundation to plan a tree give away event as an Arbor Day Celebration.

9.8.2.3 Future Projects

Coordination in this partnership is ongoing, and Liberty plans to offer its tree replacement program annually.

9.8.3 VM Partnership with Truckee Meadows Fire Protection District

9.8.3.1 Overview

Liberty entered into a Master Services Agreement with Truckee Meadows Fire Protection District (“TMFPD”) to conduct vegetation management of ground fuels around Liberty electrical infrastructure, provide qualified stand-by resources as requested when Liberty is engaged in activities during high fire risk conditions, suppression response to fires potentially impacting Liberty infrastructure, and provide staff to represent Liberty and TMFPD interests during community outreach.

9.8.3.2 Partnership History

Liberty established its partnership with TMFPD in 2024.

9.8.3.3 Future Projects

Liberty and TMFPD are currently in the process of planning fuel mitigation projects and other support as needed.

9.8.4 VM Partnership with Truckee Fire Protection District

9.8.4.1 Overview

Truckee Fire Protection District (”TFPD”) is a public agency responsible for fire suppression and fire prevention services of 125 square miles in Truckee, California, overlapping portions of Liberty’s service territory. The partnership involves collaboration in fuel reduction work, joint utility and fire agency collaboration, and cross training opportunities.

9.8.4.2 Partnership History

Liberty began collaborating with TFPD in 2023 to implement two phases of a roadside fuel break along approximately 15 miles of Liberty distribution lines. Liberty coordinated with TFPD to develop specifications and implement work near the electrical infrastructure and in the utility right-of-way to meet the objectives of the project. TFPD assisted with right-of-entry agreements with landowners and implemented the work outside of the utility right-of-way. The project was completed in 2024.

In 2024, Liberty and TFPD worked with other electric utilities in the jurisdiction to engage in utility vegetation management practices and efforts towards fuel reduction and wildfire prevention within the shared area.

In 2025, Liberty and TFPD coordinated on the Glenshire-Hirschdale Egress Project. Liberty treated 10.2 acres along 2.83 miles of 60kV right-of-way and removed over 150 trees. TFPD completed an additional 460 acres of treatment beyond the right-of-way.

TFPD’s forester participated in Liberty’s annual IVM training in 2025, presenting landscape-level wildfire prevention strategies.

9.8.4.3 Future Projects

This partnership is ongoing. Liberty and TFPD are in process of planning additional joint effort fuel treatments around electrical infrastructure.

9.8.5 VM Partnership with Local Fire, Forestry, Resource Conservation, and Special Interest Groups

9.8.5.1 Overview

Liberty is active in local special interest groups invested in wildfire mitigation and risk reduction in the service territory. This partnership involves workshopping with various agencies and organizations on mutual goals and objectives, industry developments, local priorities, and opportunities for joint project implementation. Representatives from Federal, State, local government agencies, electric utilities, and non-profit organizations invested in wildfire mitigation comprise this group.

9.8.5.2 Partnership History

Liberty began participating in weekly meetings in this partnership in 2022. This partnership is ongoing, and Liberty continues to meet weekly with South Lake Tahoe Fire, Lake Valley Fire, California Tahoe Conservancy, Tahoe Resource Conservation Group, the US Forest Service, and others to discuss ongoing work. Liberty also participates in other ad hoc special interest groups as needed to cooperate on mutual efforts. These ad hoc committees have helped establish other working partnerships such as with Truckee Fire Protection District.

9.8.5.3 Future Projects

This partnership is ongoing, and Liberty will continue to seek opportunities to work with its agency and local partners to implement additional vegetation management that meets mutual objectives.

9.9 Activities Based on Weather Conditions

9.9.1 Overview

In this section, the electrical corporation must provide an overview of planning and execution of operational changes to address wildfire risk associated with weather conditions such as pruning or removal, executed based on and in advance of a Red Flag Warning or other forecasted weather conditions that indicates an elevated fire threat in terms of ignition likelihood and wildfire potential.

Liberty actively monitors weather forecasts during fire season to prepare for elevated fire risks and Red Flag Warnings. The Fire Prevention Plan outlines restricted operating procedures for high-risk weather conditions. If fire weather thresholds are met within the service territory, Liberty will implement necessary modified operations. Additionally, Liberty tracks Project

Activity Level (PAL) ratings, as determined by the US Forest Service, to adjust vegetation management activities on Federal lands.

9.9.2 Procedures

In this section, the electrical corporation must list applicable electrical corporation procedure(s), including the version(s) and effective date(s), used for activities based on weather conditions.

Refer to LU Table 9-14.

LU Table 9-14: Vegetation Management Procedures for Activities Based on Weather Conditions

Document Name and ID	Version	Effective Date
Hazard Tree Management Plan (VM-03)	1	4/28/2021
Vegetation Threat Procedure (VM-05)	2	6/3/2022
Fire Prevention Plan	1	10/9/2020

9.9.3 Scheduling

In this section, the electrical corporation must describe how activities based on weather conditions are scheduled (or triggered). This must include how the schedule is affected by HFTD tier or other risk designation.

Activities are triggered by continuous monitoring of weather conditions and forecasts, including Liberty's Fire Potential Index ("FPI") across the service territory. When the FPI is forecasted to reach high, very high, or extreme ratings during fire season, it triggers modified operating procedures. Liberty initiates its Fire Prevention Plan, which includes restricted operating procedures for high-risk weather conditions. If weather conditions meet specific fire risk thresholds within the service territory, Liberty promptly implements modified operations. Additionally, Liberty uses Project Activity Level ("PAL") ratings from the US Forest Service to adjust vegetation management activities on Federal lands and modifies daily work schedules accordingly.

9.9.4 Updates

In this section, the electrical corporation must describe changes to its activities based on weather conditions since the last WMP submission and a brief explanation as to why those changes were made. Discuss any planned improvements or updates to pole clearing and the timeline for implementation.

Liberty has not made changes to its vegetation management activities based on weather conditions since its last WMP submission.

9.10 Post-Fire Service Restoration

9.10.1 Overview

In this section, the electrical corporation must provide an overview of vegetation management activities during post-fire service restoration.

In the post-fire service restoration section, Liberty provides information on its Emergency Response Vegetation Management initiative (WMP-VM-VFM-08). Liberty will conduct patrol inspections described in Section 9.2.2.

Assessments that occur during active restoration of electrical infrastructure and ongoing fire suppression are conducted to identify and mitigate significantly damaged trees exhibiting 50% or more crown loss, severe trunk damage or scorching, and are an immediate or critical risk to restoration efforts or the repaired infrastructure.

9.10.2 Procedures

In this section, the electrical corporation must list applicable electrical corporation procedure(s), including the version(s) and effective date(s), used for post-fire service restoration vegetation management.

Refer to LU Table 9-15.

LU Table 9-15: Procedures for Post-Fire Restoration

Document Name and ID	Type	Version	Effective Date
Vegetation Management Plan (VM-02)	Plan	3	4/10/2025
Hazard Tree Management Plan (VM-03)	Plan	1	4/28/2021
Post Work Verification Procedure (VM-04)	Process	3	2/17/2026
Vegetation Threat Procedure (VM-05)	Process	2	6/3/2022
Vegetation Management Inspection Manual (VM-07)	Process	1	8/25/2023

9.10.3 Scheduling

In this section, the electrical corporation must describe how post-fire service restoration vegetation management are scheduled (or triggered). This must include how the schedule is affected by HFTD tier or other risk designation.

Post-fire vegetation management work is triggered when vegetation and site conditions around Liberty infrastructure are damaged due to wildfire.

9.10.4 Updates

In this section, the electrical corporation must describe changes to post-fire service restoration vegetation management since the last WMP submission and a brief explanation as to why those changes were made. Discuss any planned improvements or updates to pole clearing and the timeline for implementation.

Liberty has not made any changes to its vegetation management activities for Post-Fire Service Restoration since its last WMP submission.

9.11 Quality Assurance and Quality Control

9.11.1 Overview, Objectives, and Targets

In this section, the electrical corporation must provide an overview of each of its quality assurance (QA) and quality control (QC) programs for vegetation management. This overview must include the following for each program:

- Initiative/activity being audited (each initiative/activity name must correspond to an initiative/activity described in Sections 9.2 through 9.9)
- Tracking ID from Table 9-1 or 9-2.
- Quality program type (QA or QC).
- Objective of the quality program.
- The electrical corporation must also provide the following tabular information for each QA and QC program:
- Initiative/activity being audited (each initiative/activity name must correspond to an initiative/activity described in Sections 9.2 through 9.9)
- Population/sample unit

- Population[86] size for each audited initiative/activity for each year of the three-year WMP cycle
- Sample size for each audited initiative/activity for each year of the three-year WMP cycle
- Percent of sample in the HFTD for each audited initiative/activity for each year of the three-year WMP cycle
- Confidence level and MOE
- Target pass rate for each audited initiative/activity for each year of the three-year WMP cycle

In the quality assurance and quality control (QA/QC) section, Liberty provides information on its Vegetation Management QA/QC initiative (WMP-VM-QAQC-01). Refer to Table 9-5 and Table 9-6.

Liberty's QA/QC Program is applicable to both vegetation inspections and vegetation management work conducted on private, federal, and state agency land. The QA/QC Program provides VM program oversight to provide reasonable assurance that vegetation inspection and maintenance work is being effectively performed.

The QA/QC Program is aligned with Liberty's Post Work Verification Procedure (VM-04), which outlines strategies for performing quality control inspections on the yearly workload. This is completed through statistical sampling and appropriate sample sizes to gauge acceptable quality levels ("AQL") and conformance levels ("CL") based on the selected margin of error ("MoE"). The procedure includes personnel qualification requirements, sampling methodology, sample size by priority, process assessment ("QA"), results evaluation ("QC"), description of post work verification (*i.e.*, desktop review, field review), and types of QC inspections (*i.e.*, pre-inspections, tree pruning and removal, hazard trees, pole brushing, reporting accuracy, inventory reconciliation).

Additionally, Compliance Audits are performed by appropriately trained and qualified entities to monitor the effectiveness of the Liberty VM program. Program effectiveness is measured by field sampling a statistically valid number of locations to provide an objective Compliance Rate.

Liberty employs both internal and external processes as part of its overall QA/QC strategy:

[86] In this section, a population may be the number of circuit miles inspected, the number of poles cleared, trees prescribed work, etc.

- *Internal*: A post-work documentation review, or desktop review, is performed by Liberty to assess if all required information has been submitted by the vendor. This review is also used to determine if the invoices are accurate. The review is completed on 100% of submitted invoices. Liberty also conducts a post-work validation review, or field review, to assess adherence to work specifications, industry standards, and regulatory requirements.
- *External*: QC inspections are performed by qualified vendors. These QC inspections include work that has been completed in the following categories:
    - Tree Pruning and Removal
    - Detailed Inspections
    - Hazard Tree Work
    - Pole Clearing
- *External*: Compliance Audits are performed by qualified vendors. A Compliance Audit is a statistically valid field review of overhead distribution and transmission lines for adherence to regulation clearance requirements. A statistically valid sample size of spans is randomized for selection of the Compliance Audits and the tree population size at each sample location is recorded to determine the compliance and conformance rate.

Table 9-5: Vegetation Management QA and QC Program Objectives

Initiative/Activity Being Audited	Tracking ID	Quality Program Type	Objective of the Quality Program
Completed Tree Work	WMP-VM-VFM-05	QC	To provide reasonable assurance that Tree Work is being completed as prescribed and in compliance with applicable regulations
Detailed Inspections	WMP-VM-INSP-01	QC	To provide reasonable assurance that Detailed Inspections are being performed as scheduled
Hazard Tree Work	WMP-VM-VFM-06	QC	To provide reasonable assurance that Hazard Tree Work is being completed as prescribed and in compliance with applicable regulations
Pole Clearing	WMP-VM-VFM-01	QC	To provide reasonable assurance that Pole Clearing Work is being completed as prescribed and in compliance with applicable regulations
Compliance with minimum clearance requirements	N/A	Compliance Audit	To provide reasonable assurance that minimum clearance requirements are being maintained

Table 9-6: Vegetation Management QA and QC Activity Targets

Initiative/ Activity Being Audited	**Population /Sample Unit**	**2027 Population Size**	**2027 Sample Size**	**2027 % of Sample in HFTD**	**Confidence level / MOE**	**2027 Pass Rate Target**
Completed Tree Work	Annual Circuit Miles	700 Miles	228 Miles	100%	99/7	95%
Detailed Inspections	Annual Circuit Miles	233 Miles	76 Miles	100%	99/7[87]	95%
Hazard Tree Work	Annual Hazard Trees	6,000 Trees	597 Trees	100%	99/5	95%
Pole Clearing	Annual Poles	4,900 Poles	584 Poles	100%	99/5	92%
Compliance Audit	Circuit Miles	700 Miles	40 Miles	100%	95/3	99%

[87] Due to the small number of units in this category, the sample size was based on the 3-year plan. 700 miles over the 3-year period (233 miles per year) at a CL of 99 and MoE of 7 results in 228 miles during that 3-year period or 76 miles annually.

9.11.2 QA/QC Procedures

In this section, the electrical corporation must list the applicable procedure(s), including the version(s) and effective date(s), used for each vegetation management QA and QC program listed in Table 9-20.

Refer to LU Table 9-16.

LU Table 9-16: Vegetation Management QA/QC Procedures

Document Name and ID	Type	Version	Effective Date
Vegetation Management Plan (VM-02)	Plan	3	4/10/2025
Hazard Tree Management Plan (VM-03)	Plan	1	4/28/2021
Post Work Verification Procedure (VM-04)	Process	3	2/17/2026
Vegetation Threat Procedure (VM-05)	Process	2	6/3/2022
Vegetation Management Inspection Manual (VM-07)	Process	1	8/25/2023

9.11.3 Sample Sizes

In this section, the electrical corporation must describe how it determines the sample for each QA and QC program listed in Table 9-4. This must include how HFTD tier or other risk designations affect the sampling plan, and how the electrical corporation ensures samples are representative of the population.

Liberty treats its entire service territory as an HFRA. There are no other variables used that affect the sampling plan. Liberty provides information regarding its VM QA/QC Program sample size and units below in LU Table 9-17 and Figure 9-2.

LU Table 9-17: Vegetation Management QA/QC Sample Size

Work Type	Category	Annual Circuit Miles	Annual Hazard Trees	Annual Poles	Statistical Sampling		
					CL/MoE	%	Units
Completed Tree Work	Transmission and Distribution	700	-	-	99/7	33	228 Miles
Detailed Inspections	Transmission and Distribution	233	-	-	99/7[88]	33	76 Miles
Hazard Tree Work	Transmission and Distribution	-	6,000	-	99/5	10	597 Trees
Pole Clearing	Transmission and Distribution	-	-	4,900	99/5	12	584 Poles
Compliance Audit	Transmission and Distribution	700	-	-	95/3[89]	6	40 Miles

Figure 9-2: Vegetation Management QC Sample Size Calculation Example

Sample Size Calculation Example

Common Confidence Levels:

CL	Z-Score
99%	2.576
95%	1.96
90%	1.645

Standard Deviation (Std Dev): 50% *Remains Constant*

Margin of Error (MoE): 5% *Can Vary 1-10%*

Population Size: 2,500

Sample - Underlying Calculations:

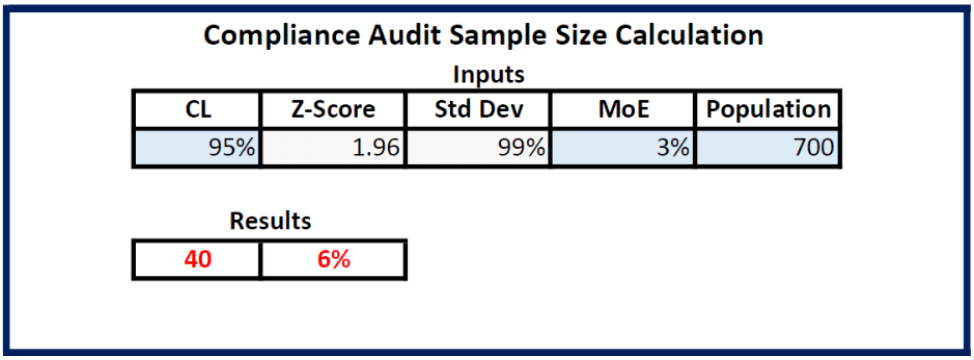
$$\text{Sample Size} = \frac{[\text{Z-Score}^2 \times \text{Standard Deviation} \times (1 - \text{Standard Deviation}) / \text{Margin of Error}^2]}{[(\text{Z-Score2} \times \text{Standard Deviation} \times (1 - \text{Standard Deviation}) / \text{Margin of Error2} \times \text{Population Size})) + 1]}$$

Sample Size = $[2.576^2 \times 0.5 \times (1 - 0.5) / 0.05^2] / [(2.576^2 \times 0.5 \times (1 - 0.5) / 0.05^2 \times 2500)) + 1]$

Sample Size = 663.578 / 1.2654

Sample Size = 524

Figure 9-3: Compliance Audit Sample Size Calculation



9.11.4 Pass Rate Calculations

In this section, the electrical corporation must describe how it calculates pass rates. This description must include:

- The sample unit that generates the pass rate for each QA and QC program (e.g., for pole clearing, the sample unit that generates the pass rate may be a single pole that passes or fails a QC audit).
- The pass and failure criteria for each program listed in Table 9-20. List each criterion and discuss any weighted contributions to the pass rate.

Liberty uses the sample units in LU Table 9-18 to establish the pass rate for each Work Type.

LU Table 9-18: Pass Rate Sample Units

Work Type	Category	Sample Unit
Completed Tree Work	Transmission and Distribution	Single Tree
Detailed Inspections	Transmission and Distribution	Single Tree
Hazard Tree Work	Transmission and Distribution	Single Tree
Pole Clearing	Transmission and Distribution	Single Pole

[88] Due to the small number of units, in this category, the sample size was based on the 3-year plan. 700 miles over the 3-year period (233 miles per year) at a CL of 99 and MoE of 7 results in 228 miles during that 3-year period or 76 miles annually.

[89] The sample size selection methodology for the Compliance Audit varies from the sample size selection methodology for QC inspections. A 95% CL, 3% MoE, and 99% Std Dev (historical rate of compliance) was used for the Compliance Audit.

Liberty uses the criteria in LU Table 9-19, LU Table 9-20, LU Table 9-21, and LU Table 9-22 when evaluating pass rates for each Work Type. The pass rates are averaged for all conditions evaluated.

LU Table 9-19: Completed Tree Work Criteria

Conditions Evaluated	Category
Work Performed as Prescribed	Pass / Fail
Maintenance Clearance Distance Achieved	Pass / Fail
Will Hold Until Next Inspection	Pass / Fail
Potential Hazard Remains	Pass / Fail
Site Clean	Pass / Fail
ANSI Pruning Applied	Pass / Fail
Other Trees Affected	Pass / Fail
Site Condition Stable	Pass / Fail

LU Table 9-20: VM Detailed Inspections Criteria

Conditions Evaluated	Category
Location Information Correct	Pass / Fail
Species Correct	Pass / Fail
Quantity Correct	Pass / Fail
Work Type Noted	Pass / Fail
Tree Health Noted	Pass / Fail
Priority Noted	Pass / Fail
Project Type Noted	Pass / Fail
Clean Up Method Noted	Pass / Fail
Quantity of Non-Listed Trees	Pass / Fail

LU Table 9-21: Hazard Tree Work Criteria

Conditions Evaluated	Category
Work Performed as Prescribed	Pass / Fail
Potential Hazard Remains	Pass / Fail
Site Clean	Pass / Fail
Other Trees Affected	Pass / Fail
Site Condition Stable	Pass / Fail

LU Table 9-22: Pole Clearing Criteria

Conditions Evaluated	Category
Location Information Correct	Pass / Fail
Subject Pole	Pass / Fail
Pole Clearing Tag	Pass / Fail
PRC 4292 Radial Clearance	Pass / Fail
PRC 4292 Vertical Clearance 0-8ft	Pass / Fail
PRC 4292 Vertical Clearance >8ft	Pass / Fail
ANSI Pruning Applied	Pass / Fail
Site Clean	Pass / Fail

Compliance Audit Pass Rate Criteria:

The number of trees found within regulated clearance distance during the compliance audit is measured against the total population of trees within the sample to determine the compliance rate. Population is defined as the count of trees that have been pruned and/or are expected to encroach regulation clearance distance within 3 years within each span evaluated from the sample size. Trees within Regulated Clearance Distance is defined as the count of trees within regulated clearance distances (4’ for 12kv - 60kV, 10’ for 120kV) within the evaluated sample.

9.11.5 Other Metrics

In this section, the electrical corporation must list and describe the metrics used by the electrical corporation, other than pass rate, to evaluate the effectiveness of its QA and QC programs and procedures (e.g., find rate, rework rate, outage rate within 6 months of inspection attributed to vegetation contact, etc.).

As described in Section 9.11.1, Liberty uses the results of the external Compliance Audit as a metric to provide reasonable assurance that work is being completed as assigned and/or prescribed and in compliance with applicable regulations.

9.11.6 Documentation of Findings

In this section, the electrical corporation must describe how it documents its QA and QC findings and incorporates lessons learned from those findings into corrective actions, trainings, and procedures.

Liberty reviews QC reports and assigns rework where applicable. Typically, Liberty will provide corrective actions to its vendors where rework is needed and conduct tailboards with vegetation crews in the field to review QC findings and work towards improvements. Liberty also reviews overall scores for each QC component and provides scores and areas for improvement to its vegetation contractors annually.

9.11.7 Changes to QA/QC Since Last WMP and Planned Improvements

In this section, the electrical corporation must describe:

- A list of changes the electrical corporation made to its QA and QC procedure(s) since its last WMP submission.
- Justification for each of the changes including references to lessons learned as applicable.
- A list of planned future improvements and/or updates to QA and QC procedure(s) including a timeline for implementation.

In its 2024 WMP Update, Liberty provided information on its Compliance Audit procedure (formerly called QA Inspections). Liberty has updated the naming of this QC program component to Compliance Audit for consistency within the industry.

Liberty is currently not planning any updates to its QA/QC program.

9.12 Work Orders

In this section, the electrical corporation must provide an overview of how it manages its work orders resulting from vegetation management inspections that prescribe vegetation management activities. This overview must include the following under these headers:

9.12.1 Priority Assignment

In this section, the electrical corporation must describe how work orders are assigned priority, including the initiative timeline for each priority level/group.

Procedures documenting work order process: Liberty implements several plans and procedures that provide guidance for action thresholds for creation and completion of work

orders for vegetation management work: VM-02 Vegetation Management Plan, VM-03 Hazard Tree Management Plan, VM-05 Vegetation Threats Procedure, and VM-07 Inspection Manual.

How work orders are prioritized based on risk: During inspections, trees and vegetation identified as requiring work for the current maintenance cycle are assigned a work order with a priority condition based on the observed field conditions at time of inspection. VM-05, Vegetation Threat Procedure, describes the criteria for assigned work order priority and mitigation timelines:

Potential Tree or Limb Failures

- *Priority 1 Conditions*: Any observed tree, or parts thereof, that is failing or expected to imminently fail and contact electric facilities or any observed tree, or parts thereof, where it appears that contact has occurred with electric facilities.
    - *P1 Mitigation*: Clear the threat within 24 hours.
- *Priority 2 Conditions*: Any observed tree, or parts thereof, that is not a Priority 1 condition but is likely to fail and impact electric facilities prior to issuing a planned maintenance work order (failure may be expected within 6 months).
    - *P2 Mitigation*: Clear the threat within 30 days.
- *Priority 3 Conditions*: Any observed tree, or parts thereof, that is not a Priority 1 or Priority 2 condition but there is a probability of failure and contact with electric facilities within two years.
    - *P3 Mitigation*: Add to the tree inventory for creating and scheduling a planned maintenance work order. The threat shall be reassessed or mitigated within nine months.
- *Priority 4 Conditions*: Any observed tree, or parts thereof, that is not considered a Priority 1, Priority 2, or Priority 3 condition, is currently stable, may be in decline or defective, but is not expected to fail and contact electric facilities.

Potential Tree Growth Encroachments

- *Priority 1 Conditions*: Any observed vegetation condition, resulting from tree growth or tree sway, where it appears that contact has occurred with electrical facilities.
    - *P1 Mitigation*: Clear to the MCD within 24 hours.
- *Priority 2 Conditions*: Any observed vegetation condition, resulting from tree growth, that is not a Priority 1 but is within the Regulation Clearance Distance
    - *P2 Mitigation*: Clear to the MCD within 30 days.

- *Priority 3 Conditions*: Any observed vegetation condition, resulting from tree growth, that is not a Priority 1 or Priority 2 condition but requires work prior to the next inspection (12 to 18-months) to maintain the Regulation Clearance Distance
- *P3 Mitigation*: Clear to the MCD no later than nine months after initial inspection.

9.12.2 Backlog Elimination

In this section, the electrical corporation must describe the plan for eliminating work order backlogs (i.e., open work orders that have passed initiative timelines), if applicable.

Liberty does not have a backlog of vegetation management work orders.

9.12.3 Trends

In this section, the electrical corporation must describe of trends with respect to open work orders and:

- An aging report for work orders past due (i.e., work orders that were not completed within the electrical corporation's assigned initiative timelines per priority level/group described in Section 9.11.1) (Table 9-5 and Table 9-6 provides the required format).

Liberty completes work orders based on timelines described in Section 9.12.1. There is no backlog of past due work orders. Refer to Table 9-7 and Table 9-8.

Table 9-7: Number of Past Due Vegetation Management Work Orders Categorized by Age and HFTD Tier

HTFD Area	0-30 Days	31-90 Days	91-180 Days	181+ Days
Non-HFTD	0	0	0	0
HFTD Tier 2	0	0	0	0
HFTD Tier 3	0	0	0	0

Table 9-8: Number of Past Due Vegetation Management Work Orders Categorized by Age and Priority Levels

HTFD Area	0-30 Days	31-90 Days	91-180 Days	181+ Days
Priority 1	0	0	0	0
Priority 2	0	0	0	0
Priority 3	0	0	0	0

9.13 Workforce Planning

In this section, the electrical corporation must provide an overview of vegetation management and inspections personnel.

The electrical corporation must:

- List all worker titles relevant to vegetation management and inspections including, but not limited to, titles related to inspecting, auditing, and tree crews.
- List and describe minimum qualifications for each worker title with an emphasis on qualifications relevant to vegetation management.

  o The electrical corporation must note if workers with title hold any certifications, such as being an International Society of Arboriculture Certified Arborist or a California-licensed Registered Professional Forester.

In the workforce planning section, Liberty provides information on its Vegetation Management Workforce Planning initiative (WMP-VM-WFP-01)

Refer to Table 9-9.

Table 9-9: Vegetation Management Qualifications and Training

Worker Title	Minimum Qualifications for Target Role	Applicable Certifications	# of Electrical Corporation Employees with Min Quals	# of Electrical Corporation Employees with Applicable Certifications	# of Contracted Employees with Min Quals	# of Contracted Employees with Applicable Certifications	Total # of Employees	Reference to Electrical Corporation Training/Qualification Programs
Manager, Vegetation Management	Five years' experience in utility arboriculture; Bachelor's degree or equivalent	ISA Certified Arborist or Registered Professional Forester, ISA Utility Specialist	1	1	0	0	1	No formal training program required for this position.
Supervisor, Vegetation Management	Five years' experience in utility arboriculture; Bachelor's degree or equivalent	ISA Certified Arborist or Registered Professional Forester, ISA Utility Specialist	1	1	0	0	1	No formal training program required for this position.
System Arborist/Forester	Three years' experience in utility arboriculture; Bachelor's degree or equivalent	ISA Certified Arborist or Registered Professional Forester, ISA Utility Specialist	4	4	0	0	4	No formal training program required for this position.
Program Administrator	Five years' experience in a finance, accounting, business administration; Bachelor's degree or equivalent	None	1	1	0	0	1	No formal training program required for this position.
Supervisor, Utility Forester	Three years' experience in utility arboriculture	ISA Certified Arborist or Registered Professional Forester	0	0	1	1	1	No formal training program required for this position.
Utility Forester I	Less than one year experience in utility arboriculture	None	0	0	0	0	0	No formal training program required for this position.
Utility Forester II	One year experience in utility arboriculture	None	0	0	1	1	1	No formal training program required for this position.
Utility Forester III	Two years' experience in utility arboricultural	ISA Certified Arborist or Registered Professional Forester	0	0	0	0	0	No formal training program required for this position.
Utility Forester IV	Three years' experience in utility arboriculture	ISA Certified Arborist or Registered Professional Forester	0	0	2	2	2	No formal training program required for this position.
Utility Forester V	Five years' experience in utility arboriculture	ISA Certified Arborist, ISA Certified Utility Specialist or Registered Professional Forester	0	0	3	3	3	No formal training program required for this position.
Vegetation Coordinator	Less than one year experience in utility arboriculture	None	1	1	0	0	1	No formal training program required for this position.
Tree Crew Supervisor	24 months experience as Line Clearance Certified Tree Worker	EHAP, CPR + First Aid, Line Clearance Arborist Certification	0	0	4	4	4	No formal training program required for this position.
Line Clearance Certified Tree Worker	18 months experience as Apprentice Line Clearance Certified Tree Worker	EHAP, CPR + First Aid, Line Clearance Arborist Certification	0	0	4	4	4	No formal training program required for this position.

Worker Title	Minimum Qualifications for Target Role	Applicable Certifications	# of Electrical Corporation Employees with Min Quals	# of Electrical Corporation Employees with Applicable Certifications	# of Contracted Employees with Min Quals	# of Contracted Employees with Applicable Certifications	Total # of Employees	Reference to Electrical Corporation Training/Qualification Programs
Apprentice Line Clearance Certified Tree Worker	6 months' experience as a Groundperson	EHAP, CPR + First Aid, Line Clearance Arborist Certification	0	0	4	3	4	No formal training program required for this position.
Equipment Operator	Commercial Driver's License or 1 year experience operating equipment	EHAP, CPR + First Aid	0	0	3	3	3	No formal training program required for this position.
Groundperson	Entry-level; related training and on-the-job experience preferred.	EHAP, CPR + First Aid	0	0	4	4	4	No formal training program required for this position.
Pole Clearing Inspector	Entry-level; related training and on-the-job experience preferred.	EHAP, CPR + First Aid	0	0	2	2	2	No formal training program required for this position.
Pole Clearing Technician	Entry-level; related training and on-the-job experience preferred.	EHAP, CPR + First Aid	0	0	7	7	7	No formal training program required for this position.

Note: Personnel and certificate holder numbers may fluctuate.

9.13.1 Recruitment

In this section, the electrical corporation must describe how it recruits vegetation management and inspections personnel, including any relevant partnerships with colleges or universities.

Liberty requires employees within the VM Department to hold professional credentials and to complete ongoing training necessary to maintain applicable certifications. Being a Certified Arborist by the International Society of Arboriculture ("ISA") with three years of relevant experience is the minimum requirement to be employed by Liberty as a System Arborist or System Forester. Additional training and credentials beyond the minimum are encouraged to further the professional development of employees and to provide a well-trained, motivated workforce.

Liberty's internal vegetation management personnel provide monitoring, oversight, and evaluation of vegetation inspections and maintenance projects. Liberty VM staff operate in high-level program and project management roles to implement the vegetation management program. Liberty's VM employees are mentors and provide continued leadership to vegetation management contractors to bring alignment with the overall goals and objectives of the program.

Liberty has been proactive in acquiring and developing trained internal VM staff and has used historical data to assess the number of Liberty employees necessary to implement the VM program. Liberty has been successful in recruiting qualified personnel for its vegetation management positions. Liberty employs a very qualified workforce with a high concentration of advanced credentials (see LU Table 9-23).

LU Table 9-23: Liberty VM Credentials or Certifications

Credential or Certification Type	Liberty Internal VM Full-Time Employees with Credentials	
	Number	Percentage
ISA Certified Arborist	5	55.6%
ISA Tree Risk Assessment Qualification	6	66.7%
ISA Certified Utility Specialist	6	66.7%
ISA Board Certified Master Arborist	2	22.2%
Certified Tree Safety Professional	1	11.1%
Utility Vegetation Management Professional Certificate	1	11.1%
PMI Project Management Professional	1	11.1%
SAF Certified Forester	1	11.1%
Licensed Timber Operator	1	11.1%
Geographic Information Systems (GIS) Certificate of Completion	1	11.1%

Liberty's contract specifications describe minimum requirements for contract personnel. Liberty reviews contract personnel qualifications to remain in compliance with the stated requirements and works with vendors to assign personnel to appropriate tasks, when necessary. This process is applied consistently throughout the Liberty service territory.

9.14 Training and Retention

In this section, the electrical corporation must describe how it trains its vegetation management and inspection personnel, including any requirements for continued/refresher education and programs to improve worker qualifications.

Liberty implements an annual training plan that includes refresher training on specific operational policies and procedures as well as other training opportunities. Field trainings, benchmarking, and tailboards on utility arboriculture topics are organized among VM groups to align on industry practices and obtain continuing education units ("CEU") to keep professional certifications in good standing. Depending on the subject and learning objectives, training will be developed by a combination of Liberty's highly qualified utility arborists and consultants who are subject matter experts in specific fields within utility vegetation management. Specific opportunities include both standard and specialized learning opportunities including:

- Electrical hazard awareness training
- Internal and external peer-to-peer training and knowledge sharing
- Liberty-specific plant identification training for IVM program development
- Industry standards and best practices training for utility VM operations

Liberty has also developed online training modules for onboarding new vegetation management employees and contractors.

Vegetation inspections worker qualifications: Minimum qualifications for worker titles listed in Table 9-9 establish personnel that are proficient in providing vegetation inspections on Liberty's system. Personnel performing vegetation inspections on Liberty's system must demonstrate the required level of competence, gained through technical training, work experience, and professional credentials, set in place by minimum qualifications for each worker title. Liberty's VM inspection contractors employ their own training programs to provide Liberty with a qualified workforce for its system.

Vegetation Management projects worker qualifications: Minimum qualifications for worker titles listed in Table 9-9 verify that personnel are proficient in providing the work required for vegetation management projects along Liberty's system. Personnel performing tree work for vegetation management projects must demonstrate the required level of competence, gained through technical training and work experience, set in place by minimum qualifications for each worker title. Liberty's line-clearance tree contractors employ their own training programs to meet minimum qualifications of qualified workforce for Liberty's system.

10. Situational Awareness and Forecasting

Each electrical corporation's WMP must include plans for situational awareness:[90]

10.1 Targets

In this section, the electrical corporation must provide qualitative and quantitative targets for each year of this three-year cycle. The electrical corporation must provide at least one qualitative and quantitative target for the following initiatives:

- Environmental Monitoring Systems (Section 10.2)
- Grid Monitoring Systems (Section 10.3)
- Ignition Detection Systems (Section 10.4)
- Weather Forecasting (Section 10.5)
- Weather Station Maintenance and Calibration (Section 10.5.5)

10.1.1 Qualitative Targets

The electrical corporation must provide qualitative targets for its three-year plan for implementing and improving its situational awareness and forecasting,[91] including the following:

- Identification of which initiative(s) in the WMP the electrical corporation is implementing to achieve the stated target, including Tracking IDs and the Tracking ID(s) used in past WMPs ("Previous Tracking ID"), if applicable.
- A completion date for when the electrical corporation will achieve the target.
- Reference(s) to the WMP section(s) or appendix, including page numbers, where the details of the target(s) are documented and substantiated.

Refer to Table 10-1.

10.1.2 Quantitative Targets

The electrical corporation must list all quantitative targets it will use to track progress on its situational awareness and forecasting in its three-year plan, broken out by each year of the WMP cycle. Electrical corporations must show progress toward completing quantitative targets

[90] Pub. Util. Code §§ 8386(c)(2)-(5).
[91] Annual information included in this section must align with the applicable data submission.

in subsequent reports, including data submissions and WMP Updates.[92] For each target, the electrical corporation must provide the following:

- Identification of which initiative(s) in the WMP the electrical corporation is implementing to achieve the stated target, including Tracking IDs and the Tracking ID(s) used in past WMPs ("Previous Tracking ID"), if applicable.
- Projected targets and totals for each of the three years of the WMP cycle, e.g., [Year 1] end of year total, [Year 2] total, and [Year 3] total, three-year total and the associated units for the targets.
- The expected % risk reduction[93] for each of the three years of the WMP cycle.

The electrical corporation's targets must provide enough detail to effectively inform efforts to improve the performance of the electrical corporation's situational awareness and forecasting initiatives.

Refer to Table 10-1.

[92] Annual information included in this section must align with the applicable data submission.
[93] The expected % risk reduction is the expected percentage risk reduction per year, as described in Section 6.2.1.2.

Table 10-1: Situational Awareness WMP Initiative Targets

WMP Initiative Category	Initiative	Activity (Tracking ID #)	Quantitative or Qualitative Target	Target Unit	2027 Total / Status	% Risk Reduction for 2027	Three-Year Total	Section; Page Number
Situational Awareness and Forecasting	Environmental monitoring systems	Fuel Moisture Sampling (WMP-SA-01)	Quantitative	Fuel sampling locations monitored	5	Not calculated	15	10.2.1; pp. 266-270
Situational Awareness and Forecasting	Environmental monitoring systems	Fuel Moisture Sampling (WMP-SA-01)	Qualitative	Use field collected fuel moisture samples to supplement automated ERC percentiles	Complete December 31, 2027	Not calculated	Complete	10.2.1; pp. 266-270
Situational Awareness and Forecasting	Grid monitoring systems	WMP-SA-02	Quantitative	Fault Indicators Installed	Complete	Not calculated	Complete	10.3.1; pp. 273-275
Situational Awareness and Forecasting	Grid monitoring systems	WMP-SA-02	Qualitative	Sensitive Earth Fault (SEF) protection module study	Complete	Not calculated	Complete	Appendix D; ACI: LU-25U-08
Situational Awareness and Forecasting	Ignition Detection Systems	WMP-SA-03	Quantitative	Wildfire Cameras Sponsored	8	Not calculated	24	10.4.1; pp. 277-280
Situational Awareness and Forecasting	Ignition Detection Systems	WMP-SA-03	Qualitative	Finalize Agreement with UNR for wildfire camera sponsorship	Complete	Not calculated	Complete	10.4.1; pp. 277-280
Situational Awareness and Forecasting	Weather forecasting	WMP-SA-04	Quantitative	Percent of weather stations in service	80%	Not calculated	80%	10.2.1; pp. 266-270 10.5.5; pp. 284-285
Situational Awareness and Forecasting	Weather forecasting	WMP-SA-04	Qualitative	Maintain fire weather dashboard functionality	Complete December 31, 2027	Not calculated	Complete	10.5.1; pp. 281-283
Situational Awareness and Forecasting	Weather Station Maintenance and Calibration	Weather Station Inspections (WMP-SA-01)	Quantitative	Weather Stations Inspected	39	Not calculated	117	10.5.5; pp. 284-285
Situational Awareness and Forecasting	Weather Station Maintenance and Calibration	Weather Station Health (WMP-SA-01)	Qualitative	Conduct necessary repairs and updates to maintain weather station network health	Complete December 31, 2027	Not calculated	Complete	10.5.5; pp. 284-285

10.2 Environmental Monitoring Systems

Tracking ID: WMP-SA-01

10.2.1 Existing Systems, Technologies, and Procedures

The electrical corporation must report on the environmental monitoring systems and related technologies and procedures currently in use, highlighting any improvements made since the last WMP submission. The electrical corporation must discuss systems, technologies, and procedures related to the reporting of the following:

- Current weather conditions:
  - o Air temperature
  - o Relative humidity
  - o Wind velocity (speed and direction)
- Fuel characteristics:
  - o Seasonal trends in fuel moisture

Each system must be summarized in Table 10-2. The electrical corporation must provide the following additional information for each system in the accompanying narrative:

- Generalized location of the system / locations measured by the system (e.g., HTFD, entire service territory)
- Integration with the broader electrical corporation's system
- How measurements from the system are verified
- Frequency of maintenance
- For intermittent systems (e.g., aerial imagery, line patrols), what triggers collection. This should include flow charts and equations as appropriate.
- For calculated quantities, how raw measurements are converted into calculated quantities. This should include flow charts and equations as appropriate.

Liberty utilizes a network of weather stations and fuel moisture sampling locations to monitor environmental conditions within its service territory. These systems provide critical real-time data on weather variables such as temperature, humidity, and wind speed, as well as fuel moisture levels. This information is essential for assessing risks and validating weather forecasts, which supports the safe operation of the electric grid during extreme weather events. Liberty provides information on its Environmental Monitoring Systems in Table 10-2.

Table 10-2: Liberty Environmental Monitoring Systems

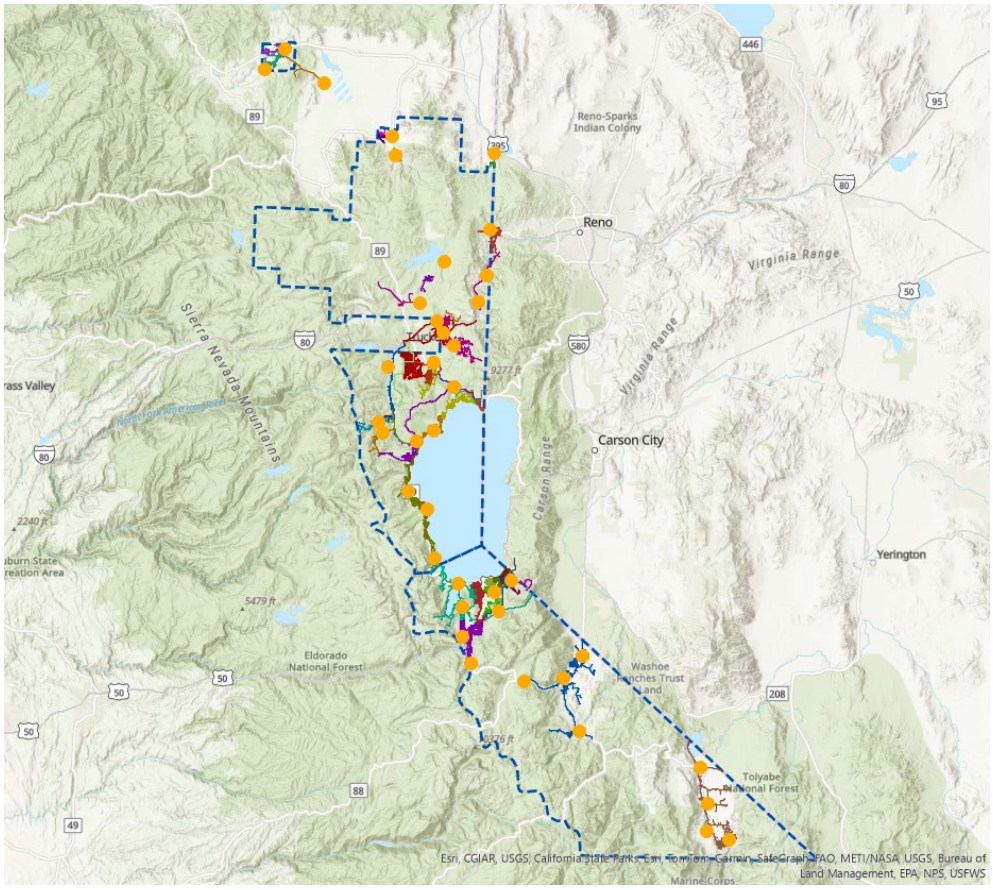
System	Measurement/ Observation	Frequency	Purpose and Integration
Weather stations	• Temperature (°F) • Dew Point (%) • Wind Speed (mph) • Wind Direction • Wind Gust (mph) • Wind Gust Direction • Latest Rain (inches) • Fuel Moisture (%) • Soil Moisture (%) • Soil Temperature (°F)	6 observations per hour	• Improve weather forecasts with observed weather station data • Configure alerts • Generate reports
Remote sensing fuel moisture	• Fuel Moisture (%)	6 observations per hour	• Calculate fuel moisture content
Remote sensing soil moisture	• Soil Moisture (%)	6 observations per hour	• Calculate soil moisture content
Fuel moisture field sampling	• Live woody (%) • 1,000 hour (%) • Live fuel moisture by predominant species	1 per week	• Calculate Energy Release Component • Fire behavior calculations

Liberty's weather station network consists of 39 weather stations (see Figure 10-1) that are distributed throughout the entire service territory. In addition to Liberty's weather stations, there are RAWS and NWS weather stations within the service territory that are monitored. Liberty's weather station data are uploaded to MesoWest for integration into Liberty's risk models developed by Technosylva. Weather station measurements are also made available to the public at https://liberty.westernweathergroup.com/

Weather stations are integrated into Liberty's fire weather dashboard where forecasted weather is plotted with weather station observations to evaluate how well models are performing. This provides accurate measurements to validate the accuracy of models used to determine the scope of PSPS events. During PSPS events, the weather station data are used as a tool when determining timing of PSPS stages for areas under consideration for PSPS.

Maintenance and calibration of weather stations, described in Section 10.5.5, is performed on an annual basis to perform any necessary repairs or updates.

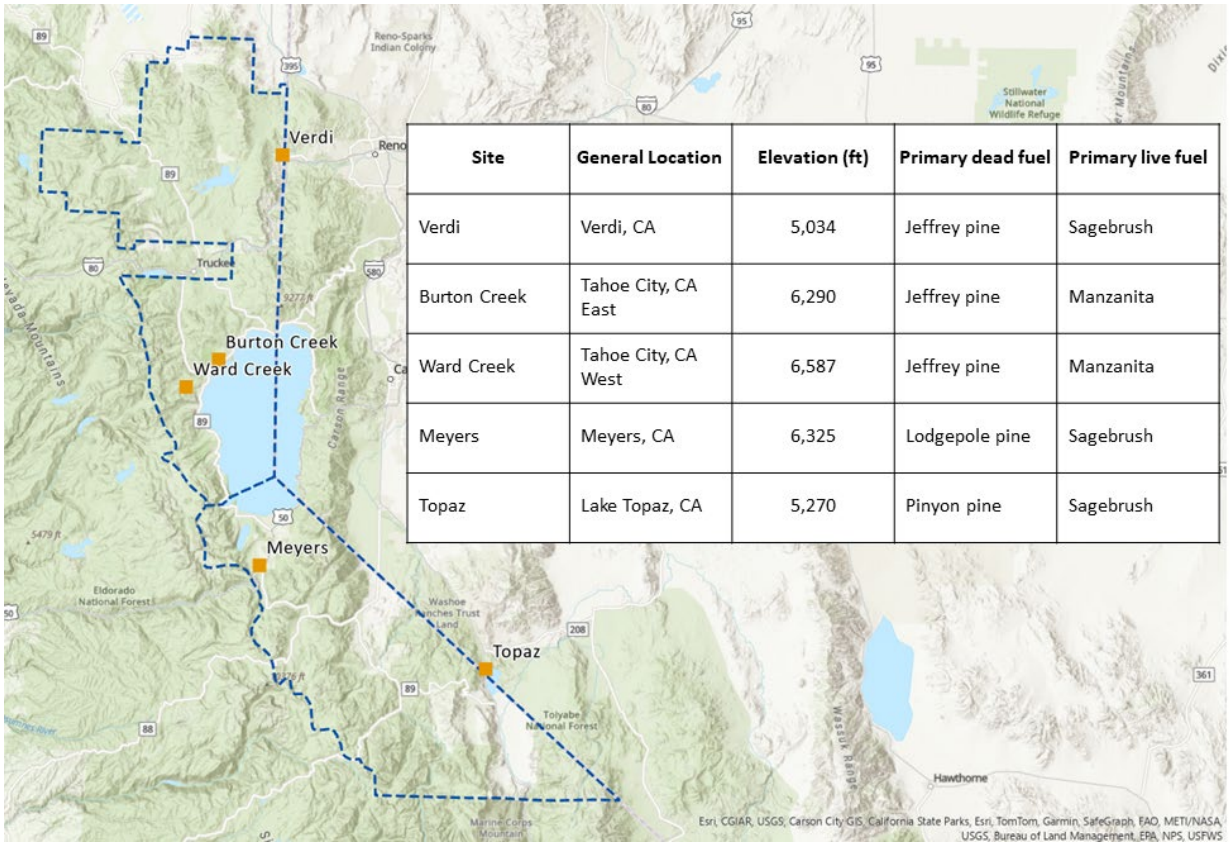
Figure 10-1: Liberty's Weather Station Network Coverage



Seasonal variations in fuel moisture conditions are monitored using a combination of analytical methods and field-based fuel moisture sampling. Observed and forecasted Energy Release Component (ERC) percentiles from the USFS Wildland Fire Assessment System (WFAS) are used to monitor intermediate to long-term fuel dryness. This data is generated from Remote Automated Weather Station (RAWS) observations and the National Weather Service (NWS) National Digital Forecast Database (NDFD). WFAS data is supplemented with in-situ fuel moisture sampling at five locations within Liberty's service territory. This sampling targets values that are challenging to accurately calculate from weather observations, including 1,000-hour dead fuel moisture, live woody fuel moisture, and foliar moisture content. Liberty provides details of its fuel moisture sampling sites in Figure 10-2. The collected fuel moisture measurements are used to calculate fire behavior indices including ERC percentiles, spread

component, burn index, and ignition component to forecast fire behavior. Liberty provides the process for converting fuel moisture samples into calculated ERC percentiles in Figure 10-3.[94]

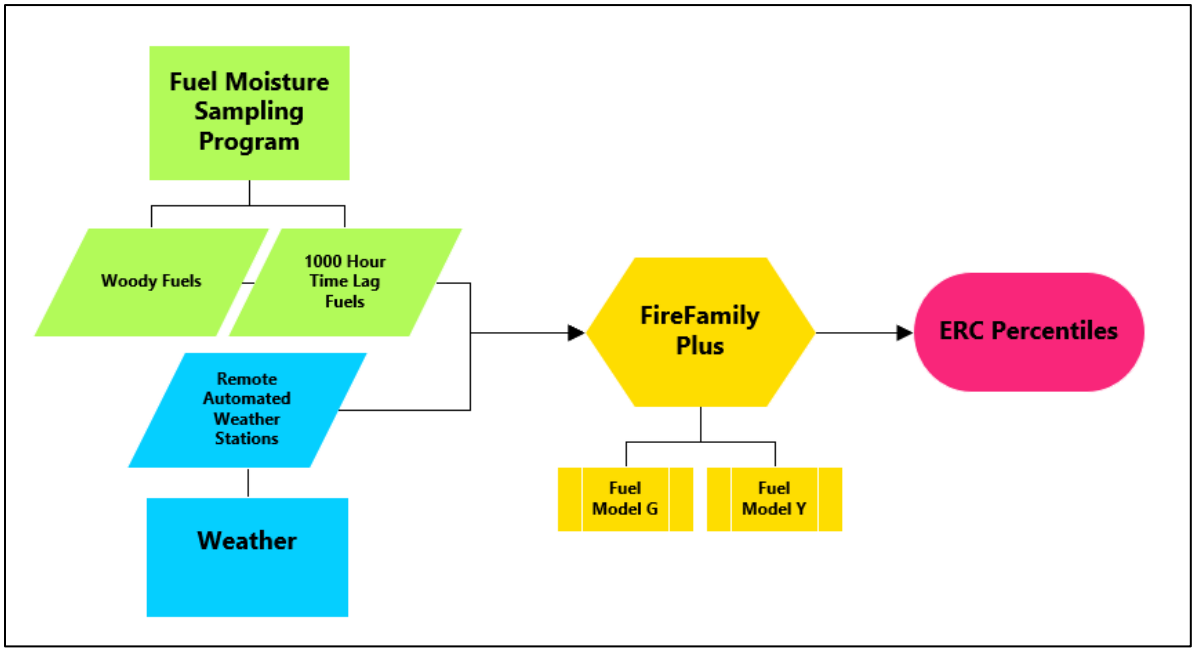
Figure 10-2: Liberty Fuel Moisture Sampling Site Details



Site	General Location	Elevation (ft)	Primary dead fuel	Primary live fuel
Verdi	Verdi, CA	5,034	Jeffrey pine	Sagebrush
Burton Creek	Tahoe City, CA East	6,290	Jeffrey pine	Manzanita
Ward Creek	Tahoe City, CA West	6,587	Jeffrey pine	Manzanita
Meyers	Meyers, CA	6,325	Lodgepole pine	Sagebrush
Topaz	Lake Topaz, CA	5,270	Pinyon pine	Sagebrush

[94] https://www.fs.usda.gov/psw/publications/documents/psw_gtr082/psw_gtr082.pdf, p.12.

Figure 10-3: ERC Calculations from Fuel Moisture Sampling



10.2.2 Evaluation and Selection of New Systems

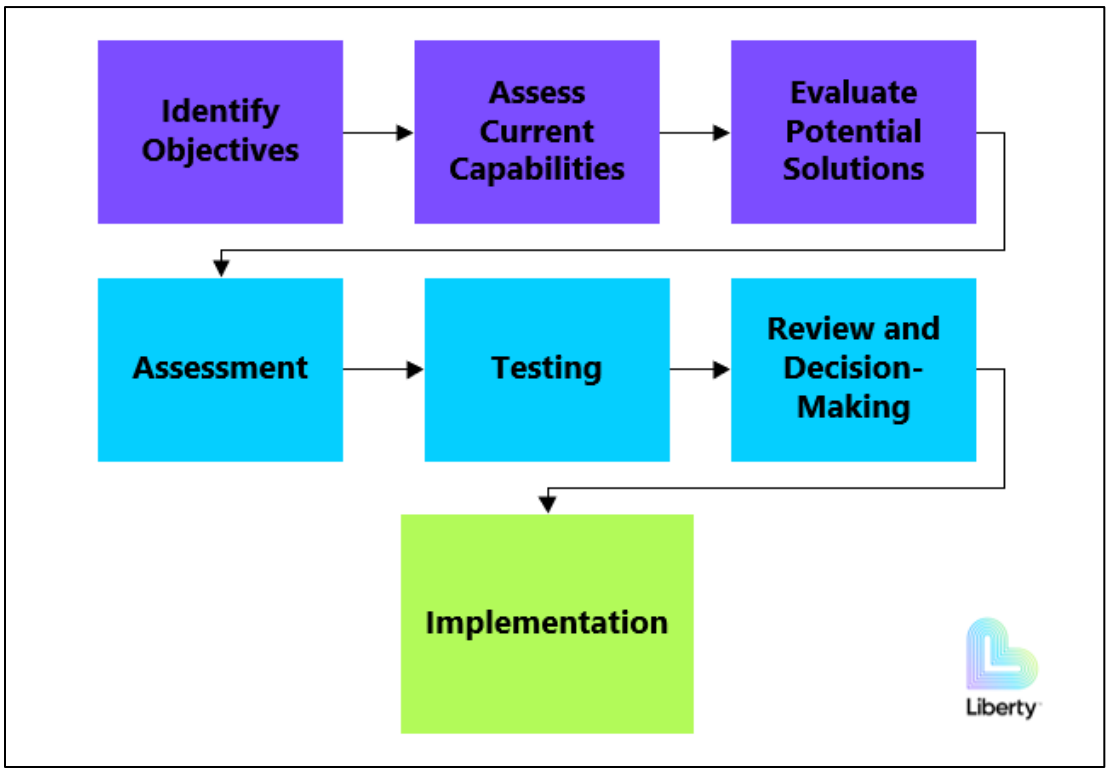
The electrical corporation must describe how it evaluates the need for additional environmental monitoring systems. This description must include:

- How the electrical corporation evaluates the impact of new systems on reducing risk (e.g., expected quantitative improvement in weather forecasting).
- How the electrical corporation evaluates the efficacy of new technologies.

These descriptions must include flow charts as appropriate.

When evaluating the need for additional monitoring systems, Liberty will follow the process outlined below in Figure 10-4.

Figure 10-4: Evaluation of New Systems



1. Identify Objectives
    - Define Goals: Establish the primary objectives for implementing new systems.
    - Stakeholder Input: Gather input from key stakeholders to understand their needs and expectations.
2. Assess Current Capabilities
    - Inventory Existing Systems: Review and document the capabilities of current environmental monitoring systems.
    - Identify Gaps: Determine any deficiencies or areas where current systems fall short.
    - If deficiencies are identified, proceed. If not, the evaluation is complete.
3. Evaluate Potential Solutions
    - Research Technologies: Investigate available technologies and solutions that could address identified gaps.
    - Cost-Benefit Analysis: Perform a cost-benefit analysis to evaluate the financial and operational impacts of potential solutions.
    - If potential solutions are identified, proceed. If not, the evaluation is complete
4. Assessment
    - Impact Analysis: Assess how new systems can achieve identified objectives.

- If potential solutions could meet objectives, proceed. If not, the evaluation is complete.

5. Testing
    - Implement Pilot Programs: Conduct pilot tests of selected technologies to evaluate their performance in real-world conditions.
    - Collect Data: Gather data on the effectiveness and reliability of the new systems during the pilot phase.
    - If the testing is successful, proceed. If not, the evaluation is complete.
6. Review and Decision-Making
    - Analyze Results: Review data collected from pilot tests to determine the efficacy of the new systems.
    - Stakeholder Review: Present findings to stakeholders for feedback and approval.
7. Implementation
    - Develop Implementation Plan: Create a detailed plan for the full-scale implementation of successful systems.
    - Training and Support: Provide training and support for smooth integration of new systems into existing operations.

10.2.3 Planned Improvements

The electrical corporation must describe its planned improvements for its environmental monitoring systems.[95] This must include any plans for the following:

- Expansion of existing systems
- Establishment of new systems

Liberty does not currently have plans for expansion of existing systems or establishment of new systems.

10.2.4 Evaluating Activities

The electrical corporation must describe its procedures for the ongoing evaluation of the efficacy of its environmental monitoring activity (program).

Liberty maintains a focus on reliable and accurate environmental monitoring systems to support wildfire mitigation and operational decision-making. The annual weather station maintenance and calibration program is designed to maintain the reliability and accuracy of the

[95] Annual information included in this section must align with the applicable data submission.

weather monitoring network. In addition, Liberty collaborates with third-party experts and consultants to evaluate the effectiveness of its weather stations, fuel moisture sampling methods, and weather forecasting accuracy. These reviews help identify opportunities to enhance the overall quality and impact of environmental monitoring activities.

10.3 Grid Monitoring Systems

The electrical corporation must describe its systems and procedures used to monitor the operational conditions of its equipment.[96] These observations should inform the electrical corporation's near-real-time risk assessment. The electrical corporation must document:

- Existing systems, technologies, and procedures
- Procedure used to evaluate the need for additional systems
- Implementation schedule for any planned additional systems
- How the efficacy of systems for reducing risk are monitored

The electrical corporation must reference the Tracking ID where appropriate.:

Tracking ID: WMP-SA-02

10.3.1 Existing Systems, Technologies, and Procedures

The electrical corporation must report on the grid system monitoring systems and related technologies and procedures currently in use, highlighting any improvements made since the last WMP submission. At a minimum, the electrical corporation must discuss systems, technologies, and procedures related to the detection of:

- Faults (e.g., fault anticipators, rapid earth fault current limiters, etc.)
- Failures
- Recloser operations
- Each system must be summarized in Table 10-3 below. The electrical corporation must provide the following information for each system in the accompanying narrative:
- Location of the system / locations measured by the system.
- Integration with the broader electrical corporation's system.
- How measurements from the system are verified.
- For intermittent systems (e.g., aerial imagery, line patrols), description of what triggers collection. This must include flow charts and equations where appropriate.

[96] Pub. Util. Code §§ 8386(c)(3), (6), (22).

- For calculated quantities, how raw measurements are converted to calculated quantities. This must include flow charts and equations where appropriate.

Liberty includes the installation of fault indicators as part of its Fast Trip or SRP Program. Fault indicators expedite power restoration during an outage by helping line crews locate the fault. Liberty has installed the majority of fault indicators on taps off the main line, which enables line crews to focus restoration efforts by driving along the main line to see if fault indicators have lit up. This helps line crews avoid patrolling unnecessary sections of the line and makes restoration efforts more efficient when there is less sunlight. Liberty provides information on its Grid Monitoring System in Table 10-3.

Liberty's substations are equipped with a variety of protective relays and monitoring equipment that enable remote visibility and control. While Liberty has implemented SEL-651RA controllers at most recloser locations to capture real-time SCADA data, fault event data, and Sequence of Events Recorder ("SER") data, similar capabilities exist at substations. Substation protective relays—such as those manufactured by Schweitzer Engineering Laboratories (SEL)—are also integrated into Liberty's SCADA system.

These substation relays are configured to send operational and fault-related data to engineering staff through SEL's AcSELerator TEAM platform. When a relay detects and logs an event, the system automatically notifies Liberty engineers via email, allowing for timely review and response. This process supports Liberty's situational awareness and enables the engineering team to identify potential mis-operations.

When system operators observe abnormal behavior or suspect mis-operation at a substation, a formal engineering review is conducted. The team analyzes relay event records, fault waveforms, and SER data to determine root cause. Based on the analysis, a corrective action plan is developed, which may include adjustments to relay settings, maintenance scheduling, or system configuration changes.

Table 10-3: Liberty Grid Monitoring Systems

System	Measurement/ Observation	Frequency	Purpose and Integration
Fault indicators	Line tripped or Line not tripped	Varies based on trip events	Expedite response and location of tripped lines
Recloser Controllers	Real-time SCADA data, fault event data, SER data	Continuous	Provide real-time visibility into recloser operations, fault detection, and event logging. Majority integrated with SCADA for system-wide situational awareness and control.
Substation Protective Relays	SCADA data, fault event records, Sequence of Events ("SER") logs	Continuous	Enable monitoring and diagnostics of substation events. Relay-triggered events automatically notify engineers via AcSELerator TEAM. Supports root cause analysis and corrective action planning.

10.3.2 Evaluation and Selection of New Systems

The electrical corporation must describe how it evaluates the need for additional grid operation monitoring systems. This description must include:

- How the electrical corporation evaluates the impact of new systems on reducing risk (e.g., expected reduction in ignitions from failures, expected reduction in failures).
- How the electrical corporation evaluates the efficacy of new technologies.

These descriptions must include flow charts where appropriate.

When evaluating the need for additional monitoring systems, Liberty will follow the process outlined in Section 10.2.2. Also refer to Liberty's response to ACI LU-25U-08 in Appendix D.

10.3.3 Planned Improvements

The electrical corporation must describe its planned improvements in its grid operation monitoring systems. This must include any plans for the following:

- Expansion of existing systems
- Establishment of new systems.

Expansion of Existing Systems:

Liberty plans to continue to install fault indicators on an as-needed basis but does not have an additional program to install them. Additionally, Liberty is making progress adding SCADA capabilities to existing devices that do not yet have it.

Establishment of new systems:

Liberty is evaluating and deploying new technologies to improve its grid monitoring capabilities. Beginning in 2026, Liberty plans to deploy GridScope multi-sensor units as part of a new EFD program to identify abnormal conditions on overhead electric infrastructure. Liberty will install 1,000 of the sensors to monitor physical, electrical, structural, and environmental conditions around each span where it is installed. The sensors are designed to detect abnormal operating conditions such as vegetation contact, wire-to-wire contact, broken conductors, pole failures, and high-impedance faults. Liberty anticipates that the GridScope sensors will complement covered conductor installations and other high-risk circuit segments by providing enhanced situational awareness and earlier detection of conditions that could lead to wildfire ignitions.

10.3.4 Evaluating Initiative Activities

The electrical corporation must describe its procedures for the ongoing evaluation of the efficacy of its grid operation monitoring program.

Liberty engineers are automatically notified of relay-triggered events through AcSELerator TEAM, which sends event data via email when protective devices such as SEL-651RA controllers operate. The engineering team is immediately aware of system disturbances and can begin timely evaluation.

When system operators suspect a possible mis-operation, a detailed review is initiated by the engineering team. This review involves analyzing event records, fault data, and SER logs to determine the root cause of the issue. Based on the findings, engineers develop a corrective action plan, which may include updating relay settings, refining logic schemes, or conducting additional field inspections.

10.4 Ignition Detection Systems

The electrical corporation must describe its systems, technologies, and procedures used to detect ignitions within its service territory and gauge ignition size and growth rates.[97]

The electrical corporation must document the following:

- Existing ignition detection sensors and systems
- Evaluation and selection of new ignition detection systems
- Planned integration of new ignition detection technologies
- Identify venues for routine sharing of the following:
    - o Evaluation of strengths and limitations of new technology
    - o Case studies/ lessons learned regarding new ignition detection systems and new ignition detection technologies
    - o Lessons learned
- Monitoring of initiative improvements

The electrical corporation must reference the Tracking ID where appropriate .

Tracking ID: WMP-SA-03

10.4.1 Existing Ignition Detection Systems

The electrical corporation must report on the sensors and systems, technologies, and procedures for ignition detection that are currently in use, highlighting any improvements made since the last WMP submission. At a minimum, the electrical corporation must document the deployment of each of the following:

- Early fire detection including, for example:
    - o Satellite infrared imagery
    - o High-definition video
    - o Infrared cameras
- Fire growth potential software

[97] Pub. Util. Code § 8386(c)(3).

The electrical corporation must summarize each system in Table 10-4 below. It must provide the following additional information for each system in an accompanying narrative:

- General location of detection sensors (e.g., HFTD or entire service territory)
- Resiliency of sensor communication pathways
- Integration of sensor data into machine learning or AI software
- Role of sensor data in risk response
- False positives filtering
- Time between detection and confirmation
- Security measures for network-based sensors

Liberty utilizes ALERTWest, PyreCast, and Technosylva to enhance its wildfire ignition detection capabilities. These systems are integral to Liberty's comprehensive approach to wildfire risk management, providing early detection, accurate forecasting, and effective response strategies. Liberty provides information on its existing ignition detection systems in Table 10-4.

Table 10-4: Fire Detection Systems Currently Deployed

Detection System	Capabilities	Companion Technologies	Contribution to Fire Detection and Confirmation
Video Cameras (ALERTWest)	AI wildfire detection	None	Confirmed detections will generate alerts to assist in quicker response and suppression times.
Fire growth potential software (PyreCast)	Forecasts for active fires, risk, and fire weather	Satellite-based heat detection, weather models, weather station data	By combining satellite-based detection, predictive modeling, and weather forecast integration, PyreCast offers a comprehensive tool for fire detection and confirmation, enhancing wildfire situational awareness and response strategies.
Fire growth potential software (Technosylva Wildfire Analyst)	Wildfire spread predictions	FireRisk, FireSight	The ability to simulate fire spread under forecast weather conditions helps identify areas at greatest risk, supporting proactive planning and mitigation efforts.

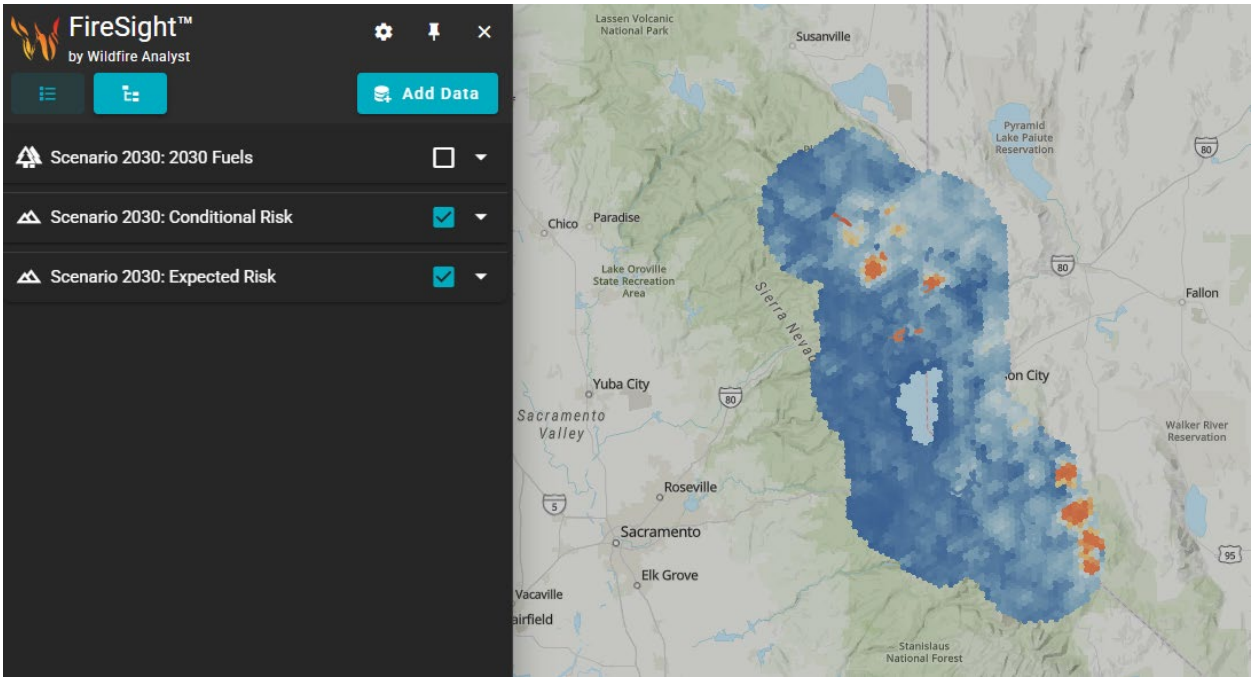
Video cameras are strategically deployed across Liberty's service territory. The sensors and communication pathways for these video cameras are owned by the service provider (University of Nevada, Reno, or Alert Wildfire). Communication networks are designed to be highly resilient to provide continuous data transmission, even under adverse weather conditions or during power outages. This resilience is crucial for maintaining real-time

monitoring capabilities. The video cameras are part of the larger Alert West network and use AI to help detect smoke from wildfires. The camera system is continuously monitored at an operations center where review all new AI detections immediately. Technicians suppress any false detections and generate alerts around confirmed positive detections to assist in quicker response and suppression times.

Fire growth potential software, provided by PyreCast, is deployed across Liberty's entire service territory. This software leverages multiple data sources to model the spread of active and hypothetical fires, using satellite-based heat detection and predictive algorithms to forecast fire behavior over multiple days. PyreCast plays a crucial role in Liberty's risk response strategy. The software provides forecasts of active fires, modeling their spread over three days. It also simulates the spread of hypothetical fires under forecast weather conditions, identifying areas at greatest risk. This information is vital for planning and executing Public Safety Power Shutoff ("PSPS") events.

Technosylva's Wildfire Analyst Enterprise software is deployed across the entire service territory, extending beyond Liberty's territory, to enhance wildfire risk management. This cloud-based solution integrates multiple data sources, including real-time tracking, detection, and advanced weather prediction models, to forecast wildfire behavior over several days. Wildfire Analyst Enterprise plays a crucial role in operational decision-making by providing on-demand wildfire spread predictions for active incidents and hypothetical scenarios. The software's ability to simulate fire spread under forecast weather conditions helps identify areas at greatest risk, supporting proactive planning and mitigation efforts. The full extent of wildfire risk modeling performed in Wildfire Analyst is illustrated in Figure 10-5.

Figure 10-5: Wildfire Analyst Extent



10.4.2 Evaluation and Selection of New Detection Systems

The electrical corporation must describe how it evaluates the need for additional ignition detection technologies. This description must include:

- How the electrical corporation evaluates the impact on new detection technologies on reducing and improving detection and response times.
- How the electrical corporation evaluates the efficacy of new technologies.
- The electrical corporation's budgeting process for new detection system purchases.

When evaluating the need for additional ignition detection technologies, Liberty will follow the process outlined in Section 10.2.2.

10.4.3 Planned Integration of New Ignition Detection Systems

The electrical corporation must provide an implementation schedule for new ignition detection and alarm system technologies. This must include any plans for the following:

- Integration of new systems into existing physical infrastructure
- Integration of new systems into existing data analysis
- Increases in budgets and staffing to support new systems

Liberty does not currently have any plans to implement new ignition detection systems

10.4.4 Evaluating Initiative Activities

The electrical corporation must describe its procedures for the ongoing evaluation of the efficacy of its fire detection systems.

Liberty internal subject matter experts ("SMEs") evaluate the efficacy of its fire detection systems through knowledge transfer and benchmarking with other utilities, and consultation with fire science experts and fire detection system service providers.

10.5 Weather Forecasting

The electrical corporation must describe its systems and procedures used to forecast weather within its service territory.[98] These forecasts must inform the electrical corporation's near-real-time-risk assessment and PSPS decision-making processes. The electrical corporation must document the following:

- Its existing modeling approach
- The known limitations of its existing approach
- Implementation schedule for any planned changes to the system
- How the efficacy of systems for reducing risk are monitored

The electrical corporation must reference the Tracking ID where appropriate.

Tracking ID: WMP-SA-04

10.5.1 Existing Modeling Approach

At a minimum, the electrical corporation must discuss the following components of weather forecasting:

- **Data assimilation** from environmental monitoring systems within the electrical corporation service territory
- **Ensemble forecasting** with control forecast and perturbations
- **Model inputs**, including, for example:
    - o Land cover / land use type
    - o Local topography
- **Model outputs**, including, for example:

[98] Pub. Util. Code § 8386(c)(3).

- o Air temperature
- o Barometric pressure
- o Relative humidity
- o Wind velocity (speed and direction)
- o Solar radiation
- o Rainfall duration and amount

- **Separate modules** (e.g., local weather analysis and local vegetation analysis)
- **Subject matter expert (SME) assessment of forecasts**
- **Spatial granularity of forecasts**, including:
  - o Horizontal resolution
  - o Vertical resolution
- **Time horizon** of the weather forecast throughout the service territory

The electrical corporation must highlight improvements made to the electrical corporation's weather forecasting since the last WMP submission.

The electrical corporation must also provide documentation of its modeling approach pertaining to its weather forecasting system in accordance with the requirements in Appendix B.

Liberty contracts with a consultant to maintain its web-based fire weather dashboard at tahoefireweather.com/ and to provide detailed weather forecasts. In 2026, the dashboard was expanded to include 79 zones, an increase from the previous 49 zones. This change was implemented to provide weather results at the circuit segment level for a more granular approach and to potentially reduce PSPS or SRP usage based on specific circuit segment conditions. During fire season, forecasts are provided weekly for the entire service territory with a focus on any specific areas of interest where heightened fire danger may exist. Liberty's weather forecasting strategy relies on data from multiple operational weather models developed by meteorological organizations. These models provide a range of spatial resolution and forecast duration. The models used at Liberty include:

- High Resolution Rapid Refresh ("HRRR"):[99] 3 km spatial resolution, 48-hr forecast duration, four cycles per day.
- North American Mesoscale ("NAM") forecast system:[100] 12 km spatial resolution, 84-hr forecast duration, four cycles per day.
- NAM CONUS nest:[101] 3 km spatial resolution, 60-hr forecast duration, 4 cycles per day.
- Global Forecast System:[102] 0.125° (approximately 13 km) and 0.25° (approximately 26 km) spatial resolution, 16-day forecast duration, 4 cycles per day
- European Centre for Medium-Range Weather Forecasts ("ECMWF") HRES:[103] 0.1° (approximately 11 km) spatial resolution, 10-day forecast duration, 2 cycles per day
- National Blend of Models ("NBM"):[104] 2.5 km spatial resolution, 11-day forecast duration, 4 cycles per day

The primary outputs that are used for short term fire-weather forecasting include wind gust, sustained wind speed, relative humidity, and temperature. Derived quantities such as Fosberg Fire Weather Index, Hot Dry Windy index, and fuel bed ignition probability are also monitored. Key quantities are summarized as timeseries plots for each PSPS zone and updated 4 times daily.

10.5.2 Known Limitations of Existing Approach

The electrical corporation must describe any known limitations of its existing modeling approach resulting from assumptions, data availability, and computational resources. It must discuss the impact of these limitations on the modeling outputs.

The primary limitation of the existing approach is the accuracy of wind gust forecasts more than two days in the future. Of the three long-range models being used (GFS, ECMWF, and NBM), the ECMWF model generally provides more accurate wind gust forecasts than the GFS and NBM.

[99] https://rapidrefresh.noaa.gov/hrrr/
[100] https://www.ncei.noaa.gov/access/metadata/landing-page/bin/iso?id=gov.noaa.ncdc:C00630
[101] https://www.ncei.noaa.gov/access/metadata/landing-page/bin/iso?id=gov.noaa.ncdc:C00630
[102] https://www.ncei.noaa.gov/products/weather-climate-models/global-forecast
[103] https://www.ecmwf.int/en/forecasts/datasets/set-i
[104] https://blend.mdl.nws.noaa.gov/

10.5.3 Planned Improvements

The electrical corporation must describe its planned improvements in its weather forecasting systems. This must include any plans for the following:

- Increase in model validation
- Increase in spatial granularity
- Decrease in limitations by removal of assumptions
- Increase in input data quality
- Increase in related frequency

Liberty does not currently have any planned improvements in its weather forecasting systems.

10.5.4 Evaluating Initiative Activities

The electrical corporation must describe its procedures for the ongoing evaluation of the efficacy of its weather forecasting program.

Liberty relies on the expertise of its consultants to evaluate the efficacy of its weather forecasting program. Additionally, input is received from internal stakeholders to verify that the forecasted weather information meets the needs and expectations of the users.

10.5.5 Weather Station Maintenance and Calibration

In this section, the electrical corporation must provide a narrative describing maintenance and calibration and risk impacts due to weather station inoperability. The narrative should be no more than one page and include the following:

- Acceptable percentage of weather station outages as defined by the electric corporation.
- Justification for how reduced coverage does/does not impact risk to PSPS decision making and any methods to reduce those impacts.
- Any limitations to conducting annual maintenance and calibrations (such as staffing, training, terrain, access, etc.).
    - o This must include the number of incomplete maintenance or calibration events for weather stations in the last calendar year.
- A description of what efforts are in place to ensure acceptable levels of weather station coverage throughout the electric corporation's service territory.

Liberty's annual weather station maintenance and calibration program is designed to maintain the reliability and accuracy of its weather monitoring network. A Liberty contractor conducts

comprehensive maintenance once per year on all 39 weather stations distributed throughout the service territory. This includes repairing or replacing any damaged equipment, calibrating sensors to maintain precise measurements, and performing necessary software updates. By proactively maintaining and calibrating these stations, Liberty maintains acceptable levels of weather station coverage. This delivers consistent and accurate real-time weather data for risk assessment, PSPS decision making, and operational planning during extreme weather events.

Liberty's vendor analyzes data from weekly health checks on its weather stations to determine if each station is online and communicating with the network or if any repairs or updates are needed. If a station is flagged and is not fixable, an incident is submitted and added to the fix list. This means the station needs a visit for parts replacement or further troubleshooting. An incident will also be submitted if the station frequently misses communications, meaning it checks in and collects data but is unhealthy for more than 30-40% of the time.

Weekly health check sensor fields and voltages pulled include:

- Wind Direction Max (Latest Observation)
- Wind Speed MPH Max (Latest Observation)
- QCError Wind Speed (abnormal reading flagged quantity)
- QCError Wind Direction (abnormal reading flagged quantity)
- Temperature Max, Min, Avg (Latest Observation)
- QCError Temperature (abnormal reading flagged quantity)
- QCError RH (abnormal reading flagged quantity)
- Soil Moisture; if applicable (Latest Observation)
- Soil Temperature; if applicable (Latest Observation)
- Fuel Moisture Max, Min; if applicable (Latest Observation)
- Daily Precipitation (Latest Observation)
- Seasonal Precipitation (Latest Observation)
- Min Battery Voltage
- QC Battery Voltage (abnormal reading flagged quantity)
- Report of unhealthy stations

Due to its small territory size and the availability of additional data being monitored from RAWS and NWS weather stations, Liberty has set an acceptable percentage of weather station outages at approximately 20% or no more than 8 weather stations out of service.

10.6 Fire Potential Index

The electrical corporation must describe its process for calculating its fire potential index ("FPI") or a similar a landscape-scale index used as a proxy for assessing real-time risk of a wildfire under current and forecasted weather conditions.[105] The electrical corporation's description must include the following:

- Its existing calculation approach and how its FPI is used in its operations.
- The known limitations of its existing approach.
- Implementation schedule for any planned changes to the system.

The electrical corporation must reference the Tracking ID where appropriate.:

Tracking ID: WMP-SA-05

10.6.1 Existing Calculation Approach and Use

The electrical corporation must describe:

- How it calculates its own FPI or if uses an external source, such as the United States Geological Survey.[106]
- Assumptions in calculations and justification for each assumption.
- How it uses its or an FPI in its operations.

Additionally, if the electrical corporation calculates its own FPI, it must provide tabular information regarding the features of its FPI. Table 10-5 provides a template for the required information.

Liberty uses multiple fire weather indices for fire threat awareness and operational decision-making. These include Energy Release Component, Severe Fire Danger Index, and Composite Risk Index. Each one is provided in Liberty's fire weather dashboard as a seven-day fire potential forecast for 49 geographic zones within the service territory. The fire weather dashboard is automatically refreshed every 6 hours (00:30, 06:30, 12:30, and 18:30 MDT).

Energy Release Component

Liberty uses Energy Release Component ("ERC") to help determine the beginning of fire season and when to disable reclosing settings on circuits to mitigate wildfire risk. Once the ERC

[105] Pub. Util. Code § 8386(c)(3).
[106] United States Geological Survey Fire Danger Map and Data Products Web Page (accessed Oct. 27, 2022): https://firedanger.cr.usgs.gov/viewer/index.html.

percentile is between 60 and 80, Liberty will put circuits into Fire Mode to disable reclosing settings. The circuits will remain in Fire Mode throughout the fire season until the fire risk is determined to be low, at which point the circuits can be returned to normal settings. Liberty uses both external sources as well as internal ERC calculations which are described in Section 10.2.1.

Severe Fire Danger Index

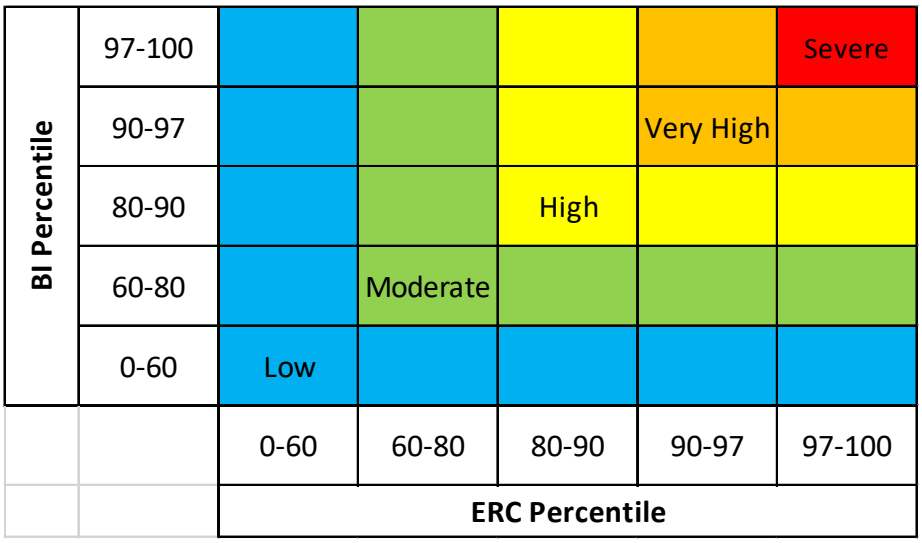
Liberty uses Severe Fire Danger Index ("SFDI") ratings in its Fire Prevention Plan for daily operating procedures by zone. SFDI forecasts are communicated to field staff to inform operational decisions when work restrictions are in place due to fire risk.

SFDI is also used to help determine when to enable SRP Fast Trip settings on circuits to mitigate wildfire risk. When SFDI is "Severe," Liberty will consult with its fire specialists to consider placing circuits into "Extreme Fire Mode" to enable Fast Trip settings. In addition, Red Flag Warnings, issued by the National Weather Service, could warrant Extreme Fire Mode settings. Red Flag conditions are generally correlated with Severe SFDI. If applicable, the circuits will remain in Extreme Fire Mode until SFDI is no longer "Severe" or a Red Flag Warning is no longer in effect.

SFDI is provided by an external source and was developed by the US Forest Service. SFDI combines two National Fire Danger Rating System ("NFDRS") indices into a single measure of fire potential. The first index, Energy Release Component ("ERC"), quantifies intermediate to long-term dryness and is strongly correlated with fire occurrence. The second index, Burning Index ("BI"), is proportional to flame length of a head fire and viewed as a measure of suppression difficulty. As shown in Figure 10-6, the combination of ERC and BI percentiles (the basis for SFDI) is strongly correlated with both the number and size of fires.

Liberty obtains gridded ERC and BI percentile forecast data from the US Forest Service Wildland Fire Assessment System ("WFAS"). These indices are converted to SFDI using the chart in in Figure 10-6.

Figure 10-6: SFDI Ratings as a Function of ERC and BI Percentiles



Composite Risk Index

Composite Risk Index ("CRI") is an internal FPI developed for Liberty to use as part of its PSPS decision making process. As the Percent of CRI Threshold increases above 80%, Liberty will monitor for potential PSPS conditions. If CRI reaches 100%, additional analysis will be done to determine the need for PSPS. Liberty also includes CRI in its criteria for enabling fast trip settings described in Section 8.7.1.

The CRI is a screening criterion that combines a function of wind gust (as proxy for utility fire ignition likelihood) and flame length (as proxy for fire consequence) into a single forecastable composite index. CRI is intended for use in implementation of incremental utility fire mitigation measures up to and including proactive de-energization when weather and fuel conditions create elevated risk from powerline-caused fires. CRI is defined as wind gust force (in units of psf) multiplied by 10 × head fire flame length, which is expressed mathematically in Equation 1 as:

(1) Composite risk index=$F_{wind} \times (10 \times L_f) = 0.00256 \times V_g^2 \times (10 \times L_f)$

Here, Fwind is wind gust force (lb/ft2), Lf is head fire flame length (ft), and Vg is 3-second wind gust speed (mph). In this formulation, wind force represents probability of powerline-caused ignitions and Lf represents the consequence of those ignitions as flame length directly affects resistance to control. The decision to use wind force, which scales with the square of wind speed, to represent the ignition axis in this composite risk index is based in part on work completed during the California Public Utilities Commission ("CPUC") high fire threat district mapping. In that work, an Independent Expert Team ("IET") led by CAL FIRE deliberated over several powerline-fire ignition models and, after analyzing ten years of fault records from utilities, selected the following formula for the ignition axis:

(2) IET ignition axis= $0.00256 \times V_g^2 \times P_{ign}$

Where Pign is ignition probability, which is similar to the NFDRS Ignition Component (IC). The same formula is used here but without the Pign factor. The choice to drop Pign is conservative, because in a line down situation, ignition is probable, and Pign can only decrease the ignition axis as defined in Equation 2.

The CRI in Equation 1 is calculated for each zone using weather model forecast data and fire modeling. The weather models used in calculation of the CRI include High Resolution Rapid Refresh (HRRR, 3 km, 48 hours), North American Mesoscale Model nest (NAM, 3 km, 60 hrs), Global Forecast System (GFS, 0.125°, 8 days), and the European Center for Medium-Range Weather Forecasts (ECMWF) HIRES forecast (ECMWF HIRES, 0.1°, 8 days).

The operational fire spread model ELMFIRE (Eulerian Level set Model of FIRE spread), is used to calculate head fire flame length at every 30 m pixel within each zone for each discrete timestep in the forecast period. Although flame length and wind gust vary spatially within a given zone, Equation 1 requires a single value of wind gust and flame length. Therefore, spatial mean values of flame length and wind gust are calculated using zonal statistics for each time in the forecast period. The flame length calculation directly or indirectly includes the following factors:

- Surface fuel characteristics (fuel type, fuel load, etc.)
- Dead fuel moisture by size / time lag class (1-hr, 10-hr, and 100-hr)
- Live herbaceous and live woody fuel moisture
- Sustained mid-flame wind speed and direction
- Topographical slope and aspect
- Relative humidity, temperature, precipitation, and solar heating

Refer to Table 10-5 for tabular information regarding the features of Liberty's FPI.

Table 10-5: Fire Potential Features

Feature Group	Feature	Altitude	Description	Source	Update Cadence	Spatial Granularity	Temporal Granularity
Weather	Wind force	Surface	Wind gust force at surface	High Resolution Rapid Refresh (HRRR) Model	4 times per day	3 km	Hourly
Weather	Wind force	Surface	Wind gust force at surface	North American Mesoscale Model (NAM) Weather Model	4 times per day	3 km	Hourly
Weather	Wind force	Surface	Wind gust force at surface	Global Forecast System (GFS) Weather Model	4 times per day	13 km	3 hours
Weather	Wind force	Surface	Wind gust force at surface	European Center for Medium Range Weather Forecasts (ECMWF) Weather Model	4 times per day	14 km	12 hours
Weather	Wind speed	Surface	3 second wind gust speed at surface	High Resolution Rapid Refresh (HRRR) Weather Model	4 times per day	3 km	Hourly
Weather	Wind speed	Surface	3 second wind gust speed at surface	North American Mesoscale Model (NAM) Weather Model	4 times per day	3 km	Hourly
Weather	Wind speed	Surface	3 second wind gust speed at surface	Global Forecast System (GFS) Weather Model	4 times per day	13 km	3 Hours
Weather	Wind speed	Surface	3 second wind gust	European Center for Medium Range Weather	4 times per day	14 km	12 Hours

Feature Group	Feature	Altitude	Description	Source	Update Cadence	Spatial Granularity	Temporal Granularity
			speed at surface	Forecasts (ECMWF) Weather Model			
Fuel	Head fire flame length	Surface	Operational fire spread model used to calculate length	Eularian Level set Model of Fire Spread (ELMFIRE)	4 times per day	30 m	6 Hours

10.6.2 Known Limitations of Existing Approach

The electrical corporation must describe any known limitations of current FPI calculation. Specifically, list of any changes implemented since its last WMP submission, including justification of for changes and lessons learned, where applicable.

Liberty's implementation of Composite Risk Index for its PSPS decision making is a change from its last approved WMP. Liberty began testing the use of CRI as a replacement for the criteria of ERC, Fosberg Fire Weather Index ("FFWI"), and wind gust for PSPS decision making. The previous criteria provided daily ratings that were representative of peak fire potential on a given day. However, fire potential may vary significantly during the day due to diurnal variations in fire weather conditions, disturbances moving into or out of the region, or precipitation. The changes made provide forecasts every six hours allowing for improved monitoring of daily variations. Another advantage of using CRI is the ability to account for fire danger when ERC percentiles may be low, but the likelihood and consequence of an ignition are both high.

The primary limitation of the existing approach is the accuracy of wind gust forecasts more than two days in the future described in Section 10.5.2.

10.6.3 Planned Improvements

The electrical corporation must describe its planned improvements for its FPI, including a description of the improvement, reason for the change, and the planned schedule for implementation.

Liberty does not have any planned improvements for its FPI.

11. Emergency Preparedness, Collaboration, and Public Awareness

Each electrical corporation must develop and adopt an emergency preparedness plan in compliance with the standards established by the CPUC pursuant to Public Utilities Code section 768.6(a).

11.1 Targets

In this section, each electrical corporation must provide qualitative targets for emergency preparedness and tribal/stakeholder outreach.

The electrical corporation must provide at least one qualitative target for the following initiatives:

- Emergency Preparedness and Recovery Plan (Section 11.2)
- External Collaboration and Coordination (Section 11.3)
- Public Communication, Outreach, and Education (Section 11.4)
- Customer Support in Wildfire and PSPS Emergencies (Section 11.5)

11.1.1 Qualitative Targets

The electrical corporation must provide qualitative targets for its three-year plans for implementing and improving its emergency preparedness and community outreach,[107] including the following:

- Identification of which initiative(s) in the WMP the electrical corporation is implementing to achieve the stated target, including Tracking IDs and the Tracking ID(s)used in past WMPs ("Previous Tracking ID"), if applicable.
- A completion date for when the electrical corporation will achieve the target.
- Reference(s) to the WMP section(s) or appendix, including page numbers, where the details of the target(s) are documented and substantiated.:

Refer to Table 11-1.

[107] Annual information included in this section must align with the applicable data submission.

Table 11-1: Emergency Preparedness and Community Outreach Targets by Year

WMP Initiative Category	**WMP Initiative**	**Activity (Tracking ID#)**	**2027 Status**	**Section; Page Number**
Emergency Preparedness	Collaboration and coordination with public safety partners ("PSPs")	WMP-EP-02	Conduct emergency drills; continue engagement with local stakeholders and PSPs to prepare for and respond to fire-related event; meet with Community Advisory Boards	11.3.1; pp. 306-309
Emergency Preparedness	Customer support in wildfire and PSPS emergencies	WMP-EP-05	Conduct Incident Command Training for all identified IC members and hold a PSPS Tabletop exercise; continue implementation of Liberty's AFN Plan; continue maintenance of emergency response plans; enhance documentation and use of lessons learned to update plans.	11.5; pp. 335-338
Emergency Preparedness	Learning after wildfire and PSPS events	WMP-EP-06	After action reports for each event	7; pp. 145-149
Community Outreach and Engagement	Public outreach and education awareness for wildfires, PSPS, outages from protective equipment and device settings, and vegetation management	WMP-CO-01	Two wildfire and PSPS outreach surveys	11.4.3; pp. 325-329

WMP Initiative Category	WMP Initiative	Activity (Tracking ID#)	2027 Status	Section; Page Number
Community Outreach and Engagement	Engagement with AFN populations, local governments, and tribal communities	WMP-CO-03	9 Events	11.4.4; pp. 330-332
Community Outreach and Engagement	Engagement with AFN populations, local governments, and tribal communities	WMP-CO-03	Enhance accessibility based on community feedback and evolve best practices where possible	11.4.4; pp. 330-332
Community Outreach and Engagement	Best practice sharing with other electrical corporations	WMP-CO-05	Participation in working groups (i.e., Risk Modeling Working Group) and Joint IOU Councils (i.e., AFN Collaborative Council)	5; p. 35-108 11.3.2; pp. 309-312 11.4.4; pp. 330-332 13.1; pp. 346-350

11.2 Emergency Preparedness and Recovery Plan

In this section, the electrical corporation must provide an overview of how it has evaluated, developed, and integrated wildfire- and PSPS-specific emergency preparedness strategies, practices, policies, and procedures into its overall emergency plan based on the minimum standards described in GO 166.[108] The electrical corporation must provide the title of and link to its latest emergency preparedness report, the date of the report, and an indication of whether the plan complies with CPUC R. 15-06-009, D. 21-05-019, and GO 166. The overview must be no more than two paragraphs.

In addition, the electrical corporation must provide a list of any other relevant electrical corporation documents that govern its wildfire and PSPS emergency preparedness planning for response and recovery efforts. This must be a bullet point list with document title, version (if applicable), and date.

The electrical corporation must reference the Tracking ID where appropriate.

Tracking ID: WMP-EP-01

In compliance with CPUC R. 15-06-009, D. 21-05-019, and G.O. 166, Liberty has developed the sixth revision of its Corporate Emergency Management Plan ("CEMP"), dated May 6, 2025. The CEMP outlines the Company's general procedures for response to and recovery for emergencies at all levels. Under CEMP procedure, wildfire or PSPS-specific emergencies would warrant activation of Liberty's Incident Management Team under the Incident Command System ("ICS").

In anticipation of a wildfire or PSPS-specific emergency, Liberty's Incident Management Team and CEMP procedures are supplemented by the procedures outlined in its PSPS Playbook. Liberty's PSPS playbook describes the roles, responsibilities, and protocols for PSPS and wildfire response and communications.

The following are additional documents that govern Liberty's wildfire and PSPS emergency preparedness planning:

- Liberty Wildland Fire Incident Response Guide (IRG) v2026.1 dated July 2026;
- Liberty Utilities Public Safety Power Shutoff Playbook_v2026.1 dated May 2026.

[108] Pub. Util. Code §§ 8386(c)(7), (11), (16), (19), (20).

11.2.1 Overview of Wildfire and PSPS Emergency Preparedness and Service Restoration

In this section of the WMP, the electrical corporation must provide an overview of its wildfire- and PSPS-specific emergency preparedness and service restoration plan.[109] The overview must describe the following:

• Overview of protocols, policies, and procedures for responding to and recovering from a wildfire or PSPS event (e.g., means and methods for assessing conditions, decision-making framework, prioritizations). This must include:

  o An operational flow diagram illustrating key components of its wildfire- and PSPS-specific emergency response procedures from the moment of activation to response, recovery, and restoration of service.

  o Separate overviews and operational flow diagrams for wildfires and PSPS events.

• Key personnel, qualifications, and training that show the electrical corporation has trained the workforce to promptly restore service after wildfire or PSPS event, accounting for workers pursuant to mutual aid agreement or contracts. This must include,

  o The key roles and responsibilities, personnel resource planning (internal and external staffing needs), personnel qualifications, and required training programs.

  o A brief narrative describing its process for planning to meet its internal and external staffing needs for emergency preparedness planning, preparedness, response, and recovery related to wildfire and PSPS.

  o The name of each training program, a brief narrative of the purpose and scope of each training program, the frequency of each training program, and how the electrical corporation tracks who has completed the training program.

• Each Memorandum of Agreement (MOA) the electrical corporation has with state, city, county, and tribal agencies within its service territory on wildfire and/or PSPS emergency preparedness, response, and recovery activities. The electrical corporation must provide a brief summary of the MOA, including the agreed role(s) and responsibilities of the external agency before, during, and after a wildfire or PSPS emergency.

[109] Pub. Util. Code § 8386(c)(16), (19), (20).

o Coordination and collaboration with public safety partners (e.g., emergency planning, interoperable communications).

o Notification of and communication to customers before, during and after a wildfire or PSPS event.

o Improvements/updates made since the last WMP submission.

The overview must be no more than six pages. The electrical corporation may refer to its emergency preparedness plan to provide more detail. Where the electrical corporation has already reported the requested information in another section of the WMP, it must provide a cross-reference with a hyperlink to that section.

In addition, the electrical corporation must provide a table with a list of current gaps and limitations in evaluating, developing, and integrating wildfire- and PSPS-specific preparedness and planning features into its overall emergency preparedness and recovery plan(s). Where gaps or limitations exist, the electrical corporation must provide a remedial action plan and the timeline for resolving the gaps or limitations.

The purpose of Liberty's wildfire and PSPS emergency preparedness plans is to promote the safety of staff, contractors, and the members of the communities it serves. Liberty is dedicated to preserving the safety and integrity of its infrastructure and the continuation of service when they are threatened by wildland fires. The scope of the plan includes Liberty's service territory, which is comprised of seven counties in Northern California. Refer to Figure 11-1 for an operational flow diagram for Liberty PSPS events and Figure 11-2 for an operational flow diagram for wildfire events.

Figure 11-1: Liberty PSPS Event Flow Diagram

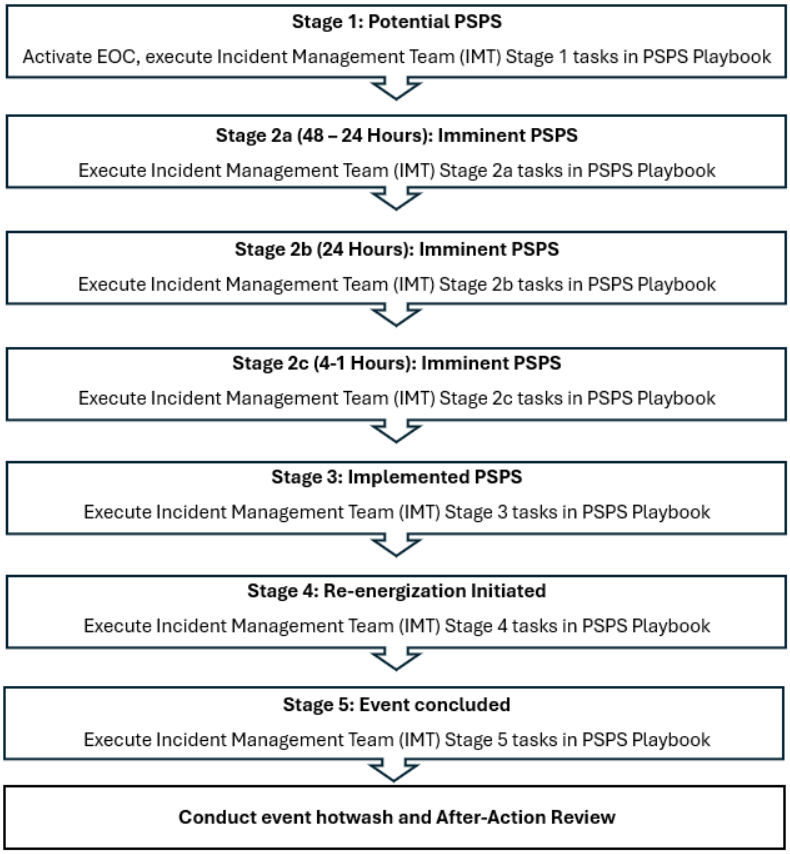
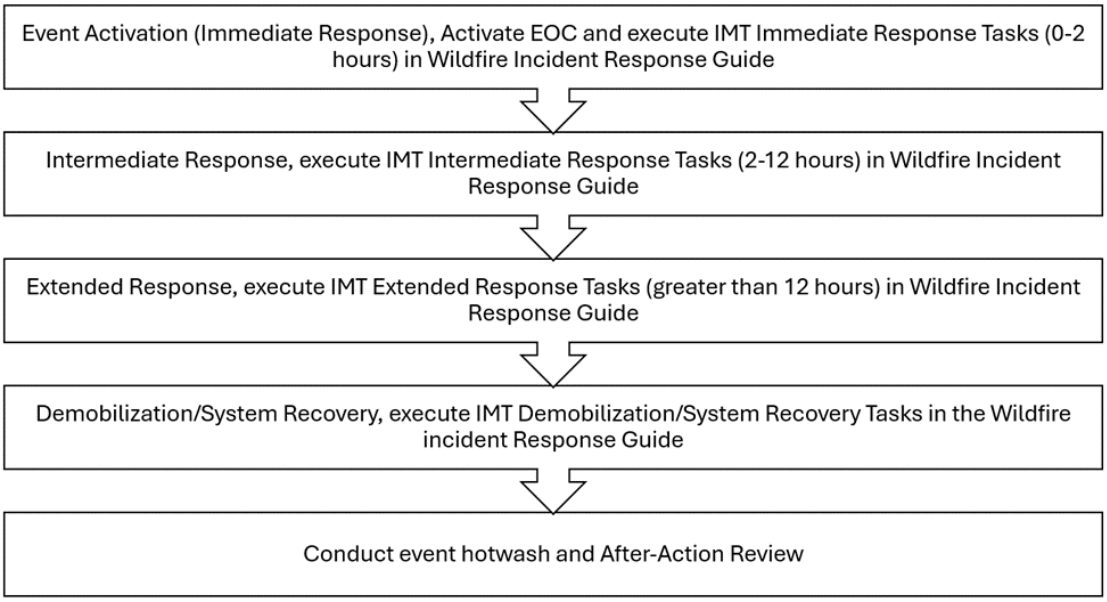


Figure 11-2: Wildfire Event Flow Diagram



Gaps and limitations in evaluating, developing, and integrating wildfire- and PSPS specific preparedness and planning features into its Liberty's overall emergency preparedness plan(s) are provided in Table 11-2. Remedial action plans and timelines are provided for gaps or limitations. Coordination and collaboration with PSPs is detailed in Section 11.3.1 and Liberty's public emergency communication strategy is provided in Section 11.4.

Table 11-2: Liberty Gaps and Limitations in Integrating Wildfire- and PSPS-Specific Strategies into Emergency Plan

Gap or Limitation Subject	**Remedial Brief Description**	**Remedial Action Plan**
Liberty's 2024 CEMP lacked detailed descriptions of Incident Management Team Liaison functions.	Manager, Emergency management should work with IMT to update CEMP.	Liberty's CEMP was updated on 05/06/2025 to include these descriptions.
Liberty's 2024 CEMP included a description of how its Incident Command System ("ICS") was organized, but not the Incident Action Planning Process.	Manager, Emergency management should work with IMT to update CEMP.	Liberty's CEMP was updated on 05/06/2025 to list the steps in the Incident Action Planning Process.

Key Personnel, Qualifications and Training:

Liberty utilizes the National Incident Management System ("NIMS") Incident Command System ("ICS") structure company-wide in its activations for incidents of any type taking place in North America. In accordance with the ICS principles of adaptability and scalability, only required ICS positions are activated initially, and additional positions are added as an incident progresses. Following an all-hazards approach, Liberty has specific response plans for the most probable incident responses to include PSPS, wildfire, and winter storms. The response plans for these incidents provide the most likely base ICS structure for these scenarios and checklists with responsibilities for the ICS positions activated in each scenario.

Due to the relatively small geographic area that Liberty covers, it is very unlikely that multiple Incident Management Teams ("IMTs") or separate Area Commands would be activated under a Unified Command structure. However, Liberty does have this capability, if needed. In larger incidents involving Liberty, coordination takes place with city, county, and/or CAL FIRE Emergency Operations Centers by providing EOC liaisons.

Liberty's incident management structure complies with SEMS, NIMS, and ICS. A Liberty IMT is made up of trained staff from multiple Liberty organizational units who may be called on to

lead a response to an incident. Multiple staff are trained for each IMT position to achieve resiliency in IMT staffing. The IMT may operate in person, via video teleconference, or through a hybrid structure using the two options. A Liberty IMT is activated for "serious impact events" where a notable number of customers are impacted or expected to be impacted, and estimated full restoration could be greater than 24 hours. In addition, an IMT is activated in any PSPS event. That said, Liberty will often activate the IMT for predicted storms including winter weather and atmospheric river events as well.

Liberty activates its PSPS IMT when conditions are projected to meet Liberty's thresholds for de-energization based on Composite Risk Index described in Section 10.6. PSPS IMT actions are outlined in the Liberty PSPS Playbook, which prescribes PSPS IMT baseline positions and checklist items for each position to accomplish during each phase of the response. A dedicated PSPS Playbook and IMT support consistent decision-making, deeper PSPS-specific experience, and greater ability to support continuous improvements during non-event periods. The PSPS Playbook includes scripted messaging for each stage of a PSPS. It also prescribes separate liaisons for regulatory affairs, public safety partners ("PSPs"), community-based organizations ("CBOs"), and AFN customers.

Initial Qualifications: IMT members are required to complete ICS training through the company Learning Management System ("LMS"). This training was developed from and incudes the principles from the FEMA Emergency Management Institute (EMI) IS 100.c and IS 200.c courses. In addition, the Emergency Manager, Fire Prevention Managers, and Incident Commander are required to have completed the IS 100.c, IS 200.c, IS 700.b and IS 800.d courses

Requalification: Training on ICS principals is assigned and tracked through the LMS system and is required to be completed yearly along with the practical application of training in both tabletop and functional exercises. Training has been conducted for customer service supervisors and staff with responsibilities for working in customer resource centers ("CRCs") in the event of a PSPS. CRC staff training is provided and required each year prior to fire season.

Additional information on Emergency Preparedness personnel training is detailed in LU Table 11-1.

<u>Emergency Preparedness and Service Restoration MOUs</u>:

Liberty does not have any MOUs with agencies related to emergency preparedness, response, and recovery activities. In executing response and recovery activities, Liberty utilizes in-house staff, contractors, and mutual aid if needed. Liberty has MOUs with its CRC locations in the event of a PSPS. However, in the event of an active fire, Red Cross and the county governments

in Liberty's service territory would be responsible for activating and manning evacuation centers.

LU Table 11-1: Emergency Management Personnel Training

Training Topic	Purpose and Scope	Training Method	Training Frequency	Position or Title of Personnel Required to Take Training	Form of Verification or Reference
Community Resource Center ("CRC") Response	• Train internal employees in Community Resource Center Lead positions. Training for the process of setting up and supporting Community Resource Center locations in the event of PSPS	Virtual or in-person	Annual	Community Resource Center Lead, CRC Contractor	Training logs
Introduction to the electrical corporation's emergency preparedness plan	• The contents of emergency response plans, in particular those for wildfire- and PSPS specific incidents • The electrical corporation's overall safety practices and those specific to wildfire and PSPS incidents • The organizational structure of how the electrical corporation responds to, manages, and recovers from incidents • The electrical corporation's and public safety partners' roles and responsibilities before, during, and after a wildfire or PSPS incident • The electrical corporation's notification and activation protocols for wildfires and PSPS incidents	Online course, workshop, or in-person training	Annual	All-staff	Training materials and training logs

Training Topic	Purpose and Scope	Training Method	Training Frequency	Position or Title of Personnel Required to Take Training	Form of Verification or Reference
Emergency response procedures during a wildfire	• Incident Management Team Assignments during a wildfire scenario • Wildfire response procedures during Incident • Immediate Response, 0-2 hours • Intermediate Response, 2-12 hours • Extended Response, Greater than 12 hours • Demobilization/System Recovery	Workshop or in-person training	Annually, prior to fire season	Incident Management Team	Training logs
Practices, policies, and procedures for emergency response and service restoration for PSPS events	• Incident Management Team actions for PSPS Stages 1, 2a, 2b, 2c, 3, 4, and 5 as outlined in the PSPS Playbook	TTX and FSX	Annual	Incident Management Team	Training logs

Training Topic	Purpose and Scope	Training Method	Training Frequency	Position or Title of Personnel Required to Take Training	Form of Verification or Reference
Introduction to the electrical corporation's mutual aid agreement with aid partner (contractor training)	• Familiarize aid partners with the concepts and actions in the mutual aid operations plan prior to implementation • Allow responding resources the opportunity to practice their procedures and responsibilities • Scope items include: o Contents of mutual aid operations plan, in particular those on wildfire- and PSPS-specific incidents o The electrical corporation's overall safety practices and those specific to wildfire and PSPS incidents o The organizational structure and interoperability of how the mutual aid partners and resources collaborate and coordinate o The electrical corporation's and public safety partners' roles and responsibilities before, during, and after a wildfire or PSPS incident o The electrical corporation's notification and activation protocols for wildfires and PSPS events	Online course, workshop, or in-person training	Annual	All potential mutual aid resources	Training materials and training logs

11.2.2 Planning and Allocation of Resources

The electrical corporation must briefly describe its methods for planning appropriate resources (e.g., equipment, specialized workers), and allocating those resources to assure the safety of the public during service restoration.[110]

In addition, the electrical corporation must provide an overview of its plans for contingency measures regarding the resources required to respond to an increased number of reports concerning unsafe conditions and expedite a response to a wildfire- or PSPS-related power outage.

This must include a brief narrative on how the electrical corporation:

- Uses weather reports to pre-position manpower and equipment before anticipated severe weather that could result in an outage.
- Sets priorities.
- Facilitates internal and external communications.
- Restores service.

The narrative for this section must be no more than two pages.:

Liberty monitors forecast and real-time weather conditions by utilizing weather station data and fire weather prediction tools. FPI and PSPS zones, which receive individualized forecasts, help to determine the specific circuits that are predicted to experience elevated fire risk conditions. This knowledge allows for patrol resources to be more accurately and efficiently deployed.

In areas with elevated fire weather condition forecasts, Liberty will activate proactive patrols along power lines. Operations personnel will be deployed to observe conditions along the electrical system (vegetation issues, equipment condition, wire sag and sway, and potential system damage related to the weather event) that may pose a threat to public safety. This added situational awareness provides the ability to identify imminent safety risks to resolve them immediately.

Liberty's Fire Prevention Plan ("FPP") describes work restrictions for certain at-risk activities based on FPI conditions. Depending on the FPI fire risk rating, some activities will require the designation of a Fire Safety Monitor or a Fire Safety Leader.

[110] Pub. Util. Code § 8386(c)(16), (20).

- *Fire Safety Monitor*: Designated field supervisor or crew member responsible for fire safety requirement oversight during Elevated Fire Risk working conditions.
- *Fire Safety Leader*: Designated field supervisor or crew member who has a dedicated role for fire safety requirement oversight during Extreme Fire Risk working conditions

Liberty's field crews are equipped with fire prevention and suppression tools throughout the service territory. Liberty's Fire Protection Specialist assists with fire prevention training and operational compliance, according to Liberty's protocols. In some instances, the Fire Protection Specialist will assist crews when a fire safety leader must be designated.

When Liberty anticipates forecasted conditions may result in power outages, and damage to the electrical system that cannot be resolved under normal operations, the Incident Management Team (IMT) will convene, and the Incident Commander may choose to activate the EOC. The CEMP, as discussed in Section 11.2, outlines the Company's general procedures for response to and recovery from emergencies at all levels. The IMT will discuss potential impacts of the event, determine existing resource availability, current warehouse inventories, and the Incident Commander will decide if additional resources and materials are needed prior to the event. At the discretion of the Incident Commander, resources may be pre-positioned and ready to respond as necessary for the given event.

Liberty describes its plan for communication during emergencies in Section 11.4.1. Liberty's plan to restore customers during emergencies is detailed in Section 11.2.1.

11.3 External Collaboration and Coordination

11.3.1 Communication Strategy with Public Safety Partners

The electrical corporation must describe at a high level its communication strategy to inform external public safety partners and other interconnected electrical corporation partners of wildfire, PSPS, and re-energization events as required by GO 166 and Public Utilities Code section 768.6.[111] This must include a brief description of the policies, practices, and procedures the electrical corporation adopts to establish appropriate communication protocols with public safety partners for both wildfire- and PSPS-specific incidents to ensure timely, accurate, and complete communications. The electrical corporation must refer to its emergency preparedness plan as needed to provide more detail. The narrative must be no more than two pages.

[111] Pub. Util. Code § 8386(c)(19).

As each public safety partner will have its own unique communication protocols, procedures, and systems, the electrical corporation must coordinate with each entity individually. The electrical corporation must summarize the following information in tabulated format:

- All relevant public safety partner groups (e.g., fire, law enforcement, OES, municipal governments, Energy Safety, CPUC, other electrical corporations) at every level of administration (state, county, city, or Tribal Nation) as needed.
- Key protocols for ensuring the necessary level of voice and data communications (e.g., interoperability channels, methods for information exchange, format for each data typology, communication capabilities, data management systems, backup systems, common alerting protocols, messaging), and associated references in the emergency plan for more details.
- Frequency of prearranged communication review and updates.

In a separate table, the electrical corporation must list the current gaps and limitations in its public safety partner communication strategy coordination. Where gaps or limitations exist, the electrical corporation must indicate the remedial action plan and the timeline for resolving the gaps or limitations. For all requested information, the electrical corporation must indicate a form of verification that can be provided upon request for compliance assurance.

Liberty maintains communication protocols to support coordination and information exchange with public safety partners, government agencies, regulatory agencies, critical infrastructure operators, interconnected utilities, the media, and other stakeholders before, during, and after wildfire-related incidents, Public Safety Power Shutoff (“PSPS”) events, outage events, and restoration activities. Liberty’s communication strategy is intended to support timely situational awareness, emergency coordination, and exchange of operational information consistent with General Order 166, Public Utilities Code section 768.6, and Liberty’s Corporate Emergency Management Plan (“CEMP”).

Liberty coordinates with public safety partners at the local, county, state, tribal, and federal levels, as appropriate to the nature and scope of an event. Public safety partners may include emergency management organizations, fire agencies, law enforcement agencies, local governments, critical infrastructure operators, applicable state regulatory and oversight agencies, interconnected utilities, and transmission providers.

Communications may be conducted through a variety of methods, including direct communications, mass notification platforms, social media platforms, emergency coordination processes, emergency operations centers, and other communication systems as appropriate to incident conditions and stakeholder needs. Additional communication procedures are

contained in Liberty's CEMP and emergency management response playbooks including Liberty's PSPS Playbook and Wildland Fire Incident Response Guide.

Liberty periodically reviews stakeholder contact information, communication procedures, notification systems, and coordination processes through emergency preparedness activities, exercises, training, after-action reviews, and routine engagement with public safety partners and governmental agencies.

Refer to Table 11-3 for Liberty's communication protocols, procedures, and systems with its Public Safety Partners.

Table 11-3: Liberty Communication Protocols, Procedures, and Systems with Public Safety Partners

Public Safety Partner Group	**Key Protocols**	**Frequency of Prearranged Communication Review and Update**
City and county officials, fire, law enforcement, and critical infrastructure	Text, email, and/or voice message via OnSolve system; PSP partner portal; exercises; state executive briefings	Annually (April)
CPUC	Email notifications; state executive briefings; PSP portal	Annually (April)
CalOES	OES notification forms; state executive briefings; email communications; PSP portal	Annually (April)

Liberty provides its current gaps and limitations in its PSP communication strategy coordination in Table 11-4.

Table 11-4: Gaps and Limitations in Communication Coordination with PSPs

Gap or Limitation Subject	**Remedial Brief Description**	**Remedial Action Plan**
During an event, a complete list of Public Safety Partners ("PSPs") that have been	A record of PSP contact should be added to Liberty's in-event tracking spreadsheet for more	Strategy: IMT members will update the in -event tracking

Gap or Limitation Subject	Remedial Brief Description	Remedial Action Plan
contacted is needed by the Regulatory Liaison in a timely manner to facilitate reporting to regulatory agencies.	efficient reporting by the Regulatory Liaison.	spreadsheet to create a section for PSP contact. Target timeline: Completed
For 2024 events, Liberty's Customer Solutions team took over responsibility of notification to PSPs, community officials, and key accounts from the PSP Liaison position, which worked well. The PSP Liaison already has multiple duties.	Assign PSP notification officially to Liberty's Customer Solutions team.	Strategy: Re-assignment of duties. Target timeline: Completed

11.3.2 Collaboration on Local Wildfire Mitigation Planning

In this section, the electrical corporation must provide a high-level overview of its plans, programs, and/or policies for collaborating with communities on local wildfire mitigation planning (e.g., wildfire safety elements in general plans, community wildfire protection plans, local multi-hazard mitigation plans) within its service territory.[112] The narrative must be no more than one page.

In addition, the electrical corporation must provide the following information in tabular form, providing no more than one page of tabulated information in the main body of the WMP and the full table in an appendix as needed.

• List of county, city, regional entities/task forces, Tribal Nations, and non-governmental organizations (e.g., nonprofits, fire safe councils) within the service territory with which the electrical corporation has collaborated or intends to collaborate on local wildfire mitigation planning efforts (i.e., non-wildfire emergency planning activities).

o For each entity, the local wildfire mitigation planning program/plan/document, level of collaboration (e.g., meeting attendance, verbal or written comments), and date the electrical corporation provided its last feedback. Table 11-5 provides an example of the

[112] Pub. Util. Code § 8386(c)(19).

minimum acceptable level of information. The electrical corporation must reference the Tracking ID where appropriate.

o In a separate table, the electrical corporation must provide a list of current gaps and limitations in its collaboration efforts with local partners on local wildfire planning efforts. Where gaps or limitations exist, the electrical corporation must indicate proposed means and methods to increase collaborative efforts. Table 11-6 provides an example of the minimum acceptable level of information.

Liberty hosts a series of public workshops each year to provide communities in its service territory with information regarding wildfire mitigation programs and PSPS procedures. Liberty presents wildfire mitigation and PSPS preparedness content at local fire safety council meetings, senior center meetings, local homeowners' association meetings, and meetings of county and tribal representatives. In addition, Liberty participates in Tahoe Fire and Fuels Team meetings throughout the year to collaborate with stakeholders in local wildfire mitigation planning.

Liberty provides information on collaboration efforts in local wildfire mitigation planning in Table 11-5.

Table 11-5: Liberty Collaboration in Local Wildfire Mitigation Planning

Name of County, City, or Tribal Agency or Civil Society Organization (*e.g.*, nongovernmental organization, fire safe council)	**Program, Plan, or Document**	**Last Version of Collaboration**	**Level of Collaboration**
Liberty, NV Energy, and Truckee Donner Public Utility District Fire Mitigation/PSPS Collaboration	None	Coordination on situational awareness, PSPS exercises and wildfire mitigation.	Meets weekly during fire season.
Washoe Tribe	Tribal Government Wildfire Safety	Review customer assistance programs and wildfire preparedness.	Schedule meetings and outreach for ongoing collaboration.

Name of County, City, or Tribal Agency or Civil Society Organization (*e.g.*, nongovernmental organization, fire safe council)	Program, Plan, or Document	Last Version of Collaboration	Level of Collaboration
South Tahoe Public Utility District and Lake Valley Fire Protection District	2026 South Tahoe Public Utility District and Lake Valley Fire Protection District Multi-Jurisdictional Hazard Mitigation Plan Update	Hazard Mitigation Planning Committee Meeting conducted on 04/02/2026	Stakeholder participant for the 2026 Multi-Jurisdictional Hazard Mitigation Plan Update
California Tahoe Conservancy, Lake Valley Fire Protection District, USFS Lake Tahoe Basin Management Unit, and Tahoe Resource Conservation District	Liberty's 2027 Wildfire Mitigation Plan	Risk Model review and feedback on 07/30/2026	Liberty hosted meeting with governmental agencies and stakeholders for feedback on its risk modeling methodology and strategy
Tahoe Fire and Fuels Team	Planning and executing fuels reduction projects.	South Lake High School Fuels Reduction Project	Regular meetings and work as implementation partners.

Liberty provides information on gaps and limitations in collaborating on local wildfire mitigation in Table 11-6.

Table 11-6: Gaps and Limitations in Collaborating on Local Wildfire Mitigation Planning

Subject of Gap or Limitation	Brief Description of Gap or Limitation	Strategy for Improvement
More timely transport and distribution of repair supplies to the Walker / Coleville area is needed as well.	Repair materials for Walker / Coleville should be pre-staged.	Strategy: Store repair materials in CONEX boxes for more timely repairs. Target timeline: Completed

11.3.3 Collaboration with Tribal Governments

In this section, the electrical corporation must provide a high-level overview of its plans, programs, and/or policies for collaborating on local wildfire mitigation planning with tribal governments served by the electrical corporation and on whose lands its infrastructure is located.[113] The narrative must be no more than one page.

In addition, the electrical corporation must provide the following information in tabular form, with no more than one page of tabulated information in the main body of the WMP and the full table in an appendix as needed.

• List of tribal governments served by the electrical corporation and on whose lands its infrastructure is located with which the electrical corporation has collaborated or intends to collaborate on local wildfire mitigation planning efforts (i.e., non-wildfire emergency planning activities).

o For each entity, the local wildfire mitigation planning program/plan/document, level of collaboration (e.g., meeting attendance, verbal or written comments), and date the electrical corporation provided its last feedback. Table 11-7 provides the required format and an example of the minimum acceptable level of information. The electrical corporation must reference the Tracking ID where appropriate.

o In a separate table, the electrical corporation must provide a list of current gaps and limitations in its collaboration efforts with local partners on local wildfire planning

[113] Pub. Util. Code § 8386(c)(19).

efforts. Where gaps or limitations exist, the electrical corporation must indicate proposed means and methods to increase collaborative efforts.

Liberty maintains a working relationship with the Washoe tribe, the only tribal community in its service territory. If Liberty needs to perform work on electrical infrastructure on tribal land, it will communicate early and often with the Carson City District of the Bureau of Land Management either directly or through an environmental consultant. The Bureau of Land Management will review project information provided by Liberty and, if appropriate, provide approval to proceed with a project.

In early February 2025, Liberty obtained an easement to complete the Diamond Valley Road Rebuild. This project included the replacement of approximately two miles of overhead conductor and the installation of 39 electric poles on the Muller 1296 circuit, which serves customers in the Markleeville area and the Washoe Tribe. Liberty completed the project to support a more resilient power grid designed to minimize the potential of outages and withstand the weather elements during both winter and fire seasons.

In October 2024, Liberty signed a CRC Memorandum of Understanding (MOU) with the Washoe Tribe. Liberty understands the unique needs of the Washoe Tribe and considered accessibility and proximity to the Hung-A-Lel-Ti community when selecting this CRC location to support customers during PSPS events. Refer to Table 11-7.

Table 11-7: Collaboration with Tribal Agencies

Name of Tribal Agency	**Program, Plan, or Document**	**Last Version of Collaboration**	**Level of Collaboration**
Washoe Tribe	Memorandum of Understanding (“MOU”)	October 17, 2024	Agreement reached for sue of tribal facility as CRC location.

Liberty provides information on gaps and limitations in collaborating with tribal agencies in Table 11-8.

Table 11-8: Gaps and Limitations in Collaborating with Tribal Agencies

Subject of Gap or Limitation	Description of Gap or Limitation	Strategy for Improvement
The Washoe CRC location is somewhat remote. More affordable options are needed by the logistics team for lunch items at this CRC.	Vendor contracts are needed for acquisition of CRC lunches.	Strategy: Execute new contracts with vendors for food options. Target timeline: Complete

11.4 Public Communication, Outreach, and Education Awareness

The electrical corporation must describe at a high level its comprehensive communication strategy to inform essential customers and other stakeholder groups of wildfires, outages due to wildfires, and PSPS and service restoration, as required by Public Utilities Code section 768.6.[114] This should include a discussion of the policies, practices, and procedures the electrical corporation adopts to establish appropriate communication protocols to ensure timely, accurate, and complete communications. The electrical corporation may refer to its Public Utilities Code section 768.6 emergency preparedness plan to provide more detail. The narrative must be no more than one page.

In the following sections, the electrical corporation must provide an overview of the following components of an effective and comprehensive communication strategy:

- Protocols for emergency communications.
- Messaging.
- Outreach and education awareness program(s) for wildfires, PSPS events, and PEDS; service restoration before, during, and after incidents; and vegetation management.
- Current gaps and limitations.

The electrical corporation must reference the Tracking ID where appropriate.

Tracking ID: WMP-EP-03

Liberty executes a robust, year-round communications and outreach effort to increase community resiliency to wildfires and educate customers and the public about PSPS and how to

[114] Pub. Util. Code § 8386(c)(7), (19).

prepare for potential de-energization events. The goal of this effort is to increase awareness and community resiliency to wildfires and PSPS.

Liberty conducts PSPS and wildfire-specific communications in three phases: before, during, and following an emergency event. Efforts before focus on immediate actions customers and the public can employ to remain safe, resilient, and updated during the emergency. During the event, Liberty focuses on providing real-time awareness and updates about the event and how to remain safe. Following the event, Liberty focuses on transparency, from educating customers and the public on the impact of the event to soliciting customer feedback to improve communication efforts for any future event. Specific details are provided in Section 11.4.2.

Public education and communication efforts target Liberty's service territory with a particular focus on the areas that are most at risk of PSPS or wildfire (High Fire Threat District). Liberty also focuses on areas with an elevated percentage of at-risk customers, such as MBL and AFN customers.

Liberty's wildfire mitigation communications and public education initiative consists of direct and indirect engagement through community outreach materials and engagement campaigns. Materials produced over the course of the year are tailored to match Liberty's respective audience and phase. Additionally, communications and outreach efforts will be enhanced and adjusted to reflect feedback received and emerging best practices.

11.4.1 Protocols for Emergency Communications

The electrical corporation must identify the relevant stakeholder groups and target communities in its service territory and describe the protocols, practices, and procedures used to provide notification of wildfires, outages due to wildfires and PSPS, and service restoration before, during, and after each incident type.[115] Stakeholder groups and target communities include, but are not limited to, the general public; priority essential services;[116] AFN populations and other vulnerable or marginalized populations; populations with limited English proficiency; Tribal Nations; and people in remote areas. The narrative must include a brief discussion of the decision-making process and use of best practices to ensure timely, accurate, and complete communications. The narrative must be no more than one page.

In addition, the electrical corporation must summarize the interests or concerns each stakeholder group/target community may have before, during, or after a wildfire or PSPS event

[115] Pub. Util. Code § 8386(c)(7).
[116] Priority essential services include but are not limited to public safety offices, critical first responders, health care facilities and operators, and telecommunications infrastructure and operators.

to help inform outreach and education awareness needs. Table 11-9 provides the required format for this summary:

Liberty has identified the relevant stakeholder groups in its service territory. These groups include the following: the general public, priority essential services, AFN populations to include Medical Baseline customers, the Spanish-speaking population with limited English proficiency, and members of the Washoe Tribe. The protocols, practices, and procedures, used to provide notification of wildfires, outages due to wildfires, PSPS, and service restoration before, during, and after each incident type are described in Table 11-9. Liberty communications messaging protocols at the operational and tactical levels to include communication efforts prior to a potential threat, during an event, and following an event are provided in Section 11.4.2.

Table 11-9: Protocols for Emergency Communication to Stakeholder Groups

Stakeholder Group	Event Type	Method(s) for Communicating	Means to Verify Message Receipt
General public	Wildfire	Wildfire-specific communications are conducted in three phases: before, during, and following an emergency event. Efforts before focus on immediate actions customers and the public can employ to remain safe, resilient, and updated during the emergency. This applies to all Liberty constituents to include the General Public, Priority Services, AFN populations, populations with limited English-speaking ability, and tribal populations.	Community outreach; public workshops; yearly surveys
General public	Wildfire-related outage	Liberty will employ standard communication channels to communicate wildfire-related outages including, but not limited to social media channels, broadcast and print media, and the Liberty website. As part of its expanded outreach, Liberty will coordinate roadside changeable message signs with Caltrans throughout affected communities to keep impacted residents informed. These signs will be critically important to educate tourists in Liberty's service territory. Liberty Customers are notified via the OnSolve Communication system.	OnSolve acknowledgment receipt
General public	PSPS-related outage	Liberty will employ standard communication channels to promote emergency service resources including, but not limited to social media channels, broadcast and print media, and the Liberty website. As part of its expanded outreach, Liberty will coordinate roadside changeable message signs with Caltrans throughout affected communities to keep impacted residents informed. These signs will be critically important to educate tourists in Liberty's service territory. Liberty has a PSPS Playbook with pre-scripted messages to deliver during all five stages of a PSPS. Liberty Customers are notified via the OnSolve Communication system.	OnSolve acknowledgment receipt

Stakeholder Group	Event Type	Method(s) for Communicating	Means to Verify Message Receipt
General public	Restoration of service	Following the event, Liberty focuses on transparency in educating customers and the public on the impact of the event and soliciting customer feedback to improve communication efforts for any future event. Liberty Customers are notified via the OnSolve Communication system.	OnSolve acknowledgment receipt, after action briefings and reports
Priority essential services	Wildfire	Wildfire-specific communications are conducted in three phases: before, during, and following an emergency event. These efforts focus on immediate actions that customers and priority essential services can take to remain safe, resilient, and informed during an emergency.	Community Outreach; public workshops; yearly surveys
Priority essential services	Wildfire related outage	During a major outage or emergency that affects a significant number of customers, an email is sent to personnel, agencies, and media to provide information, detail, and status of the outage. As the outage or emergency continues, status update emails and/or phone calls will be made to keep the agencies and media informed. Liberty will also disseminate detailed information on the wildfire including a list and maps of impacted communities, critical facilities, and estimated number of impacted customers and share it with local public safety partners and elected officials via our Public Safety Partner Portal. Public Safety Partners are notified via the OnSolve Communication system.	Notification receipt via OnSolve.
Priority essential services	PSPS-related outage	Liberty will disseminate detailed information on the PSPS event, including a list and maps of impacted communities, critical facilities, and estimated number of impacted customers and share it with local public safety partners and elected officials via our Public Safety Partner Portal. Public Safety Partners are notified via the OnSolve Communication system.	Notification receipt via OnSolve, feedback from public workshops.
Priority essential services	Restoration of service	Once the outage has concluded and the system is back to normal, a final email will be sent to close out the communication of the incident, and Public Safety Partners are notified via the OnSolve Communication system.	Notification receipt via OnSolve.

Stakeholder Group	Event Type	Method(s) for Communicating	Means to Verify Message Receipt
AFN populations	Wildfire Related outage	Medical Baseline or Green Cross customers who will be affected by the outage will receive a direct phone call from Liberty CalPeco staff notifying them of outage details, including but not limited to time, duration, and reason. Liberty's goal, whenever possible, is to notify the medical baseline customer group 72 hours in advance of a planned outage.	Notification receipt via OnSolve.
AFN populations	PSPS related outage	Medical Baseline or Green Cross customers who will be affected by the outage will receive a direct phone call from Liberty CalPeco staff notifying them of outage details, including but not limited to time, duration, and reason. Liberty's goal, whenever possible, is to notify the medical baseline customer group 72 hours in advance of a planned outage. If the customer can't be contacted via OnSolve a Liberty staff member will place a phone call and ultimately knock on the customer's door and leave a door hanger if notification receipt has not been confirmed through the methods outlined above.	Notification receipt via OnSolve. In person door knock if no OnSolve receipt notification; door hanger if door not answered.
AFN populations	Restoration of Service	Once the outage has concluded, a final update will be sent directly to customers and media, as well as posted to social media accounts and the Liberty website with a request that any customers still without power notify the Company. Liberty Customers are notified via the OnSolve Communication system.	Notification receipt via OnSolve.

Stakeholder Group	Event Type	Method(s) for Communicating	Means to Verify Message Receipt
Spanish population with limited English proficiency	Wildfire related outage	Wildfire-specific communications are conducted in three phases: before, during, and following an emergency event. Efforts before focus on immediate actions customers and the public can employ to remain safe, resilient, and updated during the emergency. English and Spanish have been identified as the most prevalent languages used in the Liberty service territory. Customers are notified via the OnSolve Communication system. As of June 2026, Liberty established utilization of Propio, a translation language service. Propio is available to customer service representatives, and supports in-language customer communication in over 300 languages. Liberty has customer-facing staff that are fluent in Spanish.	Customer Service in person communication; Notification receipt via OnSolve.
Spanish population with limited English proficiency	PSPS related outage	Liberty will employ standard communication channels to promote emergency service resources including, but not limited to social media channels, broadcast and print media, and the Liberty website. Customers are notified via the OnSolve Communication system. Liberty PSPS notifications are currently transmitted in English; however, to the extent possible, Liberty includes a line to notifications in Spanish directing customers to further information in Spanish. Liberty's Onsolve notification system directs customers to Liberty's website, which has an available Spanish translation option.	Customer service in person communication; Notification receipt via OnSolve.
Spanish population with limited English proficiency	Restoration of Service	Once the outage has concluded, a final update will be sent directly to customers and media, as well as posted to social media accounts and the Liberty website with a request that any customers still without power notify the Company. Customers are notified via the OnSolve Communication system.	Customer service in person communication; Notification receipt via OnSolve.

Stakeholder Group	Event Type	Method(s) for Communicating	Means to Verify Message Receipt
Washoe Tribe	Wildfire related outage	Wildfire-specific communications are conducted in three phases: before, during, and following an emergency event. Efforts before focus on immediate actions customers and the public can employ to remain safe, resilient, and updated during the emergency. Liberty has conducted in person briefings on emergency management at Tribal meetings.	Community uutreach; public workshops; yearly surveys
Washoe Tribe	PSPS related outage	Liberty will employ standard communication channels to promote emergency service resources including, but not limited to social media channels, broadcast and print media, and the Liberty website. As part of its expanded outreach, Liberty will coordinate roadside changeable message signs with Caltrans throughout affected communities to keep impacted residents informed. Liberty has a PSPS Playbook with pre-scripted messages to deliver during all five stages of a PSPS. Liberty Customers are notified via the OnSolve Communication system.	Notification receipt via OnSolve.
Washoe Tribe	Restoration of Service	Once the outage has concluded, a final update will be sent directly to customers and media, as well as posted to social media accounts and the Liberty website with a request that any customers still without power notify the Company. Customers are notified via the OnSolve Communication system.	OnSolve acknowledgement receipt; after action briefings and reports
People in remote areas	Wildfire related outage	Wildfire-specific communications are conducted in three phases: before, during, and following an emergency event. Efforts before focus on immediate actions customers and the public can employ to remain safe, resilient, and updated during the emergency. Liberty has made extensive efforts to present emergency management briefings in the towns of Portola and Loyalton in the north part of the service territory and in Alpine and Mono Counties in the southern portion of the service territory.	Community uutreach; public workshops; yearly surveys

Stakeholder Group	Event Type	Method(s) for Communicating	Means to Verify Message Receipt
People in remote areas	PSPS related outage	Liberty will employ standard communication channels to promote emergency service resources including, but not limited to social media channels, broadcast and print media, and the Liberty website. As part of its expanded outreach, Liberty will coordinate roadside changeable message signs with Caltrans throughout affected communities to keep impacted residents informed. Liberty has a PSPS Playbook with pre-scripted messages to deliver during all five stages of a PSPS. Liberty Customers are notified via the OnSolve Communication system.	OnSolve acknowledgment receipt
People in remote areas	Restoration of Service	Once the outage has concluded, a final update will be sent directly to customers and media, as well as posted to social media accounts and the Liberty website with a request that any customers still without power notify the Company. Customers are notified via the OnSolve Communication system.	OnSolve acknowledgment receipt; after action briefings and reports

11.4.2 Messaging

In this section, the electrical corporation must describe its procedures for developing effective messaging to reach the largest percentage of stakeholders in its service territory before, during, and after a wildfire, an outage due to wildfire, or a PSPS event.[117]

In addition, the electrical corporation must provide an overview of the development of the following aspects of its communication messaging strategy:

- Features to maximize accessibility of the messaging (e.g., font size, color contrast analyzer)
- Alert and notification schedules
- Translation of notifications
- Messaging tone and language
- Key components and order of messaging content (e.g., hazard, location, time)

The narrative must be no more than one page.

Liberty's Public Website**:** Liberty will publish an alert to its customer facing website to notify customers of event status before, during, and after a PSPS. Liberty's public website has the following accessibility features:

- Color contrast: the color palette and typography of Liberty's public website meets Web Content Accessibility Guidelines (WCAG) Level AA standards for contrast.
- Landmarks: Liberty's public website templates utilize content landmark tags such as <header>, <main>, and <footer>, to assist readers with basic fragmentation of page content.
- Bypass repeating blocks: A link element is present at the top of each web page, visible only to the screen reader, which enables skipping down to the main page content.
- HTML presentational attributes, inline styles, <font> tags, etc.: The updated Liberty public website templates do not use locally-styles content. This reduces the likelihood of interference with assistive technologies that may need to alter the content for its own purposes.
- Page Headings: To assist in organizing page content hierarchically, Liberty public website templates have been updated to better establish a top-down order of page headings, with only a single <h1> tag declaring the page purpose, and encouraging the use of descending tags <h2>, <h3>, etc.

[117] Pub. Util. Code § 8386(c)(7), (19).

- Liberty website content for California locations is available in Spanish. Liberty has used a third-party vendor for content translation since Q4 of 2022.

Emergency Alerts: In addition to website postings, Liberty uses Onsolve for emergency alerts sent directly to customers with accurate contact information. Onsolve utilizes a tiered approach so Liberty can reach as many people as possible. Onsolve will send a text, phone call, and email, and will capture data on who has received and opened the message.

Liberty will utilize its social media platforms on Facebook and X to reach not only customers, but the community as a whole. Liberty is also considering Watch Duty as another way to post information for certain applicable events. Lastly, Liberty will send messages to CBOs, PSPs, and media contacts. Liberty considers the tone of messaging and will craft messages to be urgent but not fear-inducing, action-oriented, helpful, and educational. Liberty has a robust communications procedure with multi-department coordination and review so that different stakeholders receive necessary messages crafted efficiently.

Messaging content contains real-time awareness information about the situation and where to find additional updates. Local media and community partners are also provided with similar messaging for amplification. These communications include information about the high-fire risk weather conditions as well as communities at risk for potential outages. Customers and the public are directed to the Liberty website for further information.

Prior to a potential event: In 2026, Liberty continued its public education and outreach efforts associated with its wildfire mitigation plan. Safety and resiliency communications were part of a territory-wide public education campaign. These communications focused on personal preparedness and community resiliency.

During an event: Liberty will execute standard communication protocols, such as customer notifications, media updates and situational awareness postings across social media channels. In addition, Liberty will activate a series of additional tactics to inform customers and the public about the latest developments during emergency, wildfire, and PSPS events.

Liberty will assign dedicated liaisons who are responsible for conveying real-time updates and outreach material to its public safety partners, elected officials, critical facilities, and CBOs. Liberty will also employ standard communication channels to promote emergency service resources including, but not limited to social media channels, broadcast and print media, and the Liberty website. As part of its expanded outreach, Liberty will coordinate roadside changeable message signs with Caltrans throughout affected communities to keep impacted residents informed. These signs will be critically important to educate tourists in Liberty's service territory. Liberty will disseminate detailed information on the emergency, wildfire, or

PSPS event, including a list and maps of impacted communities, critical facilities, and estimated number of impacted customers and share it with local public safety partners and elected officials. To expand its digital outreach, Liberty will distribute public service announcements ("PSAs") to read live on the airwaves and coordinate with CalOES to distribute wireless emergency alerts to impacted regions. The templates allow for the addition of real-time awareness details and provide referral to Liberty's social media platforms for additional safety information and updates.

Following an event: Communication with customers and the public early and often is essential to the region's wildfire preparedness. Liberty engages in discussions and solicits feedback from its communities and stakeholders regarding proactive safety preparations, mitigation measures and community support strategies to reduce infrastructure-related ignitions and mitigate impacts of a wildfire or PSPS. Annually, Liberty reaches out to customers through formal surveys to determine the level of awareness of wildfire mitigation and PSPS-related messaging and communications before and after wildfire season. Liberty uses the gathered feedback to evaluate, refine, and improve customer and public education efforts.

11.4.3 Outreach and Education Awareness Programs

In tabulated format, the electrical corporation must provide a list the various outreach and education awareness programs (i.e., campaigns, informal education, grant programs, participatory learning) that the electrical corporation implements before, during, and after wildfire, vegetation management, and PSPS events to target communities, including efforts to engage with partners in developing and exercising these programs.[118] In addition, the electrical corporation must describe how it implements its overall program, including staff and volunteer needs, other resource needs, method for implementation (e.g., industry best practice, latest research in methods for risk communication, social marketing), long-term monitoring and evaluation of each program's success, need for improvement, etc. The narrative for this section is limited to two to three pages.

Tracking ID: WMP-CO-01

Liberty's community outreach efforts focus on providing a presence in communities within all seven counties served by the utility. Liberty participates in a variety of outreach efforts including, but not limited to, general community events, collaboration with local organizations, and targeted tribal outreach. Liberty's outreach focus is to spread awareness of PSPS

[118] Pub. Util. Code § 8386(c)(19).

preparedness, Liberty's notification system, customer assistance program benefits, the importance of maintaining updated contact information, and AFN self-identification. CBO collaboration supports Liberty in reaching AFN communities through established community networks, and AFN categories are considered in planning collaborative efforts. Liberty provides information on its WMP and PSPS public outreach and education awareness program in Table 11-10, LU Table 11-2, and LU Table 11-3.

Table 11-10: List of Target Communities for Outreach and Awareness Efforts

Target Community	**Interests or Concerns Before, During, and After Wildfire and PSPS events**
Identified Access and Functional Needs individuals	Liberty understands customers with access and functional needs may require earlier communication to plan for needs before, during, and after PSPS events and require communication regarding available resources. Liberty values targeted outreach to Access and Functional Needs populations with a focus on PSPS preparedness measures, education around Liberty's notification system, and importance of updated contact information.
Individuals enrolled in Medical Baseline Allowance Program	Liberty understands customers with medical needs may require earlier communication to plan for medical needs before, during, and after PSPS events and require communication regarding available resources.
Community Based Organizations ("CBOs")	Liberty understands CBOs require communication regarding PSPS events to effectively communicate with and support their communities before, during, and after PSPS events.

LU Table 11-2: List of Community Partners

Community Partners	**County**	**City**
Sierra Community House	Placer	Kings Beach, CA
Tahoe Truckee Community Foundation	Nevada	Truckee, CA
Placer County Health & Human Services	Placer	Carnelian Bay, CA
Sierra Senior Services	Nevada	Truckee, CA
North Tahoe Truckee Homeless Services	Nevada	Truckee, CA
FREED Independent Living Center	Nevada, Placer, Sierra	Grass Valley, CA
Placer Independent Resource Services ("PIRS")	Placer, El Dorado, Alpine	Auburn, CA
211 Connecting Point	Nevada, Placer	Grass Valley, CA

Community Partners	County	City
Nevada County Health & Human Services	Nevada	Truckee, CA
Portola Family Resource Center	Plumas	Portola, CA
Plumas County Mental Health	Plumas	Portola, CA
Eastern Plumas Healthcare	Plumas	Portola, CA
Partnership HealthPlan of CA	Plumas	Fairfield, CA
Loyalton Senior Citizens of Sierra Co.	Sierra	Loyalton, CA
Sierra County Health and Human Services	Sierra	Loyalton, CA
Sierra County Public Health	Sierra	Loyalton, CA
Loyalton Family Resource Center	Sierra	Loyalton, CA
Boys and Girls Club of Lake Tahoe	El Dorado	South Lake Tahoe, CA
Live Violence Free	El Dorado	South Lake Tahoe, CA
Tahoe Coalition for the Homeless	El Dorado	South Lake Tahoe, CA
El Dorado Health and Human Services	El Dorado	Placerville, CA
First 5 / Community Hub El Dorado	El Dorado	Placerville, CA
South Lake Tahoe Family Resource Center	El Dorado	South Lake Tahoe, CA
Tahoe Youth and Family Services	El Dorado	South Lake Tahoe, CA
Tahoe Magic	El Dorado	South Lake Tahoe, CA
Bread and Broth	El Dorado	South Lake Tahoe, CA
Catalyst Community	El Dorado	South Lake Tahoe, CA
Rolling Start, Inc. Independent Living Center	Mono	San Bernardino, CA
Mono County Health and Human Services	Mono	Coleville, CA
Mono County Public Health	Mono	Mammoth Lakes, CA
Alpine County Health and Human Services	Alpine	Markleeville, CA
Washoe Tribe	Alpine	Markleeville, CA
Community Services Solutions	Mono	Gardnerville, NV
Tahoe Truckee Helping Hands	Placer	Truckee, CA

LU Table 11-3: Community Outreach and Education Programs

Core Activity	Event Type	Period of Application (Before, During, After Incident)	Name of Outreach or Education Program	Description of Program	Target Audience
Digital, print, and radio advertising	Campaign	All	PSPS and Wildfire Mitigation Awareness Advertising	Campaign occurs from May-October of each year, covering PSPS and Wildfire Mitigation awareness topics.	All customers, medical baseline customers
Advertising in HOA publications and customer emails	Email, social media	Before	None	Perform general PSPS and Wildfire Mitigation outreach ahead of fire season.	All customers
Manage outreach /awareness webpage	Virtual	All	Liberty PSPS and Wildfire Mitigation awareness webpage	Social media posts, bill inserts, and customer emails help drive traffic to webpage that covers PSPS and wildfire mitigation awareness topics.	All customers
General Community Outreach Events	In-Person	Before	None	Liberty attendance at community outreach events to spread PSPS awareness and preparedness education, update contact information, and provide education on available customer programs and Liberty notification system.	All customers

Core Activity	Event Type	Period of Application (Before, During, After Incident)	Name of Outreach or Education Program	Description of Program	Target Audience
Community Based Organization ("CBO") Meetings	In-Person, Virtual	Before	None	Liberty staff meetings with local CBOs to share PSPS awareness and available materials, preparedness education, customer program updates, and to maintain up to date contract information for CBO facing communities.	CBOs, AFN customers
Collaborative Community Outreach with CBOs	In-Person	Before	None	Liberty involvement in collaborative outreach events to spread PSPS awareness and preparedness education, update contact information, and provide education on available customer programs and Liberty notification system. This form of outreach leverages CBO relationships within the community to access local communities and supports targeted outreach efforts to reach AFN populations.	All customers, AFN customers, CBOs
Provision of Shelf-Stable Meal Boxes to Senior Nutrition Programs	In-Person	Before	Shelf Stable Meal Box Delivery	Provide preparedness information, customer assistance program information and shelf stable food items to vulnerable seniors.	All customers

11.4.4 Engagement with Access and Functional Needs Populations

The electrical corporation must provide an overview of its process for understanding, evaluating, designing, and implementing wildfire and outage program risk initiative strategies, policies, and procedures specific to AFN customers across its territory.[119] The electrical corporation must provide its AFN plan as an attachment and may it to provide more detail. The electrical corporation must also report on the following:

- Summary of key AFN demographics, distribution, and percentage of total customer base.
- Evaluation of the specific challenges and needs during a wildfire or PSPS event of the electrical corporation's AFN customer base.
- Plans to address specific needs of the AFN customer base throughout the service territory specific to the unique threats that wildfires and PSPS events may pose for those populations before, during, and after the incidents. This should include high-level strategies, policies, programs, and procedures for outreach, engagement in the development and implementation of the AFN-specific risk initiative strategies, and ongoing feedback practices.

The electrical corporation must reference the Tracking ID where appropriate.

Tracking ID: WMP-CO-03

Identification of Access and Functional Needs ("AFN") Populations: Liberty identifies electricity dependent individuals above and beyond those enrolled in the Medical Baseline Allowance Program, through direct outreach to customers in Liberty's service area and collaborative opportunities with local partners. Liberty has established the ability to track AFN customer categories beyond MBL in its CIS, including the following categories:

- Customers enrolled in low-income programs
- Customers with a physical, intellectual, or developmental disability
- Customers with a chronic condition or injury
- Customers identified as having limited English proficiency
- Customers in households with older adults
- Transportation-disadvantaged customers

[119] Pub. Util. Code § 8386(c)(7), (19).

Liberty has identified 15,472 individuals as AFN in its service territory, including 281 Medical Baseline individuals. Approximately 23% of Liberty's total residential customer base is identified as AFN.

Liberty performs customer outreach to share information about customer programs (CARE, ESA, MBL) and PSPS awareness through a variety of methods, including community events, website resources, social media, bill inserts, targeted outreach to multi-family dwellings and mobile home parks, radio ads, digital ads, print ads, and call center staff.

Liberty has made progress in identifying AFN individuals through collaborative outreach with local CBOs, focusing on program enrollment, and promoting self-identification. Liberty identifies the following customer groups as AFN:

- Customers enrolled in the California Alternate Rates for Energy ("CARE") and Medical Baseline ("MBL") programs;
- Older adults, who are automatically marked as AFN; and
- Customers who self-identify with the AFN categories listed above.

Evaluation of challenges and needs during a wildfire or PSPS Event: Liberty works in coordination with the AFN Collaborative Council, AFN Statewide Council, CBOs, local governments, the Washoe Tribe, and the other California small and multi-jurisdictional utilities ("SMJUs") to understand the challenges of supporting individuals with AFN during a wildfire or PSPS de-energization. During a wildfire or PSPS event, Liberty will use the best available information to evaluate and meet the needs of individuals with AFN.

Liberty also participates in community collaborative groups in both South and North Lake Tahoe with the goal of being an involved partner in community conversations, establish new connections, and provide applicable information on available assistance programs and PSPS preparedness information to local networks. Relationships with local organizations are essential to consistently learning about the unique needs of each community served by Liberty with respect to AFN populations. Feedback shared by CBOs has been valuable in understanding communication needs across the service territory in areas with high concentrations of AFN households and has shaped Liberty's evolving outreach strategy.

Liberty maintains communication channels directly with Community Resource Centers during PSPS events and can communicate AFN related needs in real time to the EOC for mitigation and collaboration with local partners. Relationships established with local Public Safety Partners, organizations, and CRC Leads support awareness of AFN impact and needs throughout an event.

Plans to address the needs of the AFN customer base: Liberty works with other SMJUs and collaboratively within a statewide AFN Council teams to develop a joint strategy to meet the needs of individuals with AFN before, during, and after a wildfire or PSPS de-energization event. California IOUs filed their respective 2026 Plans to Support Access and Functional Needs Populations During De-Energization Events on January 31, 2026. The AFN Plan, which has common elements across the utilities, includes information related to de-energization event notification cadence; support services and tools available to customers with AFN; AFN customer identification; collaboration with working groups, advisory councils, and CBOs; and available customer programs and resources. Detailed information can be found in Appendix F – Liberty's 2026 AFN Plan.

Liberty's outreach strategy considers AFN population targets and geographic coverage. Liberty understands customer assistance program awareness and enrollment supports AFN identification, ultimately supporting earlier communication of PSPS events. Customer assistance program awareness and PSPS education are key priorities of outreach efforts, and collaboration with local organizations on in-person outreach events has proven to be a successful strategy, especially in more rural communities. Improvements to accessibility of information shared, where possible, have been identified as an impactful area of consideration by local partners with respect to AFN communities. Presentations at senior centers, local organizations, and tribal communities have been included in Liberty's outreach strategy with bilingual accessibility where appropriate. Information sharing efforts around assistance program categorical enrollment with agencies supporting Public Purpose Programs has been a meaningful evolution in outreach approach.

Liberty's relationships with local Public Safety Partners and local organizations aligns with a "whole community approach" to supporting AFN populations before, during, and after PSPS events to address needs proactively and as they arise. Liberty has worked with local senior nutrition programs across its service territory to provide shelf-stable meal boxes to vulnerable seniors to support preparedness. The meal boxes included PSPS awareness and customer assistance program materials and leveraged existing networks to effectively communicate with a population that can be difficult to reach.

11.4.5 Engagement with Tribal Nations

The electrical corporation must provide an overview of its process for understanding, evaluating, designing, and implementing wildfire and outage program risk initiative strategies, policies, and procedures specific for collaboration with to Tribal Nations served by the electrical

corporation and on whose lands its infrastructure is located.[120] The electrical corporation must also report on the following:

- Summary of key tribal demographics.
- Ongoing consultation and collaborative efforts performed by the electrical corporation with Tribal Nations.
- Evaluation of the specific challenges and needs during a wildfire or PSPS event of the electrical corporation's Tribal Nation customer base.
- Plans to address specific needs of the tribal customers throughout the service territory specific to the unique threats that wildfires and PSPS events may pose for those populations before, during, and after the incidents. This should include high-level strategies, policies, programs, and procedures for outreach, engagement in the development and implementation of the tribal-specific risk initiative strategies, and ongoing feedback practices.

The electrical corporation must reference the Tracking ID where appropriate:

Liberty maintains a working relationship with the Washoe tribe, the only tribal community in its service territory. Liberty experienced 3 PSPS events in November 2024, and one in November 2025. The Washoe Tribe provides support to customers with AFN and was included as an essential Public Safety partner throughout each of these events. Liberty maintained communication with the Washoe Tribe's Emergency Manager and the Hung-A-Lel-Ti Community Chairman at each stage of PSPS. Liberty has a Memorandum of Understanding with the Washoe tribe and has established a CRC location in Markleeville, CA within close proximity to the local AFN community. This CRC location was activated from 8:00 AM to 10:00 PM during all four PSPS events and was well attended by Hung-A-Lel-Ti residents throughout each event. Customer assistance program information and PSPS awareness materials were shared at the CRC location with attendees. After receiving feedback from tribal leadership that attendees may benefit from an increased understanding of PSPS, educational videos were shown at the location. These videos were developed to support increased awareness in an accessible format and will be integrated into outreach where appropriate.

Liberty acknowledges the unique needs of tribal residents and will continue to develop a supportive relationship in 2026, including collaboration with the Washoe Tribe regarding ongoing grant opportunities. Liberty held meetings with the Washoe Tribe's emergency manager, including discussion related to the importance of electricity dependent customer

[120] Pub. Util. Code § 8386(c)(19).

awareness of the MBL Program and benefits of enrollment. Liberty also provided applications for dissemination after discovering a small number of identified medical customers in the community, which conflicted with previous conversations in terms of community needs.

Liberty works closely with the tribe throughout the year and conducts targeted outreach to the tribal community of Hung-A-Lel-Ti. Standing monthly meetings were established with the Washoe Tribe's Emergency Manager in January of 2025. These meetings are utilized to support the Washoe Tribe with a variety of topics including support of tribal grant funding opportunities involving Liberty, project application processes, and customer assistance program outreach.

11.4.6 Current Gaps and Limitations

In tabulated format, the electrical corporation must provide a list of current gaps and limitations in its public communication strategy, including any notification failures identified in the most recent PSPS post-season report. Where gaps or limitations exist, the electrical corporation must indicate the remedial action plan and the timeline for resolving the gaps or limitations. For all requested information, the electrical corporation should indicate a form of verification that can be provided upon request for compliance assurance.

Liberty provides information on gaps and limitations in its public communication strategy in Table 11-11.

Table 11-11: Gaps and Limitations in Public Emergency Communication Strategy

Gap or Limitation Subject	**Remedial Brief Description**	**Remedial Action Plan**
During 2024 PSPS events, some customers were notified as being in scope for events but were not de-energized and did not receive notices of cancellation.	Liberty should update its protocols an in-event tracking spreadsheet to make sure customers that are notified, but not, de-energized receive cancellation notices.	Strategy: Liberty will update its in-event tracker to specifically capture cancellation notifications. Target Timeline: Completed
2024 PSPS events highlighted the need to update Liberty's MBL customer contact list, as some members of the list had recently passed away.	Liberty should do an internal review of its MBL customer list.	Target Timeline: Completed

Liberty's 2025 PSPS event highlighted the need for additional signage outside CRC locations	Liberty should place external signage outside CRC locations during future PSPS events	Strategy: Liberty will work with their CRC contractor to implement signage placement during future events Target Timeline: Implementation in 2026
Liberty's 2025 PSPS event identified the need for estimated time of restoration to be included on all notifications during event, including CRC services available and where to access electricity during the hours the CRC is closed on customer notifications	Liberty will adapt its notification templates to include the requested information	Strategy: Liberty will adapt its notification templates to include the requested information Target Timeline: Completed

11.5 Customer Support in Wildfire and PSPS Emergencies

In this section of the WMP, the electrical corporation must provide an overview of its programs, systems, and protocols to support residential and non-residential customers during and after wildfire emergencies and PSPS events.[121] The overview for each emergency service must be no more than one page. The overview must cover the following customer emergency services:

- Outage reporting
- Support for low-income customers
- Billing adjustments
- Deposit waivers
- Extended payment plans
- Suspension of disconnection and nonpayment fees
- Repair processing and timing
- List and description of community assistance locations and services
- Medical Baseline support services

[121] Pub. Util. Code, § 8386(c)(21).

- Access to electrical corporation representatives

The electrical corporation must reference the Tracking ID where appropriate.:

Tracking ID: WMP-EP-05

Outage Reporting**:** Liberty utilizes a multi-channel approach for real-time situational awareness. After extreme weather conditions are forecasted and the National Weather Service issues a Red Flag Warning, Liberty begins to coordinate with local government agencies, community-based organizations, and public safety partners approximately 72 hours prior to the event. Communications are then initiated with customers via Onsolve, broadcast media, and social media channels. These communications drive traffic to Liberty's social media and/or dedicated PSPS landing page for more information and real-time situation updates. As the event progresses, these notifications become more specific and targeted to customers as the situation warrants. Along with outage updates, the channels listed above provide information related to wildfire safety, emergency preparedness, PSPS, and community resource centers.

Support for Low-Income Customers: Refer to Appendix F: Liberty's Plan to Support Populations with Access and Functional Needs During PSPS for specific measures that Liberty has developed to support AFN customers during emergencies, including PSPS events. Additionally, CARE and MBL customers may be offered special payment arrangements resulting from fire-related outages, as necessary.

Billing Adjustments: Liberty may suspend billing until power is restored to impacted customers.

Deposit Waivers: Liberty may waive deposit requirements for business customers who are seeking to re-establish service at either the same location or a new location.

Extended Payment Plans: Special consideration may be granted for payment extension when customers experience tremendous loss (*e.g.*, property loss).

Suspension of Disconnection and Nonpayment Fees: For customers impacted by wildfires, Liberty may suspend disconnection for non-payment and associated fees, waive the deposit and late fee requirements for affected customers who pay their utility bills late, and not report late payments by customers who are eligible for these protections to credit reporting agencies or to other such services.

Repair Processing and Timing: Timing for repair procedures will be determined on the severity of the wildfire. As feasible, Liberty will accelerate the repair process.

Community Assistance Locations and Services: In coordination with the communities that it serves, Liberty has established a network of Community Resource Centers ("CRCs") to assist

communities in real time during extreme weather events. Planning factors for meeting the safety needs for access and functional needs and vulnerable populations have included local demographic data, as well as the company database of medical baseline customers. The establishment of CRCs was informed by presentations and discussions in seven Town Hall Meetings held in each of seven communities in Liberty's service territory. Plan creation included consultation with regional local government, advisory boards, public safety partners, representatives of people/communities with access and functional needs, tribal representatives, senior citizen groups, business owners, community resource organizations, and public health and healthcare providers.

- *Locations*: If Liberty anticipates that the power will be off for an extended period, Liberty will open CRCs in the affected areas. The CRC locations selected by Liberty were identified through a rigorous process, which included input from fire and meteorological experts, as well as those areas that are most prone to extreme weather, as indicated by historical data. CRC locations identified to date include Walker, Markleeville, South Lake Tahoe, Truckee Tahoe Airport, Loyalton, and Portola.
- *Accommodations*: All CRCs are in fixed facility locations known to the public. CRCs will have backup power or are in areas that are contiguous to PSPS zones that would not be shut off in the event of a PSPS. They are ADA-compliant, and CRC site planning includes consideration of customers with access and functional needs.
- *Services provided*: Each CRC site meets fire codes and has at least two egress routes. Once activated, CRCs will operate in 14-hour shifts from 8:00 AM to 10:00 PM daily, until power to the affected community has been restored. Liberty contracts a third party, Fire Dawg, Inc., for support services including CRC staffing and setup. Liberty provides snacks, water, device charging ability, Wi-Fi, ADA-accessible restrooms, resource information, third-party customer service staff (including bilingual representation when possible), and blankets at CRC locations. CRC locations present a unique opportunity for program enrollment, PSPS preparedness information sharing, and AFN identification. Liberty may provide information on CARE, ESA, and MBL programs at each CRC. PSPS toolkit information will be shared in English and Spanish at CRC locations.

Medical Baseline Support Services: Liberty will provide live agent outbound calls to medical baseline customers who did not confirm contact through automated notifications (*i.e.*, e-mails, phone calls).

Access to Liberty Representatives: If Liberty's offices are not impacted by the wildfire event, operations will resume, and company representatives will be available to provide support. If

offices are impacted, nearby offices and corporate communications will be available to customers.

Liberty provides additional information on its programs to support customers in wildfire emergencies and PSPS events in Appendix F – Liberty's 2026 AFN Plan.

12. Enterprise Systems

In this section, the electrical corporation must provide an overview of inputs to, operation of, and support for various enterprise systems it uses for vegetation management, asset management and inspection, grid monitoring, ignition detection, weather forecasting, and risk assessment initiatives.[122] Enterprise systems encompass structures and methods that allow the electrical corporation and its employees and/or contractors to accept, store, retrieve, and update data for the production, management, and scheduling of related work.

12.1 Targets

In this section, the electrical corporation must provide qualitative and quantitative targets for each year of this three-year cycle. The electrical corporation must provide at least one qualitative and one quantitative target for each initiative as related to implementation and improvement of its enterprise systems.

Tracking IDs: WMP-VM-ESG-0 and WMP-GDOM-GO-05

12.1.1 Qualitative Targets

The electrical corporation must provide at least one qualitative target for each relevant initiative (vegetation management, asset management and inspection, grid monitoring, ignition detection, weather forecasting, and risk assessment) in its three-year plan for implementing and improving its enterprise systems, including the following:

- Identification of which initiative activity in the WMP the electrical corporation is implementing to achieve the stated target, including Tracking IDs and the previous tracking ID used in past WMPs, if applicable.
- A target completion date.
- Reference(s) to the WMP section(s) or appendix, including page numbers, where the details of the target(s) are documented and substantiated.

Vegetation Data Quality Management (WMP-VM-ESG-01): Liberty's Vegetation Management program has been developing a Data Quality Management ("DQM") tool to maintain data quality throughout the vegetation inspection and maintenance data lifecycle. This tool will perform daily checks against the Fieldnote and Liberty databases to compare tables and report any discrepancies to data owners. DQM Reports will be delivered through automatic emails. These daily checks will help prevent erroneous data from avoiding detection, getting stored in

[122] Pub. Util. Code § 8386(c)(10), (14), (18).

the database, and used in reporting. Currently, this process is carried out manually through inspection of dashboards, lengthy review of source data, and coordination between multiple team members and data collectors in the field. Automatic DQM Reporting on Liberty's SQL database will be in place by the end of 2028.

Asset Management Inspection Application Reduction (WMP-GDOM-GO-05): Liberty will implement a single, multi-year asset inspection and management application. Liberty will finish data migration from previous single-year apps into the new application, "Asset Tracking." Historical inspection apps will be archived, creating a single data source for Liberty's future gathering of asset inspection and maintenance data. Currently, Liberty has asset inspection and maintenance data stored in six collection apps. Five of these applications are based on inspection type and year for inspections starting in 2020. In 2024, Liberty began rolling out the "Asset Tracking" Fulcrum application. This application will serve as a multi-year asset inspection and management application. By the end of 2028, all asset inspection and management data will be stored in the Asset Tracking application and previous Fulcrum applications will be archived.

Table 12-1: Enterprise System Targets

WMP Initiative	Activity (Tracking ID#)	2026 End-of-Year Total / Completion Date	2027 Total / Status	2028 Total / Status	Section; Page Number
Enterprise System – Vegetation Management	Vegetation Data Quality Management (WMP-VM-ESG-01)	Started: March 2026	In Progress	Complete by December 31, 2028	12.1.1; pp. 339-340
Enterprise System – Asset Management and Inspection	Asset Management Inspection Application Reduction (WMP-GDOM-GO-05)	Started: March 2026	In Progress	Complete by December 31, 2028	12.1.1; pp. 339-340

12.2 Summary of Enterprise Systems

Electrical corporations must provide a summary narrative of no more than three pages that discusses how its enterprise systems contain, account, or allow for the following:

- Any database(s) the electrical corporation used for data storage.

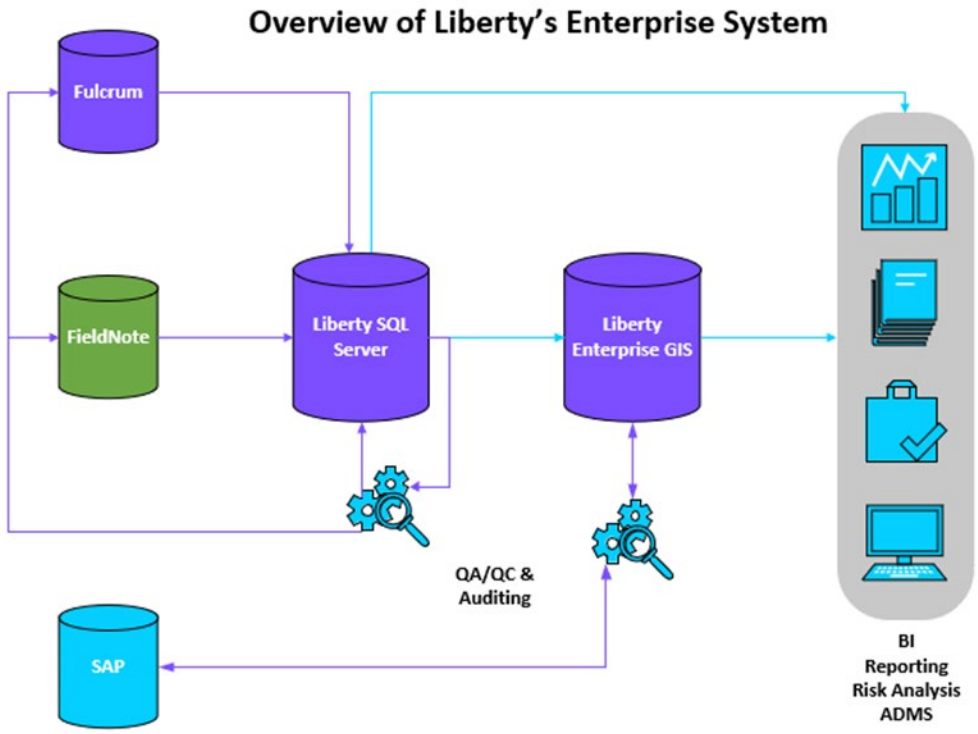
- Internal procedures for updating the enterprise system, including database(s), any planned updates, and the ability to migrate data across systems and ensure accuracy if necessary.
- The electrical corporation's asset identification process.
- The electrical corporation's process for integrating 100% asset identification or its justification if not currently in place.
- Processes to ensure data integrity (accuracy, completeness, and quality of data), accessibility (ability of the electrical corporation to access data across formats and locations), and retention (any policies the electrical corporation for how long it stores data and how it disposes of data after any retention period).
- Any QA/QC or auditing of its system.
- Overview of any data governance plan that the electrical corporation has in place. Highlighting any data stewardship practices.
- How current WMP initiatives are being tracked and monitored in enterprise systems.
- Employee and/or contractor ability to access and interact with the data and systems for tracking work order status and scheduling.
- How the electrical corporation's work order and asset management systems feed into risk analysis and alternative or interim initiative activity selection.
- Any changes to the electrical corporation's enterprise systems since the last WMP submission and a brief explanation as to why those changes were made. Include any planned improvements or updates to the enterprise systems and the timeline for implementation.

Database(s) used for data storage: Liberty utilizes a variety of databases for data storage. Incident management, customer information, and work planning data, including work orders and as-builts, are stored in SAP. Electric asset and vegetation inspection and maintenance data are stored in the respective databases of their field collection applications. These databases can be queried directly through their respective web apps (Fulcrum and Fieldnote). Data is also ingested into Liberty's SQL server database with an API. Data from SAP and SQL databases are combined into file Geodatabases and imported into Liberty's Enterprise GIS database alongside other geospatial data.

Internal procedures for updating the enterprise system, including database(s), any planned updates, and the ability to migrate data across systems and ensure accuracy if necessary: Liberty's procedure for updating the Electric Asset enterprise system begins with the data collected and updated by inspectors and work crews. This data is ingested into the SQL database where Liberty monitors and analyzes the data while making the necessary transformations. Database tables are joined in SQL views for use in BI reports. These reports are

used by managers to assist in ensuring data accuracy. After the Electric Asset data is transformed and reviewed, exports are made from SQL Server to the GIS team for storage in their enterprise database. Data requests of Electric Asset and Vegetation data can be completed through SQL queries as well as GIS exports. SQL and BI updates are performed after requirement gathering and testing is performed by the Data Analytics department. Refer to Figure 12-1 for an overview of Liberty's Enterprise System.

Figure 12-1: Overview of Liberty's Enterprise System



Liberty's asset identification process and process for integrating 100 percent asset identification: Liberty's asset identification process starts with asset designs created by Design and Operations departments in the form of as-builts. After assets are installed in the field, as-builts are sent to GIS for review and ingestion into their database. Liberty inspectors also collect data for use in asset identification as part of the 5-year detailed asset inspection cycle. As-builts and inspection data are reconciled to complete the asset identification process. Over a 5-year period of asset inspections, 100 percent asset identification is completed.

Processes to ensure data integrity (accuracy, completeness, and quality of data), accessibility (ability of the electrical corporation to access data across formats and locations), and retention (any policies the electrical corporation for how long it stores data and how it disposes of data

after any retention period): Liberty hosts several Power BI dashboards to model and visualize the data of its enterprise system. As data is observed, quality control is implemented to make corrections as necessary. Electrical Asset and Vegetation data is archived quarterly. Data Analytics maintains extract-transform-load pipelines that migrate data from the field collection apps (Fieldnote and Fulcrum) to the SQL Server database. Transformations are made in SQL and tabular data is exported in csv format. The GIS department converts these into feature classes stored in geodatabases for use in Liberty's enterprise GIS database.

Liberty implemented ESRI's Utility Network in April of 2022. As a result of this deployment, rules are set in place to promote consistency in its GIS data. These rules must be satisfied ifor the utility network to function as designed and will prevent the users from updating the utility subnetworks until all criteria are met. Liberty's enterprise GIS database is stored in an off-site location, and access to the database is allowed via ArcGIS Pro and its web portal where a series of web maps are accessible by internal staff. Data is never deleted but marked as removed when the electric assets are retired; there is currently no determination at this time for when a cutoff period will be put in place for disposal of this historical data.

Liberty is required to maintain inspection data over a ten-year period. Historically, this has been difficult as prior to 2020 data was held in paper forms. Liberty strives to retain data by leveraging its GIS and SQL databases. Since 2023, Liberty has maintained historical asset inspection and maintenance data dating back to 2020 in its SQL database. The SQL database also contains historical vegetation data dating back to 2023. As Liberty reaches the ten-years of data retained, a plan will be created to evaluate retention / disposal rate of historical data.

Data integrity checks are performed at all levels by department members for each data source. For instance, the vegetation management department tasks its arborists with maintaining data quality as it is input by contractors in the field. After these checks, Data Analytics and Vegetation Management will perform their own quality checks using in-house data quality management programs. As mentioned previously, Power BI reports are used for their accessibility to various user groups. By leveraging the accessibility of BI reports, Liberty has been able to maintain consistently higher data quality than was possible before their implementation.

QA/QC or auditing of Liberty's Systems: SQL and GIS data are reviewed quarterly with Operations, Vegetation Management, and GIS departments. System changes are completed through a process of requirement gathering, testing in development environments, and continuous monitoring after deployment to production enterprise systems.

Overview of any data governance plan that the electrical corporation has in place. Highlighting any data stewardship practices: Liberty's data governance plan aims to maintain correct compliance data that supports accurate and repeatable reporting. Accuracy of compliance data is accomplished through consistent training of data collectors, stringent database permissions, and data quality management procedures. Repeatable reporting is accomplished through data archiving and stored procedures in the SQL database for each report.

Data Analysts, System Arborists, and Electrical Foreman are heavily involved in training inspectors, contractors, and any other groups who are tasked with data collection. Data Analytics maintains strict permissions for database access and keep, write, and read access to the database reserved for trained analysts. Other users are allowed access through read permissions to Power BI dashboards and ad hoc reporting. Liberty has been developing an in-house Data Quality Management procedure used to reconcile third party data collection application databases with Liberty's SQL Server database.

Liberty strives to create consistent and repeatable compliance reports. Data used for quarterly data reporting as well as WMP Initiatives are archived quarterly. This allows for historical reports to be accessed with their underlying data the same as at the time of their reporting. Liberty also utilizes Stored SQL Procedures to create reports with month, quarter, and year variables for initiative updates as well as for QDR reporting.

How current WMP initiatives and activities are being tracked and monitored in enterprise systems: WMP Initiatives and activities based on field-collected data are tracked and monitored in Power BI dashboards. Vegetation and Asset data from inspections and maintenance programs are aggregated in Power BI dashboards for monitoring by department members. Reports and updates are generated from stored SQL Procedures.

Employee and/or contractor ability to access and interact with the data and systems for tracking work order status and scheduling: Liberty employees and contractors are given access to work order scheduling through SAP and work management software (Fulcrum and Fieldnote)..

How Liberty's work order and asset management systems feed into risk analysis and alternative or interim activity selection: System exports of electric asset details were provided by Liberty's GIS team to Filsinger Energy Partners ("FEP") and Technosylva for use in training the risk models. GIS data is delivered from Liberty's work order and asset management systems as needed or through annual reports.

Any changes to Liberty's enterprise systems since the last Base WMP submission and a brief explanation as to why those changes were made, including any planned improvements or

updates to the enterprise systems and the timeline for implementation: Since Liberty's last Base WMP submission, the enterprise systems for Asset and Vegetation data have been improved by continuing to leverage the capabilities of the SQL Server database as well as continued adoption of Power BI as a business intelligence tool.

Liberty's GIS refreshes data from the customer information system ("CIS") on a nightly basis to keep customer data up to date. Previously imports were done manually monthly from the legacy CIS using excel exports. In the future Liberty aims to streamline its data schema so that it can more efficiently and accurately capture asset details for internal and external use.

13. Lessons Learned

An electrical corporation must use lessons learned to drive continual improvement in its WMP.[123] Electrical corporations must include lessons learned due to ongoing monitoring and evaluation initiatives, collaboration with other electrical corporations and industry experts, PSPS or outage events, and feedback from Energy Safety and other regulators.

13.1 Description and Summary of Lessons Learned

In this section, the electric corporation must provide a brief narrative describing the key lessons learned tied to feedback from government agencies and stakeholders, collaboration efforts with other electrical corporations, areas for continued improvement, and outcomes from previous WMP cycles.

The narrative must also include lessons learned from prior catastrophic wildfires ignited by the electrical corporation's facilities or equipment and findings from Energy Safety compliance audits and reports.

For each lesson learned, the electrical corporation must identify the following in Table 13-1:

- The year of the WMP cycle the lesson learned was identified.
- Category and specific source of lesson learned.
- Brief description of the lesson learned that informed improvement to the WMP.
- Brief description of the proposed improvement to the WMP and which initiative(s) or activity(s) the electrical corporation intends to add or modify.
- If applicable, a brief description of how the lesson learned ties to implementation of a corrective action program.
- Estimated timeline for implementing the proposed improvement.
- If applicable, reference to the documentation that describes and substantiates the need for improvement, including:
    - o Where relevant, a hyperlinked section and page number in the appendix of the WMP.
    - o Where relevant, the title of the report, date of report, and link to the electrical corporation web page where the report can be downloaded.
    - o If any lessons learned were derived from quantifiable data, visual/graphical representations of these lessons learned in the supporting documentation.

[123] Pub. Util. Code §§ 8386(a) & (c)(5), (22).

Liberty's WMP framework includes the incorporation of lessons learned, corrective actions, areas of continued improvement, and review and correction of any Notifications of Violation and Defect. Refer to Table 13-1 for a summary of lessons learned.

Table 13-1: WMP Lessons Learned

ID #	Year of Lesson Learned	Subject	Category and Source of Lesson Learned	Description of Lesson Learned	Proposed WMP Improvement	Timeline for Implementation	Reference
1	2023-2024	Grid Hardening	Feedback from government agencies	Permitting projects with multiple agencies can cause project delays. Delays can be due to lack of resources by permitting agencies to respond to requests within expected timelines and other projects within the same area may create need for additional collaboration.	Work with contractors familiar with permitting agency process and requirements.	Ongoing	8.2; pp. 155-174
2	2024-2025	Vegetation Management	QA/QC	In the 2023-2025 WMP Liberty determined pass rate targets for all conditions being evaluated in each QC program component. Liberty determined it is more beneficial to assess an overall pass rate for each of its QC program components to evaluate program effectiveness. Liberty still reviews QC failures for each condition being evaluated in each QC program component. However, Liberty measures overall work quality by looking at the overall pass rate, an average of all conditions evaluated.	Liberty is updating QC targets as detailed in its 2027 WMP, Section 9.11, Table 9-19 Vegetation Management QA and QC Activity Targets	Completed 2025	9.11; pp. 244-254
3	2025	Vegetation Management	Fuel Management	Leverage joint IOU partnerships for potential of shared biomass utilization projects.	Liberty will continue to collaborate with neighboring utilities to explore opportunities for alternative biomass utilization, as well as other industry-specific benchmarking.	Completed 2025	9.3-9.7; pp. 225-235
4	2025	Vegetation Management	Key Performance Indicators	Liberty identified the need to regularly track and report contractor key performance indicators (KPI) to monitor contractor production metrics.	Liberty developed KPI reporting to set targets to measure production against for its VM contractors.	Completed 2025	12; pp. 339-345
5	2025	Vegetation Management	Contractor Safety	Liberty identified opportunities to continue enhancing safety oversite of contractor work.	Liberty has implemented routine safety observations of VM contractors and worked with its primary tree contractor to implement an updated job tailboard form to include a more detailed roping and rigging plan for tree work.	Completed 2025	9; pp. 213-262
6	2024	Grid Design, Operations, and Maintenance	Collaboration efforts with other electrical corporations	NV Energy's new wildfire encroachment policy, if implemented on the 619 line, would lead to loss of power supply to all customers in Portola and Loyalton.	Plumas-Sierra Rural Electrical Cooperative could provide an alternate power supply to Portola and Loyalton.	Completed 2024	8; pp. 150-212
7	2024	PSPS	2024 PSPS Events	Refer to Table 7-1.	Refer to Table 7-1.	Ongoing	7; pp. 145-149

ID #	Year of Lesson Learned	Subject	Category and Source of Lesson Learned	Description of Lesson Learned	Proposed WMP Improvement	Timeline for Implementation	Reference
8	2020-2024	Risk Modeling	Risk Modeling Working Group	Liberty has gained a greater understanding of best practices across the CA IOUs regarding the following topics: • Modeling baselines • Fire consequence • Asset risk events and ignitions • Vegetation risk events and ignitions • PSPS likelihood • PSPS consequence and reliability analysis and impacts • Modeling algorithms, components, and interdependencies • Smoke and suppression impacts • Climate change impacts	Liberty will continue to participate in the Joint IOU Wildfire Risk Modeling Working Group to understand best practices across the California IOUs (*i.e.*, further integration of community vulnerability, improvements to wildfire consequence modeling).	Ongoing	5; pp. 35-108
9	2022	Data tracking	Feedback from stakeholders; outcomes from previous WMP cycles	Liberty was lacking data quality for tracking and reporting WMP initiatives.	Refer to Section 12.	Completed 2024	12; pp. 339-345
10	2024	Emergency Preparedness, Collaboration, and Public Awareness	Feedback from government agencies and stakeholders; outcomes from previous WMP cycles.	Liberty was lacking MBL specific door hangers for communication of critical information during PSPS events.	MBL specific letter to be used as part of the PSPS notification process to leave at customers' houses after exhausting other attempts to notify via text, phone, or other means.	Completed 2024	11; pp. 292-339
11	2024	Emergency Preparedness, Collaboration, and Public Awareness	Feedback from government agencies and stakeholders	Some customers do not understand why PSPS may occur	Provide additional educational materials to Public Safety Partners for them to share through their community outreach channels.	Completed 2024	11; pp. 292-339
12	2026	Risk model internal review processes	Energy Safety decision on the 2026-2028 Base WMP	Liberty's risk model validation reporting and internal review processes were vague and lacked the detail necessary for progress tracking.	Establish an internal Risk Focus Group to provide governance for risk model development and validation.	Completed May 7, 2026	5.6.1; pp. 96-101
13	2026	Risk model development	Energy Safety decision on the 2026-2028 Base WMP	Liberty relied heavily on outside consultants for the development of its risk model leading to a lack of internal subject matter expertise.	Hire a Lead Risk Analyst to drive risk model development and continuous improvement	Completed June 22, 2026	5.1.1; pp. 35-37
14	2026	Mitigation strategy development	Energy Safety decision on the 2026-2028 Base WMP	The wildfire mitigation strategy must be risk informed and supported by an accurate assessment of mitigation effectiveness to effectively plan and prioritize WMP projects.	Improve risk mitigation strategy development by incorporating accurate cost benefit analysis and mitigation effectiveness to support risk informed decision making.	Initial model version completed July 23, 2026; additional improvements are outlined in the Risk Assessment Improvement Plan	6; pp. 109-144 5.7; pp. 103-108

13.1.1 Feedback from Governmental Agencies and Stakeholders

Liberty collaborates with multiple government agencies, including Alpine County, Placer County, the Town of Truckee, the California Public Utilities Commission ("CPUC"), Caltrans, CalFIRE, U.S. Forest Service, Tahoe Regional Planning Agency, Truckee Fire Protection District, Bureau of Indian Affairs, South Lake Tahoe Fire Department, Lake Valley Fire Protection District, California Tahoe Conservancy, Tahoe Resource Conservation District, and the Tahoe Fire and Fuels Teams. Liberty works with these agencies and stakeholders to receive constructive input, feedback, recommendations and support as well as to obtain proper land rights and permits. Upon completion of the development of its new risk model, Liberty conducted an external technical review of its wildfire risk model through a stakeholder engagement session described in Section 5.6.1. The meeting provided an opportunity to receive feedback on the risk model and included subject matter experts in wildfire prevention and risk modeling from local, state, and federal governmental agencies and stakeholders.

13.1.2 Collaboration with Other Electrical Corporations and Industry Experts

Refer to Liberty's response to ACI LU-25U-03 in Appendix D.

13.1.3 Areas for Continued Improvement

Liberty continues to track and provide updates on the Areas for Continued Improvement ("ACIs") identified in Energy Safety Decisions on Liberty WMPs. Refer to Appendix D for detailed information on each ACI.

13.1.4 Outcomes from Previous WMP Cycles

Liberty continues to track and provide updates on the Areas for Continued Improvement ("ACIs") identified in Energy Safety Decisions on Liberty WMPs. Refer to Appendix D for detailed information on each ACI issued in Liberty's 2025 WMP Update approval and each critical issues issued in Energy Safety's Decision on Liberty's 2026-2028 Base WMP.

13.2 Working Group Meetings

The electrical corporation must identify any Energy Safety-required working group meetings attended or planning to attend in the WMP submission year and provide any lessons learned that applied to its WMPs. The electrical corporation must include interactions and collaborations related to the electrical corporation's WMP submission such as identifying new technology, industry best practices, and shared lessons learned from the WMP process.

13.2.1 Risk Modeling Working Group

Liberty participates in the Energy Safety-led risk modeling working group, where discussions focus on risk assessment methodologies and wildfire mitigation strategies. Topics covered in these sessions include utility-specific approaches to identifying the likelihood of risk events and ignitions, assessing fire consequences based on meteorological, environmental, and fuel data, and modeling the probability and impact of PSPS de-energizations. Through these discussions, Liberty has gained insights into industry best practices, including:

- Modeling baselines
- Fire consequence
- Asset risk events and ignitions
- Vegetation risk events and ignitions
- PSPS likelihood
- PSPS consequence and reliability analysis and impacts
- Modeling algorithms, components, and interdependencies
- Smoke and suppression impacts
- Climate change impacts

13.2.2 Enhanced Vegetation Management Working Group

Liberty reviews the publicly shared outputs of the Energy Safety-required enhanced vegetation management working group led by SDG&E. Liberty will participate in future enhanced vegetation management working group meetings to the extent the smaller utilities are included.

13.2.3 AFN Statewide Council

Liberty participates in the AFN statewide council, where stakeholders discuss perspectives and feedback regarding IOU decision, operations, and lessons learned regarding AFN topics. Through these discussions, Liberty remains aware and continually educated on evolving best practices in terms of a whole community approach to supporting AFN customers and communities.

13.3 Discontinued Initiative Activities

The electrical corporation must provide all initiative activities from previous WMP submissions that it is no longer implementing ("Discontinued Initiative Activities"),[124] the rationale for discontinuation, the applicable lessons learned, and a list of the new or existing activities that mitigate risk in place of the discontinued activity ("Replacement Activities"), including cross-references to the page numbers within the WMP where each replacement activity is discussed.

Liberty is discontinuing its substation equipment replacement WMP initiative, previously tracked as WMP-GDOM-GH-12f. This initiative is being discontinued due to its vague scope and limited direct impact on wildfire risk mitigation. The activity, as previously described, encompassed general substation equipment replacements and upgrades, which were not tied to wildfire ignition risk. Furthermore, feedback from both internal reviews and Energy Safety emphasized that the initiative lacked clearly defined objectives and measurable outcomes specific to wildfire prevention. The underlying work, such as substation inspections and emergency equipment replacements, continues as part of routine utility operations and capital upgrade programs. While the discontinued initiative will no longer be tracked under a separate WMP initiative, risk mitigation previously attributed to this initiative is now supported through the following ongoing activities and WMP initiatives: Substation Inspections (WMP-GDOM-AI-06) and Substation Defensible Space (WMP-VM-VFM-03).

Liberty has applied the following lessons learned to its 2027 WMP:

- Clarity and Risk Relevance Are Essential: Initiative activities must be clearly defined and directly tied to measurable wildfire risk reduction to be meaningful and auditable.
- Program Discipline: Ongoing feedback loops with Energy Safety and operational teams are critical to ensuring that WMP initiatives remain aligned with their intended purpose and are responsive to actual risk.

Refer to Table 13-2.

[124] Discontinued initiative activities do not include initiative activities that the electrical corporation has completed. An initiative activity that has been completed is not a discontinued initiative activity.

Table 13-2: Lessons Learned from Discontinued Activities

Discontinued Activity (Tracking ID)	**Rationale for Discontinuation**	**Lessons Learned**	**Replacement Activities**
Substation Equipment Replacement (WMP-GDOM-GH-12f)	The activity, as previously described, encompassed general substation equipment replacements and upgrades—many of which were not directly tied to wildfire ignition risk. Furthermore, feedback from both internal reviews and Energy Safety emphasized that the initiative lacked clearly defined objectives and measurable outcomes specific to wildfire prevention	1) Clarity and Risk Relevance Are Essential: Initiative activities must be clearly defined and directly tied to measurable wildfire risk reduction to be meaningful and auditable. 2) Program Discipline: Ongoing feedback loops with Energy Safety and operational teams are critical to see that WMP initiatives remain aligned with their intended purpose and are responsive to actual risk	The underlying work, such as substation inspections and emergency equipment replacements, continues as part of routine utility operations and capital upgrade programs. While the discontinued initiative will no longer be tracked under a separate WMP initiative, risk mitigation previously attributed to this initiative is now supported through the following ongoing activities and WMP initiatives: Substation Inspections (WMP-GDOM-AI-06) and Substation Defensible Space (WMP-VM-VFM-03)

Appendix A
Office of Energy Safety WMP Definitions

Appendix A: Office of Energy Safety WMP Definitions

Unless otherwise expressly stated, the following words and terms, for the purposes of these Guidelines, have the meanings shown in this chapter.

Terms Defined in Other Codes

Where terms are not defined in these Guidelines and are defined in the Government Code, Public Utilities Code, or Public Resources Code, such terms have the meanings ascribed to them in those codes.

Terms Not Defined

Where terms are not defined through the methods authorized by this section, such terms have ordinarily accepted meanings such as the context implies.

Definition of Terms

Term	Definition
Access and functional needs population (AFN)	Individuals, including, but not limited to, those who have developmental or intellectual disabilities, physical disabilities, chronic conditions, or injuries; who have limited English proficiency or are non-English speaking; who are older adults, children, or people living in institutionalized settings; or who are low income, homeless, or transportation disadvantaged, including, but not limited to, those who are dependent on public transit or are pregnant. (Gov. Code, § 8593.3(f)(1).)
Asset (utility)	Electric lines, equipment, or supporting hardware.
Benchmarking	A comparison between one electrical corporation's protocols, technologies used, or mitigations implemented, and other electrical corporations' similar endeavors.
Burn likelihood	The likelihood that a wildfire with an ignition point will burn at a specific location within the service territory based on a probabilistic set of weather profiles, vegetation, and topography.

Term	Definition
Catastrophic wildfire	A fire that caused at least one death, damaged over 500 structures, or burned over 5,000 acres.
Circuit miles	The total length in miles of separate transmission and/or distribution circuits, regardless of the number of conductors used per circuit (*i.e.*, different phases).
Circuit segment	A specific portion of an electrical circuit that can be separated or disconnected from the rest of the system without affecting the operation of other parts of the network. This isolation is typically achieved using switches, circuit breakers, or other control mechanisms.
Consequence	The adverse effects from an event, considering the hazard intensity, community exposure, and local vulnerability.
Contact from object ignition likelihood	The likelihood that a non-vegetative object (such as a balloon or vehicle) will contact utility-owned equipment and result in an ignition.
Contact from vegetation likelihood of ignition	The likelihood that vegetation will contact utility-owned equipment and result in an ignition.
Contractor	Any individual in the temporary and/or indirect employ of the electrical corporation whose limited hours and/or time-bound term of employment are not considered "full-time" for tax and/or any other purposes.
Critical facilities and infrastructure	Facilities and infrastructure that are essential to public safety and that require additional assistance and advance planning to ensure resiliency during PSPS events. These include the following: Emergency services sector: Police stations Fire stations

Term	Definition
	Emergency operations centers Public safety answering points (*e.g.*, 9-1-1 emergency services) Government facilities sector: Schools Jails and prisons Health care and public health sector: Public health departments Medical facilities, including hospitals, skilled nursing facilities, nursing homes, blood banks, health care facilities, dialysis centers, and hospice facilities (excluding doctors' offices and other non-essential medical facilities) Energy sector: Public and private utility facilities vital to maintaining or restoring normal service, including, but not limited to, interconnected publicly owned electrical corporations and electric cooperatives Water and wastewater systems sector: Facilities associated with provision of drinking water or processing of wastewater, including facilities that pump, divert, transport, store, treat, and deliver water or wastewater Communications sector: Communication carrier infrastructure, including selective routers, central offices, head ends, cellular switches, remote terminals, and cellular sites Chemical sector: Facilities associated with manufacturing, maintaining, or distributing hazardous materials and chemicals (including Category N-Customers as defined in D.01-06-085)

Term	Definition
	Transportation sector: Facilities associated with transportation for civilian and military purposes: automotive, rail, aviation, maritime, or major public transportation (D.19-05-042 and D.20-05-051)
Customer hours	Total number of customers, multiplied by average number of hours (*e.g.*, of power outage).
Dead fuel moisture	The moisture content of dead organic fuels, expressed as a percentage of the oven dry weight of the sample, that is controlled entirely by exposure to environmental conditions.
Detailed inspection	In accordance with General Order (GO) 165, an inspection where individual pieces of equipment and structures are carefully examined, visually and through routine diagnostic testing, as appropriate, and (if practical and if useful information can be so gathered) opened, and the condition of each is rated and recorded.
Disaster	A serious disruption of the functioning of a community or a society at any scale due to hazardous events interacting with conditions of exposure, vulnerability, and capacity, leading to one or more of the following: human, material, economic, and environmental losses and impacts. The effect of the disaster can be immediate and localized but is often widespread and could last a long time. The effect may test or exceed the capacity of a community or society to cope using its own resources. Therefore, it may require assistance from external sources, which could include neighboring jurisdictions or those at the national or international levels. (United Nations Office for Disaster Risk Reduction [UNDRR].)

Term	Definition
Discussion-based exercise	Exercise used to familiarize participants with current plans, policies, agreements, and procedures or to develop new plans, policies, agreements, and procedures. Often includes seminars, workshops, tabletop exercises, and games.
Electrical corporation	Every corporation or person owning, controlling, operating, or managing any electric plant for compensation within California, except where the producer generates electricity on or distributes it through private property solely for its own use or the use of its tenants and not for sale or transmission to others.
Emergency	Any incident, whether natural, technological, or human caused, that requires responsive action to protect life or property but does not result in serious disruption of the functioning of a community or society. (FEMA/UNDRR.)
Enhanced inspection	Inspection whose frequency and thoroughness exceed the requirements of a detailed inspection, particularly if driven by risk calculations.
Equipment caused ignition likelihood	The likelihood that utility-owned equipment will cause an ignition through either normal operation (such as arcing) or failure.
Exercise	An instrument to train for, assess, practice, and improve performance in prevention, protection, response, and recovery capabilities in a risk-free environment. (FEMA.)
Exposure	The presence of people, infrastructure, livelihoods, environmental services and resources, and other high-value assets in places that could be adversely affected by a hazard.
Fire hazard index	A numerical rating for specific fuel types, indicating the relative probability of fires starting and spreading, and the probable

Term	Definition
	degree of resistance to control; similar to burning index, but without effects of wind speed. [127]
Fire potential index (FPI)	Landscape scale index used as a proxy for assessing real-time risk of a wildfire under current and forecasted weather conditions.
Fire season	The time of year when wildfires are most likely for a given geographic region due to historical weather conditions, vegetative characteristics, and impacts of climate change. Each electrical corporation defines the fire season(s) across its service territory based on a recognized fire agency definition for the specific region(s) in California.
Fireline intensity	The rate of heat release per unit time per unit length of fire front. Numerically, it is the product of the heat yield, the quantity of fuel consumed in the fire front, and the rate of spread. [128]
Frequency	The anticipated number of occurrences of an event or hazard over time.
Frequent PSPS events	Three or more PSPS events per calendar year per line circuit.
Fuel continuity	The degree or extent of continuous or uninterrupted distribution of fuel particles in a fuel bed thus affecting a fire's ability to sustain combustion and spread. This applies to aerial fuels as well as surface fuels.[129]
Fuel density	Mass of fuel (vegetation) per area that could combust in a wildfire.

[127] National Wildfire Coordinating Group: https://www.nwcg.gov/node/393188 (accessed May 9, 2024).

[128] National Wildfire Coordinating Group: https://www.nwcg.gov/node/447140 (accessed May 9, 2024).

[129] National Wildfire Coordinating Group: https://www.nwcg.gov/node/444281 (accessed May 9, 2024).

Term	Definition
Fuel management	Act or practice of controlling flammability and reducing resistance to control of wildland fuels through mechanical, chemical, biological, or manual means, or by fire, in support of land management objectives.[130]
Fuel moisture content	Amount of moisture in a given mass of fuel (vegetation), measured as a percentage of its dry weight.
Full-time employee (FTE)	Any individual in the ongoing and/or direct employ of the electrical corporation whose hours and/or term of employment are considered "full-time" for tax and/or any other purposes.
GO 95 nonconformance	Condition of a utility asset that does not meet standards established by GO 95.
Grid hardening	Actions (such as equipment upgrades, maintenance, and planning for more resilient infrastructure) taken in response to the risk of undesirable events (such as outages) or undesirable conditions of the electrical system to reduce or mitigate those events and conditions, informed by an assessment of the relevant risk drivers or factors.
Grid topology	General design of an electric grid, whether looped or radial, with consequences for reliability and ability to support PSPS (e.g., ability to deliver electricity from an additional source).
Hazard	A condition, situation, or behavior that presents the potential for harm or damage to people, property, the environment, or other valued resources.

[130] National Wildfire Coordinating Group: https://www.nwcg.gov/node/386549 (accessed May 9, 2024).

Term	Definition
Hazard tree	A tree that is, or has portions that are, dead, dying, rotten, diseased, or otherwise has a structural defect that may fail in whole or in part and damage utility facilities should it fail
High Fire Threat District (HFTD)	Areas of the state designated by the CPUC as having elevated wildfire risk, where each utility must take additional action (per GO 95, GO 165, and GO 166) to mitigate wildfire risk. (D.17-01-009.)
High Fire Risk Area (HFRA)	Areas that the electrical corporation has deemed at high risk from wildfire, independent of HFTD designation.
Highly rural region	Area with a population of less than seven persons per square mile, as determined by the United States Bureau of the Census. For purposes of the WMP, "area" must be defined as a census tract.
High-risk species	Species of vegetation that (1) have a higher risk of either coming into contact with powerlines or causing an outage or ignition, or (2) are easily ignitable and within close proximity to potential arcing, sparks, and/or other utility equipment thermal failures. The status of species as "high-risk" must be a function of species-specific characteristics, including growth rate; failure rates of limbs, trunk, and/or roots (as compared to other species); height at maturity; flammability; and vulnerability to disease or insects.
High wind warning (HWW)	Level of wind risk from weather conditions, as declared by the National Weather Service (NWS). For historical NWS data, refer to the Iowa State University archive of NWS watches/warnings.[131]
HWW overhead (OH) circuit mile day	Sum of OH circuit miles of utility grid subject to a HWW each day within a given time period, calculated as the number of OH circuit miles under a HWW multiplied by the number of days those miles are under said HWW. For example, if 100 OH circuit miles are under a HWW for one day, and 10 of those miles are under the

[131] https://mesonet.agron.iastate.edu/request/gis/watchwarn.phtml.

Term	Definition
	HWW for an additional day, then the total HWW OH circuit mile days would be 110.
Ignition likelihood	The total anticipated annualized number of ignitions resulting from electrical corporation-owned assets at each location in the electrical corporation's service territory. This considers probabilistic weather conditions, type and age of equipment, and potential contact of vegetation and other objects with electrical corporation assets. This should include the use of any method used to reduce the likelihood of ignition. For example, the use of protective equipment and device settings (PEDS) to reduce the likelihood of an ignition upon an initiating event.
Incident command system (ICS)	A standardized on-scene emergency management concept specifically designed to allow its user(s) to adopt an integrated organizational structure equal to the complexity and demands of single or multiple incidents, without being hindered by jurisdictional boundaries.
Initiative activity	See mitigation activity.
Initiative construction standards	The standard specifications, special provisions, standards of practice, standard material and construction specifications, construction protocols, and construction methods that an electrical corporation applies to activities undertaken by the electrical corporation pursuant to a WMP initiative in a given compliance period.
Level 1 finding	In accordance with GO 95, an immediate safety and/or reliability risk with high probability for significant impact.
Level 2 finding	In accordance with GO 95, a variable safety and/or reliability risk (non-immediate and with high to low probability for significant impact).

Term	Definition
Level 3 finding	In accordance with GO 95, an acceptable safety and/or reliability risk.
Limited English proficiency (LEP) population	Population with limited English working proficiency based on the International Language Roundtable scale.
Line miles	The number of miles of transmission and/or distribution conductors, including the length of each phase and parallel conductor segment.
Live fuel moisture content	Moisture content within living vegetation that can retain water longer than dead fuel.
Locally relevant	In disaster risk management, generally understood as the cope at which disaster risk strategies and initiatives are considered the most effective at achieving desired outcomes. This tends to be the level closest to impacting residents and communities, reducing existing risks, and building capacity, knowledge, and normative support. Locally relevant scales, conditions, and perspectives depend on the context of application.
Match-drop simulation	Wildfire simulation method forecasting propagation and consequence/impact based on an arbitrary ignition.
Memorandum of Agreement (MOA)	A document of agreement between two or more agencies establishing reciprocal assistance to be provided upon request (and if available from the supplying agency) and laying out the guidelines under which this assistance will operate. It can also be a cooperative document in which parties agree to work together on an agreed-upon project or meet an agreed objective.
Mitigation	Undertakings to reduce the loss of life and property from natural and/or human-caused disasters by avoiding or lessening the impact of a disaster and providing value to the public by creating

Term	Definition
	safer communities. Encompasses mitigation categories, mitigation initiatives, and mitigation activities within the WMP.
Mitigation activity	A measure that contributes to or accomplishes a mitigation initiative designed to reduce the consequences and/or probability of wildfire or outage event. For example, covered conductor installation is a mitigation activity under the mitigation initiative of Grid Design and System Hardening.
Mitigation category	The highest subset in the WMP mitigation hierarchy. There are five Mitigation Categories in total: Grid Design, Operations, and Maintenance; Vegetation Management and Inspections; Situational Awareness and Forecasting; Emergency Preparedness; and Enterprise Systems. Contains mitigation initiatives and any subsequent mitigation activities.
Mitigation initiative	Efforts within a mitigation category either proposed or in process, designed to reduce the consequences and/or probability of wildfire or outage event. For example, Asset Inspection is a mitigation initiative under the mitigation category of Grid Design, Operations, and Maintenance.
Model uncertainty	The amount by which a calculated value might differ from the true value when the input parameters are known (*i.e.*, limitation of the model itself based on assumptions).[132]

[132] Adapted from SFPE, 2010, "Substantiating a Fire Model for a Given Application," *Society of Fire Protection Engineers Engineering Guides*.

Term	Definition
Mutual aid	Voluntary aid and assistance by the provision of services and facilities, including but not limited to electrical corporations, communication, and transportation. Mutual aid is intended to provide adequate resources, facilities, and other support to an electrical corporation whenever its own resources prove inadequate to cope with a given situation.
National Incident Management System (NIMS)	A systematic, proactive approach to guide all levels of government, nongovernment organizations, and the private sector to work together to prevent, protect against, mitigate, respond to, and recover from the effects of incidents. NIMS provides stakeholders across the whole community with the shared vocabulary, systems, and processes to successfully deliver the capabilities described in the National Preparedness System. NIMS provides a consistent foundation for dealing with all incidents, ranging from daily occurrences to incidents requiring a coordinated federal response.
Operations-based exercise	Type of exercise that validates plans, policies, agreements, and procedures; clarifies roles and responsibilities; and identifies resource gaps in an operational environment. Often includes drills, functional exercises (FEs), and full-scale exercises (FSEs).
Outage program risk	The measure of reliability impacts from wildfire mitigation related outages at a given location.
Overall utility risk	The comprehensive risk due to both wildfire and PSPS incidents across a utility's territory; the aggregate potential of adverse impacts to people, property, critical infrastructure, or other valued assets in society.
Overall utility risk, PSPS risk	See Outage program risk.

Term	Definition
Parameter uncertainty	The amount by which a calculated value might differ from the true value based on unknown input parameters. (Adapted from Society of Fire Protection Engineers [SFPE] guidance.)
Patrol inspection	In accordance with GO 165, a simple visual inspection of applicable utility equipment and structures designed to identify obvious structural problems and hazards. Patrol inspections may be carried out in the course of other company business.
Performance metric	A quantifiable measurement that is used by an electrical corporation to indicate the extent to which its WMP is driving performance outcomes.
Population density	Population density is calculated using the American Community Survey (ACS) one-year estimate for the corresponding year or, for years with no such ACS estimate available, the estimate for the immediately preceding year.
Preparedness	A continuous cycle of planning, organizing, training, equipping, exercising, evaluating, and taking corrective action in an effort to ensure effective coordination during incident response. Within the NIMS, preparedness focuses on planning, procedures and protocols, training and exercises, personnel qualification and certification, and equipment certification.
Priority essential services	Critical first responders, public safety partners, critical facilities and infrastructure, operators of telecommunications infrastructure, and water electrical corporations/agencies.
Property	Private and public property, buildings and structures, infrastructure, and other items of value that may be destroyed by wildfire, including both third-party property and utility assets.

Term	Definition
Protective equipment and device settings (PEDS)	The electrical corporation's procedures for adjusting the sensitivity of grid elements to reduce wildfire risk, other than automatic reclosers (such as circuit breakers, switches, etc.). For example, PG&E's "Enhanced Powerline Safety Settings" (EPSS).
PEDS outage consequence	The total anticipated adverse effects from an outage occurring while increased sensitivity settings on a protective device are enabled at a specific location, including reliability and associated safety impacts.
PEDS outage exposure potential	The potential physical, social, or economic impact of an outage occurring when PEDS are enabled on people, property, critical infrastructure, livelihoods, health, local economies, and other high-value assets.
PEDS outage likelihood	The likelihood of an outage occurring while increased sensitivity settings on a protective device are enabled at a specific location given a probabilistic set of environmental conditions.
PEDS outage risk	The total expected annualized impacts from PEDS enablement at a specific location.
PEDS outage vulnerability	The susceptibility of people or a community to adverse effects of an outage occurring when PEDS are enabled, including all characteristics that influence their capacity to anticipate, cope with, resist, and recover from the related adverse effects (e.g., high AFN population, poor energy resiliency, low socioeconomics).
PSPS consequence	The total anticipated adverse effects of a PSPS for a community. This considers the PSPS exposure potential and inherent PSPS vulnerabilities of communities at risk.

Term	Definition
PSPS event	The period from notification of the first public safety partner of a planned public safety PSPS to re-energization of the final customer.
PSPS exposure potential	The potential physical, social, or economic impact of a PSPS event on people, property, critical infrastructure, livelihoods, health, local economies, and other high-value assets.
PSPS likelihood	The likelihood of an electrical corporation requiring a PSPS given a probabilistic set of environmental conditions.
PSPS risk	The total expected annualized impacts from PSPS at a specific location. This considers two factors: (1) the likelihood a PSPS will be required due to environmental conditions exceeding design conditions, and (2) the potential consequences of the PSPS for each affected community, considering exposure potential and vulnerability.
PSPS vulnerability	The susceptibility of people or a community to adverse effects of a PSPS event, including all characteristics that influence their capacity to anticipate, cope with, resist, and recover from the adverse effects of a PSPS event (*e.g.*, high AFN population, poor energy resiliency, low socioeconomics).
Public safety partners	First/emergency responders at the local, state, and federal levels; water, wastewater, and communication service providers; community choice aggregators (CCAs); affected publicly owned electrical corporations/electrical cooperatives; tribal governments; Energy Safety; the Commission; the California Office of Emergency Services; and CAL FIRE.
Qualitative target	Specific, measurable, achievable, realistic, and timely outcomes for the overall WMP strategy, or mitigation initiatives and activities that a utility can implement to satisfy the primary goals and subgoals of the WMP program.

Term	Definition
Quantitative target	A forward-looking, quantifiable measurement of work to which an electrical corporation commits to in its WMP. Electrical corporations will show progress toward completing targets in subsequent reports, including data submissions and WMP Updates.
RFW OH circuit mile day	Sum of OH circuit miles of utility grid subject to RFW each day within a given time period, calculated as the number of OH circuit miles under RFW multiplied by the number of days those miles are under said RFW. For example, if 100 OH circuit miles are under RFW for one day, and 10 of those miles are under RFW for an additional day, then the total RFW OH circuit mile days would be 110.
Risk	A measure of the anticipated adverse effects from a hazard considering the consequences and frequency of the hazard occurring.[133]
Risk component	A part of an electric corporation's risk analysis framework used to determine overall utility risk.
Risk evaluation	The process of comparing the results of a risk analysis with risk criteria to determine whether the risk and/or its magnitude is acceptable or tolerable. (ISO 31000:2009.)

[133] Adapted from D. Coppola, 2020, "Risk and Vulnerability," *Introduction to International Disaster Management,* 4th ed.

Term	Definition
Risk event	An event with probability of ignition, such as wire down, contact with objects, line slap, event with evidence of heat generation, or other event that causes sparking or has the potential to cause ignition. The following all qualify as risk events: • Ignitions • Outages not caused by vegetation • Outages caused by vegetation • Wire-down events • Faults • Other events with potential to cause ignition
Risk management	Systematic application of management policies, procedures, and practices to the tasks of communication, consultation, establishment of context, and identification, analysis, evaluation, treatment, monitoring, and review of risk. (ISO 31000.)
Rule	Section of Public Utilities Code requiring a particular activity or establishing a particular threshold.
Rural region	In accordance with GO 165, area with a population of less than 1,000 persons per square mile, as determined by the U.S. Bureau of the Census. For purposes of the WMP, "area" must be defined as a census tract.
Seminar	An informal discussion, designed to orient participants to new or updated plans, policies, or procedures (e.g., to review a new external communications standard operating procedure).
Sensitivity analysis	Process used to determine the relationships between the uncertainty in the independent variables ("input") used in an analysis and the uncertainty in the resultant dependent variables ("output"). (SFPE guidance.)

Term	Definition
Situational Awareness	An on-going process of gathering information by observation and by communication with others. This information is integrated to create an individual's perception of a given situation. [134]
Slash	Branches or limbs less than four inches in diameter, and bark and split products debris left on the ground as a result of utility vegetation management. [135]
Span	The space between adjacent supporting poles or structures on a circuit consisting of electric lines and equipment. "Span level" refers to asset-scale granularity.
Tabletop exercise (TTX)	A discussion-based exercise intended to stimulate discussion of various issues regarding a hypothetical situation. Tabletop exercises can be used to assess plans, policies, and procedures or to assess types of systems needed to guide the prevention of response to, or recovery from a defined incident.
Trees with strike potential	Trees that could either, in whole or in part, "fall in" to a power line or have portions detach and "fly in" to contact a power line in high-wind conditions.
Uncertainty	The amount by which an observed or calculated value might differ from the true value. For an observed value, the difference is "experimental uncertainty"; for a calculated value, it is "model" or "parameter uncertainty." (Adapted from SFPE guidance.)
Urban region	In accordance with GO 165, area with a population of more than 1,000 persons per square mile, as determined by the U.S. Bureau of the Census. For purposes of the WMP, "area" must be defined as a census tract.

[134] https://www.nwcg.gov/node/439827 (assessed May 13, 2024).

[135] California Public Resources Code section 4525.7.

Term	Definition
Utility-related ignition	An event that meets the criteria for a reportable event subject to fire-related reporting requirements. [136]
Validation	Process of determining the degree to which a calculation method accurately represents the real world from the perspective of the intended uses of the calculation method without modifying input parameters based on observations in a specific scenario. (Adapted from ASTM E 1355.)
Vegetation management (VM)	The assessment, intervention, and management of vegetation, including pruning and removal of trees and other vegetation around electrical infrastructure for safety, reliability, and risk reduction.
Verification	Process to ensure that a model is working as designed, that is, that the equations are being properly solved. Verification is essentially a check of the mathematics. (SFPE guidance.)
Vulnerability	The propensity or predisposition of a community to be adversely affected by a hazard, including the characteristics of a person, group, or service and their situation that influences their capacity to anticipate, cope with, resist, and recover from the adverse effects of a hazard.
Wildfire consequence	The total anticipated adverse effects from a wildfire on a community that is reached. This considers the wildfire hazard intensity, the wildfire exposure potential, and the inherent wildfire vulnerabilities of communities at risk.

[136] CPUC Decision 14-02-015, Appendix C, page C-3: https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M087/K892/87892306.PDF.

Term	Definition
Wildfire exposure potential	The potential physical, social, or economic impact of wildfire on people, property, critical infrastructure, livelihoods, health, environmental services, local economies, cultural/historical resources, and other high-value assets. This may include direct or indirect impacts, as well as short- and long-term impacts.
Wildfire hazard intensity	The potential intensity of a wildfire at a specific location within the service territory given a probabilistic set of weather profiles, vegetation, and topography.
Wildfire likelihood	The total anticipated annualized number of fires reaching each spatial location resulting from utility-related ignitions at each location in the electrical corporation service territory. This considers the ignition likelihood and the likelihood that an ignition will transition into a wildfire based on the probabilistic weather conditions in thearea.
Wildfire mitigation strategy	Overview of the key mitigation initiatives at enterprise level and component level across the electrical corporation's service territory, including interim strategies where long-term mitigation initiatives have long implementation timelines. This includes a description of the enterprise-level monitoring and evaluation strategy for assessing overall effectiveness of the WMP.
Wildfire risk	The total expected annualized impacts from ignitions at a specific location. This considers the likelihood that an ignition will occur, the likelihood the ignition will transition into a wildfire, and the potential consequences—considering hazard intensity, exposure potential, and vulnerability—the wildfire will have for each community it reaches.

Term	Definition
Wildfire spread likelihood	The likelihood that a fire with a nearby but unknown ignition point will transition into a wildfire and will spread to a location in the service territory based on a probabilistic set of weather profiles, vegetation, and topography.
Wildfire vulnerability	The susceptibility of people or a community to adverse effects of a wildfire, including all characteristics that influence their capacity to anticipate, cope with, resist, and recover from the adverse effects of a wildfire (e.g., AFN customers, Social Vulnerability Index, age of structures, firefighting capacities).
Wildland-urban interface (WUI)	The line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetation fuels (National Wildfire Coordinating Group).
Wire down	Instance where an electric transmission or distribution conductor is broken and falls from its intended position to rest on the ground or a foreign object.
Work order	A prescription for asset or vegetation management activities resulting from asset or vegetation management inspection findings.
Workshop	Discussion that resembles a seminar but is employed to build specific products, such as a draft plan or policy (e.g., a multi-year training and exercise plan).

Definitions of Initiatives by Category

Category	Section #	Initiative	Definition
Risk Methodology and Assessment	5	Risk Methodology and Assessment	Development and use of tools and processes to assess the risk of wildfire and PSPS across an electrical corporation's service territory.
Wildfire Mitigation Strategy	6	Wildfire Mitigation Strategy Development	Development and use of processes for deciding on a portfolio of mitigation initiatives to achieve maximum feasible risk reduction and that meet the goals of the WMP.
Grid Design, Operations, and Maintenance	8.2	Grid Design and System Hardening	Strengthening of distribution, transmission, and substation infrastructure to reduce the risk of utility-related ignitions resulting in catastrophic wildfires.
Grid Design, Operations, and Maintenance	8.3	Asset Inspections	Inspections of overhead electric transmission lines, equipment, and right-of-way.
Grid Design, Operations, and Maintenance	8.4	Equipment Maintenance and Repair	Remediation, adjustments, or installations of new equipment to improve or replace existing connector equipment, such as hotline clamps.
Grid Design, Operations, and Maintenance	8.5	Quality Assurance and Quality Control	Establishment and function of audit process to manage and confirm work completed by employees or contractors, including packaging QA/QC information for input to

Category	Section #	Initiative	Definition
			decision-making and related integrated workforce management processes.
Grid Design, Operations, and Maintenance	8.6	Work Orders	Actions taken to manage the electrical corporation's open work orders resulting from inspections that prescribe asset management activities.
Grid Design, Operations, and Maintenance	8.7	Grid Operations and Procedures	Operations and procedures to reduce across the electrical corporation's system to reduce wildfire risk.
Grid Design, Operations, and Maintenance	8.8	Workforce Planning	Programs to ensure that the electrical corporation has qualified asset personnel and to ensure that both employees and contractors tasked with asset management responsibilities are adequately trained to perform relevant work.
Vegetation Management and Inspections	9.2	Vegetation Management Inspections	Inspections of vegetation around and adjacent to electrical facilities and equipment that may be hazardous by growing, blowing, or falling into electrical facilities or equipment.
Vegetation Management and Inspections	9.3	Pruning and Removal	Pruning, removal, and other vegetation management activities that are performed as a result of inspections.

Category	Section #	Initiative	Definition
Vegetation Management and Inspections	9.4	Pole Clearing	Plan and execution of vegetation removal around poles per Public Resources Code section 4292 and outside the requirements of Public Resources Code section 4292 (e.g., pole clearing performed outside of the State Responsibility Area).
Vegetation Management and Inspections	9.5	Wood and Slash Management	Actions taken to manage all downed wood and "slash" generated from vegetation management activities.
Vegetation Management and Inspections	9.6	Defensible Space	Actions taken to reduce ignition probability and wildfire consequence due to contact with substation equipment.
Vegetation Management and Inspections	9.7	Integrated Vegetation Management	Actions taken in accordance with Integrated Vegetation Management principles that are not covered by another initiative.
Vegetation Management and Inspections	9.8	Partnerships	Collaboration of of resources, expertise, and efforts to accomplish agreed upon objectives related to wildfire risk reduction achieved through vegetation management.
Vegetation Management and Inspections	9.9	Activities Based on Weather Conditions	Actions taken in accordance with weather condition forecasts that indicate an elevated fire threat in terms of ignition probability and wildfire potential.

Category	Section #	Initiative	Definition
Vegetation Management and Inspections	9.10	Post-Fire Service Restoration	Actions taken during post-fire restoration to restore power while active fire suppression is ongoing and actions that occur following active fire suppression during the post-fire suppression repair and rehabilitation phases of fire protection operations.
Vegetation Management and Inspections	9.11	Quality Assurance and Quality Control	Establishment and function of audit process to manage and confirm work completed by employees or contractors, including packaging QA/QC information for input to decision-making and related integrated workforce management processes.
Vegetation Management and Inspections	9.12	Work Orders	Actions taken to manage the electrical corporation's open work orders resulting from inspections that prescribe vegetation management activities.
Vegetation Management and Inspections	9.13	Workforce Planning	Programs to ensure that the electrical corporation has qualified personnel and to ensure that both employees and contractors tasked with vegetation management responsibilities are adequately trained to perform relevant work.

Category	Section #	Initiative	Definition
Situational Awareness and Forecasting	10.2	Environmental Monitoring Systems	Development and deployment of systems which measure environmental characteristics, such as fuel moisture, air temperature, and velocity.
Situational Awareness and Forecasting	10.3	Grid Monitoring Systems	Development and deployment of systems that checks the operational conditions of electrical facilities and equipment and detects such things as faults, failures, and recloser operations.
Situational Awareness and Forecasting	10.4	Ignition Detection Systems	Development and deployment of systems which discover or identify the presence or existence of an ignition, such as cameras.
Situational Awareness and Forecasting	10.5	Weather Forecasting	Development methodology for forecast of weather conditions relevant to electrical corporation operations, forecasting weather conditions and conducting analysis to incorporate into utility decision-making, learning and updates to reduce false positives and false negatives of forecast PSPS conditions.
Situational Awareness and Forecasting	10.6	Fire Potential Index	Calculation and application of a landscape scale index used as a proxy for assessing real-time risk of a wildfire under current and forecasted weather conditions.

Category	Section #	Initiative	Definition
Emergency Preparedness, Collaboration and Public Awareness	11.2	Emergency Preparedness and Recovery Plan	Development and integration of wildfire- and PSPS-specific emergency strategies, practices, policies, and procedures into the electrical corporation's overall emergency plan based on the minimum standards described in GO 166.
Emergency Preparedness, Collaboration and Public Awareness	11.3	External Collaboration and Coordination	• Actions taken to coordinate wildfire and PSPS emergency preparedness with relevant public safety partners including the state, cities, counties, and tribes. • Development and integration of plans, programs, and/or policies for collaborating with communities on local wildfire mitigation planning, such as wildfire safety elements in general plans, community wildfire protection plans, and local multi-hazard mitigation plans.
Emergency Preparedness, Collaboration and Public Awareness	11.4	Public Communication, Outreach, and Education Awareness	• Development and integration of a comprehensive communication strategy to inform essential customers and other stakeholder groups of wildfires, outages due to wildfires, and PSPS and service

Category	Section #	Initiative	Definition
			restoration, as required by Public Utilities Code section 768.6. • Development and deployment of public outreach and education awareness program(s) for wildfires; outages due to wildfires, PSPS events, and protective equipment and device settings; service restoration before, during, and after the incidents and vegetation management. • Actions taken understand, evaluate, design, and implement wildfire and PSPS risk mitigation strategies, policies, and procedures specific to access and functional needs customers.
Emergency Preparedness, Collaboration and Public Awareness	11.5	Customer Support in Wildfire and PSPS Emergencies	Development and deployment of programs, systems, and protocols to support residential and non-residential customers in wildfire emergencies and PSPS events.
Enterprise Systems	12	Enterprise Systems Development	Structures and methods that allow the electrical corporation and its employees and/or contractors to accept, store, retrieve, and update data for the production, management, and scheduling of related work.

Definitions of Activities by Initiative

Initiative	Section #	Activity	Definition
Grid Design and System Hardening	8.2.1	Covered conductor installation	Installation of covered or insulated conductors to replace standard bare or unprotected conductors (defined in accordance with GO 95 as supply conductors, including but not limited to lead wires, not enclosed in a grounded metal pole or not covered by: a "suitable protective covering" (in accordance with Rule 22.8), grounded metal conduit, or grounded metal sheath or shield). In accordance with GO 95, conductor is defined as a material suitable for: (1) carrying electric current, usually in the form of a wire, cable or bus bar, or (2) transmitting light in the case of fiber optics; insulated conductors as those which are surrounded by an insulating material (in accordance with Rule 21.6), the dielectric strength of which is sufficient to withstand the maximum difference of potential at normal operating voltages of the circuit without breakdown or puncture; and suitable protective covering as a covering of wood or other non-conductive material having the electrical insulating efficiency (12kV/in. dry) and impact strength (20ft.-lbs) of 1.5 inches of redwood or other material meeting the requirements of Rule 22.8-A, 22.8-B, 22.8-C or 22.8-D.

Initiative	Section #	Activity	Definition
Grid Design and System Hardening	8.2.2	Undergrounding of electric lines and/or equipment	Actions taken to convert overhead electric lines and/or equipment to underground electric lines and/or equipment (i.e., located underground and in accordance with GO 128).
Grid Design and System Hardening	8.2.3	Distribution pole replacements and reinforcements	Remediation, adjustments, or installations of new equipment to improve or replace existing distribution poles (i.e., those supporting lines under 65kV), including with equipment such as composite poles manufactured with materials reduce ignition probability by increasing pole lifespan and resilience against failure from object contact and other events.
Grid Design and System Hardening	8.2.4	Transmission pole/tower replacements and reinforcements	Remediation, adjustments, or installations of new equipment to improve or replace existing transmission towers (e.g., structures such as lattice steel towers or tubular steel poles that support lines at or above 65kV).
Grid Design and System Hardening	8.2.5	Traditional overhead hardening	Maintenance, repair, and replacement of capacitors, circuit breakers, cross-arms, transformers, fuses, and connectors (e.g., hot line clamps) with the intention of minimizing the risk of ignition.
Grid Design and System Hardening	8.2.6	Emerging grid hardening technology installations and pilots	Development, deployment, and piloting of novel grid hardening technology.
Grid Design and System Hardening	8.2.7	Microgrids	Development and deployment of microgrids that may reduce the risk of ignition, risk from PSPS, and wildfire consequence. "Microgrid" is

Initiative	Section #	Activity	Definition
			defined by Public Utilities Code section 8370(d).
Grid Design and System Hardening	8.2.8	Installation of system automation equipment	Installation of electric equipment that increases the ability of the electrical corporation to automate system operation and monitoring, including equipment that can be adjusted remotely such as automatic reclosers (switching devices designed to detect and interrupt momentary faults that can reclose automatically and detect if a fault remains, remaining open if so).
Grid Design and System Hardening	8.2.9	Line removals (in HFTD)	Removal of overhead lines to minimize the risk of ignition due to the design, location, or configuration of electric equipment in HFTDs.
Grid Design and System Hardening	8.2.10	Other grid topology improvements to minimize risk of ignitions	Actions taken to minimize the risk of ignition due to the design, location, or configuration of electric equipment in HFTDs not covered by another initiative.
Grid Design and System Hardening	8.2.11	Other grid topology improvements to mitigate or reduce PSPS events	Actions taken to mitigate or reduce PSPS events in terms of geographic scope and number of customers affected not covered by another initiative.
Grid Design and System Hardening	8.2.12	Other technologies and systems not listed above	Other grid design and system hardening actions which the electrical corporation takes to reduce its ignition and PSPS risk not otherwise covered by other initiatives in this section.
Grid Operations and Procedures	8.7.1	Equipment Settings to Reduce Wildfire Risk	The electrical corporation's procedures for adjusting the sensitivity of grid elements to reduce wildfire risk.

Initiative	Section #	Activity	Definition
Grid Operations and Procedures	8.7.2	Grid Response Procedures and Notifications	The electrical corporation's procedures it uses to respond to faults, ignitions, or other issues detected on its grid that may result in a wildfire.
Grid Operations and Procedures	8.7.3	Personnel Work Procedures and Training in Conditions of Elevated Fire Risk	Work activity guidelines that designate what type of work can be performed during operating conditions of different levels of wildfire risk. Training for personnel on these guidelines and the procedures they prescribe, from normal operating procedures to increased mitigation measures to constraints on work performed.

Appendix B
Supporting Documentation for Risk Methodology and Assessment

Appendix B: Supporting Documentation for Risk Methodology and Assessment

Note: As part of its WMP, the electrical corporation is required to provide the "Summary Documentation" as defined by this appendix. For all other requirements in this appendix, the electrical corporation must be readily able to provide the defined documentation in response to a data request by Energy Safety or designated stakeholders.

The risk modeling and assessment in the main body of these Guidelines and electrical corporation's WMP are focused on providing a streamlined overview of the electrical corporation risk framework and key findings from the assessment necessary to understand the wildfire mitigation strategy presented in Section 7.

The focus of this appendix is to provide additional information pertaining to the risk modeling approach used by the electrical corporation. This includes the following:

- Additional detail on model calculations supporting the calculation of risk and risk components
- Additional detail on the calculation of risk and risk components
- More detailed presentation of the risk findings

The following sections establish the reporting requirements for the approaches used by the electrical corporation to calculate each risk and risk component. These have been synthesized and adapted from guidance documents on model quality assurance developed by many agencies, with a focus on guidance related to machine learning, artificial intelligence, and fire science and engineering. These guidance documents include those from the Institute of Electrical and Electronics Engineers (IEEE),[1] the Society of Fire Protection Engineers (SFPE),8 the American Society for Testing and Materials (ASTM International),9 the U.S. Nuclear Regulatory Commission (NRC),10 the Electric Power Research Institute (EPRI),52 the National Institute of Standards and Technology (NIST),11 and the International Organization for Standardization (ISO).12

Summary Documentation

The electrical corporation must provide high-level information on the calculation of each risk and risk component used in its risk analysis. The summary documentation must include each of the following:

- **High-level bow tie schematic** showing the inputs, outputs, and interaction between risk components.

[1] IEEE, 2022, "P2841/D2: Draft Framework and Process for Deep Learning Evaluation."

- **High-level calculation procedure schematic** showing the logical flow from input data to outputs, including separate items for any intermediate calculations in models or sub-models and any input from subject matter experts.
- **High-level narrative describing the calculation procedure** in a concise executive summary. This narrative must include the following:
    - Purpose of the calculation/model
    - Assumptions and limitations
    - Description of the calculation procedure shown in the bow tie and high-level schematics
    - Description of how outputs will be characterized and presented (e.g., visualization) to decision makers
    - Concise description and timeline of planned changes to the calculation procedure over the triennial WMP cycle.

For supporting documentation regarding Liberty's 2027 WMP risk model, reference the attached reports in Appendix B:

- B1 – Liberty Risk Methodology_FEP
- B2 - WMP Model Documentation_TSYL

Attachment B1
Liberty Risk Methodology_FEP

FILSINGER ENERGY PARTNERS

Risk Methodology

Prepared for Liberty Utilities by Filsinger Energy Partners

THE BUSINESS, THE SCIENCE, THE EXPERTS – IN ENERGY

Executive Summary

Liberty's new wildfire risk methodology provides a transparent, circuit-level framework for estimating and comparing wildfire risk across its electric system. The methodology was developed to improve the likelihood component of Liberty's existing risk framework while retaining and recalibrating the existing consequence assumptions based on modeled fire spread. It reflects the best available outage, ignition, inspection, asset, vegetation, weather, operational, and wildfire-consequence information and is intended to support circuit prioritization, mitigation evaluation, benefit-cost analysis, and other risk-informed planning decisions.

The model is structured to evaluate the conditions that can produce a high-consequence utility-related wildfire, with emphasis on the low-frequency, severe outcomes that drive wildfire tail risk. It first estimates the probability that a circuit experiences an outage-causing event, then evaluates the probability that the event occurs during extreme fire-weather conditions and finally combines that likelihood with the potential consequence of a spreading wildfire. Historical outages are used as a practical proxy for abnormal electrical and vegetation-related conditions capable of producing a spark, arc, hot material, or other ignition source. An outage is not treated as equivalent to an ignition or wildfire; rather, it provides a broader and more statistically meaningful record of ignition-capable system disturbances than Liberty's limited reportable-ignition history alone. This structure allows the model to focus on the overlap between ignition events, hazardous fire weather, and high-end wildfire consequences that are most relevant to catastrophic loss and enterprise risk.

Extensive data preparation and QA/QC informed the model design. Liberty's outage records were standardized into consolidated asset- and geographic-driver classifications, while ambiguous records were reviewed conservatively using available cause, sub-cause, and comment information. Review of Liberty's asset spatial datasets identified inconsistencies in geometry, naming, completeness, and linkage between current spatial records and asset attributes. These limitations, together with the available outage, inspection, and ignition data, supported use of the circuit as the primary analytical unit for the current model rather than attempting span-level or asset-level granularity.

A methodology was also developed to define fire season and extreme fire weather conditions across Liberty's service territory. Historical weather conditions were compared with large regional wildfire occurrence using multiple candidate variables, including temperature, relative humidity, vapor pressure deficit, energy release component, and burning index. Vapor pressure deficit was selected as the primary fire-season indicator because it provides a physically interpretable measure of atmospheric moisture demand and closely tracks the seasonal temperature signal.
Fire season is represented by conditions with VPD of at least 2 kilopascals, while extreme fire weather is defined by VPD of at least 2 kilopascals occurring with wind gusts of at least 50 miles

per hour. These thresholds are intended as repeatable risk-screening criteria, not deterministic predictions of wildfire occurrence.

Two probability approaches were developed to estimate circuit-level outage likelihood. The Bayesian latent asset-health model jointly evaluates historical outages and inspection findings to infer an underlying circuit condition state and quantify uncertainty in future outage frequency. The machine-learning model evaluates historical outage occurrence in relation to weather, circuit exposure, vegetation, inspection, loading, and operational characteristics. Its results distinguish outage-prone from non-outage conditions better than random classification, with an ROC-AUC of approximately 0.69, and show that weather variables—particularly recent maximum wind gust—provide the strongest predictive information, while asset, vegetation, loading, and inspection variables further differentiate risk among circuits.

The consequence component uses Technosylva fire-spread outputs and monetizes modeled impacts to structures, acres, population, and safety using Liberty-selected financial assumptions. Independent comparison with USFS and CAL FIRE wildfire simulation datasets found limited spatial agreement among the three modeling products and indicated that Technosylva modeled fire sizes were substantially smaller than public-model and historical wildfire outcomes. The current methodology therefore uses the 100th-percentile Technosylva scenario as a conditional severe-event consequence input and applies a consequence scaling factor of 1.26 to better align modeled losses with observed regional wildfire behavior. The high-end consequence value does not assume that each outage produces a maximum-loss fire; the likelihood model controls how frequently the initiating conditions are expected to occur.

The model results demonstrate substantial differentiation in wildfire-related likelihood across Liberty's circuits. A relatively limited group of circuits accounts for the highest modeled annual ignition likelihood, with TPZ1202 producing the highest estimate at approximately one-third, followed by MEY3200, MEY3300, MULLER1296, and other circuits concentrated in the Meyers and southern portions of the service territory. The results also confirm that reliability risk exposure, wildfire likelihood, and wildfire consequence are distinct. A circuit with a high annual probability of outage may still have relatively low wildfire likelihood if the probability of extreme fire weather affecting that circuit is low. Conversely, a circuit with a more moderate outage probability may rank higher where the likelihood of extreme fire weather is greater. Final wildfire risk should therefore be interpreted through the integrated calculation of outage likelihood, extreme fire weather likelihood, and consequence rather than through any single input, outage count, or model ranking.

The methodology also establishes an initial approach for applying mitigation effectiveness to baseline risk and evaluating residual risk and benefit-cost performance. For this model version, effectiveness values are incorporated for covered conductor, undergrounding, PSPS, and sensitive relay settings. Covered conductor uses differentiated effectiveness assumptions by outage driver, while the other included mitigations use uniform effectiveness values appropriate to the currently available evidence. This structure supports near-term benefit-cost analysis without overstating the precision of the available mitigation-performance data and provides a foundation for expanding differentiated effectiveness treatment as Liberty-specific and industry evidence improves.

Future refinement should focus on improving the quality, consistency, and granularity of the underlying data and strengthening the empirical basis for mitigation effectiveness. Near-term priorities include establishing a vegetation-outage investigation and feedback process and participating in joint utility effectiveness studies. Mid-term improvements include standardized outage cause and sub-cause options, clearer precedence among operator comments and cause determinations, targeted reduction of unknown causes, improved field documentation of ignitions, retrospective record review, and enhanced multidisciplinary outage investigation.
Longer-term opportunities include material testing of failed equipment, additional field validation of modeled wildfire hazards, more complete ignition-to-asset linkage, and progression toward failure-mode- and asset-level modeling where the supporting data are sufficient.

Overall, the revised methodology provides Liberty with a defensible foundation for evaluating circuit risk and comparing mitigation investments. It improves transparency by separating outage likelihood, extreme fire-weather exposure, and wildfire consequence; incorporates two independent likelihood methods; documents major assumptions and limitations; and preserves a clear pathway for continued validation and refinement as Liberty's data, operational processes, and modeling capabilities mature.

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QA/QC Review of Technosylva Consequence Datasets

Objective

The objective of this quality assurance and quality control (QA/QC) review was to evaluate the relative consistency of proprietary wildfire consequence datasets developed by Technosylva against independent, publicly available wildfire risk datasets for the Liberty Utilities service area in California.

This assessment focused on transmitted risk, defined as wildfire impacts originating from ignition locations and propagating across the landscape to expose downstream assets and infrastructure. The purpose was not to evaluate in-situ wildfire likelihood at asset locations, but rather to assess whether independently developed stochastic fire simulation datasets identified similar wildfire transmission pathways and consequence magnitudes.

The review was intended to benchmark the Technosylva outputs against transparent, publicly available datasets developed using comparable large-fire simulation methods.

Datasets

Technosylva Consequence Datasets

Technosylva developed a suite of wildfire modeling products for Liberty Utilities. The Technosylva dataset was generated using the Minimum Travel Time (MTT) fire spread algorithm and incorporated a 2030 fuelscape, 600 selected fire weather days, and twenty years of WRF reanalysis weather data. The resulting dataset provided event-level consequence metrics including acres burned, population impacted, buildings threatened, and estimated buildings destroyed. To maintain consistency with the publicly available datasets, the conditional acres burned product was primarily evaluated.

USFS Risk Assessment – WildfireRisk.org

The first public benchmark dataset was the Wildfire Risk to Communities (WRC) dataset (Scott et al. 2024), developed by the United States Forest Service. This dataset provides nationally consistent wildfire risk components across the United States and includes modeled ignition locations, fire perimeters, and consequence-related exposure layers.

The analysis utilized both the published WRC spatial datasets and the underlying raw simulation data provided directly by Gregory Dillon (USFS Fire Modeling Institute). Housing unit exposure was derived from the WRC housing unit count (HuCNT) raster at 30-meter resolution. Prior validation of WRC burn probability products has demonstrated alignment with observed wildfire occurrence (Carson et al. 2025).

CAL FIRE Risk Assessment

The second public benchmark dataset was the CAL FIRE statewide wildfire risk assessment (Pyrologix and Vibrant Planet Data Commons 2025), using the 2035 capable fuels scenario. This dataset includes statewide ignition locations, modeled fire perimeters, and wildfire consequence layers generated using methods described in Vogler et al. (2021).

Prior validation of previous iterations of the CAL FIRE wildfire risk datasets demonstrated very strong agreement with observed fire occurrence and spread patterns (Moran et al. 2025).

Methodology

The following methodology describes the post-processing steps applied to the event-level wildfire simulation outputs from the USFS WRC and CAL FIRE statewide risk assessment datasets to develop comparable wildfire consequence surfaces for evaluation against the Technosylva datasets. These methods are consistent with established approaches used in national and state wildfire risk assessments and have been widely applied in the scientific literature (Ager et al. 2021, Thompson et al 2022, Vogler et al. 2015). Where possible, post-processing procedures were intentionally aligned with those described in Technosylva's technical documentation, including spatial aggregation, smoothing, and circuit-level attribution methods, to support greater methodological consistency and improve the comparability of resulting wildfire consequence estimates.

Study Area

All analyses were conducted within the Liberty Utilities service area using the SPANS 2025 infrastructure dataset as the operational analysis framework. Circuit-level overhead (OH) line infrastructure served as the basis for comparative risk attribution.

Ignition Selection and Filtering

To identify potential wildfire transmission sources relevant to Liberty infrastructure, the SPANS 2025 infrastructure dataset was buffered using the Pairwise Buffer tool in ArcGIS Pro with a 250-meter buffer distance.

Ignition locations from both the WRC and CAL FIRE statewide risk assessment datasets were clipped to this buffered extent to isolate potential wildfire transmission events originating in proximity to Liberty infrastructure. This approach was intended to evaluate downstream wildfire consequence associated with infrastructure-adjacent ignitions, rather than direct wildfire exposure to Liberty assets. A unique identifier was assigned to each ignition point to preserve event-level linkage throughout subsequent analyses.

Perimeter Attribution

For each selected ignition point, the corresponding modeled fire perimeter was extracted from the public datasets. To estimate wildfire consequences associated with each ignition, the Zonal Statistics as Table tool was applied using wildfire perimeter polygons as zones and the WRC

housing unit count (HuCNT) raster as the value raster. The SUM statistics were used to calculate total housing units exposed within each fire perimeter.

The HuCNT raster is provided at 30-meter spatial resolution and was selected as a consistent structure exposure dataset for both the USFS and CAL FIRE analyses to standardize structure exposure estimates across datasets.

The resulting zonal summary table was joined back to the clipped ignition point datasets using the unique event identifier. This process generated event-level consequence metrics including conditional wildfire size (acres) and total structures exposed.

Raster Conversion and Spatial Smoothing

The attributed ignition point datasets were converted to raster format using the Point to Raster tool in ArcGIS Pro with a 30-meter cell size to maintain consistency with the underlying HuCNT raster resolution.

Where multiple ignition points occurred within the same 30-meter grid cell, the MEAN value was used for aggregation. To generalize localized variation and reduce point clustering artifacts, Focal Statistics were applied to the raster surfaces using the P95 statistic and a circular neighborhood with a 50-cell radius, equivalent to approximately a 1.5-kilometer smoothing window.

This smoothing process was completed independently for both conditional wildfire size and structures exposed for the USFS and CAL FIRE datasets. This post-processing approach was selected to maintain methodological consistency with the spatial smoothing and aggregation methods used in the Technosylva wildfire consequence datasets.

Circuit Sampling and Attribution

To assign wildfire transmission-based consequence values to each of the Liberty circuits, a series of sample points was generated along the SPANS 2025 overhead line dataset at 10-meter intervals. Raster values for conditional wildfire size and structures exposed were sampled to these points using the Extract Multi Values to Points tool.

The resulting point-level data were exported to Microsoft Excel and summarized at the circuit level. For each circuit, the maximum sampled value was retained for both conditional wildfire size and structures exposed. This approach was selected to maintain consistency with the methodology described in Technosylva's technical documentation.

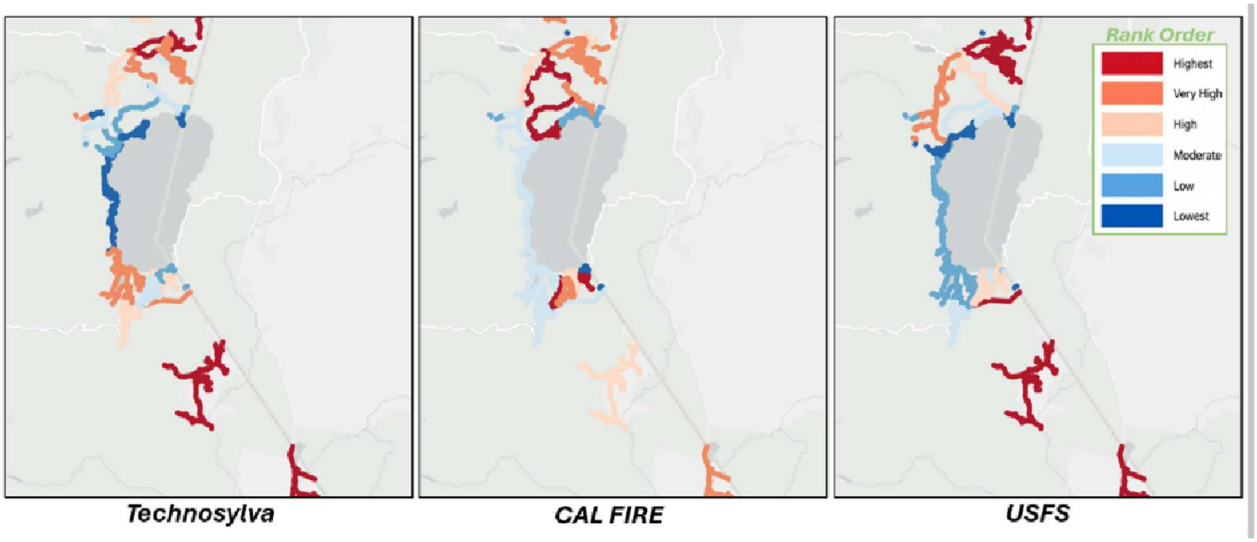
Comparative Analysis

Comparisons between the Technosylva, USFS, and CAL FIRE-derived datasets were conducted across two dimensions: spatial alignment and magnitude.

Spatial Alignment

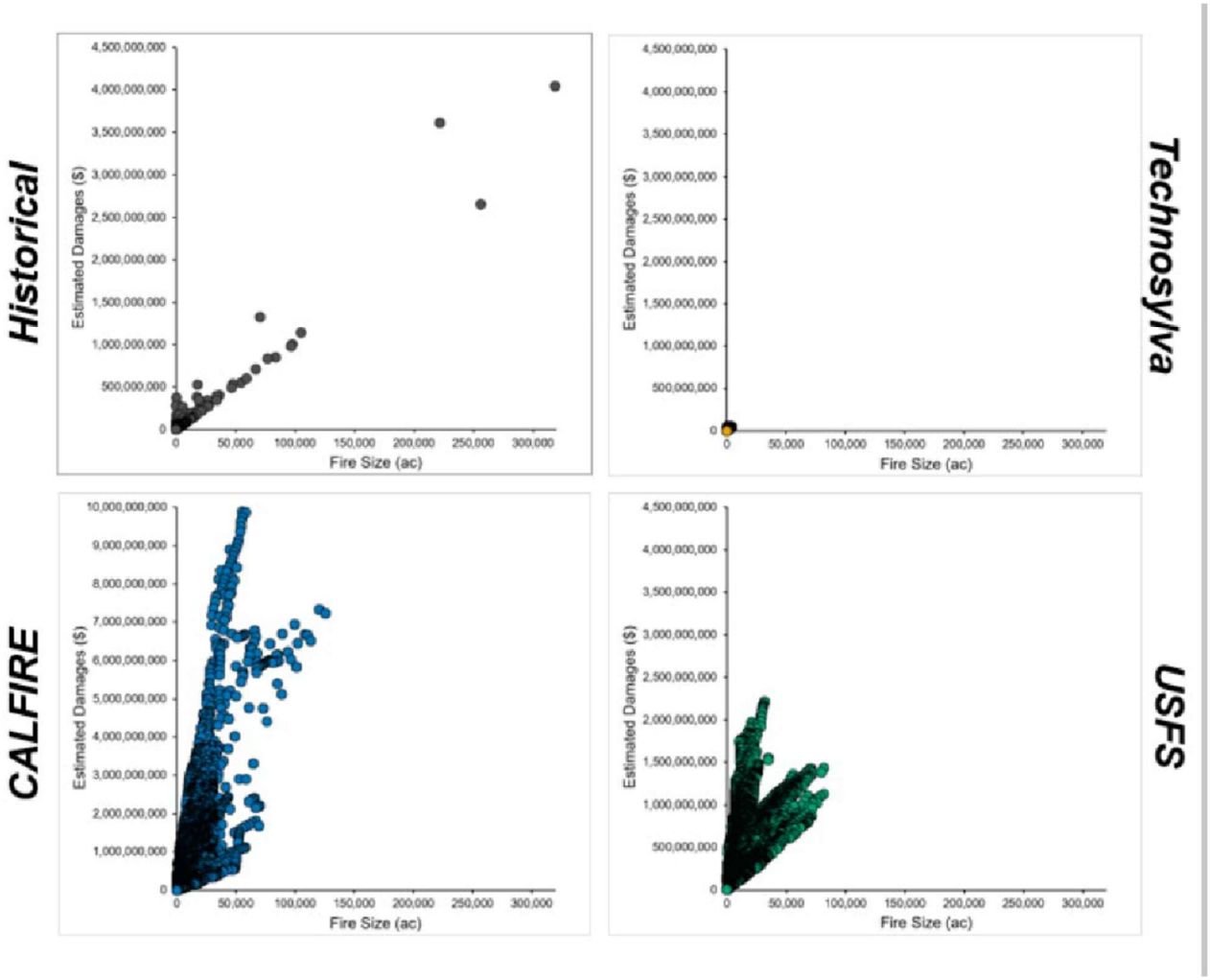
Spatial alignment was evaluated by comparing the geographic coincidence of high-consequence source areas and transmission pathways across datasets. This assessment focused on identifying whether independent simulation systems consistently prioritized similar source areas as dominant contributors to downstream wildfire exposure.

Circuit-level rankings derived from the maximum sampled values were compared to evaluate whether independent simulation products consistently prioritized similar infrastructure. There was found to be limited spatial alignment across the 3 datasets with the closest alignment between the USFS and CAL Fire analysis.



Magnitude Comparison

Magnitude comparisons evaluated differences in modeled wildfire consequence across datasets. Conditional wildfire size was selected as the primary comparison metric across all three modeling products because it provided the most directly comparable measure of wildfire potential. Historical wildfire occurrence data from CAL FIRE (1990 to 2024) were used as a contextual benchmark for evaluating modeled fire size distributions.



The USFS and CAL FIRE datasets demonstrated close alignment with the historical average and distribution of wildfire sizes originating within the Liberty Utilities service area. In contrast, the Technosylva dataset produced substantially smaller modeled fire sizes, with the maximum simulated fire under the P95 scenario reaching 4,407 acres, approximately an order of magnitude smaller than the average observed historical wildfire occurrences. This divergence may be partially attributable to the eight-hour simulation duration constraint applied in the Technosylva modeling framework, which limits the representation of extended-duration wildfire growth and is not a constraint present in the USFS or CAL FIRE simulation datasets.

Future Field Validation

Recognizing that modeled wildfire risk datasets can contain localized artifacts or miss important site-specific conditions, future field validation is recommended to support interpretation and refinement. Field validation efforts may include site photography, fuel condition documentation, defensible space characterization, wildfire fuels assessment. Tools such as Survey123 provide an

efficient framework for collecting georeferenced field observations and integrating standardized hazard rubric scores. These observations can be used to distinguish true high-risk conditions from model artifacts and may support the development of localized risk modifiers for incorporation into future wildfire mitigation planning efforts.

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Consequence Methodology and Use of the 100th Percentile Technosylva Scenario

Consequence Methodology and Use of the 100th Percentile Technosylva Scenario

Liberty's risk model revision focuses on redeveloping the likelihood side of the risk equation to better reflect outage probability, fire-weather exposure, and circuit-specific ignition potential, while retaining the existing Technosylva-based consequence framework to preserve and build upon Liberty's prior investment.

The consequence component of Liberty's revised wildfire risk model estimates the potential adverse outcomes of a wildfire if an ignition associated with Liberty's system were to occur and spread. Liberty's methodology relies on Technosylva wildfire consequence outputs as the core fire-spread consequence input, using modeled estimates of potential impacts from asset-based ignition locations under a range of fire-spread scenarios. These outputs reflect physical consequence metrics such as acres burned, structures destroyed or threatened, and population affected, but do not directly provide dollar loss estimates. To translate these modeled impacts into monetized consequence values, Liberty's Risk Focus Group selected financial variables and assumptions that assign costs to each consequence metric. For example, modeled acres burned are converted into estimated restoration and suppression costs, modeled buildings destroyed are converted into structure loss values, and modeled population or fatality-related impacts are converted into safety consequence values using the applicable value-of-statistical-life assumption. The resulting monetized consequence value is then combined with the revised likelihood model as part of Liberty's broader wildfire risk calculation.

An important step in applying the fire spread outputs is determining which consequence percentile best reflects the loss exposure Liberty is seeking to model. Wildfire consequence is better understood as a distribution than as a single average outcome. Many potential ignitions (defined for this context as any sparking, arcing or discharge of energy from electrical assets) would result in no reportable fire or relatively limited fire spread, while a smaller number of events could produce very large losses under adverse weather exposure, fuel dryness and type and suppression conditions. Because of this right-tailed distribution, average or mid-percentile consequence values may be appropriate for some planning questions, but they can understate the financial exposure associated with the low-frequency, high-consequence events that drive utility wildfire risk.

For Liberty's model, the 100th percentile Technosylva consequence scenario is used as the consequence value because it best aligns the modeled consequence framework with observed fire behavior and financial losses in and near Liberty's service territory. The purpose of this selection is not to assume that every outage or ignition would result in a maximum-loss wildfire. The likelihood component of the model already accounts for the probability of an outage and the probability that the outage occurs under extreme fire-weather conditions. Instead, the consequence component is intended to answer a conditional question: if an ignition occurs on a specific circuit under the hazardous conditions represented in the

revised likelihood model and becomes a spreading wildfire, what level of consequence is most appropriate for estimating the potential financial loss?

The benchmarking analysis indicates that lower Technosylva consequence percentiles undervalue the level of loss that has been observed from actual wildfires in and near Liberty's service territory. When modeled consequence values are compared against historical fire losses, the upper-end Technosylva scenarios come closest to reflecting the magnitude of actual financial losses associated with severe regional wildfire events. This is particularly important for Liberty because its service territory is located in a high-consequence wildfire environment, including mountainous terrain, forested areas, communities with limited egress, and wildland-urban interface exposure. In this context, relying on an average or central-tendency consequence scenario would risk understating the potential enterprise exposure from a relatively small number of catastrophic events. For example, the following two tables illustrate actual fires anticipated losses from within 100 miles of the service area and directly within the service area.

Table 1: Fire loses within 100 miles of service territory

Return Year (Year)	Prob. Exceedance (%)	Return Level Financial Loss ($B)
2	51%	0.06
3	33%	0.15
10	10%	1.52
20	5%	3.12
61	2%	19.30

The following are fires within Liberty's service area.

Table 2: Fire losses within Liberty Service Area

Return Year (Year)	Prob. Exceedance (%)	Return Level Financial Loss ($B)
1.2	83%	0.06
1.5	67%	0.14
2.0	50%	0.15
3.0	33%	0.18
6.0	17%	1.52

For reference, when comparing the worst-case consequence from the Technosylva model, the consequence was only ~$57.5 million. This is significantly lower than observed fires. The table below

shows the difference between modeled fire growth as performed by Technosylva (TS), CalFire, and the US Forest Service (USFS), looking at the 95th percentile values for all.

	95th percentile acres burned		
Feeder	TS	CalFire	USFS
MULLER1296	4,125	125,824	58,602

As shown, the Technosylva fire size output for the Muller1296 circuit is an order of magnitude lower than other fire behavior simulations for the same ecology, fuel, weather etc. In order to bring the baseline annual expected risk (using modeled fire size results) to closer alignment with observed fire behavior and inputs from public safety partners with regional expertise, the 100th percentile results from the fire spread model are the most appropriate input for the risk model. The model separates likelihood and consequence so that the 100th percentile consequence value is not interpreted as an annual expected loss by itself. Rather, it is combined with the modeled probability of outage and the probability of extreme fire-weather exposure to estimate risk. This allows the model to reflect both the rarity of the initiating conditions and the severity of the potential outcome if those conditions occur together. In other words, the high-end consequence value represents the conditional severity of a wildfire event, while the likelihood model controls how often that severe consequence is expected to be realized.

This approach is appropriate for the current stage of Liberty's model development because Liberty does not yet have a sufficiently large or detailed utility-caused ignition and wildfire-loss dataset to calibrate a more granular ignition-to-loss distribution directly from Liberty-specific events. In the absence of a more robust dataset, the revised model uses available outage, weather, and fire-spread data to construct a transparent and conservative risk framework. The 100th percentile Technosylva scenario is used as a planning consequence assumption because it is the modeled scenario that most closely approximates observed severe wildfire losses in the region, while also preserving a clear pathway for future refinement as additional ignition, fire-weather, asset-condition, and consequence data become available.

Several assumptions should be noted. First, the 100th percentile Technosylva value is used as a conditional consequence input, not as an assumption that all outages become wildfires or that all wildfires reach maximum modeled impact. Second, the selection reflects a calibration judgment based on comparison to actual historical losses and is intended to reduce the risk of systematically understating catastrophic wildfire exposure. Third, because the specific weather conditions associated with each Technosylva fire-spread percentile were not available, the percentile selection is treated as a severity-matching assumption rather than a direct weather-recurrence assumption. Finally, the methodology should be revisited as Liberty's model matures, including through additional benchmarking against observed fire behavior, updated Technosylva outputs, refreshed values-at-risk data, and any future Liberty-specific ignition or wildfire-loss experience.

Overall, the use of the 100th percentile Technosylva consequence scenario provides a defensible consequence value for Liberty's revised wildfire risk model. It better reflects the heavy-tailed nature of wildfire losses, avoids understating catastrophic exposure, and aligns the consequence input with the severe-loss events that are most relevant for wildfire mitigation planning, investment prioritization, and enterprise risk management.

Scaling Factor

As shared previously, the 8hr 100th percentile burned across all circuits significantly underestimates consequences. In order to get a closer approximated annual expected risk Liberty must use a scaling factor to modify the consequences to be more in line with actual fires.

Using the following estimates for variable consequences, the Cal Fire incident data was used to model estimated losses from actual fires to compare to Technosylva.

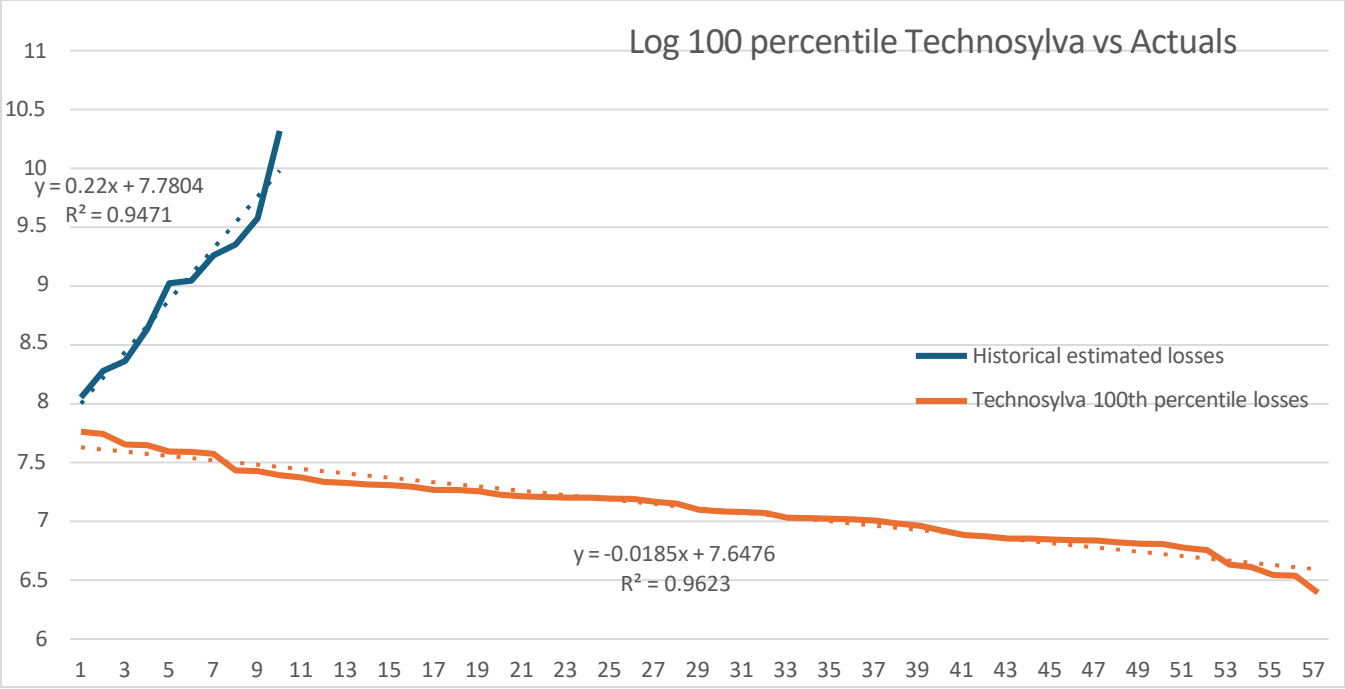
Table 3: Estimated Consequence Financial Impact

Variable	Assumed Cost
Building value	$1,000,000
Per acre restoration	$1,460
Per acre suppression	$876
VSL/building	0.0039
Value of Statistical Life (VSL)	$16,500,000

When performing a power law fit and log transforming the historical losses to the log transformed Technosylva consequences, the highest Technosylva result is not even the lowest of moderate-large size fires.

Fire	Year	Acres	Fatalities	Structures Destroyed	*Acres $*	*Fatality $*	*Structures $*	*Total*
Dixie Fire	**2021**	**963309**	**0**	**1311**	***$2,250,289,824***	***$0***	***$1,311,000,000***	***$3,561,289,824***
Park Fire	**2024**	**429603**	**0**	**713**	***$1,003,552,608***	***$0***	***$713,000,000***	***$1,716,552,608***
Creek Fire	**2020**	**379895**	**0**	**858**	***$887,434,720***	***$0***	***$858,000,000***	***$1,745,434,720***
North Complex Fire	**2020**	**318935**	**16**	**2352**	***$745,032,160***	***$264,000,000***	***$2,352,000,000***	***$3,361,032,160***
Rim Fire	**2013**	**257314**	**0**	**112**	***$601,085,504***	***$0***	***$112,000,000***	***$713,085,504***
Caldor Fire	**2021**	**221835**	**0**	**1005**	***$518,206,560***	***$0***	***$1,005,000,000***	***$1,523,206,560***
Camp Fire	**2018**	**153336**	**85**	**18804**	***$358,192,896***	***$1,402,500,000***	***$18,804,000,000***	***$20,564,692,896***
Detwiler Fire	**2017**	**81826**	**0**	**134**	***$191,145,536***	***$0***	***$134,000,000***	***$325,145,536***
Butte Fire	**2015**	**70868**	**2**	**928**	***$165,547,648***	***$33,000,000***	***$928,000,000***	***$1,126,547,648***
Donnell Fire	**2018**	**36450**	**0**	**135**	***$85,147,200***	***$0***	***$135,000,000***	***$220,147,200***
Oak Fire	**2022**	**19244**	**0**	**194**	***$44,953,984***	***$0***	***$194,000,000***	***$238,953,984***
Cascade Fire (Wind Complex)	**2017**	**9989**	**0**	**264**	***$23,334,304***	***$0***	***$264,000,000***	***$287,334,304***
River Fire	**2021**	**9656**	**0**	**154**	***$22,556,416***	***$0***	***$154,000,000***	***$176,556,416***

When averaging the log transformed results of historical to modeled the ratio comes out to be 1.26.



Applying the 1.26 scaling factor to the previously discussed Muller1296 feeder produces an adjusted Technosylva estimate of 75,062 acres, which falls between the corresponding USFS and CAL FIRE estimates.

	95th percentile acres burned			
	TS	CalFire	USFS	TS-Scaled
MULLER1296	4125	125824	58602	75062

This scaling factor is not intended to be managing to the worst-case scenario (e.g. Eaton or Camp Fire) but allow the annual expected risk results to fit to an exceedance probability and return interval that matches a rich historical dataset of losses. Post probability adjustment, the baseline risk after protective settings and PSPS results in an estimated annual exposure of ~$122million/year. This fits nearly perfectly to the data presented in Table 2.

Fire Season and Extreme Fire Weather Methodology

A weather-based fire season definition was developed to help identify the times of year when an outage or fault condition may have an increased likelihood of resulting in an ignition that could become a self-propagating fire. The analysis is not intended to predict exactly when a fire will occur. Rather, it is intended to identify the seasonal window when weather conditions are generally more favorable for ignition growth and fire spread.

The methodology reviewed daily weather conditions across Liberty's service territory over a historical period. The risk modeling team evaluated several fire-weather variables commonly associated with wildfire potential, including temperature, relative humidity, vapor pressure deficit, energy release component, and burning index. These variables were used to characterize how hot, dry, and fire-conducive conditions were on each day.

The analysis then compared those daily weather conditions to a regional wildfire dataset of large fires within 100 miles of Liberty's service territory that grew to 5,000 acres or larger. Each fire's ignition or discovery date was matched to the corresponding daily weather conditions. This allowed the risk modeling team to compare days when large regional fires occurred with days when they did not.

After evaluating several candidate weather variables, the risk modeling team selected vapor pressure deficit, or VPD, as the proposed primary basis for defining fire season. VPD measures the atmosphere's demand for moisture from vegetation and other fuels. Higher VPD generally indicates drier atmospheric conditions that can make fuels more receptive to ignition and fire spread. VPD was also highly correlated with temperature in the analysis, meaning it captured much of the same seasonal weather pattern while providing a more direct physical connection to fuel dryness.

Based on this review, the proposed fire season window is defined as the period when average daily VPD across the service territory is likely to be 2 kilopascals or higher, expressed as VPD ≥ 2. This threshold is intended to provide a reasonable and repeatable indicator of days when regional fire occurrence is more likely under the weather conditions reviewed.

The methodology also evaluated conditions associated with extreme fire weather. For this purpose, the analysis considered both dry atmospheric conditions and wind. Extreme fire weather is proposed to be defined as VPD greater than 2 kilopascals and wind gusts greater than 50 miles per hour occurring at the same time. The 50-mph wind gust threshold was informed by review of Liberty's past PSPS events and is used as an approximation of the wind conditions under which de-energization has previously been considered or implemented.

This methodology provides a transparent and repeatable basis for identifying fire season and extreme fire weather conditions in Liberty's service territory. It should be interpreted as a planning and risk-screening tool, not as a deterministic prediction of wildfire occurrence. Actual wildfire behavior can still be affected

by local terrain, fuels, wind exposure, ignition source, and real-time conditions. However, the approach provides a practical framework for identifying periods when weather conditions are more supportive of wildfire growth and when additional operational awareness may be warranted.

Purpose and scope

This methodology describes the process used to prepare and evaluate fire weather variables for the development of a statistically derived, regional fire season definition tailored to Liberty Utilities' (LUs) service territory. This definition of fire season is intended to identify the times and locations where an ignition is more likely to become a self-propagating fire. The analysis compared daily meteorological conditions observed in LU's territory between ignition dates and non-ignitions dates and identified the statistically optimal choice of variable and threshold for discriminating between when wildfires are present or absent.

The source information for this analysis combined gridded weather data with wildfire records that varied in available date fields and event size information. For this reason, the data workup focused on creating a consistent daily analytical dataset prior to selecting threshold values. The resulting thresholds were intended to provide a reliable basis for identifying periods when wildfire occurrence and risk is elevated.

Fire weather data preparation

Daily meteorological and fire-weather time series of the average conditions over LUs service territory were derived for five candidate variables using GRIDMET data for January 1, 1979, to December 31, 2025 (https://www.climatologylab.org/gridmet.html). The spatial domain of LUs service territory was defined using California Public Utilities Commission IOU service territory information (https://cecgis-caenergy.opendata.arcgis.com/documents/electric-investor-owned-utility-areas/about).

The five-candidate fire-weather variables included energy release component (ERC), burning index (BI), vapor pressure deficit (VPD), maximum daily temperature (max_T), and minimum relative humidity (min_RH). For the threshold evaluation, min_RH was transformed using 100 minus min_RH, reversing the scale so that higher values corresponded to drier conditions. The analysis also calculated the severe fire danger index (SFDI), which has been an effective indicator of wildfire consequence in other settings (https://doi.org/10.3390/fire2030047).

Wildfire record preparation and linkage

Wildfire records were loaded from the historical fire dataset (sourced from CALFIRE, DINS, and ICS209Plus) which captured all fires on record within 100 miles of the LU service territory and reaching 5,000 acres or larger in size. The analysis used the incident creation date where available and substituted the Fire Occurrence Database (FOD) discovery date where the incident creation date was missing. This produced a single final ignition or discovery date field for matching wildfire records to the daily weather time series.

For each fire record, the analysis assigned the corresponding daily values of ERC, BI, VPD, max_T, and min_RH based on the matched date. The daily analytical table then identified whether one or more fires occurred on each day and associated fire size information, measured in acres burned, with the corresponding date.

Threshold evaluation process

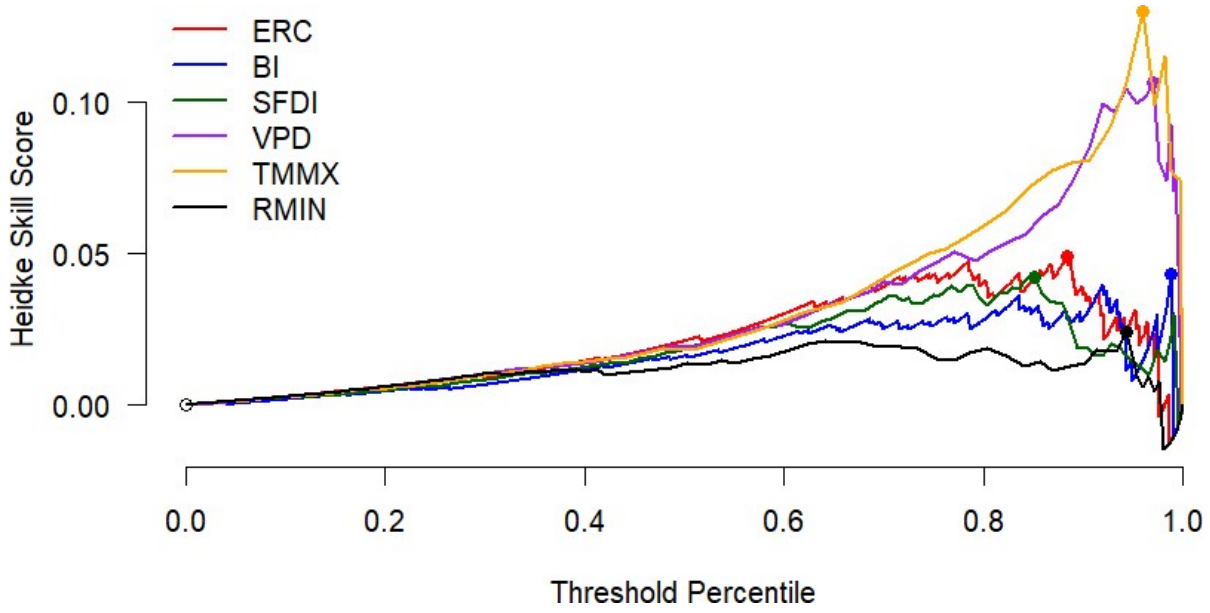
The ability of the five variables to discriminate between days where fires did and did not occur was evaluated for the years 2013-2024, the same observational record as the fire occurrence data. Two performance metrics were used to compare candidate rules: Peirce Skill Score (PSS) and Heidke Skill Score (HSS).

$$PSS = \frac{TP}{TP+FN} - \frac{FP}{FP+TN};$$

$$HSS = \frac{2(TP \cdot TN - FP \cdot FN)}{(TP+F\ \ ) \cdot (FN+TN) + (TP+FP) \cdot (FP+T\ \ )}.$$

Both metrics provide a holistic description of how well a classification rule balances conflicting objectives of correctly detecting positives and minimizing false alarms. HSS does this by comparing the forecast rule against the expected skill of random classification, while PSS measures the ability of the rule to discriminate between positive and negative cases independent of the underlying event frequency. HSS provides a balanced measure of overall classification skill, while PSS can support a more risk-averse rule by rewarding higher detection even where the rule produces more false alarms. The optimal threshold for each variable was identified by selecting the threshold value that maximized PSS and the threshold value that maximized HSS.

The results indicated that maximum daily temperature provided the strongest fire occurrence rule among the candidate variables. A maximum temperature threshold of 83 degrees Fahrenheit produced the highest HSS, while a threshold of 71 degrees Fahrenheit produced the highest PSS and represented a more conservative rule for identifying days within wildfire season. However, while temperature has been identified as an important driver of wildfire activities (Flannigan et al. 2009), VPD was selected because it directly represents the atmospheric moisture demand that governs fuel drying and plant water stress. As a result, the resulting classification rule is more physically interpretable and generalizable, despite a modest reduction in overall classification skill. Moreover, the Pearson correlation between temperature and VPD is 0.94, indicating little information loss with substituting VPD for maximum daily temperature. Hence, a threshold of 2 kPa, which optimized the HSS, was used to define the starts and ends of fire season. Note that this choice of meteorological variable has been observed as an important predictor of wildfire parameters in various settings including as a predictor of forest fire burned area in the Western United States (Williams et al. 2014, Mueller et al. 2020, Juang et al. 2022).



High Fire Danger Threshold Review

The analysis used a similar threshold-screening process to identify conditions associated with relatively higher fire danger among days on which a wildfire ignited (fire days). For this step, the dataset was limited to days with recorded fires, and the median number of acres burned was used to distinguish larger fires from smaller fires. Candidate thresholds were then evaluated based on their ability to discriminate between fire days above and below the median size threshold.

This review again compared ERC, BI, VPD, SFDI, max_T, and the scale-reversal transformed max_RH. Maximum daily temperature produced the strongest result, with an evaluated threshold of approximately 77 degrees Fahrenheit providing the highest skill for distinguishing larger-fire days in the reviewed dataset. These results were used as statistical indicators of elevated fire danger and should not be interpreted as deterministic breakpoints or as evidence that temperature alone controls fire size.

Limitations and interpretation

The thresholds developed through this process are intended for analytical use and should be interpreted in light of source data limitations. The analysis used daily spatial averages across Liberty's service territory, which reduces the influence of local terrain, microclimate, wind exposure, and fuel conditions. The wildfire records were regional records within 100 miles of the service territory and do not represent utility-caused ignitions. Future work may also consider substituting first/last dates of threshold exceedance as a

definition of fire season to instead use percentiles of this quantity, and/or use rolling averages or another smoothing technique to minimize the effects of episodic drying events.

The methodology was designed to be repeatable. Future applications should follow the same sequence, apply the same contingency-table metrics, and interpret selected thresholds with operational judgment and source data limitations.

References

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Mueller, Stephanie E., et al. "Climate relationships with increasing wildfire in the southwestern US from 1984 to 2015." *Forest Ecology and Management* 460 (2020): 117861.

Williams, A. Park, et al. "Causes and implications of extreme atmospheric moisture demand during the record-breaking 2011 wildfire season in the southwestern United States." *Journal of Applied Meteorology and Climatology* 53.12 (2014): 2671-2684.

Outage and Ignition Data Methodology

Objective

This methodology describes the process used to prepare, review, classify, and aggregate Liberty outage records to support analysis by feeder to inform probability of failure modeling.

The review was designed to prepare Liberty's historical outage and ignition information for use in probability-of-failure analysis. Because the source records were developed over multiple years and reflected varying levels of detail, terminology, and categorization, the review focused on using the information available in Liberty's records to assign standardized outage drivers that could be applied consistently across the dataset. This allowed the historical records to be compared across circuits, time periods, and event types in a manner suitable for statistical analysis and risk modeling support.

The resulting classifications were used to support analysis of feeder-level outage occurrence over time. The review relied on the data fields available in Liberty's outage records, including original cause and sub-cause values, comments, circuit or feeder identifiers, dates, and other available record attributes. Where record information was limited, the classification was kept conservative rather than assigning a cause that was not supported by the available information.

Distribution outage data preparation

Distribution outage records were pulled from the Liberty-provided file titled "CA 5 Yr SAIFI and SAIDI through CY25 11302025 (delivered 05_04)." The review used the data on the "Historic Outages" and "All" tabs. Duplicate outage records were removed. Where an outage record was associated with more than one feeder, the record was split so that each analytical record was associated with a single feeder. This preparation step produced 3,473 distribution outage records for analysis, covering the period from January 1, 2022, through December 31, 2025, including Major Event Days.

The original Liberty Cause and Sub-cause values were then reviewed to identify the unique combinations present in the outage records. The source data contained 65 unique Cause-Sub-cause combinations. Examples included similar but not identical values such as "Vegetation/Fall in Tree" and "Vegetation/Tree Fall," as well as varying levels of specificity, such as the use of both "Equipment" and "Distribution Transformer Overload" as cause values. The records also included spelling inconsistencies, such as "baloon" that suggest the option for free-text entry in the cause codes. These conditions are common in utility outage datasets and were addressed through a standardized classification process before the data was used for statistical analysis.

This review also identified opportunities for more structured outage data to capture overtime. A more standardized set of cause and sub-cause options in the outage management system, ideally aligned where practical with the cause code combinations used in the OEIS WMDR (formerly Quarterly Data Report) template, would support more consistent internal analysis and external reporting. The review also

recognizes that Liberty's outage data capture processes have matured over time, and some inconsistencies in the reviewed records may reflect legacy processes or system options that are no longer in use.

Outage driver and Sub driver classification

The review team first developed a preliminary crosswalk from each original Cause-Sub-cause combination into a consolidated Driver and sub driver taxonomy. The taxonomy was intended to support statistical analysis of outage causation by feeder over time while avoiding unnecessary fragmentation of similar event types. The consolidated taxonomy used three primary outage Driver categories: Asset, Geographic, and Exclude.

The Asset driver was used for outages primarily attributed to utility infrastructure or equipment issues, including degraded equipment condition, construction or installation issues, operational error, or contact with utility facilities by living beings (people or animals). Examples include animal contact, tree trimmer contact with overhead lines, snowblower contact with facilities, corroded hardware, and other equipment-related conditions. Within the Asset driver, the review used the following principal sub drivers: Third Party, Animal, Equipment, Vehicle Strike, and Other. The Third-Party sub driver included human contact events such as dig-ins, tree trimming contact, customer-caused events, and similar work-practice or external contact events. The Other sub driver included records such as switching or operational errors or highly specific secondary causes.

The Geographic driver was used for outages primarily attributed to exposure of utility infrastructure to environmental or terrain-related conditions, including weather, vegetation and lightning. Examples include uprooted trees, limbs on lines, vegetation grow-in, wind, snow, and ice. Within the Geographic driver, the review used four principal sub drivers: Vegetation, Snow/Ice, Weather, and Lightning. Vegetation included trees, limb, grow-in, and fall-in events where the available record information indicated vegetation coming into contact with energized facilities.

The Exclude driver was used for records that were not appropriate to include unplanned outage risk modeling. This included planned outages, outages attributed to power supply availability from Liberty's transmission provider, and records that did not contain sufficient information to assign a discernible cause. Examples include planned maintenance outages, PSOM events from NV Energy, and records where the available outage record information was too limited to support a cause classification.

Record-level outage review process

After the preliminary crosswalk was developed, Liberty's outage records were reviewed to validate or refine the original Cause and Sub-cause values into the consolidated Driver and sub driver classifications. The first step was a direct mapping from each original Cause-Sub-cause combination to a Driver-sub

driver combination. This provided the initial classification for records where the original cause information was sufficiently specific and consistent with the consolidated taxonomy.

The review team then performed a targeted review of the Comments field for records with an initial Cause of Unknown or Other. For these records, the Driver and sub driver were assigned based on interpretation of the available comment text and the original sub-cause where one was available. Records were left unclassified or assigned to Exclude when the comments did not provide enough information to support a more specific classification.

The review also included keyword-based checks of the Comments field to validate whether the assigned Driver and sub driver were consistent with the event description. Numerous keywords and phrases such as "snow," "bird," and "planned outage" were used to identify records that warranted closer review, which relied on subject matter judgment to interpret the context of the comments. For example, references to snow blowing were not automatically classified as Snow/Ice, and references to equipment issues at a customer weather head were not automatically classified as weather-related.

The original Cause and Sub-cause classifications, as mapped to the consolidated Driver and sub driver taxonomy, were generally preserved unless the Comments field clearly supported a different classification. For example, a record originally listed as Equipment-Corrosion/Decay was reclassified as Geographic-Vegetation because the comment identified a large tree as the cause and did not otherwise indicate an inherent equipment health issue. Similarly, records that indicated planned work in the Comments field were assigned to Exclude even if the original cause code did not identify the event as planned.

The review was constrained by the information available in the outage records and by the level of effort required for full manual review of more than 3,400 records. As a result, not every record was manually re-evaluated by a subject matter expert at the same level of detail. The review team used a combination of direct mapping, targeted comment review, keyword validation, and subject matter judgment to make the best practical classification of the outage records for statistical comparison. Where the available information was insufficient, the review avoided over-attributing events to a specific cause.

Aggregation for probability of failure analysis

After classification, outage counts were aggregated by feeder, Driver, and sub driver. These counts were compiled into a single analytical table and paired with feeder-level attributes, including overhead circuit length for use in normalization. The aggregated dataset was used to support statistical analysis of outage patterns and to inform understanding of relative unplanned outage risk across Liberty's system.

Transmission outage preparation

Transmission and distribution outages are often tracked through separate systems and may include different data fields. To support probability-of-failure modeling for Liberty's 60 kV and 120 kV circuits using

historical performance information, the analysis team reviewed Liberty's operations and lockout logs for the period from January 1, 2023, through May 2, 2026.

The yearly operations and lockout logs were combined into a single table. Records were then categorized as distribution or transmission based on the Feeder field. For purposes of this review, feeders beginning with "1" or "6" were classified as transmission. Because a separate transmission outage database was not available for this analysis, the review of the combined operations and lockout log focused on the transmission records identified through this process.

The combined table contained 87 rows associated with transmission circuits. For analytical purposes, each row was treated as an event, including records identified as either "Operation" or "Lockout." This approach was used because many records labeled as "Operation" still indicated a trip, lockout, or other unusual activity that could be relevant to evaluating transmission circuit performance. Treating these records as events provided a practical basis for evaluating historical transmission reliability and relative probability of failure across Liberty's transmission circuits.

Transmission records from this table were not classified into the Asset and Geographic driver categories used for distribution outage records. The available transmission records generally did not contain enough information to support consistent driver-level classification. Although some records referenced vegetation, weather, or other conditions, many did not include sufficient detail to assign a comparable cause category. As a result, the transmission review was limited to identifying and aggregating transmission events rather than assigning standardized Asset or Geographic drivers.

Asset Inspection Records

Inspection records and associated deficiencies or findings were used as a proxy for assessing asset health at the circuit level. The analysis used information from Liberty's provided "Asset Inspections and Maintenance" file, which contains approximately 50,000 records of asset inspections performed between April 2020 and April 2026. The file includes records from the Detailed Inspections program, patrol inspections, and QA/QC of detailed inspections. Available fields included inspection date, feeder or feeders, pole number, finding severity, and varying levels of detail regarding the deficient condition, such as "Pole Cracked" or "Bare Jumpers." Severity values were interpreted with Level 3 as the lowest severity and Level 1 as the highest or most critical severity.

For application within the statistical model, the review did not assume that specific findings identified over the prior six-year period remained active or un-remediated. Instead, the analysis used feeder-level trends in the percentage of completed inspections that resulted in findings of varying severity. These trends were treated as an annual indication of the likelihood and relative criticality of observed asset deficiencies at the feeder level.

The machine-learning model used the inspection data differently. For that model, deficiencies without a listed remediation date were treated as remaining active and were considered traceable to outages

occurring after the date of the finding. Where inspection records listed multiple circuits, which commonly occurred for poles with transmission and distribution underbuild, the inspection was generally assigned to the listed distribution circuit. Pole age was also incorporated into the dataset, where possible, by matching pole numbers to the asset attributes provided in Liberty's spatial asset information.

Limitations and interpretation

The classifications developed through this process are intended for analytical use and should be interpreted in light of the source data limitations. The review did not verify field conditions for events, and it did not attempt to determine definitive root cause beyond what was reasonably supported by Liberty's records. The classifications reflect the best available interpretation of the outage and ignition data for purposes of feeder-level statistical analysis.

The methodology was designed to be repeatable. Future applications of this process should use the same general sequence: prepare the source data, remove duplicates, assign records to a single feeder where needed, consolidate original cause values into a stable taxonomy, perform targeted review of comments for unknown or ambiguous records, apply subject matter judgment where the text supports refinement, and aggregate the results by feeder and driver for statistical analysis. As Liberty's data capture practices continue to mature, the same framework can be updated to incorporate more structured cause codes, additional equipment attributes, and more complete ignition record linkage.

Outage Driver	sub driver
Asset	3rd Party
	Vehicle Strike
	Equipment
	Asset Other
	Animal
Geo	Vegetation
	Snow / Ice
	Weather Other
	Wind

Feeder	Count of Lockouts & Operations
625	39
609	14
132	8
640	8
111	7
619	5
634	2
629	2
608	1
187	1
Grand Total	**87**

QA/QC Liberty Asset Spatial Data.

Objective:

The objective of this QA/QC process was to identify and resolve geospatial discrepancies among Liberty Utility's delivered asset spatial datasets before conducting other analyses. This process was undertaken over the course of the project as new iterations of asset data were delivered and QA/QC findings were communicated to Liberty's GIS team. As analyses and data manipulation proceeded for various project components, inconsistencies and misalignment between Liberty asset spatial dataset became a progressive challenge. Ultimately, through cooperation with Liberty's GIS team we were able to acquire a revised "best-fit" pair of spatial datasets for analysis. Asset spatial data quality and alignment challenges, along with asset failure and maintenance data issues, supported the pivot to circuit-level risk modeling.

Data	Summary of Issues
Electric_lines, OH_Electric, Primary_OH (segment-level asset management database export)	Spatially inconsistent/outdated. Line geometries inconsistent with Spans_2025, no span IDs.
Spans_2025 (LiDAR-derived span-level data)	Spatially accurate/current but lacks asset information (conductor type, asset age, etc.). Cannot be linked back to electric_lines except at circuit level.
CalPecoLines (earliest delivered asset spatial data, unknown provenance)	Spatially inconsistent/outdated. Lacks asset information.
Technosylva risk and fire simulation products asset footprint	Outdated circuit and line geometries differed considerably from newer LU shapefile, including some missing

Datasets:

Data alignment and quality Issues:

All four asset spatial datasets were qualitatively compared for geographic coincidence across the Liberty Utilities (CalPeco electric) service territory. Significant alignment issues were found across all spatial datasets. Circuit geometry appeared most inconsistent across terminal conductor segments, possibly reflecting infrastructure updates that have not been reconciled. Datasets had unexpectedly different circuit counts and utilized inconsistent naming conventions within and in between versions making reconciliation difficult (ex. TOPAZ1202 and TPZ1202). Datasets were delivered in inconsistent projections and coordinate systems. After collaboration with Liberty Utilities' GIS team, the LiDAR-derived spans_2025 layer was determined to represent the most accurate record of overhead infrastructure. The final delivery of electric lines was determined to be the most accurate representation when both underground and overhead asset geometries were needed.

Overhead Conductor Mileage by Circuit

To calculate total primary distribution and transmission overhead conductor mileage by circuit, span lengths (SPAN_MILES) were summed by circuit name (LINE_ID) using the latest LiDAR_Spans_2025 layer in the CLPELE.gdb geodatabase delivered in All_Liberty_Conductor_20260515.zip on June 1st, 2026 at 2:00PM.

Covered Conductor Mileage by Circuit

To calculate total primary distribution covered conductor mileage by circuit, conductor segment lengths (Shape_Length [feet] divided by 5280) were summed by circuit name (Subnetwork Name) for segments where Common Conductor Type equaled either 3 – AAC/TW or 8 – ACSR/TW. This calculation was completed using the Primary_OH layer in the CLPELE.gdb geodatabase delivered in Liberty_Assets_v3_20260203.zip on April 9th, 2026 at 1:34PM. While more recent versions of Primary_OH or Electric_lines layers were delivered, only this first version included accurate conductor type data suitable for calculating covered conductor coverage by circuit.

Statistical Method

Liberty's revised wildfire risk model combines updated likelihood modeling with the existing consequence framework, using probabilistic circuit rankings across multiple outages, weather, and system-risk metrics to better estimate where wildfire risk is most likely to materialize. Liberty's revised model is designed to evaluate wildfire risk as a sequence of dependent events rather than as a single static score. The modeling framework begins with the probability that an outage will occur on a given circuit, then evaluates the probability that the outage occurs during fire-weather conditions and finally estimates the potential consequences of a wildfire that could spread from an ignition associated with that outage. This structure reflects the practical chain of causation that drives utility wildfire risk: a utility-caused wildfire requires an electrical or vegetation-related event capable of producing an ignition, environmental conditions that allow that ignition to become a spreading fire, and exposed people, property, infrastructure, or environmental resources in the path of the fire.

The revised likelihood model begins by estimating outage probability at the circuit level to identify the portions of Liberty's system, most likely to experience outage-causing events that could plausibly become ignition precursors under hazardous conditions. Because Liberty's historical ignition dataset is limited, outage occurrence is used as a practical and transparent proxy for the types of system disturbances that can create a spark or other ignition source. In this context, an outage is not treated as equivalent to a reportable ignition or a self-propagating wildfire. Rather, it is used as evidence that a fault, equipment failure, vegetation contact, wire contact, animal contact, protective-device operation, or other abnormal electrical condition occurred on the circuit. These types of events may produce arcing, sparks, molten material, hot particles, or other heat sources capable of igniting receptive fuels when they occur during sufficiently hazardous environmental conditions.

This proxy is appropriate for the current stage of model development because Liberty's outage data provides a broader and more statistically meaningful record of system disturbances than its available ignition data alone. Many outage-causing events, including conductor slap, vegetation contact, failed connectors, equipment failures, animal contact, or downed wires, involve energy release or physical contact with conductive materials even when no ignition is observed or reported. Whether these events become wildfire-relevant depends on additional conditions, including fault energy and duration, receptive fuels, wind, humidity, and suppression effectiveness, which are addressed only partially through the fire-weather and consequence components of the current model. The outage model therefore estimates relative exposure to ignition-capable events, not the probability that every outage will result in an ignition.

The next refinement is to condition circuit-level outage probability on fire-weather exposure. This step is critical because wildfire risk is not driven only by whether an outage occurs, but by whether it occurs when fuels, wind, humidity, temperature, and other fire-weather variables make ignition and fire spread more likely. A circuit with frequent outages may not create the same wildfire risk as a circuit with fewer outages if the latter is more likely to experience those outages during high fire-potential periods. By estimating the

probability of outage occurrence during fire-weather conditions, the model better distinguishes ordinary reliability exposure from wildfire-relevant outage exposure.

The likelihood results are then combined with Liberty's existing consequence model, which estimates the potential outcomes of a fire that spreads from an ignition associated with an outage at or near the circuit. This consequence modeling component translates ignition-source potential into risk by evaluating how a fire could behave once started and what it could impact. In this framework, consequence is not simply a function of the number of assets or customers on a circuit. It reflects modeled fire spread and damage potential, including exposure of communities, structures, evacuation-constrained areas, critical infrastructure, and other values at risk.

As Liberty's data and modeling capabilities mature, the outage-based proxy can be supplemented or refined with a more bottom-up probability-of-failure and spark-emission model. Such a model would estimate ignition-source likelihood by asset type and condition, and could incorporate specific failure mechanisms such as conductor failure, equipment overheating, tracking, insulation breakdown, splice failure, animal contact, vegetation grow-in, vegetation fall-in, or wire-to-wire contact. This would allow Liberty to move toward a more granular estimate of the probability that a specific asset failure mode produces an actual spark, arc, molten particle, or heat source.

For the current model, however, outage occurrence provides a defensible interim framework because it is observable, circuit-specific, and directly related to abnormal electrical conditions that can precede ignition. The model does not assume that every outage results in an ignition. Instead, it uses outage occurrence to rank circuits by their relative tendency to experience ignition-capable events, conditions those rankings on fire-weather exposure, and combines the revised likelihood results with the existing consequence model. This structure preserves a clear pathway for future refinement while allowing Liberty to develop a more decision-useful wildfire risk framework based on currently available outage, asset-health, weather, and consequence data. A key feature of the revised Liberty methodology is the use of a dual likelihood-modeling approach. Many utility wildfire risk models rely primarily on a single method to rank asset or circuit risk. Liberty's revised framework instead compares two independent methods for estimating the likelihood component of risk using the same underlying outage, asset-health, weather, and system-exposure datasets. The first method applies a Bayesian, evidence-based framework that uses observed outage occurrence, asset condition, and known reliability drivers to estimate the relative probability of future outage events. The second method applies machine-learning techniques to the same data to identify statistical patterns, interactions, and non-linear relationships that may not be fully captured through a structured Bayesian framework.

The purpose of using both approaches is to provide additional QA/QC and analytical depth in the likelihood estimate. The Bayesian model provides a transparent, engineering-informed view of outage likelihood by incorporating observed outage history and asset-health indicators in a probability-based framework. The machine-learning model provides an empirical pattern-recognition view of the same risk problem, allowing the analysis to test whether the observed data suggest similar or different circuit rankings when relationships among variables are learned directly from the dataset. Where the two methods produce similar circuit rankings, confidence in the likelihood signal increases. Where the two

methods diverge, the difference becomes a useful diagnostic flag for further review, data validation, or subject matter expert interpretation.

This dual-method approach is especially useful for Liberty because outage and ignition-related risk is shaped by multiple overlapping drivers, including asset condition, circuit configuration, exposure to vegetation, local weather patterns, terrain, and historical outage performance. A single modeling method may overemphasize one class of variables or obscure uncertainty in sparse or noisy datasets. By comparing a Bayesian probability model against a machine-learning model trained on the same core inputs, Liberty can better understand whether high-risk circuit rankings are stable across methods or are sensitive to modeling assumptions. This strengthens the defensibility of the revised likelihood results and reduces reliance on any one model as a standalone ranking tool.

For Liberty, the revised model does not replace the existing consequence framework. Rather, it improves the likelihood side of the risk equation. Consequence continues to be evaluated through the existing wildfire consequence modeling approach, while likelihood is refined through probabilistic circuit rankings based on observed outage occurrence, asset-health evidence, fire-weather coincidence, and related system-risk indicators. The resulting risk score reflects the interaction of revised likelihood and existing consequence modeling, allowing Liberty to identify circuits where outage probability, fire-weather exposure, and consequence potential combine to create elevated wildfire risk.

For Liberty, the intent is not to replace the existing wildfire risk framework with a black-box model, but to improve the likelihood component and add dimensionality to the overall risk assessment. The revised model identifies circuits with elevated likelihood of outage-causing events, evaluates whether those events are likely to coincide with fire-weather conditions, and combines those revised likelihood results with the existing consequence model, which has not changed from the original filing. This structure recognizes that the highest-risk circuit is not necessarily the circuit with the most outages, the most assets, or the highest modeled consequence in isolation. Rather, wildfire risk is greatest where outage likelihood, fire-weather exposure, ignition potential, and consequence potential overlap. By explicitly modeling each part of that chain, Liberty can more effectively prioritize mitigation investments and demonstrate that its wildfire risk reduction strategy is grounded in empirical system performance, service territory-specific fire-weather conditions, and modeled fire behavior.

Methods: Bayesian Latent Asset Health and Outage Modeling

Objective

We developed a Bayesian hierarchical model to infer circuit-level asset health from inspection findings and historical outage behavior. The model assumes that both inspection outcomes and outage frequency arise from a latent circuit-level condition state we call the asset health index (AHI). Inspection findings severity were treated as noisy observations of the latent AHI state, while outage rates were treated as an additional manifestation of that same latent process.

Data

Inspection Records

Inspection records were provided by Liberty in tabular form from April 4, 2022, until April 15, 2026. Each row represented a single inspection event, with multiple inspection events on the same circuit at distinct times and locations. Records without a valid circuit identifier were removed prior to modeling. Condition text from the inspection events was converted into a matrix of binary symptoms indicating whether specific keywords occurred within the text. [redacted]



An additional covariate representing inspection complexity was derived from inspection data: the number of listed condition items associated with each inspection. The bracketed lists were counted by the number of comma-separated entries, single non-missing entries were treated as one item, and missing entries were treated as zero items.

A severity label is occasionally associated with a given inspection event indicating whether certain actions must be carried out and the level of urgency. Level I and Level II represent the highest priority inspection

findings and were used as a proxy for critical/near-critical failures. Inspections with maximum priority equal to “Level 3,” “none,” or “None” were treated as indicating acceptable or healthy asset conditions.

Outage Records

Circuit-level outage counts from January 1, 2022, to November 24, 2025, were derived from data provided from Liberty Utilities. Moreover, outage counts were divided into two types: Asset and Geo. Asset outages represented outages that arrived largely from asset failure. Geo outages represented outages that were weather and vegetation related. Asset geometry data were also provided from Liberty Utilities.

External Data

Land cover data comes from the multi-resolution land consortium (https://www.mrlc.gov/) and was aggregated to the circuit level using the modal land cover classification of the intersecting pixels.
Modeling

Overview

There are at least two proxies that can be proposed to measure asset health: outage counts and inspection outcomes. Outages, with specific cause-codes can indicate that there has been a failure of some component of the electrical system, and the frequency of these outages could be used to identify circuits with particularly failure-prone assets. On the other hand, an asset with poor health may not necessarily produce an unusual number of outages but the underlying condition may result in a more catastrophic failure with elevated likelihood of spark production (for example, a cracked crossarm with loose hardware may be much more impacted by vegetation contact than it would if it was in perfect condition). Inspection data is therefore valuable for identifying circuits with enhanced risk but limited outage history. By considering both information sources jointly, we can leverage their complementary strengths and obtain a more complete characterization of underlying circuit conditions than either proxy provides individually.

This is achieved mathematically by assuming there exists an underlying quantity, which we colloquially refer to as “Asset Health,” for each circuit and with which both proxies are correlated. We assume assets with high health would have a low number of outages relative to the number of line miles and would return practically significant inspection findings only very rarely when inspected. Conversely, an asset with low health would likely exhibit an unusually high outage rate and a relatively high probability of returning a practically significant inspection finding. This conceptualization is naturally represented using a Bayesian hierarchical model, in which asset health is treated as a latent circuit-level variable with inspection outcomes and outage counts assumed to be dependent on that latent state.

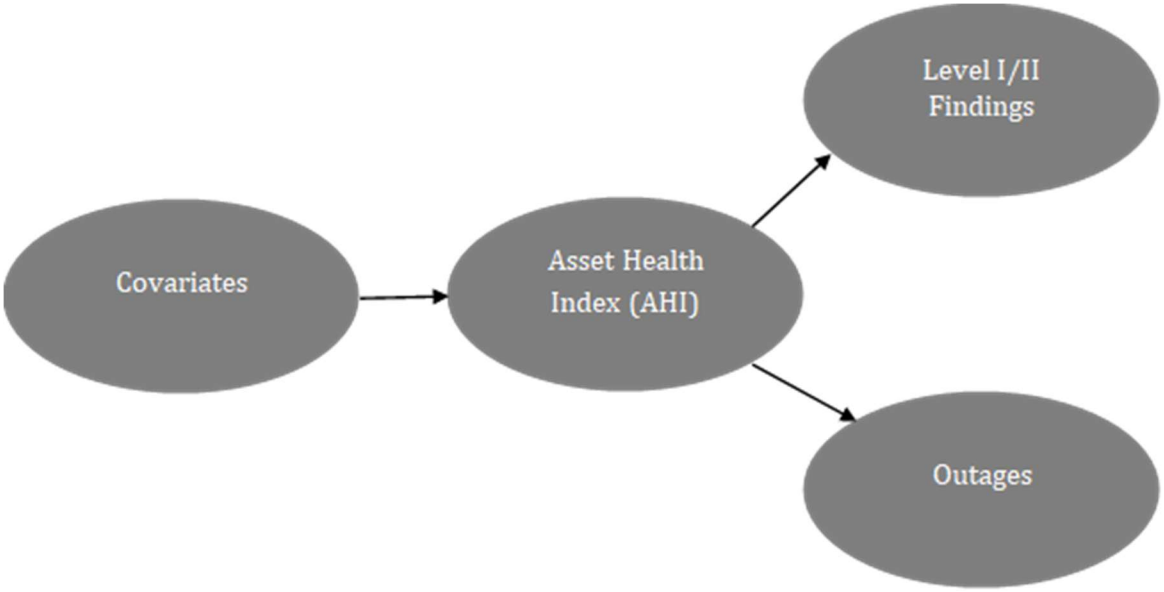


Figure 1. Flowchart of state-space modeling structure. Asset health is estimated using a set of predictors. The number of outages and the probability of an inspection returning level I or level II findings are assumed to be dependent on the latent asset health state.

Under this interpretation, the model does not assume that inspection findings directly cause outages; rather, both are viewed as manifestations of the same underlying circuit condition. The model therefore estimates whether circuits exhibiting inspection patterns consistent with poorer inferred asset health also exhibit systematically elevated outage counts after accounting for circuit exposure.

State Space Model

$$Outages_k \sim \text{NegBin}(\mu_k, r) \quad (1)$$

$$\log(\mu_k) = a \cdot AHI_k + \log(Length_k) + c \quad (2)$$

$$Findings_{kj} \sim \text{Bernoulli}(AHI_k) \quad (3)$$

$$\text{logit}(AHI_k) = x_k^T \cdot \beta \text{logit}(AHI_k) = x_k^T \cdot \beta \quad (4)$$

[redacted]

[redacted]

Candidates

Candidate models were generated by increasing the number of inspection-derived symptom covariates permitted in the model. Individual symptom indicators were first ranked according to their univariate association with poor inspection outcomes using an odds-ratio statistic. Beginning with the highest-ranked symptom, a sequence of nested models was constructed by successively adding one additional symptom indicator at a time. In addition to this collection of symptoms, each candidate model also included a binary indicator identifying undeveloped land cover to distinguish between asset health patterns between anthropogenic and wildland areas.

Symptoms are reported at the inspection scale and must be aggregated to the circuit level. Aggregation is done by averaging across all inspections associated with a circuit, producing circuit-specific covariates that were linked to both inspection outcomes and outage count through a shared latent asset health state. The resulting family of nested models represents an increasing level of complexity, allowing model performance to be compared using the Deviance Information Criterion (DIC) while simultaneously evaluating the contribution of additional inspection-derived predictors to inference on circuit asset health and outage frequency. The model candidate set was

Model Fitting

The model was implemented in JAGS using the rjags package using three chains. Posterior samples were collected for:

- Asset health intercept
- Symptom-weight hyperparameters
- Individual symptom weights
- Circuit-level latent asset health probabilities
- Circuit-level symptom scores
- Outage-model coefficients
- Negative binomial dispersion
- Expected outage counts

Posterior samples from all chains were pooled for summary and visualization.

Model Diagnostics and Evaluation

Model fit was evaluated using the deviance information criterion (DIC). A custom convergence diagnostic analogous to a potential scale reduction factor was also calculated by comparing pooled posterior ranges to within-chain posterior ranges and visual inspection of the trace plots was performed to verify convergence. These results are omitted for brevity but can be provided upon request.

Posterior distributions of circuit-level latent asset health probabilities were visualized using boxplots ordered by posterior mean asset health. This allowed comparison of the circuits with the highest and lowest inferred latent condition states.

Model validation was performed using [redacted] leave-one-out cross-validation ([redacted]-LOO), [redacted]

Three commonly used validation metrics were calculated using this approach: root mean squared error (RMSE), mean absolute error (MAE), and bias. Posterior predictive checks were also performed for the outage model to assess whether the fitted model could plausibly reproduce the observed outage data.

Output

The workflow saves posterior samples, convergence diagnostics, deviance information criterion (DIC) summaries, and model configuration metadata to R data files for later review and comparison. These posterior samples provide a substantially richer inference than a simple ranking of circuits. The shared latent-state model produces an integrated asset health index that combines information from both inspection outcomes and historical outage experience while explicitly quantifying uncertainty. At the inspection level, the model estimates the probability that a future inspection will return a practically significant (Level I/II) finding, enabling identification of circuits with elevated latent risk even when inspection histories are sparse. At the outage level, [redacted] produces a full predictive distribution for future outage counts rather than a single expected value. Because the model includes an exposure offset for line miles, these predictive distributions can be naturally scaled to arbitrary planning horizons or circuit lengths, providing probabilistic forecasts of expected outage frequency and uncertainty. Collectively, these outputs support uncertainty analysis, model comparison, and the prioritization of circuits exhibiting evidence of poorer inferred asset health and elevated outage risk.

Results

The mean posterior estimates for the model parameters for the Asset and Geo class of models are displayed in (Table 1). In general, frequent observations of symptoms will reduce AHI, and asset failure likelihood increases.

Outage Class	Inverse.logit[AHI]/Inverse.logit[Pr(Acceptable conditions)]
Asset	[redacted]
Geo	[redacted]
Tx	[redacted]

Table 1. Formulas for asset health index, the latent state, for the Asset, Geo, and transmission outage classes.

The below equations can be used to parameterize a [redacted] to calculate outage event probabilities (Table 2).

Outage Class	log(μ)	r
Asset	[redacted]	[redacted]
Geo	[redacted]	[redacted]
Tx	[redacted]	[redacted]

Table 2. Formulas for expected number of outages and the dispersion term. Note that transmission did not use outages, but instead used lockout logs.

To generate the probability of mass function of outages, we note that μ is the expected value and that the variance is given by equation (5)

$$Var(Outages) = \mu + \frac{\mu^2}{r}. \qquad (5)$$

And the probability of mass function is defined via Equation (6),

$$\Pr(\#\ of\ outages = z) = \frac{\Gamma(z+r)}{\Gamma(r)\Gamma(z+1)}\left(\frac{r}{r+\mu}\right)^r\left(\frac{\mu}{r+\mu}\right)^z. \qquad (6)$$

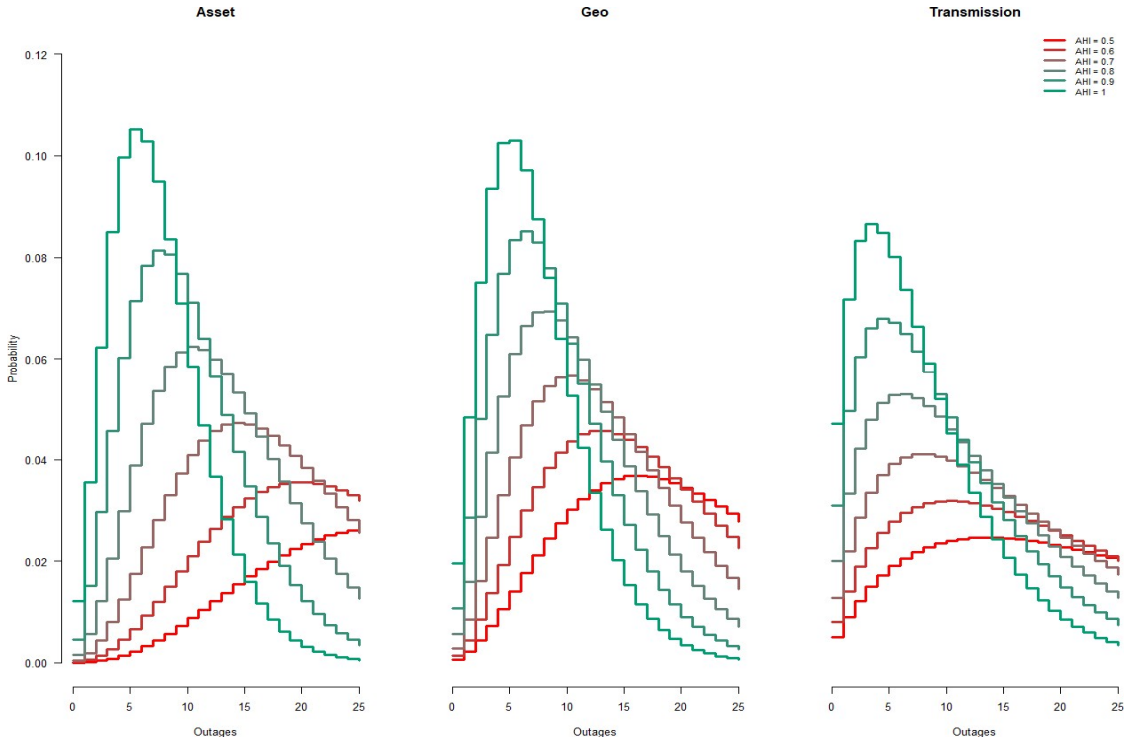
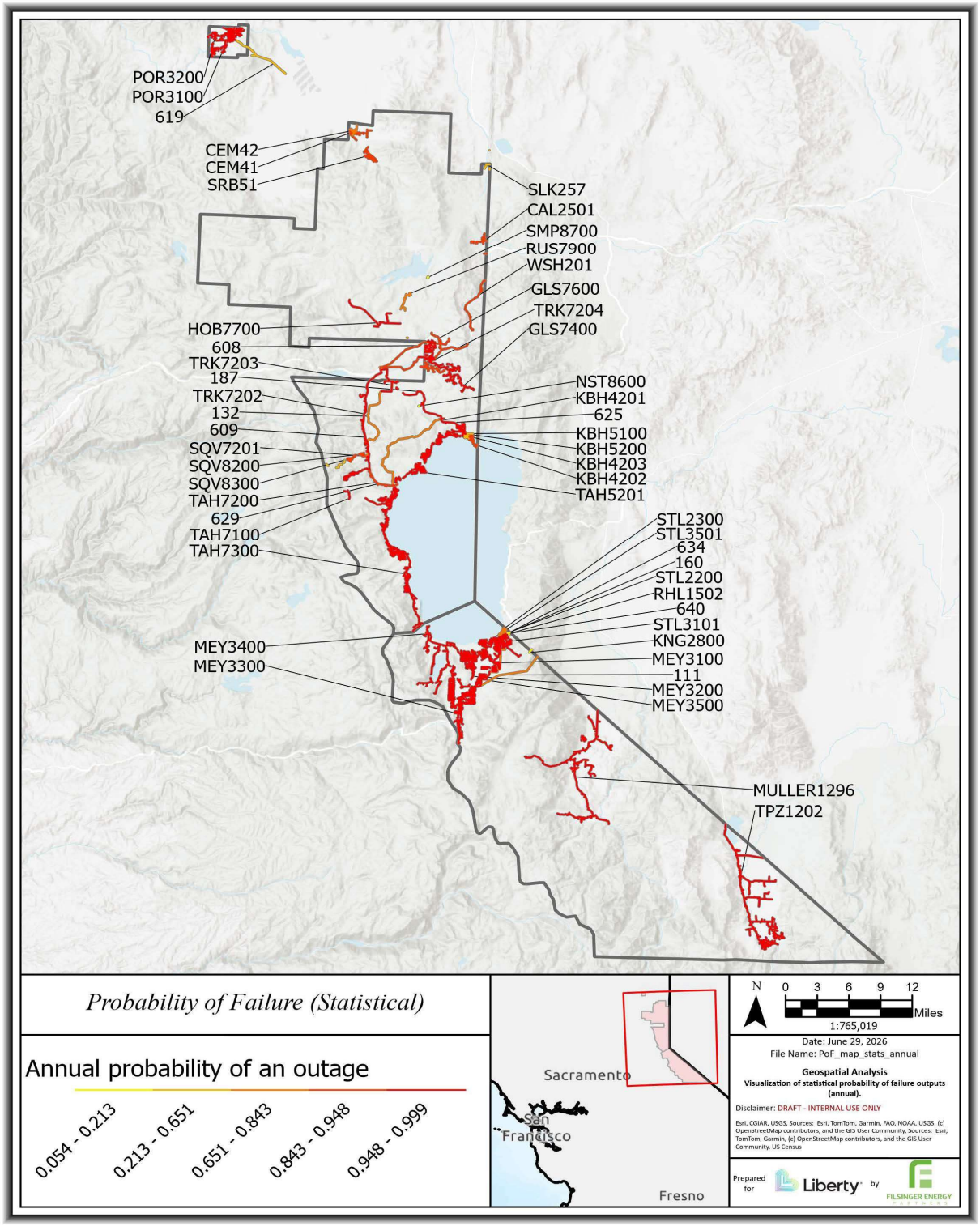
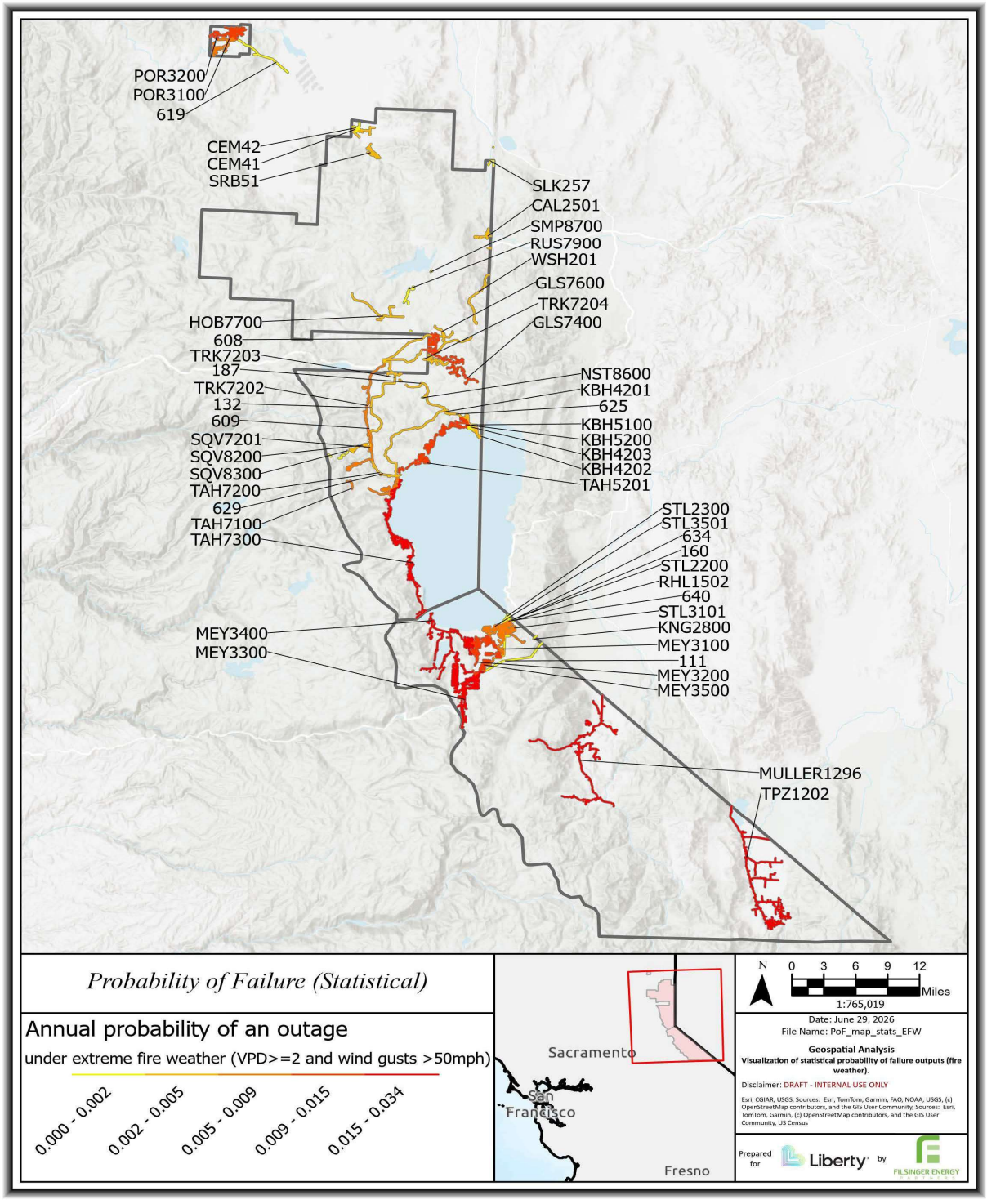


Figure 2. The probability mass function characterizing the number of outages on a hypothetical 10-mile circuit over a 1424-day period assuming a range of asset health states.


POR3200
POR3100
619
CEM42
CEM41
SRB51
SLK257
CAL2501
SMP8700
RUS7900
WSH201
GLS7600
TRK7204
GLS7400
HOB7700
608
TRK7203
187
TRK7202
132
609
SQV7201
SQV8200
SQV8300
TAH7200
629
TAH7100
TAH7300
NST8600
KBH4201
625
KBH5100
KBH5200
KBH4203
KBH4202
TAH5201
STL2300
STL3501
634
160
STL2200
RHL1502
640
STL3101
KNG2800
MEY3100
111
MEY3200
MEY3500
MEY3400
MEY3300
MULLER1296
TPZ1202
Probability of Failure (Statistical)
Annual probability of an outage
0.054 - 0.213
0.213 - 0.651
0.651 - 0.843
0.843 - 0.948
0.948 - 0.999
Sacramento
San Francisco
Fresno
N
0 3 6 9 12
Miles
1:765,019
Date: June 29, 2026
File Name: PoF_map_stats_annual
Geospatial Analysis
Visualization of statistical probability of failure outputs (annual).
Disclaimer: DRAFT - INTERNAL USE ONLY
Prepared for
Liberty
by
FILSINGER ENERGY


POR3200
POR3100
619
CEM42
CEM41
SRB51
SLK257
CAL2501
SMP8700
RUS7900
WSH201
GLS7600
TRK7204
GLS7400
HOB7700
608
TRK7203
187
TRK7202
132
609
SQV7201
SQV8200
SQV8300
TAH7200
629
TAH7100
TAH7300
NST8600
KBH4201
625
KBH5100
KBH5200
KBH4203
KBH4202
TAH5201
STL2300
STL3501
634
160
STL2200
RHL1502
640
STL3101
KNG2800
MEY3100
111
MEY3200
MEY3500
MEY3400
MEY3300
MULLER1296
TPZ1202
Probability of Failure (Statistical)
Annual probability of an outage
under extreme fire weather (VPD>=2 and wind gusts >50mph)
0.000 - 0.002
0.002 - 0.005
0.005 - 0.009
0.009 - 0.015
0.015 - 0.034
Sacramento
San Francisco
Fresno
N
0 3 6 9 12
Miles
1:765,019
Date: June 29, 2026
File Name: PoF_map_stats_EFW
Geospatial Analysis
Visualization of statistical probability of failure outputs (fire weather).
Disclaimer: DRAFT - INTERNAL USE ONLY
Prepared for
Liberty
by
FILSINGER ENERGY

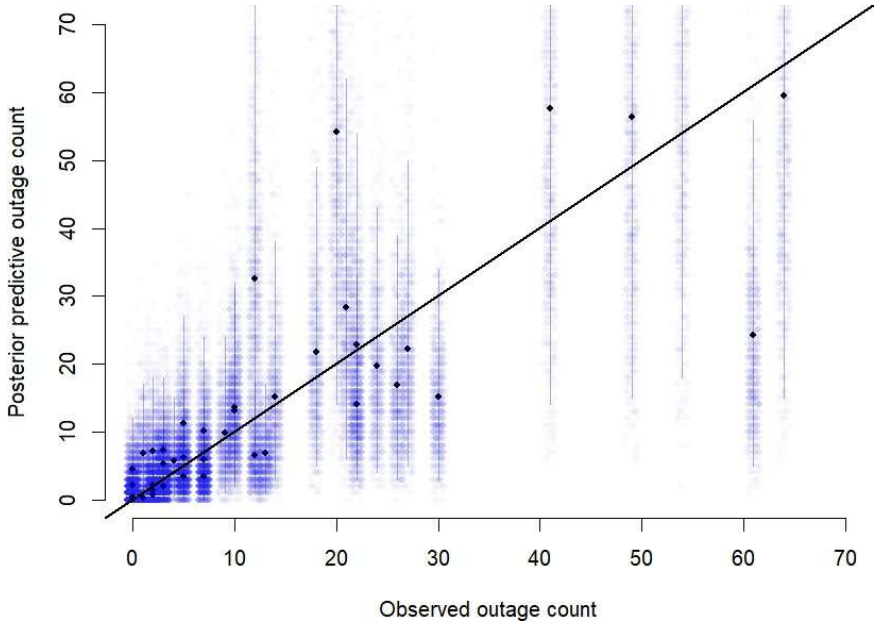
Cross validation and Posterior Predictive Checks

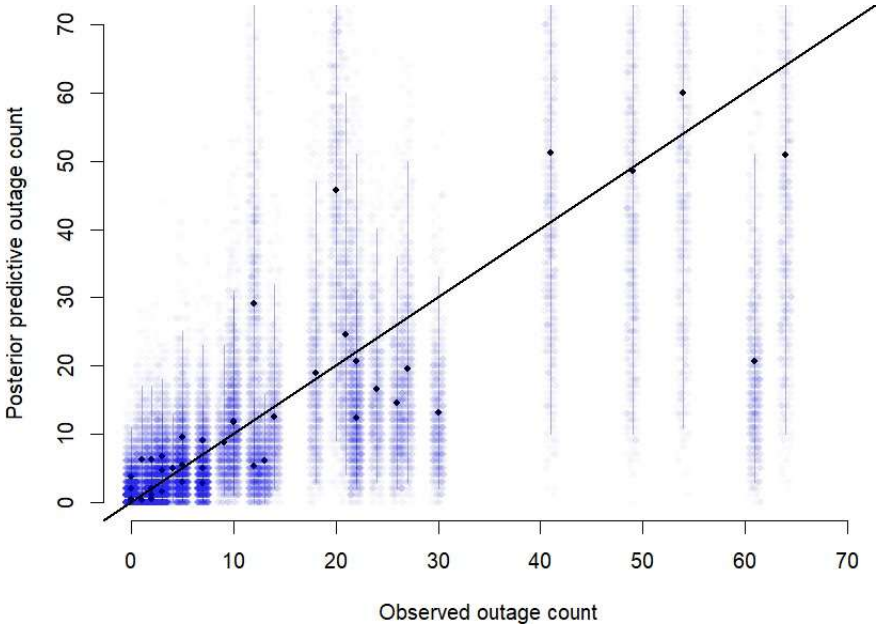
The predictive performance of the asset and geographic models is summarized in (Table 3). In general, these models achieved RMSE of approximately 0.3 outages per mile-year, and MAE of approximately 0.2 outages per mile-year. This corresponds to an error of about one outage per 3-5 mile-years. Performance was slightly worse for transmission, with an RMSE of approximately 0.6 and MAE of approximately 0.3, corresponding to an error of about one outage per 2-3 miles. The models are reporting a slight positive bias, however, the values are near zero, suggesting no obvious overestimation or underestimation of outage counts. In other words, while the counts may differ by about one outage per 3-5 miles, over the length of a circuit these errors tend to cancel out (one mile will be under by 1 outage, the next mile will be over by 1 outage so the cumulative outage counts over the entire span are close to the observations).

Outage Class	RMSE	MAE	Bias
Asset	0.33	0.21	0.03
Geo	0.33	0.20	0.06
Tx	0.55	0.33	0.04

Table 3. [redacted]-LOO derived cross validation statistics. These quantities represent the per mile-year differences between predictions and observations.

Plots of the posterior predictive checks for the Asset and Geo outage classes are shown below (Figure 3). The scatterplots indicate that the model predictions are reasonably well calibrated, with coverage probabilities that are consistent with what would be expected from a 95% prediction interval. As seen in the above table, performance is slightly worse for Tx compared to the other two distribution outage classes. Note here that the point clouds represent the realizations of the assumed underlying data generating process, not uncertainty in the mean outages counts.


Posterior predictive outage count
0
10
20
30
40
50
60
70
Observed outage count


Posterior predictive outage count
0
10
20
30
40
50
60
70
Observed outage count

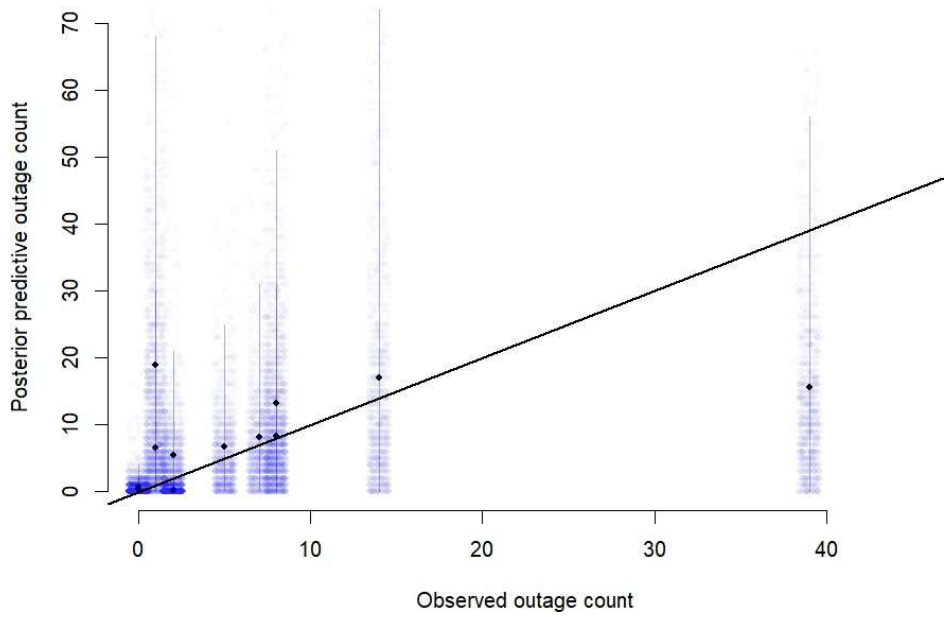


Figure 3. Posterior predictive checks reporting the 95% prediction interval of outage counts for each circuit for the asset (top), geo (middle), and Tx outage classes. The blue point clouds represent random data generated from the model, whereas the black points represent the average model prediction.

Physical Interpretation and Spatiotemporal Scaling

[redacted]

[redacted]

Limitations

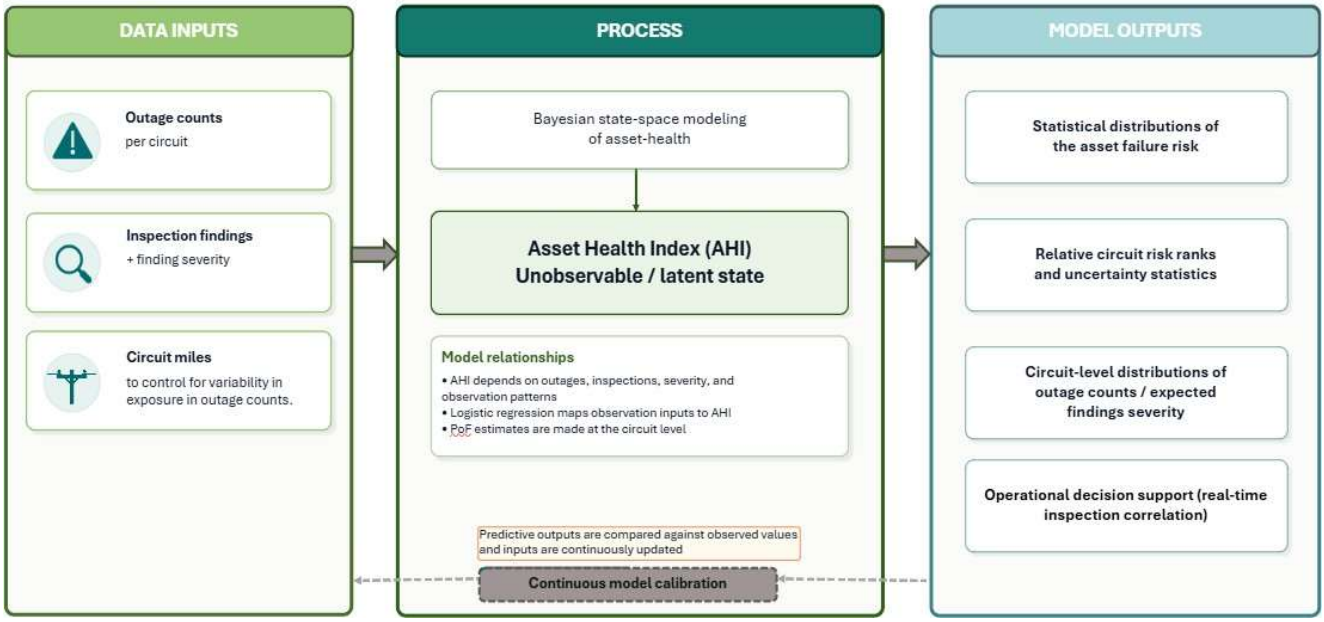
This model assumes that counts are generated from a spatially and temporally homogenous process. This model will therefore underestimate outage probabilities where and when the environment is uniquely conducive to outages. That is, conditional probabilities of outages will likely report elevated outage risk during high wind days. This model does not use information about wind intensity and duration and will report on the distribution of outages that would be expected over the relevant period with no consideration for the effects of meteorological conditions. It should be noted here that while meteorology is certainly an important predictor of outage activity, it is also highly uncertain over the time scale of planning decisions. That is, although outage rates will be elevated during high wind events, the future frequency of these events over multiple years is challenging to predict and models that are conditioned on these data will produce predictions that must assume these inputs are known. It should also be mentioned that approximately half of LUs outages are from causes that are unrelated to meteorology. This approach naturally addresses both the fact that meteorology is, for all practical purposes, unknown over planning horizons and that many of the outages will arise for reasons that are independent of meteorology.

One may reasonably argue that a circuit that has been aggressively inspected and for which all identified repairs have been completed should exhibit high asset health. There are, however, several aspects of this argument that warrant consideration. First, at least some outage causes cannot be eliminated through additional repairs. Vehicle strikes; animal interference, vandalism, and foreign-object contact represent inherent risks that are largely independent of asset conditions. Second, there is uncertainty regarding the magnitude of the effect that repairs have on overall asset health and the associated proxy measures. Repairs may be incomplete, inspections may overlook defects, and some failure mechanisms may not be fully observable. Consequently, while there is an understandable desire to adjust asset health scores immediately following repairs, the model inputs are intended to reflect long-term changes in asset conditions that are real, documented, and auditable. One potential approach would be to update asset health scores at regular intervals – say recalculation at annual intervals looking at the most recent four years of data - to allow sufficient time for any changes in outage rates and acceptable-condition probabilities attributable to repairs to become statistically detectable.

Alternative model formulations could certainly be proposed and tested that include additional covariates, substitute exposure metrics, aggregation methods, and consider other mathematical structures. The model described here has attempted to make sensible first-approximation decisions to trade off parsimony, interpretability, and predictive performance. Finally, the model results are conditioned on the inspection data, which may be collected in a non-random manner with some circuits being more heavily inspected for various reasons. This is not inherently an issue unless the models are applied to data that was collected in a manner that substantially, in which case, the model predictions could produce biases. This is not a model deficiency per se, but end users should be aware that this is a potential sensitivity when applying the model.

Risk Modeling Approach

The statistical approach to modeling outage probabilities:



References

[redacted]

Probability of Failure - Machine Learning Approach

Objective

This project develops a circuit-level Probability of Failure (PoF) outage prediction framework designed to estimate outage likelihood under varying weather, infrastructure, vegetation, inspection, and operational conditions. The methodology integrates historical outage records, weather observations, circuit characteristics, vegetation metrics, and operational data within a supervised machine learning framework to quantify relative outage risk.

The resulting model generates daily outage probabilities for individual circuits under a range of operating and weather conditions. These probabilities are adjusted to reflect historical outage frequencies and are subsequently used to estimate long-term reliability metrics, including daily and annual outage probabilities. The framework also supports weather-based risk analysis, extreme-weather assessment, and circuit prioritization.

The methodology follows a structured workflow that progresses from **data preparation → feature engineering → machine learning model development → model validation → long-term risk estimation → output generation → assumptions → references.** The sections that follow describe the implemented processing logic, model configuration, assumptions, and calculations used to translate historical outage and weather information into circuit-level outage risk metrics.

1. Outage Data Preparation

Historic outage records were processed from the outage dataset and standardized for modeling purposes as discussed in prior sections.

Outage timestamps were constructed using the outage Date and From fields.

The processing logic was:

- when a valid outage time existed in the “From” field, the exact outage time was used,
- when outage time was unavailable, the outage timestamp was estimated as 12:00 PM local time.

A quality flag was generated for each outage:

outage_time_quality	Meaning
exact_time	exact outage time available
estimated_noon	outage time unavailable; 12:00 PM assumed

All timestamps were ultimately processed and stored as local datetime values to align with the weather data timestamps

2. Circuit GIS Association and Weather Location Handling

2.1 Weather Location Handling

During initial QA/QC review, outage X/Y coordinates were evaluated against circuit geometry.

Approximately 40 outage locations were identified as spatially inconsistent or invalid relative to Liberty Utility's service territory.

Based on this review, the outage X/Y coordinates were not used for weather station assignment because the overall outage coordinate fields were determined to potentially contain broader quality issues.

Instead, circuit polygons from the GIS shapefile were used as the primary source for outage weather locations.

Representative points derived from circuit polygons were used for weather station assignment and weather aggregation.

In cases where the exact circuit identifier from the outage table could not be found in the circuit polygon shapefile, circuit identifiers were adjusted to reference the parent circuit.

For example:

XXXX R1 → XXXX

This adjustment was only applied when the exact circuit identifier did not exist in the circuit polygon dataset.

Outage records referencing multiple circuits were handled by merging the associated circuit polygons using geometric union operations.

2.2 Multi-Circuit Outage Handling

Some outage records referenced multiple circuits.

For these records:

- all matching circuit polygons were identified,
- circuit polygons were merged using geometric union operations,
- a representative point was generated from the merged polygon,
- the representative point was used as the outage weather location.

This approach ensured that outages associated with multiple circuits still received a weather location for station assignment.

2.3 Missing Circuit Geometry

If an outage circuit does not have matching circuit polygons in the shapefile, the following diagnostic outputs were generated to identify:

- unmatched circuit IDs,
- missing circuit geometries,
- missing weather locations.

Rows without valid circuit geometry were flagged as:

missing_location

Diagnostic CSV files were exported for quality review.

Note: For Liberty outage data, this module does not create any unmatched or missing geometries although this flexibility is offered by model design.

3. Outage and Non-Outage Sample Generation

3.1 Positive Samples

Positive samples were generated from actual outage circuit-days.

Each positive sample represented:

one circuit on one outage day

The earliest outage timestamp on a circuit-day was used as the prediction timestamp.

3.2 Non-Outage Samples

Non-outage samples were generated to create a balanced training dataset for machine learning model development.

The historical outage records naturally contain information only for circuit-days on which an outage occurred. When combined with all historical circuit-days, outage events represent only a small fraction of the available observations, while the vast majority correspond to normal operating conditions without outages. Consequently, the original dataset is highly imbalanced, with substantially more non-outage than outage samples.

Training directly on such an imbalanced dataset can bias the classifier toward predicting the majority (non-outage) class, allowing the model to achieve high apparent accuracy while failing to adequately learn the conditions associated with outage occurrence. To reduce this bias and improve the model's ability to

distinguish outage-prone from non-outage conditions, a balanced set of non-outage samples was generated.

[redacted]

4. Weather Station Mapping

4.1 Weather Station Inventory

Weather station metadata were downloaded from the Western Weather Group API.
If there are stations with missing latitude or longitude values, the model would exclude them.

4.2 Nearest Station Assignment

Weather stations were assigned to each outage and non-outage sample using geographic nearest-neighbor searches based on circuit representative-point locations.

[redacted]

[redacted]

Stabilization constantly prevents division-by-zero conditions and reduces the influence of stations located extremely close to the circuit representative point. Weights were subsequently normalized so that the sum of all assigned station weights equaled one.

The station assignment framework includes functionality to incorporate elevation differences between weather stations and outage locations when calculating station weights. However, elevation weighting was not applied in the current implementation because outage weather locations are represented using circuit polygon representative points rather than actual outage locations. Given the mountainous nature of the service territory, representative-point elevations may not accurately represent the elevation of individual outage locations and could introduce additional uncertainty into station weighting. As a result, only distance-based weighting was used for weather station assignment. Maximum allowable station distance threshold (50 km) was enforced.

5. Weather Data Download and Processing

Weather data were downloaded from the Western Weather Group API. Quality-control diagnostics were generated during processing to identify missing weather records, empty API responses, malformed files, and outages without nearby weather stations.

6. Weather Feature Engineering

Weather variables were aggregated relative to the prediction timestamp.
Only weather observations occurring before the prediction timestamp were used.
The following rolling windows were implemented:

Window	Description
previous 24 hours	short-term weather conditions
previous 72 hours	storm and weather persistence
previous 7 days	accumulated environmental stress

6.1 Aggregated Weather Variables

[redacted]

[redacted]

7. Asset and Network Feature Engineering

Circuit-level asset and network characteristics were derived from Liberty GIS, load, and fault-current datasets and joined to outage and non-outage samples using circuit identifiers.

The feature engineering process generated circuit -level metrics describing:

[redacted]

These variables provide a measure of circuit size, exposure, and infrastructure extent.

Circuit Inclusion Criterion

Circuits with zero primary overhead conductor miles were excluded from the analysis in our machine learning model development. Because several network metrics are normalized by primary overhead conductor mileage and the modeling framework is intended to estimate outage risk associated with overhead distribution infrastructure, only circuits with non-zero primary overhead exposure were included in subsequent model training, model validation, and long-term risk calculations.

Device Inventory and Density Metrics

[redacted]

Voltage Characteristics

Voltage-related features were derived from available GIS asset attributes and included circuit-level nominal and operating voltage indicators.

Where multiple voltage values existed within a circuit, representative circuit voltage values were derived from the most common (mode) voltage assignment and supplemented by maximum observed voltage values where available.

8. LiDAR Vegetation Feature Engineering

LiDAR-derived vegetation metrics were incorporated to represent vegetation exposure and condition. The vegetation feature engineering process generated circuit-level indicators describing:

- vegetation condition and vegetation change,
- vegetation decline and deterioration,
- vegetation risk classifications,
- vegetation exposure along circuit spans,
- proportions of circuit mileage associated with elevated vegetation risk categories.

These metrics were intended to capture differences in vegetation-related outage exposure among circuits and to provide information on both vegetation condition and potential vegetation interaction with electrical infrastructure.

Vegetation variables were treated as circuit-level characteristics and assumed constant throughout the modeling period. Following model development and feature selection, a subset of vegetation variables was retained in the final machine learning model, including vegetation decline indicators and measures of circuit exposure to Very High Vegetation risk areas.

Higher vegetation-risk values generally indicate increased vegetation exposure, greater vegetation deterioration, or a larger proportion of circuit mileage located in elevated vegetation-risk conditions.

9. Inspection Feature Engineering

Historical inspection and maintenance records were processed and aggregated at the circuit level. For each outage and non-outage sample, only inspection records occurring before the prediction timestamp were considered.
The implemented inspection indicators included:

- open issue count,
- significant issue count during the previous three years (issues with priority of 1, 2, 3),
- days since last inspection.

Open issues were defined as inspection findings without completed maintenance prior to the prediction date.

10. Load and Fault Current Integration

Load Characteristics

Circuit load characteristics were derived from monthly load records and included:

- average load,
- peak load,
- maximum average load,
- maximum peak load,
- peak-to-average load ratio.

These variables were intended to represent circuit loading conditions and operational stress.

Fault Current Characteristics

Fault current features were derived from circuit fault-current data and included the circuit -level three-line-to-ground (3LG) fault current.

Where multiple values were available, the median fault current was used as the representative circuit -level value.

All asset and network variables were aggregated at the circuit level and assumed constant throughout the modeling period.

11. Machine Learning Model Development

The Probability of Failure (PoF) model uses a supervised machine learning framework to estimate circuit-level outage probability for a specific circuit-day by combining weather, asset, vegetation, load, and inspection indicators.

The response variable was a binary variable where a one indicated the presence of at least one outage on a given circuit-day, and zero was reported otherwise. Balanced outage and non-outage samples were used during model training.

Several machine learning algorithms were evaluated, including:

- Random Forest
- XGBoost
- LightGBM
- CatBoost
- Ensemble models (RF + XGB + LGBM + CAT)

The primary objective of the modeling framework is to estimate daily outage probabilities, which are subsequently scaled and aggregated to estimate long-term outage risk metrics, including expected outage-days, daily and annual outage probability, and circuit risk rankings.

For model evaluation purposes, however, the probabilistic predictions must be compared against the binary outage observations available in the historical dataset. Model performance was assessed using [redacted]out-of-fold cross-validation, ensuring that each sample was evaluated using a model that had not previously observed that sample during training.[redacted]

Probability-based metrics such as ROC-AUC were also used to evaluate the model's ability to distinguish outage-prone and non-outage conditions independent of the selected classification threshold.

Based on predictive performance, model stability, and interpretability, the production model was configured as a **LightGBM** (LGBM) classifier.

11.1. Model Training and Prediction Workflow

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

12. Model Evaluation

Performance metrics are calculated using 5-fold out-of-fold cross-validation to ensure that every sample is evaluated using a model that was not trained using that sample. Each time, the model is trained on four folds and used to predict the held-out fold. After all, five folds are completed, the out-of-fold (OOF) predictions from all samples are combined, and the performance metrics are calculated using the complete set of predictions. This ensures that every sample is evaluated using a model that was not trained on that sample while providing a single performance estimate for the entire dataset.

The following diagnostic outputs are generated:

- Confusion matrix (Powers, 2011)
- Receiver Operating Characteristic (ROC) curve (Hanley and McNeil, 1982)
- Calibration Curve (Niculescu-Mizil and Caruana, 2005) – Appendix A
- Feature importance ranking (Breiman, 2001)
- SHAP feature contribution plots (Lundberg and Lee, 2017)

These metrics evaluate classification performance, model discrimination, calibration, and feature influence. They are used to assess model quality and interpretability prior to application of the long-term risk and circuit-ranking framework described in Section 13.

12.1. Confusion Matrix

Figure 1 summarizes model classification performance using out-of-fold predictions generated during cross-validation. The confusion matrix compares predicted outage occurrence against observed outage outcomes and reports the number of true positives, true negatives, false positives, and false negatives.

The model correctly identified 638 outage observations and 648 non-outage observations, while 408 outage observations were missed and 378 non-outage observations were incorrectly classified as outages (false positives). These results demonstrate that the model can identify a substantial portion of outage events while maintaining reasonable discrimination between outage and non-outage conditions.

The comparable numbers of correctly identified outage and non-outage observations indicate that the model does not exhibit a strong bias toward either class and provides a balanced ability to distinguish outage-prone from normal operating conditions. Although some outage events are missed and some non-outage conditions are incorrectly identified as outages, such errors are expected given the stochastic nature of outage occurrence and the many operational factors that cannot be fully represented by the available predictor variables.

Because the primary objective of the PoF model is to estimate outage probabilities rather than produce binary classifications, the confusion matrix should be interpreted together with threshold-independent performance metrics, including the ROC curve, ROC-AUC, and calibration curve. These probability-based metrics provide a more comprehensive assessment of model discrimination and probability calibration, whereas the confusion matrix reflects performance at the selected operating thresholds.

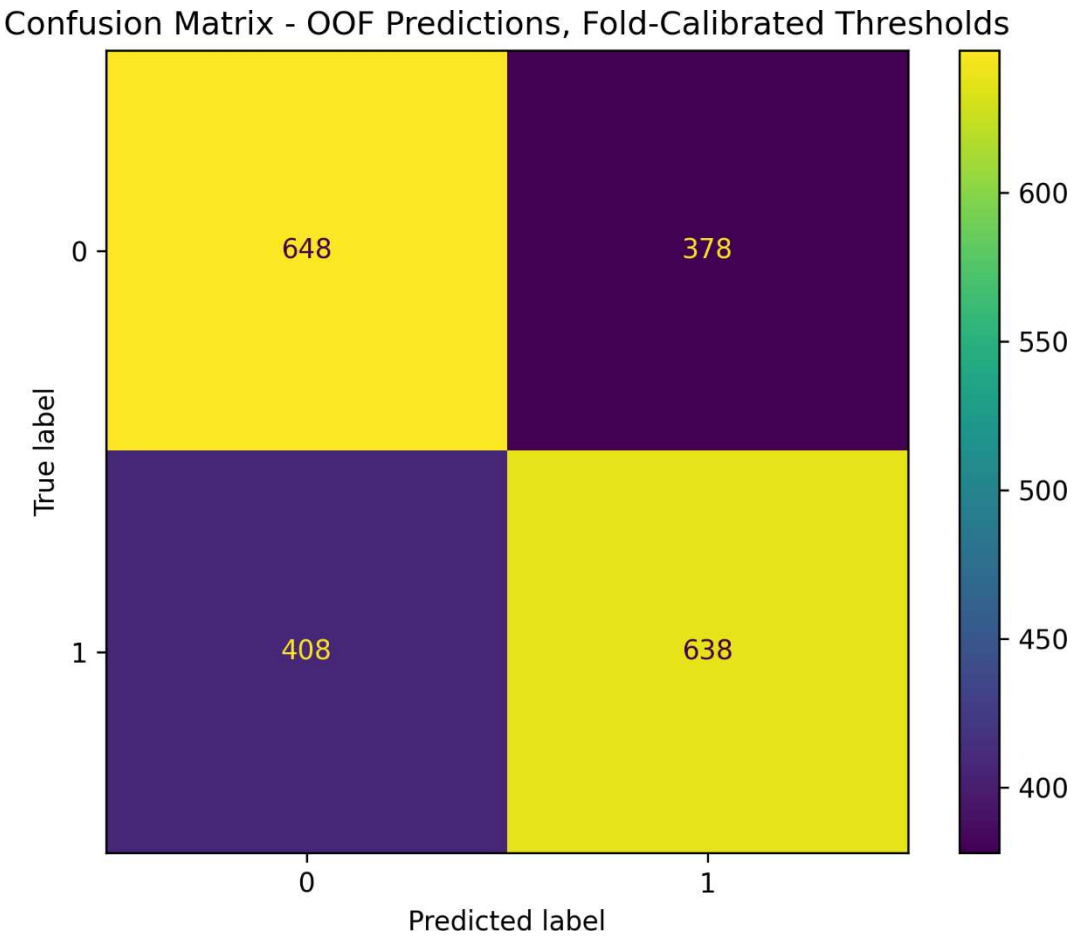


Figure 2. Confusion matrix for out-of-fold predictions generated during 5-fold cross-validation. Values represent the number of correctly and incorrectly classified outage and non-outage observations using the selected classification threshold.

12.2 ROC Curve

Figure 2 presents the Receiver Operating Characteristic (ROC) curve generated from out-of-fold predictions. The ROC curve evaluates model performance by comparing the true positive rate against the false positive rate across all possible classification thresholds.

The Area under ROC curve (ROC-AUC) is a measure of how well the model distinguishes between outage events (1) and non-outage events (0). ROC-AUC ranges from 0 to 1, with 0.5 representing a completely random model (equivalent to flipping a coin). Values above 0.5 indicate increasing predictive capability, while values below 0.5 suggest that the model is systematically making incorrect distinctions between outage and non-outage conditions. The ROC-AUC metric evaluates ranking performance independent of any specific probability threshold and therefore provides a threshold-independent measure of model discrimination.

An ROC-AUC of 0.69 indicates that the model can distinguish outage-prone conditions from non-outage conditions substantially better than random classification. In other words, if we randomly select one outage day and one non-outage day, there is approximately a 69% probability that the model assigns a higher daily outage probability to the outage day than to the non-outage day.

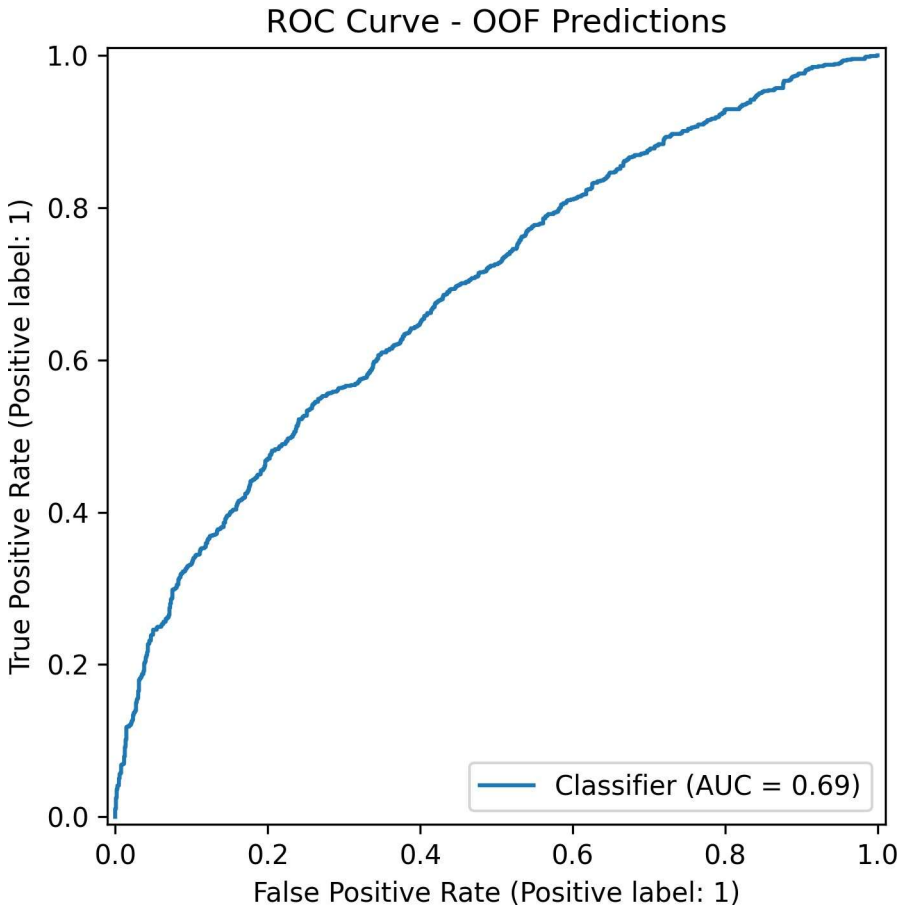


Figure 3. Receiver Operating Characteristic (ROC) curve for out-of-fold model predictions. The area under the curve (ROC-AUC) quantifies the model's ability to distinguish outage and non-outage observations across all classification thresholds.

12.3. Feature Importance Analysis (SHAP-Based)

Understanding which variables contribute most strongly to outage prediction is important for interpreting model behavior and identifying the factors most closely associated with outage risk. Feature importance analysis was therefore performed using SHAP (SHapley Additive exPlanations), a model-interpretation technique that quantifies the overall influence of each variable on model prediction To maintain consistency with the model evaluation framework, SHAP values were computed using the out-of-fold (OOF) predictions generated during the five-fold cross-validation process. Each circuit-day was therefore

explained using the same model that generated its independent validation prediction, ensuring that feature importance was derived from predictions on previously unseen data.

To maintain consistency with the model evaluation framework, SHAP values were computed using the out- of-fold (OOF) predictions generated during the five-fold cross-validation process. Each circuit-day was therefore explained using the same model that generated its independent validation prediction, ensuring that feature importance was derived from predictions on previously unseen data.

[redacted]

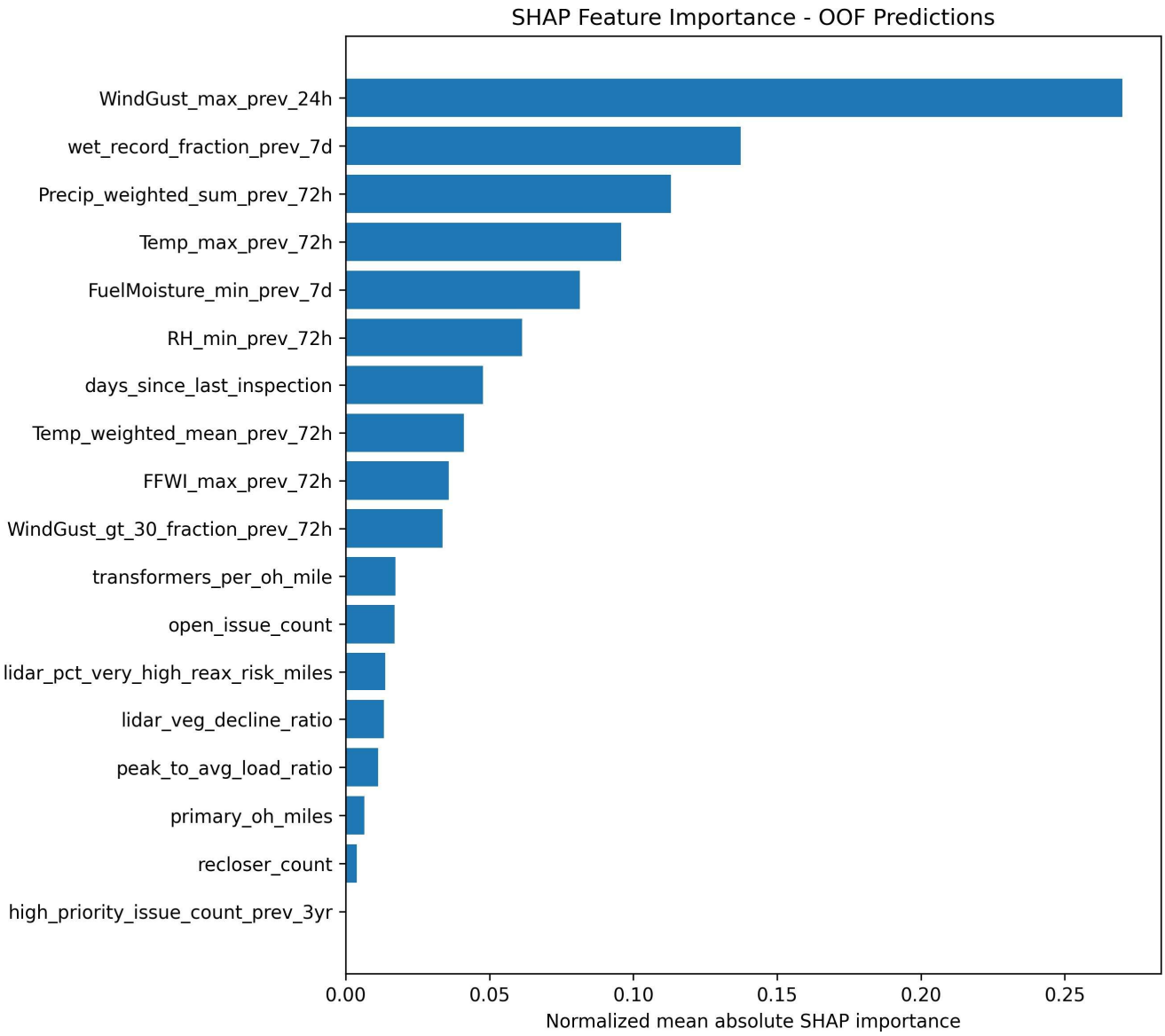
The normalized SHAP feature importance provides a relative ranking of the variables according to their overall contribution to the model predictions. Variables with higher importance values have a greater influence on the predicted outage probability across the evaluated circuit-day samples, whereas variables with lower importance values contribute relatively little to the model predictions on average. A high feature importance does not imply causation; rather, it indicates that the model relies more heavily on that variable when estimating outage probability. Likewise, a low importance does not necessarily indicate that a variable is redundant or uninformative, as its contribution may overlap with other correlated variables or become important only under specific operating conditions.

Figure 4 presents the normalized SHAP-based feature importance ranking for the outage prediction model. Higher values indicate variables that have a larger overall influence on model-predicted outage probability across the evaluated samples**.** If a highly ranked variable were removed from the model, a larger reduction in predictive performance would generally be expected because the model would lose one of its primary sources of predictive information. In contrast, removing a lower-ranked variable would typically have a smaller effect on overall model performance, although the actual impact depends on interactions and correlations among the input variables.

The results indicate that weather-related variables are the dominant drivers of outage probability predictions. Maximum wind gust during the previous 24 hours is the most influential predictor, followed by wet-weather frequency, precipitation accumulation, maximum temperature, and fuel moisture. These results indicate that short-term weather intensity and environmental conditions provide the strongest predictive information for outage occurrence.

Overall, the feature importance results indicate that outage risk is primarily driven by weather conditions, while circuit characteristics, vegetation exposure, load, and inspection history help differentiate risk among circuits.

Figure 4. Normalized SHAP feature importance based on Figure



12.4 SHAP Summary Analysis

While the feature importance ranking identifies which variables contribute most strongly to model predictions, it does not indicate how those variables influence outage probability. To provide additional interpretability, a SHAP summary analysis was performed.

Figure 5 presents the SHAP summary plot for the outage prediction model. Each point represents an individual circuit-day sample. The horizontal position of each point indicates whether the feature

increased or decreased the model-predicted outage probability for that sample. Positive SHAP values increase predicted outage probability, while negative SHAP values decrease predicted outage probability. Point color represents the relative magnitude of the feature value, with red indicating higher values and blue indicating lower values.

Unlike the feature importance ranking, which is calculated using the mean absolute SHAP value, the SHAP summary plot displays the signed SHAP value for each individual sample. Consequently, a variable may have both positive and negative SHAP values while still having a high feature importance ranking. This indicates that the variable has a strong overall influence on the model predictions, but its effect depends on the combination of operating and environmental conditions represented by the other model features. Such behavior reflects interaction effects learned by the machine learning model rather than a simple linear relationship between a single variable and outage probability.

The SHAP summary plot confirms the dominant influence of weather-related variables identified in the feature importance analysis. Higher wind gusts generally increase predicted outage probability, while wet-weather frequency, precipitation, temperature, fuel moisture, and humidity exhibit nonlinear relationships that vary depending on the combination of operating and environmental conditions present. These patterns reflect the complex interactions among weather, vegetation, infrastructure, and operational factors that contribute to outage occurrence.

Asset, inspection, vegetation, and operational variables generally exhibit smaller SHAP value ranges, indicating that they primarily modify outage risk rather than dominate model predictions. Together, the feature importance ranking and SHAP summary analysis provide a transparent view of model behavior by identifying both the most influential variables and their relative impact on individual outage predictions.

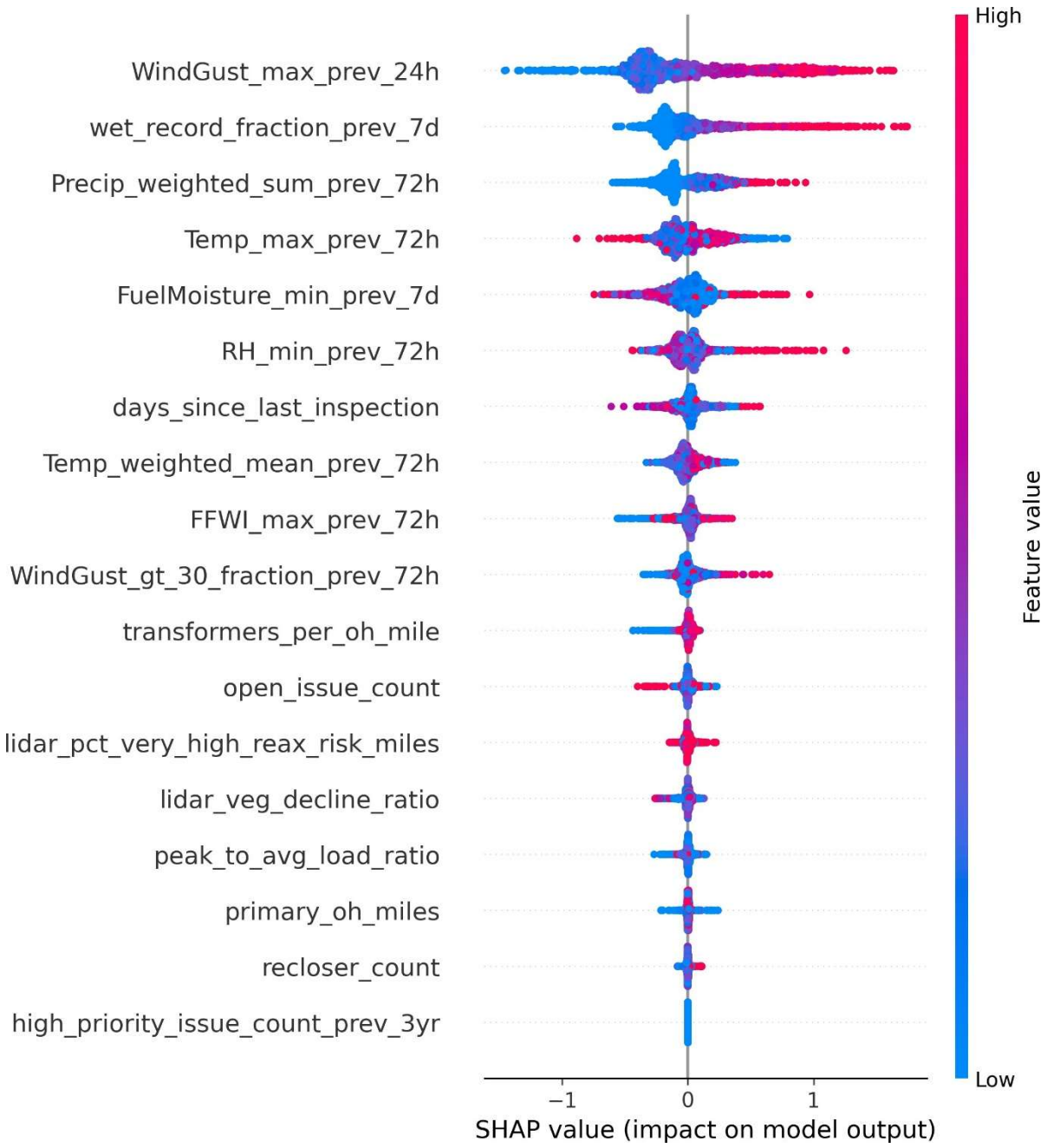


Figure 5. SHAP summary plot showing the direction and magnitude of each variable's influence on predicted outage probability. Each point represents an individual circuit-day sample.

13 Long-Term Risk Metrics

13.1. Probability Scaling

Because the machine learning model is trained using approximately balanced outage and non-outage samples (Section 3), the raw model probabilities do not directly represent true historical outage frequencies.

[redacted]

13.2. Long-Term Circuit-Day Sample Generation

For long-term risk estimation, the model creates circuit-day samples by combining each modeled circuit with historical weather dates from the study period.

The current implementation uses every calendar day from January 1, 2022 through December 31, 2025. For each circuit-day scenario, the prediction time is set to 12:00 PM local time. Weather features are then calculated using only weather observations before that prediction time.

This produces one modeled daily outage probability for each circuit on each historical weather day. These daily probabilities are used to estimate average daily outage probability, expected outage-days, and annual or seasonal probability of one or more outages.

The model also includes an optional seasonal sampling approach, where a fixed number of dates can be sampled from each season. However, the current configuration uses the full daily sampling approach rather than the seasonal sample option.

13.3. Daily and Annual Probability Calculations

For each circuit, the model calculates:

Daily Probability of one or more Outages = Mean scaled outage probability across all modeled circuit-days in the selected analysis window.

This is equivalent to:

$$\textbf{Mean Daily Pr(o)}_c = \sum_i \Pr(\mathrm{Wx})_i \times \Pr(\mathrm{o} \mid \mathrm{Wx})_{c,i} = \sum_i \left(\frac{\mathrm{N_i}}{\mathrm{N_{total}}}\right) \times \Pr(\mathrm{o} \mid \mathrm{Wx})_{c,i}$$

Where:

- $\mathrm{N_i}$ is the number of days in i^{th} weather bin
- $\mathrm{N_{total}}$ is the total number of modeled days across all weather bins
- $\Pr(\mathrm{o} \mid \mathrm{Wx})_{c,i}$ is the mean scaled probability of outage-day of all samples in circuit c and i^{th} weather bin
- c and i represents circuit and weather bin, respectively

In all equations, Pr(o) refers to the probability of an outage-day per circuit (at least one outage occurring on a circuit during a day), not the probability of an individual outage event. If a VPD/wind bin contains no modeled circuit-days, the mean scaled probability for that bin is undefined. In these cases, the mean probability is assigned a value of 0.0005, representing a very low outage probability (less than one expected outage during the study period) while avoiding undefined values in the probability calculations.

The Annual probability of one or more outages is calculated as:

$$\textbf{Annual Pr}(\mathbf{o} \geq \mathbf{1})_c = 1 - [1 - \text{Mean Daily Pr(o)}_c]\text{^}365$$

Expected outage-days are calculated as:

$$\textbf{Expected (o)}_c = \text{Mean Daily Pr(o)}_c \times 365$$

To evaluate the long-term risk framework at the circuit level, machine-learning predictions are compared with historical outage experience using annual outage frequency metrics.

Figure 5 compares historical average outage-days per year with machine-learning estimated outage-days per year for each circuit. The 1:1 reference line represents perfect agreement between historical and modeled outage frequency. Circuits located near the reference line indicate good agreement between observed and modeled outage frequency, while deviations from the line identify circuits where outage frequency is slightly over- or under-estimated by the model.

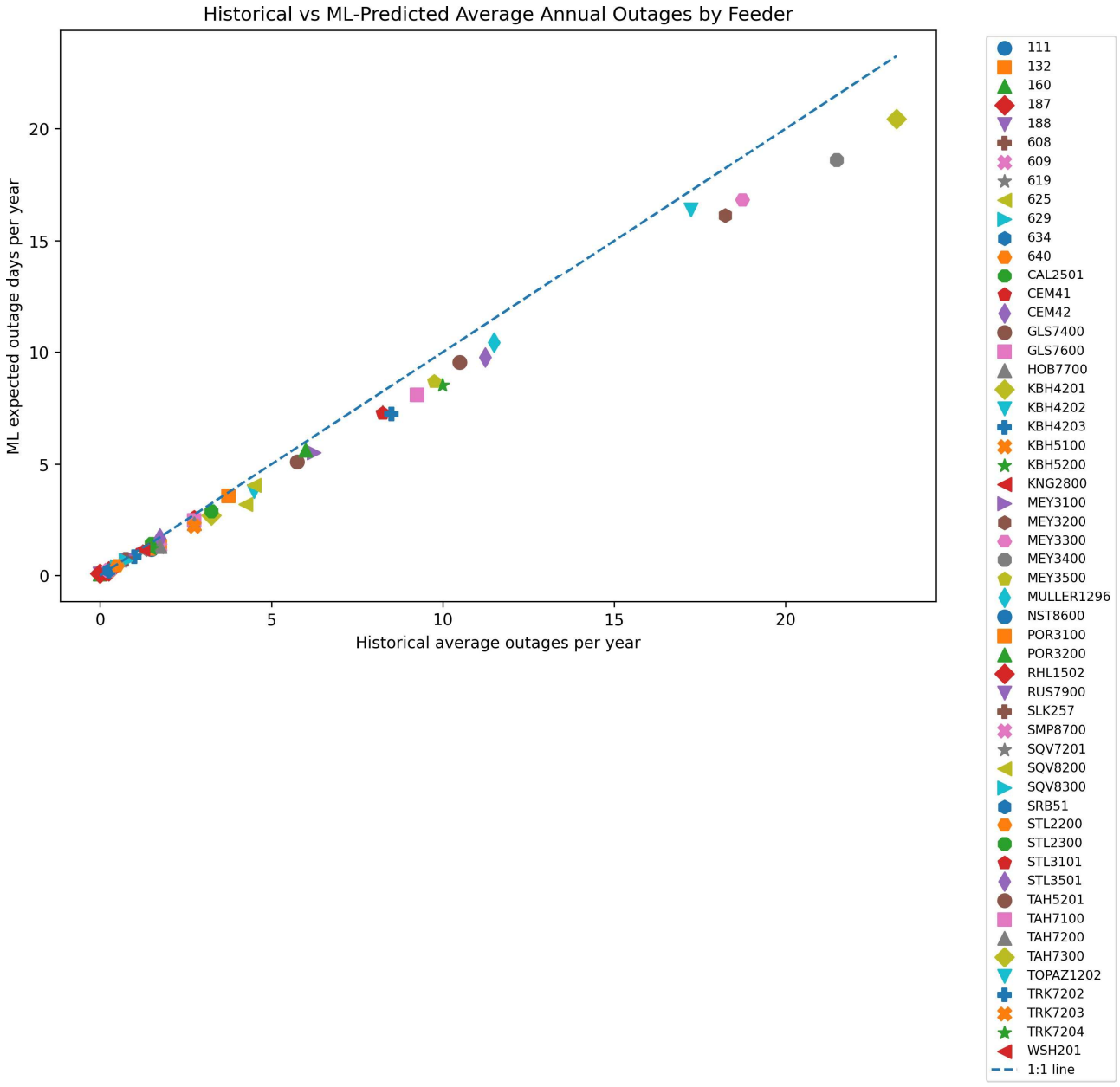


Figure 6. Historical versus ML average annual outage-days by circuit.

Figure 6 compares circuit rankings derived from historical annual outage frequency and machine-learning estimated annual outage frequency. Rankings are based on the total average annual outage-days calculated for each circuit. Close agreement between historical and modeled rankings indicates that the

long-term probability framework preserves the relative ordering of higher-risk and lower-risk circuits and can therefore be used for circuit prioritization and risk-based planning applications.

Together, these comparisons provide validation that the probability scaling, daily probability aggregation, and annual outage calculations produce circuit-level risk estimates that are broadly consistent with observed historical outage experience.

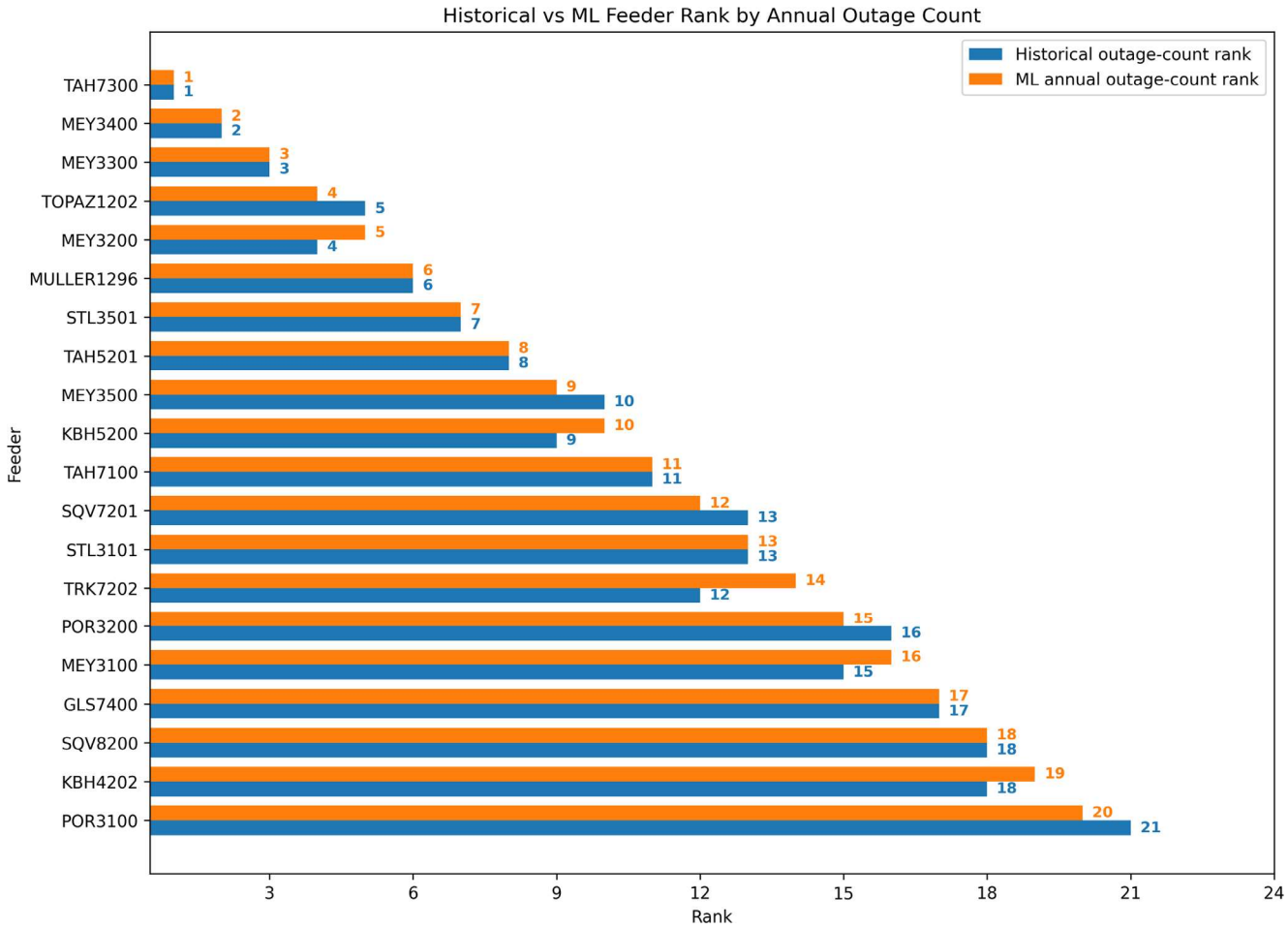
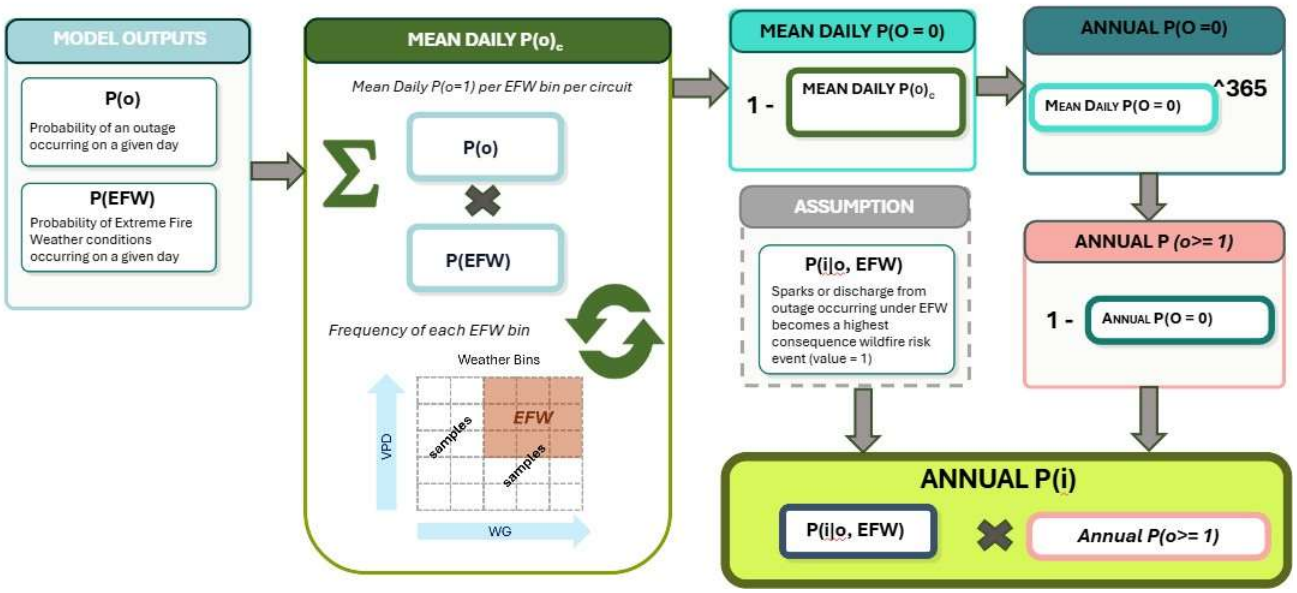
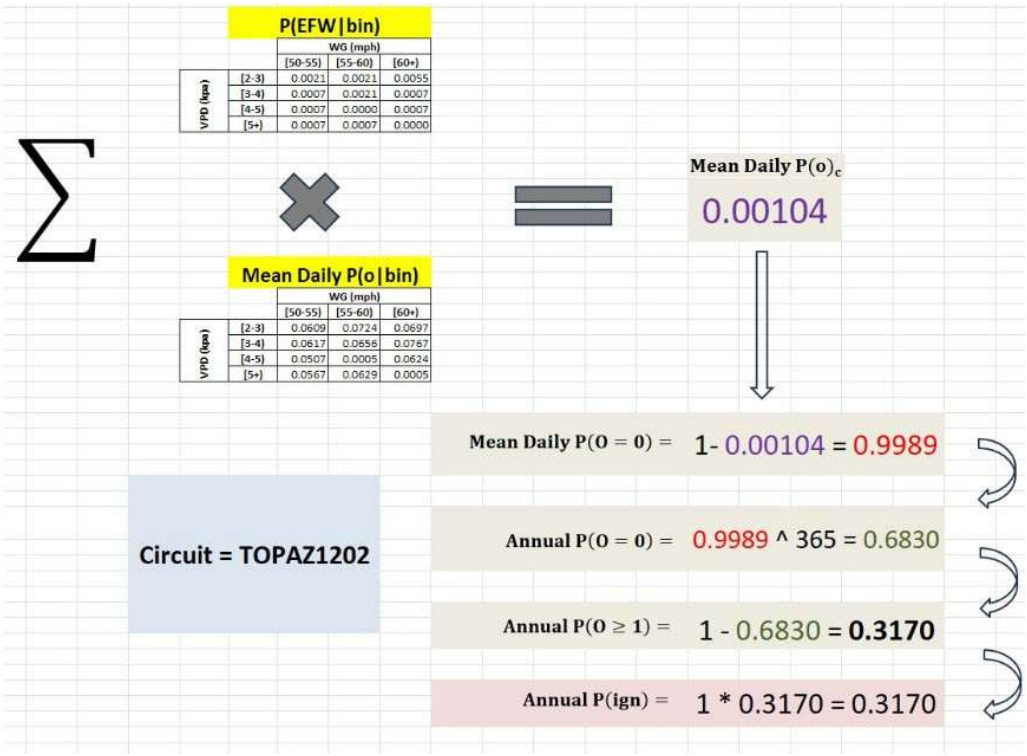


Figure 7. Historical and ML circuit rankings based on average annual outage-days.

Annual Probability of Ignition *P(i)*



Sample Calculations



13.4. VPD and Wind Weather-Risk Lookup Tables

The weather-risk lookup table summarizes outage probability by vapor pressure deficit (VPD) and wind gust bins.

VPD is calculated from:

- Temp_max_prev_72h
- RH_min_prev_72h (kpa)

Wind gust is represented using:

- WindGust_max_prev_24h (mph)

The lookup table uses the following bins.

Wind Gust Bins (mph): [0–5), [5–10), [10–15), [15–20), [20–25), [25–30), [30–35), [35–40), [40–45), [45–50), [50–55), [55–60), [60+)

VPD Bins (kPa): [0–1), [1–2), [2–3), [3–4), [4–5), [5+)

For each circuit, the output workbook reports:

- number of modeled days in each VPD/wind bin
- mean daily scaled outage probability in each bin

The daily probability across all bins is calculated by weighting each bin's mean probability by the number of modeled days in that bin.

13.5 Extreme Fire Weather (EFW) Probability Contribution

The model also quantifies outage risk associated with EFW conditions that historically correspond to elevated outage activity in the region.

A circuit-day is classified as a severe-weather condition when:

- VPD ≥ 2 kPa
- WindGust_max_prev_24h ≥ 50 mph

The severe-weather daily outage probability is calculated using the same weighted aggregation framework used for the overall daily outage probability.

For each VPD and wind bin:

$$\text{Bin Contribution} = \frac{\text{Number of modeled days in bin}}{\text{Total modeled circuit} - \text{days}} \times \text{Mean scaled outage prob in bin}$$

The EFW daily outage probability is then calculated by summing the contributions from all bins meeting the severe-weather criteria:

$$\textbf{Mean Daily Pr(o)}_{EFW,c} = \sum_{i,EFW} \left(\frac{N_i}{N_{total}}\right) \times \Pr(o \mid Wx)_{c,i}$$

for all bins where:

- VPD ≥ 2 kPa
- Wind Gust ≥ 50 mph

The probability of one or more outages associated with EFW conditions is then calculated as:

$$\textbf{Annual Pr(o} \geq \textbf{1)}_{EFW,c} = 1 - [1 - \text{Mean Daily Pr(o)}_{EFW,c}]\text{^}365$$

Expected annual outage-days associated with severe-weather conditions are calculated as:

$$\textbf{Expected (o)}_{EFW,c} = \text{Mean Daily Pr(o)}_{EFW,c} \times 365$$

This methodology is identical to the overall daily probability calculation except that the summation is restricted to bins representing EFW conditions.

13.6. Summary of End-to-End Probability and Risk Workflow

The end-to-end probability and wildfire risk framework developed in this study is summarized in Figures 8-10. The workflow begins with machine learning predictions of daily circuit-level outage probability, which are aggregated to estimate annual outage probability using historical weather sampling. The annual outage probability is subsequently combined with the probability of extreme fire weather conditions (EFW) to estimate annual ignition probability. Finally, annual ignition probability is integrated with circuit-specific wildfire consequence estimates to quantify the overall annual wildfire risk for each circuit. Together, these figures illustrate the progression from machine learning predictions to the final risk metric used for circuit prioritization and ranking.

Figure 7 illustrates the methodology used to estimate annual outage probability from machine learning predictions. Daily outage probabilities are first generated for every modeled circuit-day using the trained machine learning model and historical weather observations. These daily probabilities are grouped into weather-condition bins defined by vapor pressure deficit (VPD) and wind gust, where the mean outage probability is calculated for each bin. The bin probabilities are then weighted by their historical frequency of occurrence to estimate the mean daily outage probability for each circuit. Finally, assuming independent daily outage occurrence, the mean daily probability is converted into the annual probability of experiencing one or more outage-days, which forms the basis for circuit ranking and subsequent wildfire risk calculations.

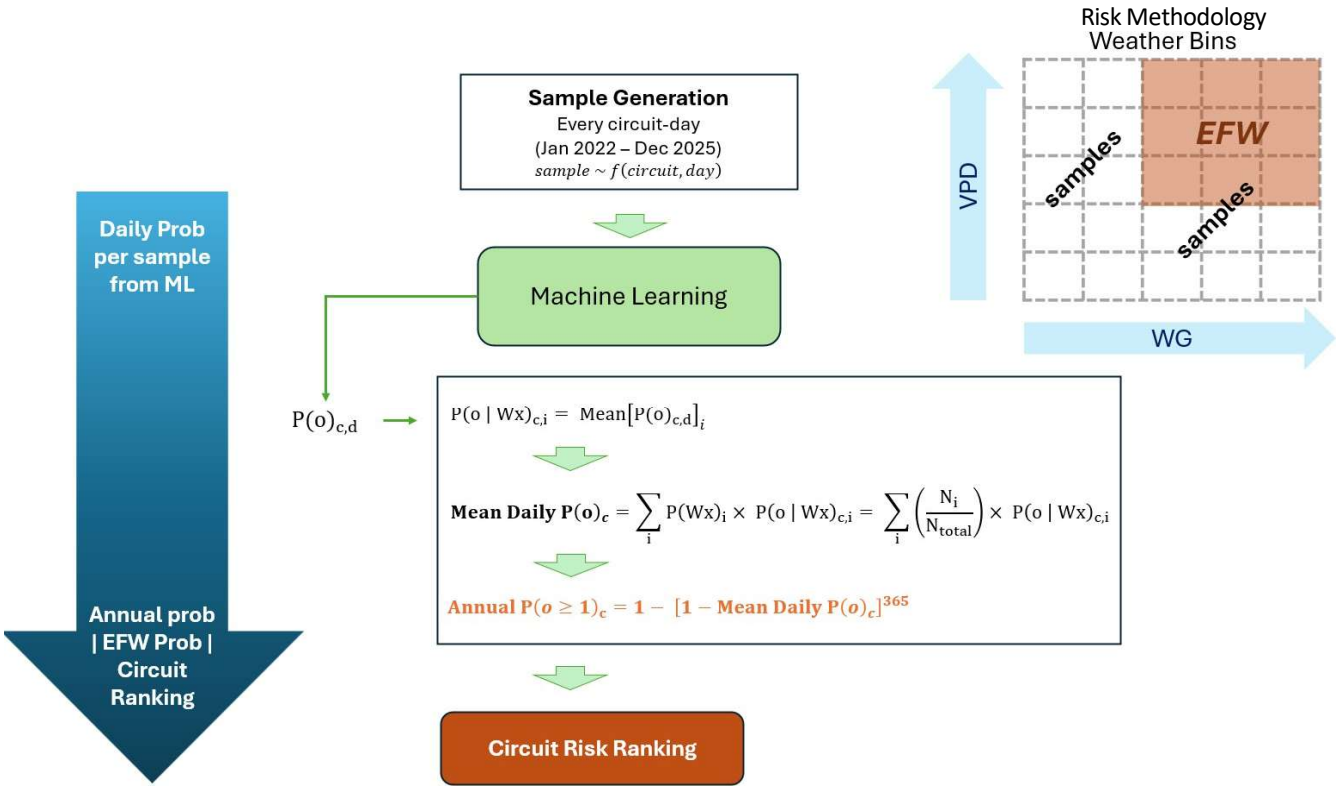


Figure 8. Annual Outage-Day Probability Calculation

Figure 8 summarizes the methodology used to estimate annual wildfire ignition probability. The annual outage probability is combined with the probability of extreme fire weather (EFW) conditions under the assumption that outages occurring during EFW conditions have the potential to produce high-consequence wildfire ignitions, whereas outages occurring under non-EFW conditions are assumed to contribute negligible wildfire ignition risk. The resulting annual ignition probability represents the likelihood that a circuit experiences at least one outage-day during extreme fire weather conditions within a year.

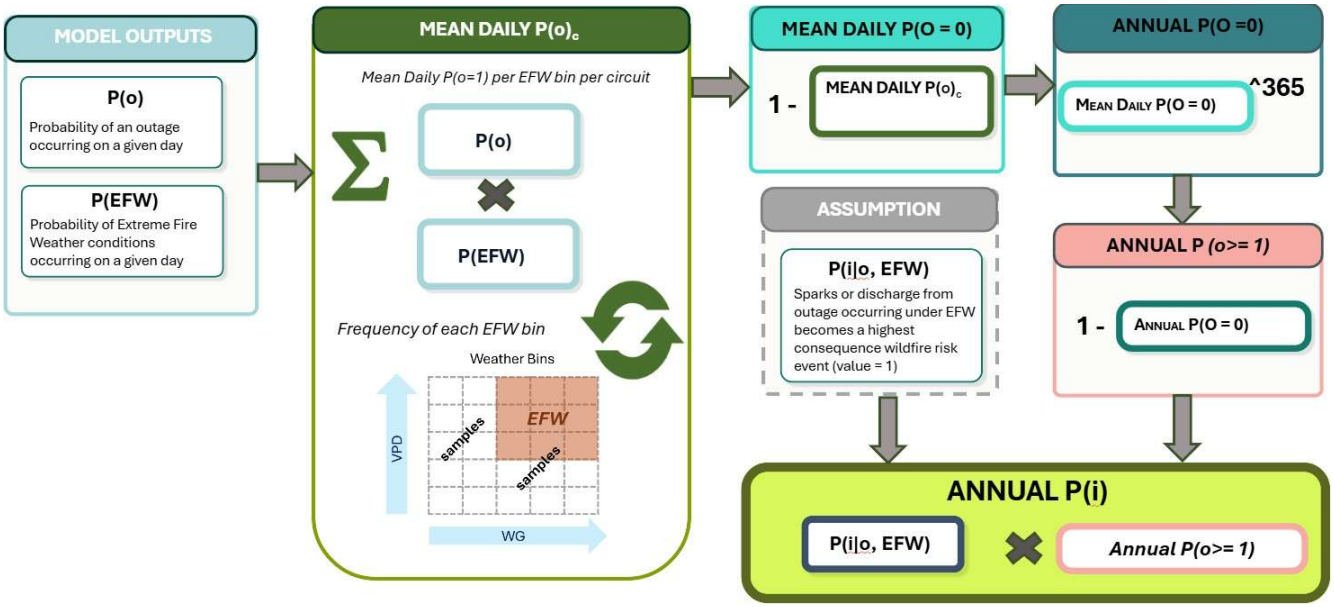


Figure 9. Annual Ignition Probability Calculation

Figure 9 illustrates the final wildfire risk calculation framework. The annual ignition probability is combined with circuit-specific wildfire consequence estimates derived from Technosylva wildfire consequence modeling. A consequence scaling factor may also be applied to calibrate the consequence estimates to the desired risk framework. The resulting product represents the annual wildfire risk for each circuit, providing a quantitative metric for comparing, prioritizing, and ranking circuits according to their combined likelihood of ignition and potential wildfire consequence.

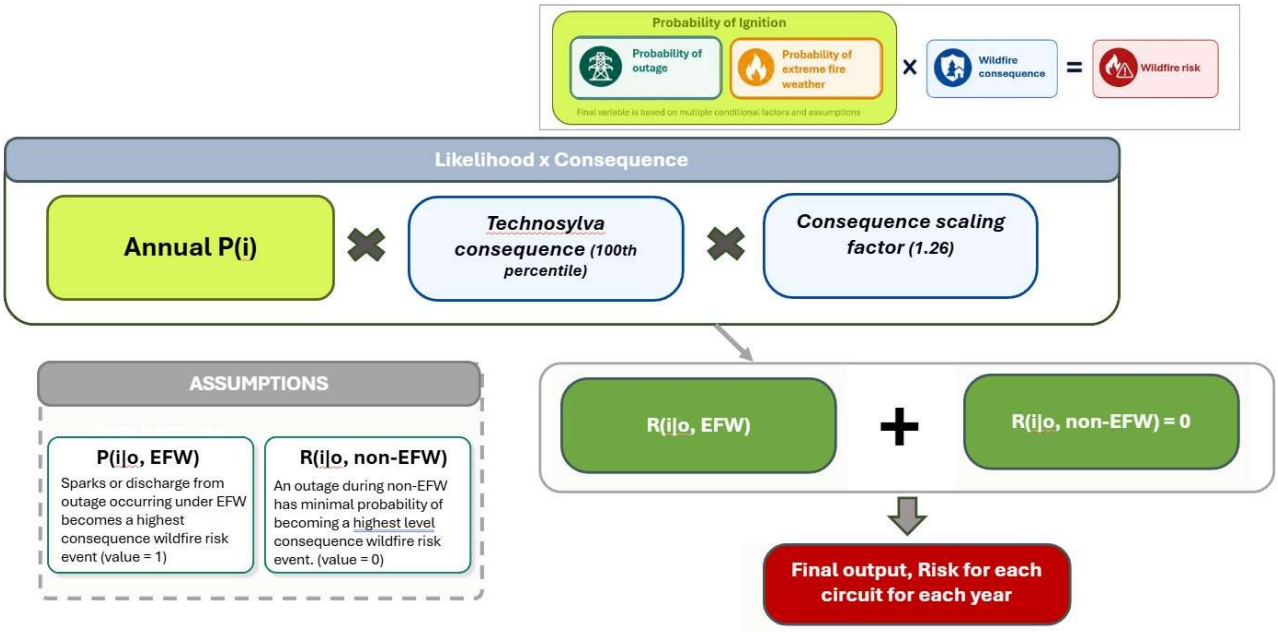
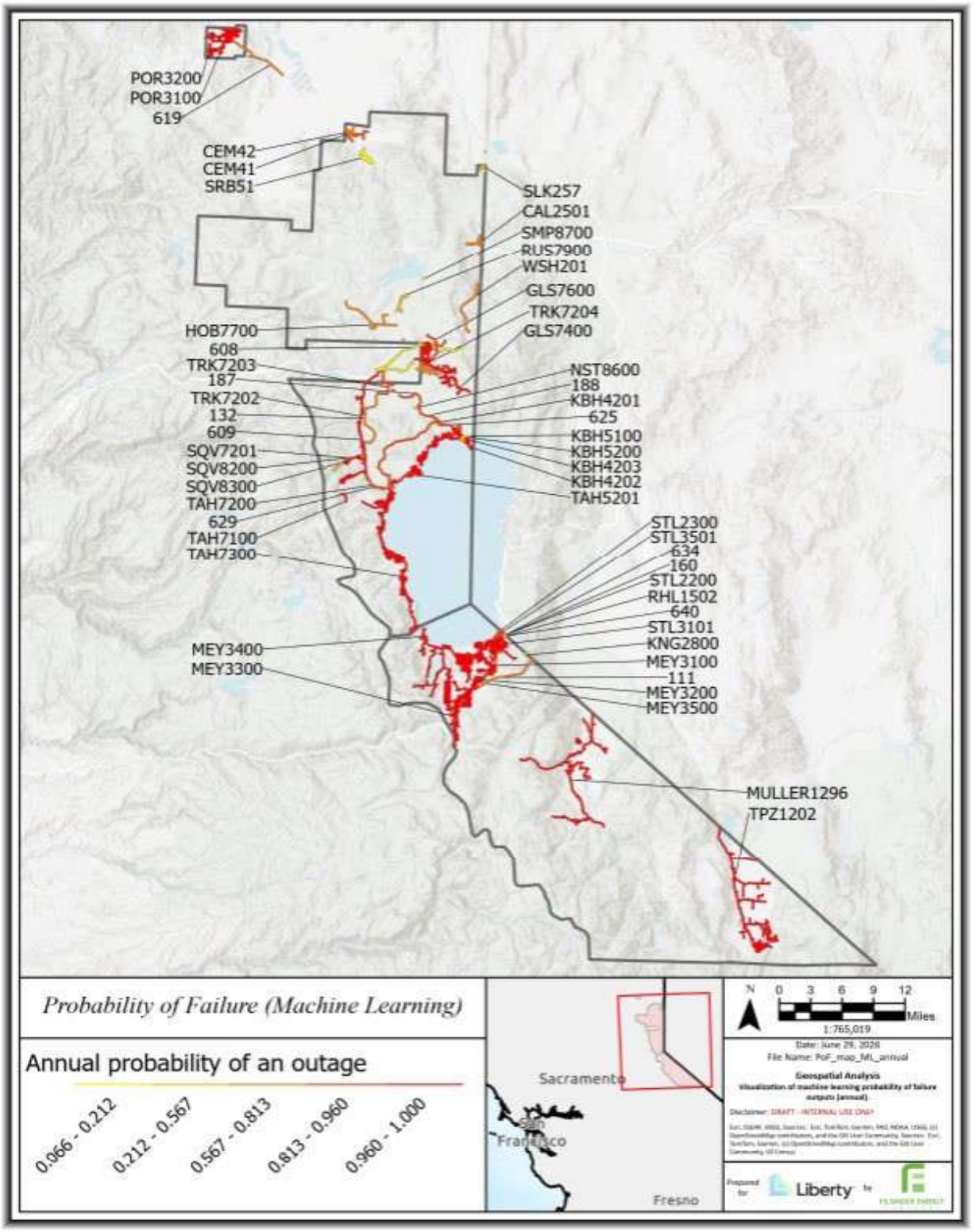


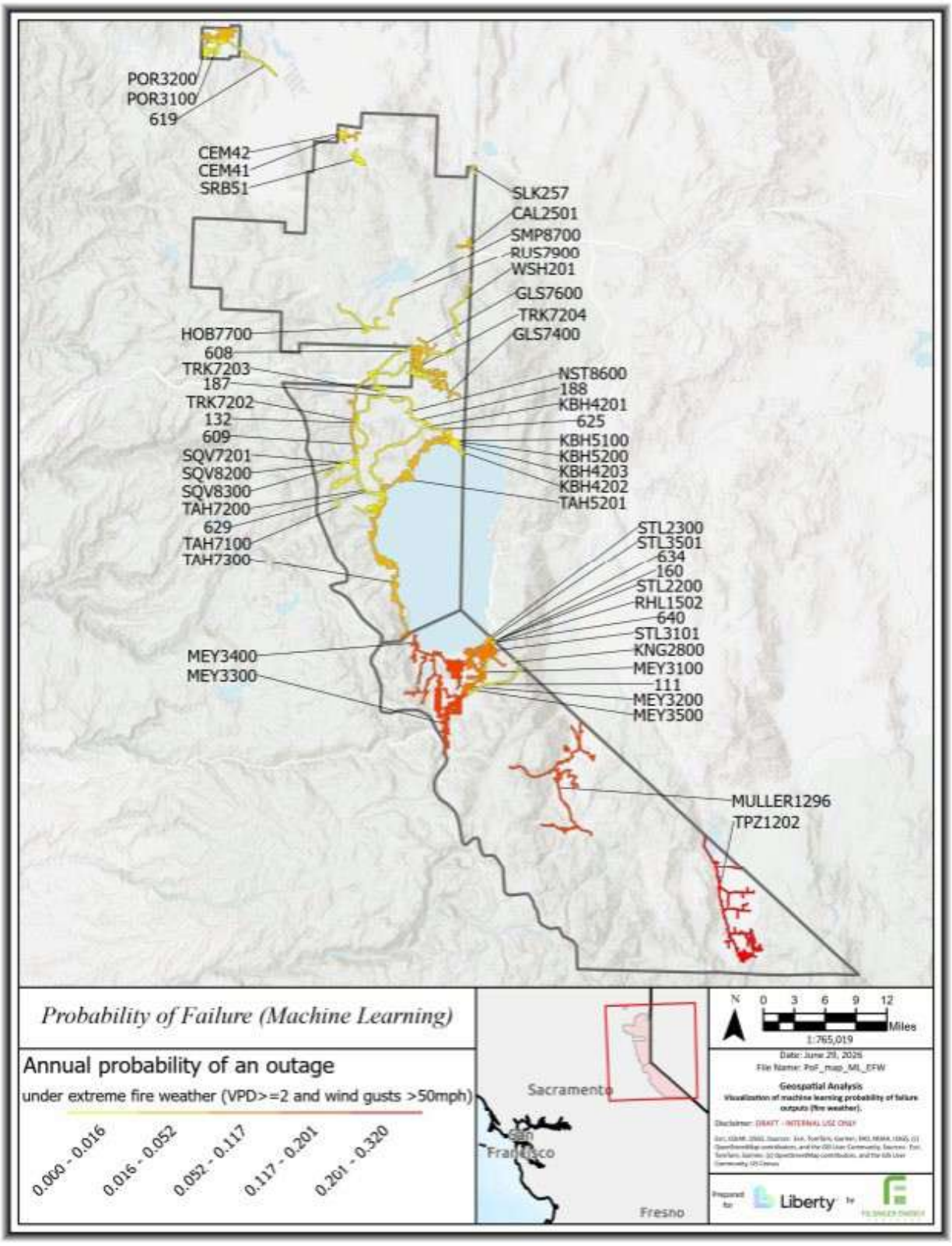
Figure 10. Annual Wildfire Risk Calculation

14. Model Outputs

The model produces the following primary outputs:

Output	Description
Daily circuit probability	Probability of outage for a circuit-day
Scaled daily probability	Probability adjusted to historical outage frequency
Annual outage probability	Probability of one or more outages per year
Expected annual outage-days	Expected outage occurrence frequency
Circuit risk percentile rankings	Relative circuit risk ranking
Historical versus ML ranking comparison	Validation of model ranking performance
Weather-risk lookup tables	Probability look up by wind and fire-weather conditions
Feature importance plots	Relative driver analysis
SHAP plots	Local and global model interpretability
VPD/wind bin lookup tables	Number of days and mean outage probability by VPD and wind bin
Severe-weather probability contribution	Annual outage probability contribution for VPD ≥ 2 and wind gust ≥ 50 mph
Historical vs ML annual outage rank bar chart	Comparison of circuit rankings based on historical annual outages and ML expected annual outage-days.


POR3200
POR3100
619
CEM42
CEM41
SRB51
SLK257
CAL2501
SMP8700
RUS7900
WSH201
GLS7600
TRK7204
GLS7400
HOB7700
608
TRK7203
187
TRK7202
132
609
SQV7201
SQV8200
SQV8300
TAH7200
629
TAH7100
TAH7300
NST8600
188
KBH4201
625
KBH5100
KBH5200
KBH4203
KBH4202
TAH5201
STL2300
STL3501
634
160
STL2200
RHL1502
640
STL3101
KNG2800
MEY3100
111
MEY3200
MEY3500
MEY3400
MEY3300
MULLER1296
TPZ1202
Probability of Failure (Machine Learning)
Annual probability of an outage
0.066 - 0.212
0.212 - 0.567
0.567 - 0.813
0.813 - 0.960
0.960 - 1.000
Sacramento
Fresno
N
0 3 6 9 12
Miles
1:765,019
Liberty


POR3200
POR3100
619
CEM42
CEM41
SRB51
SLK257
CAL2501
SMP8700
RUS7900
WSH201
GLS7600
TRK7204
GLS7400
HOB7700
608
TRK7203
187
TRK7202
132
609
SQV7201
SQV8200
SQV8300
TAH7200
629
TAH7100
TAH7300
NST8600
188
KBH4201
625
KBH5100
KBH5200
KBH4203
KBH4202
TAH5201
STL2300
STL3501
634
160
STL2200
RHL1502
640
STL3101
KNG2800
MEY3100
111
MEY3200
MEY3500
MEY3400
MEY3300
MULLER1296
TPZ1202
Probability of Failure (Machine Learning)
Annual probability of an outage
under extreme fire weather (VPD>=2 and wind gusts >50mph)
0.000 - 0.016
0.016 - 0.052
0.052 - 0.117
0.117 - 0.201
0.201 - 0.320
Sacramento
Fresno
N
0 3 6 9 12
Miles
1:765,019
Liberty

15. Assumptions

The following assumptions are implemented within the outage prediction workflow.

Assumption	Description
Missing outage times	Outages without a valid outage time are assigned a prediction timestamp of 12:00 PM local time.
Local timestamps	Outage and weather timestamps are treated consistently as local time.
Circuit geometry representation	Circuit representative points derived from circuit polygons are assumed representative of circuit weather conditions.
Multi-circuit outages	Outages associated with multiple circuits are represented using the geometric union of all associated circuit polygons.
Circuit normalization	Circuit identifiers may be standardized to improve matching across outage, GIS, and asset datasets.
Non-outage sampling	Non-outage samples are generated from circuit-days without outages using same-circuit and seasonal matching to create approximately balanced training data.
Weather assignment	Nearby weather stations are assumed representative of circuit weather conditions.
Distance weighting	Weather observations from closer stations are assumed more representative and receive greater weight during aggregation.
Station search distance	Weather stations located more than 50 km from a circuit representative point are excluded from weather assignment.
Weather windows	Only weather observations occurring before the prediction timestamp are used for feature generation.

Assumption	Description
Circuit-level aggregation	Asset, vegetation, inspection, load, and fault-current variables are aggregated at the circuit level and assumed representative of all samples associated with that circuit.
Load representation	Average load, peak load, and peak-to-average load ratio are assumed representative of circuit operating characteristics during the analysis period.
Fault current representation	Circuit fault current values are assumed constant throughout the analysis period.
LiDAR representation	LiDAR-derived vegetation metrics are assumed representative of vegetation conditions during the analysis period.
Inspection history	Only inspection records occurring before the prediction timestamp are used when generating inspection features.
Long-term weather representation	Historical weather observations from 2022–2025 are assumed representative of future weather conditions used for long-term risk estimation.
Daily scenario generation	Long-term risk calculations assume one modeled prediction is generated for each circuit-day in the selected analysis period.
Severe-weather definition	Severe-weather conditions are defined as VPD ≥ 2 kPa and Wind Gust ≥ 50 mph based on regional outage-risk analysis.
Daily probability interpretation	Daily outage probabilities represent the average modeled probability across all circuit-day scenarios included in the selected analysis window.
Probability scaling	Raw machine learning probabilities are adjusted using circuit-specific scaling factors derived from historical outage frequency and training sample frequency.

Assumption	Description
Probability interpretation	Predicted probabilities are intended to represent relative outage risk and prioritization rather than deterministic outage predictions.
Outage cause inclusion	All non-planned outage causes are included in model development. Planned outages are excluded.
Model evaluation	Model performance metrics are derived using out-of-fold cross-validation, ensuring each sample is evaluated using a model that was not trained on that sample.

Appendix A.
Calibration Curve

Figure A1 compares raw machine learning outage probabilities with observed outage frequencies using out-of-fold (OOF) predictions generated during five-fold cross-validation. The calibration curve evaluates whether the raw probabilities produced by the machine learning model are consistent with the observed outage occurrence in the modeling dataset.

[redacted]

$$Observed\ Outage\ Frequency = \frac{Number\ of\ samples\ with\ outage_today = 1}{Total\ number\ of\ samples\ in\ the\ bin}$$

A perfectly calibrated model would lie on the 1:1 reference line, indicating that predicted probabilities match observed outage frequencies. The results show generally good agreement across most probability ranges, indicating that higher predicted probabilities are consistently associated with higher observed outage frequencies.

Important Note on Probability Interpretation

The calibration analysis is based on raw OOF probabilities generated during model validation and is intended solely to evaluate machine learning calibration. Because the training dataset contains approximately balanced outage and non-outage samples, the observed outage frequencies shown in the calibration curve are also derived from the balanced dataset and do not represent actual system-wide outage frequencies. Following model evaluation, circuit-specific probability scaling is applied to align the raw machine learning probabilities with historical outage frequencies. The scaled probabilities are subsequently used to calculate the long-term outage probabilities and risk metrics presented in Section 13.

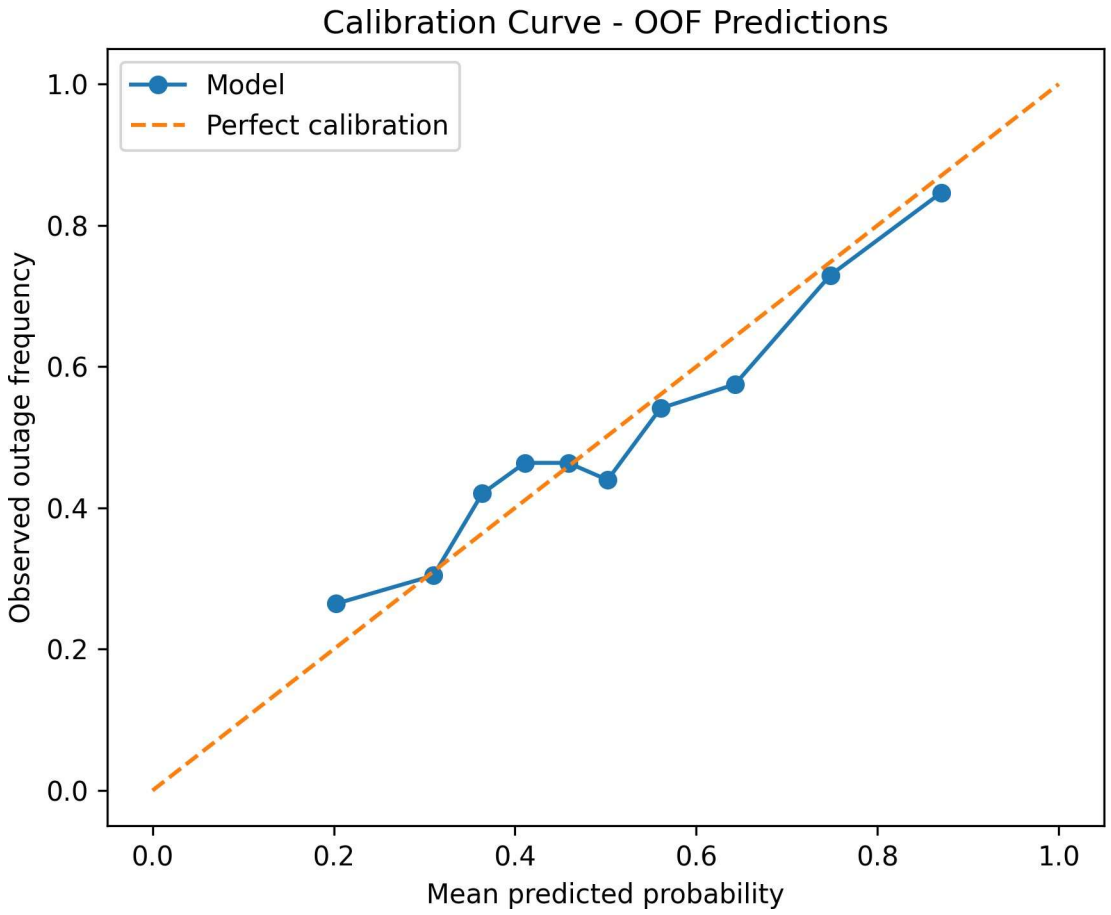
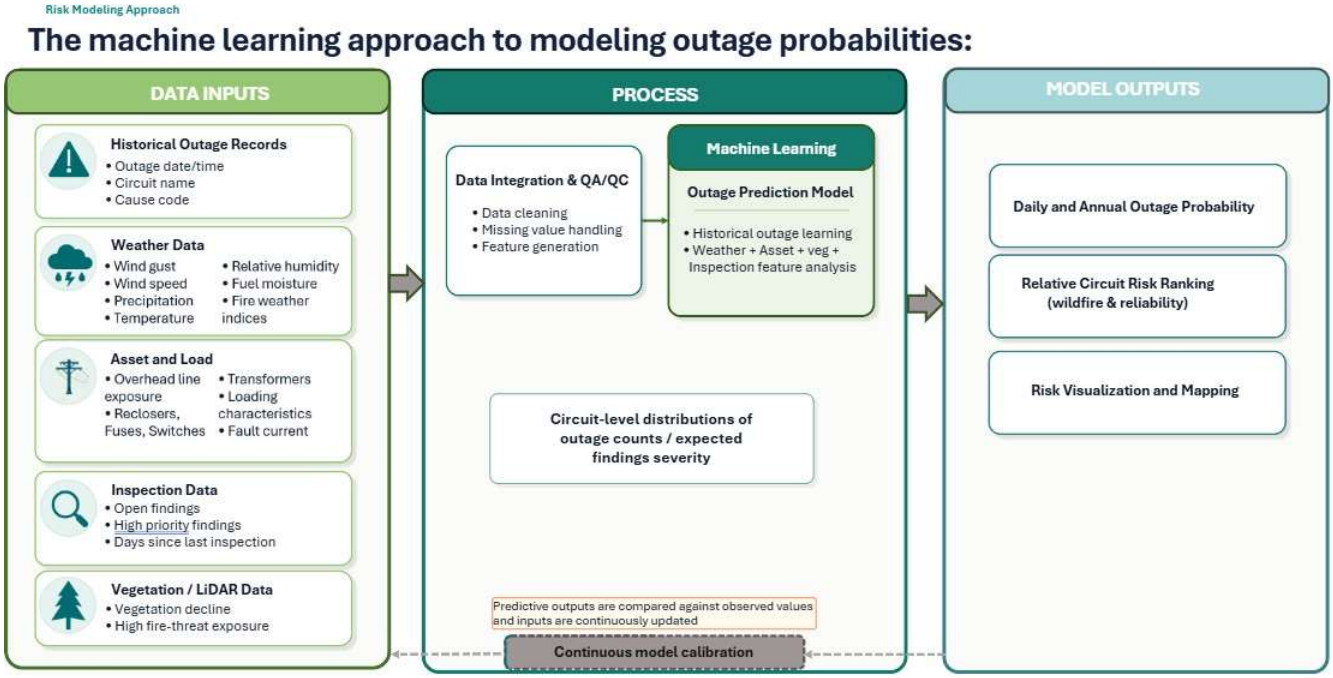


Figure 11. Calibration curve comparing raw predicted outage probabilities from ML with observed outage frequencies in outage data. The dashed line represents perfect calibration.



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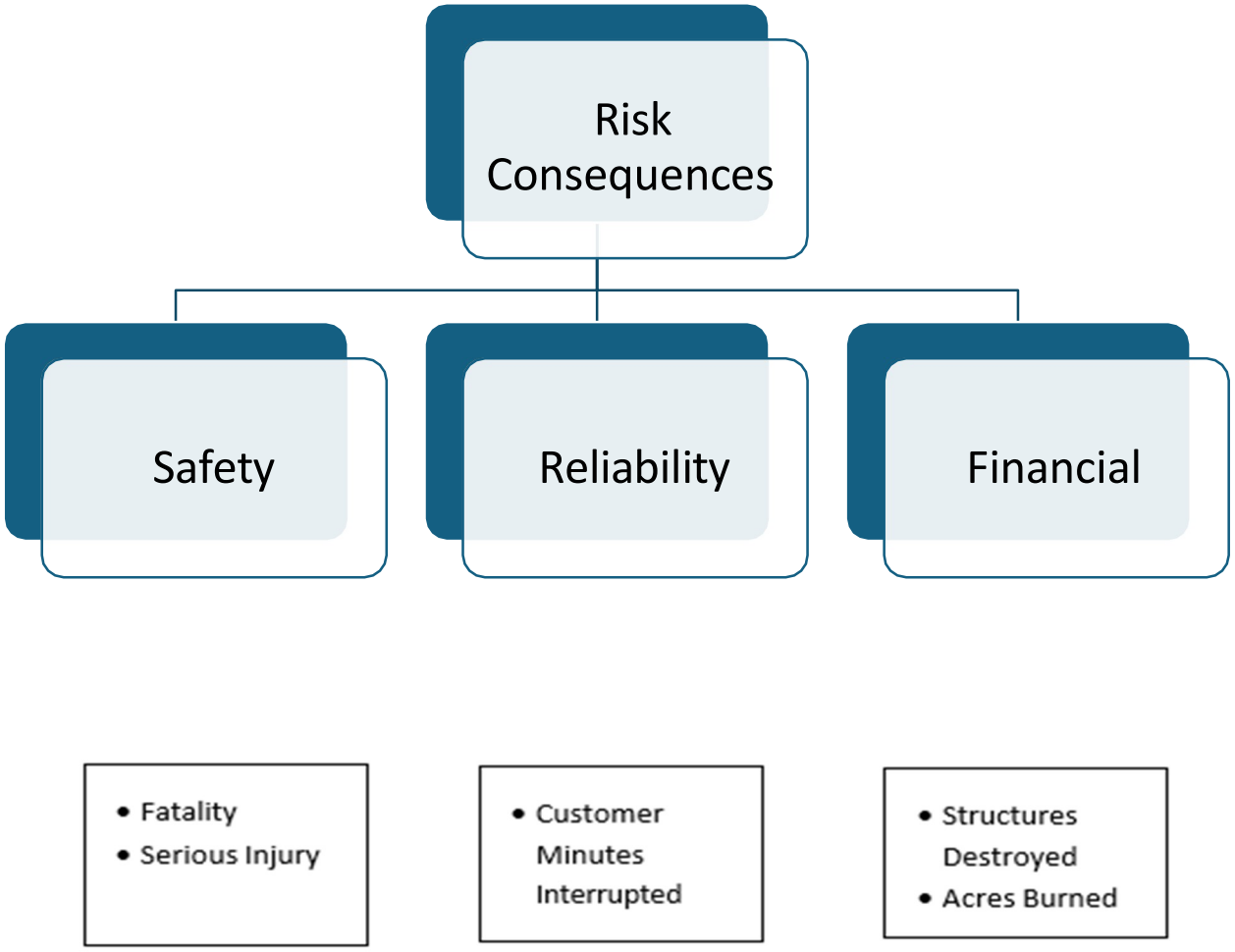
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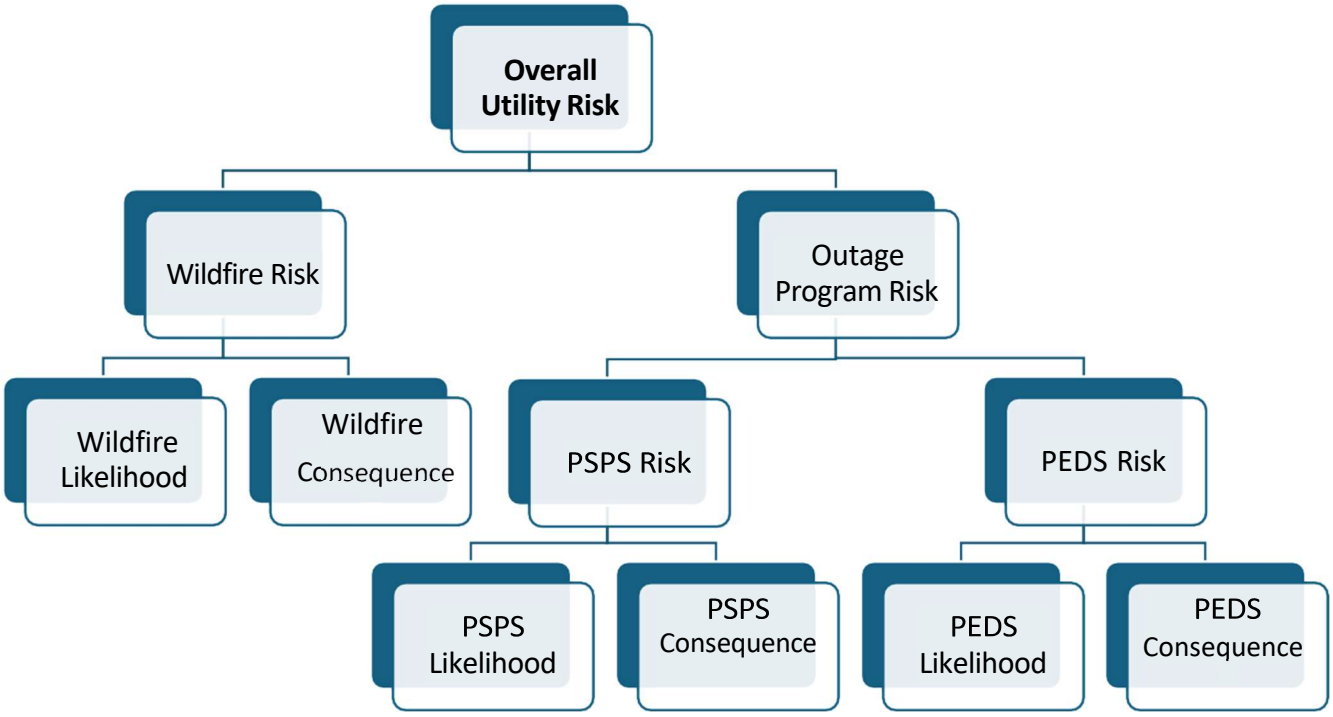
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Risk Model Inputs and Assumptions

Risk-Informed Decision-Making Framework (RDF)



Overall Utility Risk Modeling Framework



Risk Consequence Category: Safety

The safety attribute estimates the potential fatalities and injuries resulting from a wildfire risk event and translates them into a consistent dollar value.

To estimate the potential safety consequence of a wildfire event, the number of structures destroyed is first estimated. Proxy ratios are then used to translate that estimate into projected fatalities and injuries. Finally, a value of statistical life (VSL) framework is applied to estimate the monetized value of the safety consequence.

Reported data are used to estimate proxy ratios for fatalities; however, injury data are generally less consistent. Therefore, where needed, injuries are estimated using proxy assumptions or historical relationships, depending on the utility.

- Fatality Proxy = $\boldsymbol{Fatalities \div Structures\ Destroyed}$
- Monetized Impact = $\boldsymbol{Safty\ Impact\ X\ VSL}$

California Public Utilities Commission (CPUC) Decision 22-12-027 (Rulemaking 20-07-013) requires large California utilities to use the most current published United States Department of Transportation (DOT) VSL, adjusted for the filing year. Utilities shall apply one of two following methods for the dollar valuation of injury prevention, depending on the availability of data:

1. A serious injury as 0.25 of a fatality
2. The injury severity level using DOT estimates for the value of injury prevention

as indicated below:

Value of Preventing Injuries as a Fraction of VSI, by Injury Severity Level[1]

Injury Severity	Fraction of VSL
Minor	0.003
Moderate	0.047
Serious	0.105
Severe	0.266
Critical	0.593

Unsurvivable	1.000

Liberty decided to use the California-adjusted VSL, consistent with other large California investor-owned utilities (IOUs). Liberty also decided to use one-quarter of the California-adjusted VSL, consistent with other large California IOUs, to monetize the serious injury component of safety consequences across all risk areas.

To estimate the number of potential fatalities and serious injuries associated with wildfire risk, utilities typically apply proxy factors to translate direct wildfire consequences—such as structures destroyed, which are estimated through fire spread modeling—into human impacts. Due to the limited number of historical wildfire events within Liberty's service territory, Liberty elected to use proxy factors developed by SCE to convert estimated structures destroyed into potential fatalities and serious injuries. SCE derived these proxy factors from its historical wildfire data and documented its methodology and assumptions in its 2026–2028 Wildfire Mitigation Plan (WMP). These proxy factors may be revisited and updated in the future as additional historical data become available, either statewide or within Liberty's service territory.

For each assumption, the summary identifies the selected value, the basis for its selection, how the assumption was evaluated for reasonableness, and how it may be refined in the future as additional Liberty-specific, statewide, or peer utility data become available.

Variable	Definition	Unit	Standard Source
Fatalities	Deaths attributable to wildfire	Count (#)	Incident reports
Serious Injuries	Hospitalization-level injuries	Count (#)	Incident reports
Fatality Proxy	Proxy used to estimate number of fatalities per structure destroyed	#/Structure	Incident reports
Serious Injury Proxy	Proxy used to estimate number of serious injuries per structure destroyed	#/Strictire	Incident reports
(VSL)	Dollar value assigned to a statistical fatality	$ (millions)	DOT

Summary of Variable Assumptions

Fatality Proxy: ~0.0039 (1 fatality per 256 structures destroyed)

What it is	Why this value was chosen
A proxy used to estimate the number of fatalities based on the estimated number of buildings destroyed in the fire-spread modeling.	Liberty selected a proxy value of approximately 0.0039 (1 fatality per 256 structures destroyed), consistent with the value used by SCE in its 2026–2028 WMP. This proxy is used to estimate the safety consequences associated with individual wildfire simulations, based on recent historical wildfires in its service territory. Given the limited availability of comparable data within Liberty's service territory and the reasonable basis for SCE's approach, Liberty adopted the same proxy value.
How it was evaluated	**How it will be refined**
This value is also generally aligned with the proxy value used by SDG&E in its 2025 RAMP filing (0.00617), although the methodology and basis for that value were not explained in detail. PG&E's proxy value could not be identified in its recent regulatory filings.	This proxy can be updated in the future based on wildfire experience within Liberty's service territory or emerging data from other California utilities or statewide analyses.

Serious Injury Proxy: ~0.0093 (1 serious injury per 107 structures destroyed)

What it is	Why this value was chosen
A proxy used to estimate the number of serious injuries based on the estimated number of buildings destroyed in the fire-spread modeling.	Liberty selected a proxy value of approximately 0.0093 (1 serious injury per 107 structures destroyed), consistent with the value used by SCE in its 2026–2028 WMP. This proxy is used to estimate the safety consequences associated with individual wildfire simulations, based on recent historical wildfires in its service territory. Given the limited availability of comparable data within Liberty's service territory and the reasonable basis for SCE's approach, Liberty adopted the same proxy value.
How it was evaluated	**How it will be refined**
SDG&E's and PG&E's proxy values could not be identified in their recent regulatory filings.	This proxy can be updated in the future based on wildfire experience within Liberty's service territory or

emerging data from other California utilities or statewide analyses.

California Adjusted VSL: $16. Million per Fatality

What it is	Why this value was chosen
VSL is used to monetize the estimated number of potential fatalities.	Liberty selected a VSL of $16.5 million, consistent with the values used by PG&E, SCE, and SDG&E in their most recent regulatory filings, which range from $16.2 million to $16.6 million. For serious injuries, Liberty selected 25% of the VSL ($4.1 million), also consistent with the methodology used by large California utilities.

How it was evaluated	How it will be refined
This value was benchmarked against the VSL values used by large California utilities in their most recent regulatory filings. The selected value falls within the range of those values. All large California utilities also use 25% of the VSL to monetize serious injuries in their risk modeling.	This value should be updated if the DOT publishes a new California-adjusted VSL in the future. The methodology and corresponding value used to monetize serious injuries may also be refined as new data or methodologies become available.

Valuation Comparison: Fatalities & Serious Injuries

Utility	Data Source	Impact Type (Parameter)	Methodology Or Value	Human Impact Rate (per Structure)	VSL Base Year	Adjusted VSL 1 ($M)	Safety Monetization Ratio of VSL	Monetized Impact ($/Structure)
PG&E	15 catastrophic wildfires PG&E tracked since 2015[2]	Fatality	Historical events	*Not publicly disclosed*	2025	16.2[3]	1	*Not available*
PG&E	N/A	Serious Injury	*Not publicly disclosed*	*Not publicly disclosed*	2025	4.05	1/4	*Not available*
SCE	Ratios based on recent historical wildfires in SCE's service territory[4]	Fatality	1 fatality per 256 structures impacted	~0.0039	2025	16.6[5]	1	~$64,500
SCE	Ratios based on recent historical wildfires in SCE's service territory	Serious Injury	1 serious injury per 107 structures impacted	~0.0093	2025	4.15	1/4	~$38,600
SDG&E	Estimated based on an internal analysis of CALFIRE dataset[6]	Fatality	Internal analysis	0.00617	2024	16.2	1	~$100,000
SDG&E	Estimated based on an internal analysis of CALFIRE dataset	Serious Injury	*Not publicly disclosed*	*Not publicly disclosed*	2024	4.05	1/4	*Not available*

Future Refinement

The Fatality Proxy, Serious Injury Proxy, California-Adjusted VSL, and methodology used to monetize serious injuries may evolve over time. These assumptions may be updated as additional data become available from future wildfire events within Liberty's service territory, other utility service territories, or statewide analyses. The VSL may also be updated based on future DOT guidance or replaced with another appropriate valuation methodology as industry practices evolve.

Risk Consequence Category: Reliability

To quantify reliability impacts, Customer Minutes Interrupted (CMI) is estimated as the product of the number of impacted customers and outage duration, using Liberty's historical outage data. A standard dollar-per-CMI ($/CMI) value is then applied to monetize the overall reliability impact.

"CPUC" expects large utilities to use the most current version of the Lawrence Berkeley National Laboratory Interruption Cost Estimate (ICE) Calculator to determine the standard dollar valuation of electric reliability risk.

- Reliability (CMI) = $\#\ of\ Customers \times Outage\ Duration\ (minutes)$
- Monetized Impact = $CMI \times Reliability\ \$\ Value$

Variable	Definition	Unit	Standard Method
Customer Minutes Interrupted (CMI)	Total minutes of outage experienced across all affected customers	Count (minutes)	Utility outage records
System $/CMI	Economic cost per interrupted customer minute for non-residential customers	$/CMI	ICE Calculator

Liberty selected ICE 2.2, the most current version of the CE Calculator, to quantify reliability consequences. The following high-level process is used to estimate the $/CMI value applied in Liberty's reliability risk assessment.



Liberty updated the following key input variables in ICE 2.2 using the best available utility-specific data.

- SAIFI & SAIDI: Five-year average based on Liberty's historical OMS data
- Residential and Non-Residential Customer Counts: Five-year average (2021–2025)
- Average Annual Energy Usage (kWh) per Residential and Non-Residential Customer: Five-year average (2021–2025) based on Liberty's historical data
- Weekend/Weekday Outage Distribution (%): Five-year historical outage data from OMS
- Outage Timing Distribution (Morning, Midday, Off Hours): Five-year historical outage data from OMS

ICE 2.2 resulted in $2.63/CMI (system level) value:

Sector	# of Customers	Cost per event ($)	Per average kW ($)	Per unserved kWh ($)	Per minute interrupted ($)	Annual cost ($)	Total cost (2025 $)	$/CMI
Residential	43,847	12.58	18.51	7.19	0.08	26.43	1,158,778.63	$ 0.08
Non-Residential	5,173	3,546.74	695.97	270.19	22.95	7,451.70	41,052,795.32	$ 23.47
All Customers	49,020	385.53	336.52	130.65	2.49	810	42,211,573.95	**$ 2.63**

The resulting $/CMI value was then benchmarked against values reported by large California utilities in their most recent regulatory filings:

IOU	Source	ICE Version	All Customers	Res	Small C&I	Med & Large C&I	$ Year
PG&E	2024 RAMP	1.0	$3.17	$0.06	$9.99	$77.89	2023$
SCE	2026 RAMP	2.2	$5.63 *	$0.09	$41.62		2025$
SDG&E	2025 RAMP	1.0	$3.67 **	$0.05	$7.81	$188.38	2024$

Liberty's system value is lower than other IOUs, primarily due to its higher residential-to-non-residential customer ratio. The residential value is comparable to the other IOUs, while the non-residential value is lower.

* SCE applied the specific mix of residential and non-residential customers at each location to calculate a location-specific average $/CMI value for reliability consequence modeling.

** SDG&E updated the system value to $3.85 per CMI (2025$) in their 2026-28 WMP

Summary of Variable Assumptions

$/CMI : $2.63/CMI (All Customers)

What it is	Why this value was chosen
A standard dollar value applied to CMI. This assumption converts the estimated reliability impact or CMI into financial consequence.	Liberty used ICE 2.2 and updated key input assumptions using the utility's best available data. These assumptions were documented and reviewed by a team of subject matter experts. The resulting ICE 2.2 estimate of $2.63/CMI was also benchmarked against values reported by large California utilities in their most recent regulatory filings.

How it was evaluated	How it will be refined
The value was benchmarked against those estimated by large California utilities. Liberty's estimated value is lower than those of other utilities, primarily due to its higher proportion of residential customers relative to non-residential customers.	Key ICE input assumptions should be updated as new or updated Liberty-specific data become available. If a new version of ICE becomes available, Liberty may also elect to adopt the updated version.

Valuation Comparison: Reliability

Utility	Data Source	Methodology	Dollar Year	$ / CMI	Seasonal Outage Mix	Customer Aggregation Method
PG&E	2024 RAMP[1], RAMP Workshop[2] , and 2026-28 WMP[3]	PG&E-specific data in the ICE 1.0 Calculator such as customer class composition and annual energy usage, C&I industry percentages, temporal outage distribution and average interruption frequency.	2025$	$3.33 (System Rate)	75% winter 25% summer	Weighted avg $/CMI of % res and % non-res for each geographic segment. Single blended local rate applied to CMI.
SCE	SCE 2026 Pre RAMP Workshop[i]	ICE 2.0, derived by using SCE system-wide customer counts by class, as well as outage seasonality, and SADI/SAIFI values from SCE 10 -year average.	2025$	$3.68 (System Rate)	61% winter 39% summer	Keeps customer types separate rather than blending into one rate.
SDG&E	SDG&E 2025 RAMP SDG&E 26-2028 WMP	ICE 1.0 System-wide rate only; SAIDI and SAIFI assumptions not stated in public filing. Residential / non-residential breakdown not applied.	2024$	$3.67 (System Rate)	*Not Stated*	System-level only. No geographic or customer-type disaggregation applied in risk model

Future Refinement

The $/CMI value can be refined over time as new or updated Liberty-specific data become available. Key ICE input assumptions, including customer counts, customer mix, energy consumption, outage duration, and other relevant variables, should be periodically reviewed and updated to ensure the estimate continues to reflect Liberty's system and customer characteristics. Liberty may also elect to use newer versions of ICE as they become available and evaluate whether methodological updates or expanded data inputs materially affect the estimated value.

Liberty should also continue to benchmark its $/CMI value against those used by large California utilities and other relevant peer utilities.

Risk Consequence Category: Financial

This section documents the assumptions used to estimate wildfire financial consequences in Liberty's risk model. Financial consequences are used to estimate the direct financial impact of a wildfire risk event, including costs associated with damaged structures, fire suppression, and restoration. The tables distinguish between the modeled risk events, such as structures destroyed and acres burned, and the cost assumptions applied to those events, such as dollars per structure-destroyed or dollars per acre-burned.

For each assumption, the summary identifies the selected value, the basis for choosing that value, how the assumption evaluated for reasonableness, and how it may be refined in the future as additional Liberty-specific, statewide, or peer utility data become available.

Summary of Variable Assumptions

Variable	Definition	Unit	Standard Method
Buildings Destroyed	Number of structures destroyed by wildfire attributable to utility equipment	Count(#)	Utility ignition records, State Agencies, CalFire
Acres Burned	Total acreage consumed per wildfire event	Acres	State Agencies, CalFire
Suppression Cost	Cost of firefighting and aerial suppression per acre burned	$/acres burned	CalFire Emergency Fund expenditure data; ratio of expenditures to acres burned
Restoration Cost	Post-fire land and ecosystem restoration cost per acre burned	$/acres burned	Utility benchmarks; public agency restoration/remediation cost data; unit-cost estimates

Structure Loss Cost Assumption: $1,000,000 per Structure Destroyed

What it is

A standard dollar value applied to each structure destroyed in a utility-attributable wildfire. This assumption converts the modeled or observed number of destroyed structures into financial consequence.

Why this value was chosen

Liberty selected $1,000,000 per structure destroyed because it is consistent with the structure loss value used by other major California IOUs including SDG&E, PG&E and SCE in recent wildfire risk modeling and regulatory filings. The value provides a simple, benchmarked, and defensible assumption for translating structure damage into financial impact.

How it was evaluated

The value was benchmarked against peer utility assumptions, publicly available property value data, and

How it will be refined

The assumption may be updated over time using more localized structure value data, updated housing cost

historical wildfire loss information to confirm that it is reasonable and appropriate for Liberty's service territory.

information, inflation adjustments, or additional wildfire loss experiences.

Acres Burned Cost Assumption: $2,336 per Acre Burned

What it is	Why this value was chosen
A combined per-acre financial consequence assumption applied to acres burned. The total value includes estimated suppression and restoration costs associated with each acre burned.	Liberty selected a value of $2,336 per acre burned, based on SCE's 2026–2028 WMP values for suppression and restoration. SCE's assumptions were selected because they are recent, documented, and defensible. The combined value is also closely aligned with SDG&E's $2,350 per acre estimate, providing additional benchmark support.

How it was evaluated	How it will be refined
The value was compared against peer utility benchmarks, available CalFire suppression cost data, and any available restoration or remediation cost information. The review focused on whether the combined per-acre value remains reasonable and directionally appropriate for Liberty's modeling needs.	The assumption may be refined as additional utility-specific, statewide, or incident-specific data become available. Future refinements may distinguish costs by fire size, terrain, burn severity, land type, access constraints, or restoration need.

Suppression Cost Assumption: $876 per Acre Burned

What it is	Why this value was chosen
A dollar-per-acre assumption used to estimate firefighting and aerial suppression costs for a wildfire event. The value is multiplied by acres burned as determined by Liberty's existing wildfire spread modeling to estimate suppression-related financial consequence.	Liberty selected $876 per acre burned based on SCE's 2026–2028 WMP assumption. This value was chosen because it is based on a documented benchmark methodology using California wildfire suppression cost information and was considered reasonable and defensible for use where Liberty-specific historical data are limited.

How it was evaluated	How it will be refined
The value was benchmarked against other IOU assumptions, CalFire expenditure data, and historical suppression cost-per-acre ranges.	The assumption may be updated with newer CalFire data, Liberty-specific event data, or incident-level suppression cost information. Future refinement may account for fire size, terrain, resource intensity, and access constraints.

Restoration Cost Assumption: $1,460 per Acre Burned

What it is	Why this value was chosen
A dollar-per-acre assumption used to estimate post-fire land, watershed, ecosystem, or related restoration costs. The value is multiplied by acres burned as determined by Liberty's existing wildfire spread modeling to estimate restoration-related financial consequence.	Liberty selected $1,460 per acre burned based on SCE's 2026–2028 WMP assumption. This value was chosen because it is a recent peer utility benchmark and can be paired with SCE's suppression value to create a documented and internally consistent per-acre financial consequence estimate.

How it was evaluated	How it will be refined
The value was reviewed against available peer utility assumptions and public restoration or remediation cost information. The review focused on whether the value is reasonable as a high-level restoration cost proxy.	The assumption may be refined using more detailed restoration cost data, burn severity information, land ownership, watershed sensitivity, slope, erosion potential, or incident-specific restoration requirements.

Valuation Comparison: Financial Consequences

Utility	Source	Impact Type (Parameter)	Methodology	Unit Value	$ Year	Additional Insured Losses Multiplier
PG&E	Wildfire Consequence Model Version 4	Buildings Destroyed	Annual structures destroyed/damaged in nominal dollars used to estimate the weighted average financial consequence per fire	$1,000,000/ structure	Nominal	N/A
	Wildfire Consequence Model Version 4	Suppression	Weighted average suppression cost per acre x acres burned	$1,175/ acres burned	Nominal	N/A
	N/A	Restoration	*Not Modeled*	*N/A*	*N/A*	*N/A*
SCE	SCE 2026-2028 WMP[ii]	Buildings Destroyed	Statewide standard structure value	$1,000,000/ structure	2025$	x1.25
	SCE 2026-2028 WMP	Suppression	Based on a five-year average of California's reported wildfire suppression costs from 2016-2020	$876/ acre burned	2025$	N/A
	SCE 2026-2028 WMP	Restoration	*Not publicly disclosed*	$1,460/ acres burned	2025$	N/A
SDG&E	SDG&E 2025 RAMP SDG&E 2026–2028 WMP	Buildings Destroyed	SME assumption based on a review of publicly available data on the median listing home price in San Diego County as of February 2025	$1,000,000/ structure	2025$	N/A
	SDG&E 2025 RAMP	Suppression and Restoration	SME assumption based on a review of CalFire suppression costs incurred from 2000 to 2023	$2,350/ acres burned	2025$	N/A

Future Refinement

The following variables were identified as potentially relevant to the financial consequence methodology but are not included as separate inputs in Version 1 of the model. For V1, Liberty is using a standardized structure loss cost assumption of $1,000,000 per destroyed structure, which provides a simple, benchmarked, and defensible approach for monetizing structure loss. Because this value already

functions as a proxy for structure-related financial loss, separate modeling of localized structure value and additional insured loss multipliers were deferred to avoid introducing complexity that may not materially improve model defensibility at this stage. Additional Insured Losses (AIL) reflects a level of granularity that may be better suited for use in future iterations of Liberty's risk model as risk modeling capabilities mature with appropriate feedback loops of observed data.

These variables will be retained for future consideration as the model is refined. In later versions, Liberty may evaluate whether localized property value data or additional insured loss assumptions would improve the precision of financial consequence estimates, particularly if more granular exposure data, claims data, or event-specific loss information become available.

Variable	Type	Definition	Unit	Standard Method
Structure Value	Parameter	Dollar value assigned per destroyed structure	$/structure	Publicly available county assessor data; MSA median SFR value; historical wildfire loss events, such as Thomas 2017 and Grand Prix/Padua 2003
Additional Insured Losses (AIL)	Parameter	Multiplier applied to base structure loss to capture insured losses beyond direct property value, such as contents, additional living expenses, and related insured losses	Multiplier (x)	Model assumption

PSPS Outage Risk

PSPS risk is estimated by combining the likelihood of a PSPS event at a specific location with the associated safety, reliability, and financial consequences of that event. The likelihood is estimated by considering the utility's PSPS decision criteria, environmental conditions, and historical operational experience. For utilities with relatively infrequent PSPS events, historical data snapshots can also be used. For example, if a utility experienced four PSPS events over four years, it may assume an average of one PSPS event per year and use the average event duration in its analysis.

Liberty's historical data indicated an expected PSPS outage duration of approximately 12 hours. However, Liberty adopted a 17-hour outage duration based on operational experience and the anticipated resource constraints associated with patrolling and re-energizing the system when more than two circuits are de-energized simultaneously.

To estimate the potential safety consequences of a PSPS event, and in the absence of Liberty-specific data, Liberty adopted the fatality and serious injury estimates presented in SCE's 2026–2028 WMP. SCE provided a transparent and well-documented methodology for estimating the potential number of fatalities and serious injuries associated with PSPS events, making it a reasonable proxy for Liberty's analysis.

To estimate the reliability consequences of a PSPS event, the assumed 17-hour outage duration was converted to CMI, and the same reliability valuation of $2.63/CMI was applied to monetize the resulting reliability impact.

The direct financial impact of PSPS was estimated by adopting SCE's value of $450 per residential customer account.

Variable	Definition	Unit	Standard Method
PSPS Duration	Estimated duration of each PSPS event, including de-energization, inspection/patrolling, and re-energization	Hours	Utility historical records, adjusted based on operational constraints identified by subject matter experts
Fatality Proxy	Number of potential fatalities per PSSP event	Count	Based on utility operating experience, major outage events nationwide, and publicly available information
Serious Injury Proxy	Number of potential seirous injuries per PSSP event	Count	Based on utility operating experience, major outage events nationwide, and publicly available information
Safety Consequence	Estimated number of fatalities and serious injuries, monetized using the selected VSL methodology	$	E stimated number of fatalities and serious injuries multiplied by the California-Adjusted VSL and serious injury valuation
Reliability Consequence	Monetized value of the estimated CMI associated with a PSPS event	$	Estimated CMI for a PSPS event multiplied by the $/CMI value estimated in the Reliability section
Financial Consequence	Direct financial impact of a PSPS event on a customer	$	Direct financial impacts on customers (e.g., meals, accommodations, and other out-of-pocket expenses)

Summary of Variable Assumptions

PSPS Duration: 17 Hours

What it is	Why this value was chosen
Estimated duration of each PSPS event used to quantify overall PSPS risk.	Liberty's historical data indicated an expected PSPS outage duration of approximately 12 hours. However, Liberty adopted a 17-hour outage duration based on operational experience and the anticipated resource constraints associated with patrolling and re-energizing the system when more than two circuits are de-energized simultaneously.

How it was evaluated	How it will be refined
Benchmarked against PSPS outage durations used by other California utilities, which range from 8 to 24 hours.	The assumed PSPS outage duration should be updated as Liberty gains additional PSPS operational experience. Future refinements may reflect changes in mitigation strategies, PSPS decision thresholds, operational practices, and lessons learned from Liberty and other utilities.

PSPS Safety Consequences: 0.00000002870 fatalities and 0.00000012671 serious injuries per customer event

What it is	Why this value was chosen
Consistent valuation applied to estimate the potential safety consequences of a PSPS event	In absence of Liberty-specific data, Liberty adopted SCE's most recent estimate, as it was supported by the most detailed publicly available documentation. Large CA IOUs developed their proxies using a combination of historical data, national long-duration outage events, and SME input.

How it was evaluated	How it will be refined
SDG&E's and PG&E's proxy values could not be identified in its recent regulatory filings.	This proxy values can be updated in the future based on PSPS experience within Liberty's service territory or emerging data from other California utilities or statewide analyses.

PSPS Reliability Consequence: 17 Hours x 60 Minutes x $2.63/CMI

What it is	Why this value was chosen
Estimated monetized value of PSPS reliability impacts.	The $2.63/CMI value estimated in the Reliability section was used to monetize the reliability impacts of PSPS events.

How it was evaluated	How it will be refined
Consistent with all large California utilities.	N/A

PSPS Financial Consequence: $450 per customer event

What it is	Why this value was chosen
Estimates the financial consequence of PSSP events	In absence of Liberty-specific data, Liberty selected SCE's estimate of $450 per customer account provided their 2026 RAMP filing.

How it was evaluated	How it will be refined
This estimate is consistent with SDG&E's estimate of $482 per event for residential customers. PG&E's values could not be identified in its recent regulatory filings.	This estimate may be refined over time as additional Liberty-specific data become available and as updated information from other utilities or statewide analyses becomes available.

Valuation Comparison: PSPS Reliability Risk

PSPS Likelihood

Utility	Data Source	Methodology
PG&E	PG&E 2026-28 WMP[1]	The PSPS likelihood is estimated based on a historical PSPS event lookback, and the Potentially-Impacted Customers (PICs) for future PSPS events, using a meteorology PSPS protocol back-cast model. Likelihood is assessed at each individual customer service point based on the circuit configuration, allowing individual annual probabilities for each customer. PIC is created as a 1 in 13-year frequency. Outage Duration is based on average outage duration from 12 year PSPS lookback Likelihood = [# of customer events / 5 years] x [Average outage duration / Event]
SCE	SCE 2026-28 WMP[2]	10+ years of historical weather conditions along distribution circuits compared current de-energization thresholds, as well as the state of current and forecasted grid hardening deployment. Historical weather conditions are used to establish a baseline regarding the frequency and duration of de-energization conditions for individual circuits.
SDG&E	SDG&E 2026-28 WMP[3]	Machine learning model estimates the probability that a given feeder-segment would be proactively de-energized on a given high-fire day by leveraging historical wind speeds measured at all upstream weather stations and taking into account the grid-hardening state of the full upstream trace from the given feeder-segment. It also forecasts the number of PSPS de-energizations and leverages the PSPS Consequence attributes to estimate the magnitude of forecasted PSPS de-energizations, including the number of customers de-energized per event.

PSPS Consequences

Consequences associated with a proactive de-energization event are estimated by using the number of customers impacted along with the potential frequency and duration of those events to estimate potential safety, reliability, and financial impacts.

Utility	Data Source	Consequence	Methodology	Value
PG&E	2026-28 WMP[1]	Safety	Based off 50% PG&E PSPS planned and 50% unplanned long duration outages across the United States (U.S.). PSPS events are relatively new and there is minimal SIF data to include in the risk analysis. For this reason, other large external national events (i.e., 2003 NE Blackout, 2011 SW Blackout, 2012 Superstorm Sandy, etc.) were considered in evaluating safety risks associated with PSPS events.	*Not publicly disclosed*
		Reliability	PSPS consequence is based on PSPS impact and current PSPS protocols. SME's estimated that patrol and restoration typically take 11 hours; this estimate is used instead of the Estimated Time of Restoration (ETOR). The combination of weather, switching, and restoration is represented as total CMI.	11 hours
		Financial	*Not publicly disclosed*	*Not publicly disclosed*
SCE	SCE 2026-28 WMP[i]	Safety	Multiplies the total customers in scope by 3 to estimate the total population impacted. The resulting total population impacted is then multiplied by a safety conversion factor, based on epidemiological data from several widespread outage events[ii] to estimate the number of fatalities and serious injuries. To estimate Safety Consequence associated with individual PSPS simulations, SCE uses a ratio of 0.00000002870 fatalities per customer de-energized, and a ratio of 0.00000012671 serious injuries per customer deenergized. These safety consequences are combined into a Safety Index in which one serious injury is equal in value to one quarter fatality.	0.00000002870 fatalities per customer de-energized, and a ratio of 0.00000012671 serious injuries per customer deenergized

		Reliability	Reliability = # Customers × (8 hours[iii] × 60 minutes)	8-hour service interruption for each customer account on the circuit in scope
		Financial	Financial = # Customers × $250 per event[iv]	$250 per customer service account, per de-energization event
SDG&E	SDG&E 2026-2028 WMP[2]	Safety	Subject matter expert conservative assumption is used to estimate the potential number of Serious Injuries and Fatalities (SIF). Estimated based on a review of historical PSPS de-energizations in California (2018-2021).	1 fatality per 10 billion customer minutes de-energized
		Reliability	CMI estimates are calculated using impacted customer counts at each feeder segment and expected PSPS de-energization durations informed by historical and projected data.	*Not publicly disclosed*
		Financial	Subject matter expert conservative assumption is applied. Assumption: For residential customers a $482 cost per event is calculated using per diem rates applicable to San Diego, California, as of September 2024, with the assumption of accommodating four family members per customer meter. For C&I customers, a $1,446 cost per event is estimated.	$482 per event for residential customers and $1,446 per Event for C&I customers.

Protective Equipment and Device Settings (PEDS) Outage Risk

Liberty initiated an effort to quantify PEDS outage risk as part of the development of its wildfire risk modeling framework. The objective was to estimate both the likelihood and consequences of PEDS events using available historical and operational data.

During the assessment, it became evident that the availability, quality, and maturity of historical PEDS data were not sufficient to support a robust and defensible quantification of outage likelihood and duration. Given these limitations, Liberty determined that including PEDS risk quantification in this WMP risk model would not produce results with an appropriate level of confidence.

Accordingly, Liberty elected to exclude PEDS risk quantification from the 2027 WMP risk model. Instead, PEDS risk quantification has been identified as a future enhancement to Liberty's risk modeling framework. The 2027 WMP includes a roadmap describing Liberty's approach for incorporating PEDS risk quantification as data availability, data quality, and model maturity improve over time.

Valuation Comparison: PEDS Reliability Risk

PEDS Outage Likelihood

Utility	Data Source	Methodology
PG&E	PG&E 2026-28 WMP[i]	EPSS Likelihood Model EPSS enablement does not increase the number of faults on the system, but does affect the character of outages that occur. Under normal conditions, some faults would resolve automatically through reclosing, resulting in momentary outages. EPSS enablement prevents reclosing which converts momentary faults into sustained outages. The likelihood of an EPSS-enabled sustained outage on a circuit segment is estimated based on the portion of the wildfire season during which EPSS is enabled and the expected number of sustained outages on that segment. Historical EPSS outage data reveals that out of approximately 8,000 outages recorded where EPSS was enabled, a majority resulted in sustained outages. Historical data indicates that approximately 85 percent of outages in HFTD/HFRA areas result in sustained outages.
SCE	SCE 2026-28 WMP[ii]	Derived PEDS outage rates based on 5-year historical outages on PEDS enabled circuits. These historical events are used to establish a baseline for outage frequency and duration of outage conditions on individual circuits, adjusted to reflect current and future mitigation deployment.
SDG&E	SDG&E 2026-28 WMP[1]	Model simulation of the annual frequency of PEDS outage impacts at specific grid locations.

PEDS Consequences

Utility	Data Source	Consequence	Methodology	Value
PG&E	PG&E 2026-28 WMP[iii]	Safety	*Not publicly disclosed*	*Not publicly disclosed*
		Reliability	PG&E data indicates that outage duration is not significantly affected by EPSS enablement. CMI (EPSS-Enabled Segments) = [Outage Duration (hours)] x [# of Customers Impacted] The value of service for a circuit segment is then estimated as the weighted average of value of service across customer classes, weighted by the number of customers in each class.	*Not publicly disclosed*
		Financial	*Not publicly disclosed*	*Not publicly disclosed*
SCE	SCE 2026-2028 WMP[iv]	Safety	Same formula as PSPS	Same as PSPS
		Reliability	Reliability = # Customers × (8 hours × 60 minutes)	8 hours
		Financial	Same formula as PSPS	Same as PSPS
SDG&E	SDG&E 2026-28 WMP[2]	Safety	Same formula as PSPS	Same as PSPS
		Reliability	Same formula as PSPS	Same as PSPS
		Financial	Subject matter expert conservative assumption is applied. Assumption: Based on historical overhead line patrol costs during elevated or extreme fire weather conditions. Whether conducted on foot or by helicopter, a 10% ratio of the expected reliability cost is assumed.	10% ratio of the expected reliability cost

Other input variable to be provided by the Liberty team:

- Mitigation unit cost estimates
- Mitigation asset lives
- Weighted Average Cost of Capital (WACC)

- Inflation Rate
- PSPS/PEDS Effectiveness

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[1] CPUC Decision 22-12-027 (RISK-BASED DECISION-MAKING FRAMEWORK)

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[1]2 WFC V4:

https://www.pge.com/assets/pge/docs/outages-and-safety/outage-preparedness-and-support/wildfire-consequence-model-documentation-v4.pdf

[1]3 SCE 2026-2028 WMP:

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[1]4 SDG&E 2025 RAMP:

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[1]9 SCE 2026-28 WMP:

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20 Safety Conversion Factor: Fatalities - Calculated based on fatality data from 2003 NE Blackout, 2011 SW Blackout, 2019 PSPS Events, 2021 Texas Storm, 2012 Hurricane Sandy, 2017 Hurricane Irma, 2012 Derecho windstorm events; 0.00000002870 fatalities per customer de-energized. Safety Conversion Factors: Serious Injuries - Calculated based on hospitalization/injury/safety concern data from 2019 PSPS events, 2003-06 NE Blackouts, 2011 SW Blackout, 2017 Hurricane Irma; 0.00000012671 serious injuries per customers de-energized.

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29 SDG&E 2026-28 WMP:

https://www.sdge.com/sites/default/files/regulatory/SDG%26E_2026-2028_Base-WMP_R2.pdf

Mitigations Activity Effectiveness for Risk Reduction and Benefit-Cost Analysis

Mitigation effectiveness is used to estimate how much baseline wildfire risk is reduced after mitigation is applied. In the benefit-cost ratio (BCR) calculation, the effectiveness factor is applied to the portion of risk addressed by the mitigation, and the resulting risk reduction is compared against the lifecycle cost of the activity. Residual risk is calculated as $Baseline\ Risk\ x\ (1 - Effectiveness\ Factor)$, and the difference between baseline and residual risk represents the estimated benefit of the mitigation. This approach is intended to distinguish between the technical effectiveness of mitigation and the total risk reduction achieved by a project.

The BCR calculation incorporates effectiveness values for four mitigation types: covered conductor, undergrounding, PSPS, and PEDS (sensitive relay profile). Covered conductor is treated with more granularity because available benchmarking supports different effectiveness assumptions by outage driver. Undergrounding, PSPS, and PEDS are assigned single effectiveness values for this update, reflecting their broader application in the model and the current state of available Liberty-specific data. Effectiveness values for other activities, including inspection programs, vegetation management, expulsion fuse replacement, pole replacement, and other mitigation activities, are being evaluated separately and may be incorporated into future BCR updates as the methodology is refined.

The effectiveness values were developed following a review of Liberty-specific information, utility benchmarking, publicly available wildfire mitigation plan data, historical outage data, SME judgment, and internal review and ultimately draw heavily from values used by PG&E. PG&E's effectiveness values are a reasonable benchmarking input for Liberty because PG&E operates in similar wildfire risk conditions, including mountainous terrain, vegetation-driven exposure, and WUI communities. PG&E also has a more mature mitigation effectiveness framework, supported by dedicated testing, post-implementation performance data, and regulatory review. Where Liberty's mitigation scope is reasonably comparable, PG&E's values provide a useful proxy until Liberty has enough of its own outage, ignition, and mitigation performance data to support utility-specific effectiveness values.

For covered conductor, the BCR calculation uses differentiated outage-driver effectiveness values ranging from 0.64 to 0.77, adopted from the values provided by PG&E in the Joint IOU Grid Hardening Working Group Report: Update for 2026-2028 Wildfire Mitigation Plan (Table 1). Covered conductor is expected to provide stronger risk reduction for contact-driven events such as vegetation contact, animal contact, wire-to-wire contact, and certain object contacts than for risk drivers that are less directly addressed by conductor covering. This approach allows covered conductor benefits to be tied more closely to the failure modes it is designed to reduce, while still recognizing that values may need to be adjusted over time to reflect Liberty's specific construction standards, implementation scope, and observed performance.

For undergrounding, the BCR calculation uses a uniform effectiveness value of 0.95 across risk drivers. This value reflects the expected configuration of Liberty's undergrounding program, which would leave at least some secondary facilities overhead. As a result, the model does not use a full undergrounding

effectiveness value that would assume all relevant overhead exposure is eliminated. The value is based on the values used by PG&E as shown in the Joint IOU Grid Hardening Working Group Report: Update for 2026-2028 Wildfire Mitigation Plan (Table 1), for undergrounding primary while leaving secondary overhead, using the average value of the risk driver-level averages from the PG&E table. This provides a more appropriate estimate for Liberty's expected project scope than a value associated with undergrounding both primary and secondary facilities.

For PSPS and PEDS, uniform effectiveness values are also used in the BCR calculation. These values are based on PG&E's effectiveness values listed in Table 6-3 of the 2026-2028 WMP, then scaled down with assumed programmatic maturity comparison factors to reflect the relative maturity of Liberty's operational mitigation programs as compared to the assumed maturity of PG&E. A relative maturity scaling factor of 0.79 was applied to PG&E's compositive PSPS effectiveness value of .95, resulting in a modified effectiveness value for Liberty of 0.75. The same process was used for PEDS, with a scaling factor of 0.86, resulting in a modified effectiveness value of 0.56. These operational mitigations reduce ignition risk by changing system operating posture during elevated fire-risk conditions, but their effectiveness depends on enablement criteria including established weather thresholds, circuit coverage, device settings, and operational execution. Future updates may refine these values as Liberty gains additional experience with PEDS operations, PSPS decision-making, outage outcomes, and ignition performance under elevated fire-weather conditions.

The use of differentiated outage-driver effectiveness values remains an important roadmap item for future versions of the BCR methodology. As outage and ignition attribution improves, Liberty can expand the approach currently used for covered conductor to other mitigation types where driver-specific treatment is supported by the data. This would allow future BCR calculations to better distinguish, for example, between mitigations that primarily reduce vegetation-contact risk, equipment-failure risk, contact-from-object risk, or weather-related risk.

Mitigation Effectiveness Improvements Roadmap

Near-term improvements should focus on activities that can be advanced through coordination and shared learning, including establishing a vegetation-outage investigation process with defined evidence-retention, inspection-turnaround, and feedback-loop requirements, and participating in joint investor-owned utility mitigation-effectiveness studies. Mid-term efforts should strengthen the underlying outage and ignition data used to estimate effectiveness by standardizing outage cause and sub-cause classifications, aligning classifications where practical with regulatory driver and sub driver categories, and defining the relative priority of operator comments, troubleshooter findings, and initial cause coding when records conflict. This phase should also introduce a practical level of equipment-failure granularity, reduce overreliance on weather as a default attribution, establish multidisciplinary review and feedback processes for final cause determinations, set measurable targets for reducing unknown causes, improve field collection of ignition data and photographs, and conduct retrospective reviews of outage, claims, and vegetation records to develop a more complete ignition history. Liberty may also benefit from observing other utilities' outage and ignition review task-force processes. Over the longer term, Liberty should

consider establishing a material-testing pilot for failed equipment to support evidence-based failure-mode identification and refine mitigation-effectiveness assumptions using direct physical testing.

WMP Initiative Activity	3rd Party Contact (non-vehicle)	Animal contact	Equipment failure	Vehicle contact	Snow/Ice	Vegetation Contact
Overhead hardening	0.7	0.77	0.69	0.64	0.72	0.72
Undergrounding of electric lines and/or equipment	0.95	0.95	0.95	0.95	0.95	0.95
Equipment settings to reduce wildfire risk	0.56	0.56	0.56	0.56	0.56	0.56
PSPS	0.75	0.75	0.75	0.75	0.75	0.75

PG&E WDRM V4 Driver	Liberty Driver	PG&E Overhead Hardening	PG&E UG Primary and OH Secondary
Vegetation (Branch)	Geo	76%	98%
Vegetation (Trunk)	Geo	58%	98%
Vegetation (other)	Geo	83%	97%
	Average	72%	98%
Animal (Bird)	Asset:Animal contact	79%	100%
Animal (Squirrel)	Asset:Animal contact	74%	100%

Animal (other)	Asset:Animal contact	78%	99%
	Average	77%	100%
Third Party (Vehicle)	Asset:Vehicle contact	64%	99%
Third Party (Balloon)	Asset:3rd Party Contact (non-vehicle)	88%	100%
Third Party (other)	Asset:3rd Party Contact (non-vehicle)	52%	71%
	Average	68%	90%
Primary Conductor - Line Slap	Asset:Equipment failure	85%	99%
Primary Conductor - Wire Down	Asset:Equipment failure	47%	100%
Primary Conductor - Other	Asset:Equipment failure	74%	100%
Secondary Conductor	Asset:Equipment failure	50%	50%
Equipment (Support Structure)	Asset:Equipment failure	73%	100%
Equipment (Transformer)	Asset:Equipment failure	70%	100%
Equipment (Voltage Control)	Asset:Equipment failure	32%	96%
Equipment (other)	Asset:Equipment failure	76%	94%
Equipment (Capacitor)	Asset:Equipment failure	41%	91%
Equipment (DPD)	Asset:Equipment failure	40%	97%

Equipment (Fuse)	Asset:Equipment failure	73%	100%
	Average	60%	93%

Results and Roadmap for Enhanced Features

#	Opportunity Item	Description	Roadmap	Next WMP	2028+ WMP
1	Risk modeling granularity	Segment- or asset-level risk and mitigation modeling	Yes		Yes
2	Fire spread modeling	8+ hours , move towards blended historical and time based models	Yes		Yes
3	Tree mortality	Predictive model for ignition probability changes for TM and eventually fire behavior intensity	Yes	Yes	
4	Egress/ingress risk	Predictive models for safety impacts of egress	Yes	Yes	
5	Climate change	Predictive models for PSPS frequency and eventually POF adjustments	Yes	Yes	
6	Reliability risk	Res/non-res $/CMI and customer mix at each circuit	Yes	Yes	
7	Reliability risk	Feeder-specific critical customers	Yes	Yes	
8	Reliability risk	PEDS risk quantification	Yes	Yes (?)	
9	Mitigation effectiveness	See Mitigation Effectiveness & Data section below	Yes	Yes	Yes
10	Unit cost	Circuit- or segment-specific unit costs	Yes	Yes (circuit - level)	Yes (segment - level)
11	Inclusion of additional mitigations in BCR	Fuses, poles, etc.	Yes	Yes (poles, Gridscope)	Yes (fault detection,

					distribution automation, etc.)
12	Vegetation management BCR	Circuit- or segment-specific BCR estimation	Yes		Yes
13	Optimization	Portfolio optimization based on $ targets or risk reduction objectives (safety, reliability, etc.)	No		
14	Ignition Management	Standardized process for recording and investigating ignitions including root cause	Yes	Yes	Yes
15	High Impedance Fault and Fault Induced Conductor Slap (FICS) modifiers	Develop predictive models for FICS and HIF	No		
16	BCR	Inclusion of future O&M savings in BCR	Yes	Yes	
17	BCR	NPV benefits and costs	Yes	Yes	

Mitigation Effectiveness & Data

Implemented

- Establish vegetation outage investigation process & criteria (keeping branches, veg inspection turnaround time)
- Participation in joint IOU effectiveness studies

Next WMP

- Standardize process and system options for outage cause and sub-cause classifications, ideally aligned to OEIS driver-sub drivers used in the QDR (since renamed) and WMP templates
- Decide on rank order of operator comment, troubleshooter input, initial classification, etc.
- Start small on equipment granularity, reduce dependence on weather attribution
- Establish feedback loop for VM

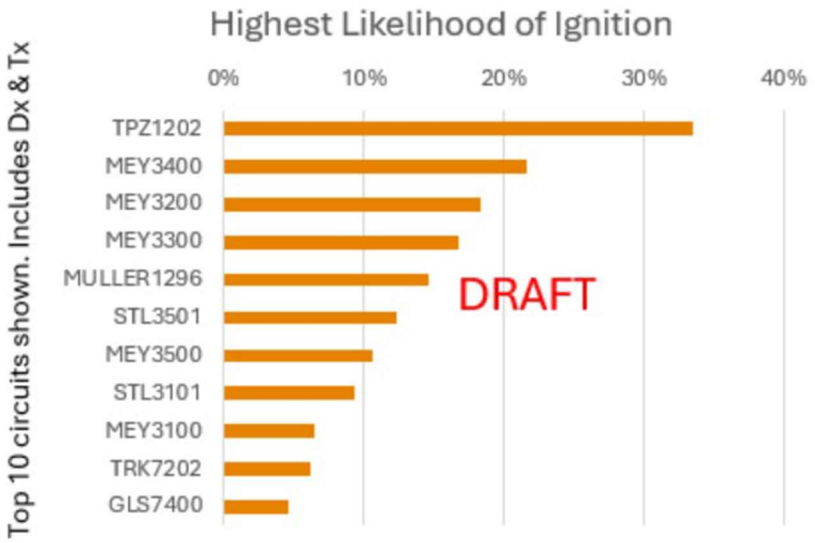
- Establish review process and feedback loop for outage review and ultimate cause determinations (such as protection engineer, veg crew, post-storm clean up data review)
- Set targets for reduction in unknown outage causes, including follow up investigations for a % of unknown
- Improve process and adoption for capturing data and photos of all ignitions (even localized) in the field
- Retroactive data review of outage records, claims, vegetation follow up records, etc. to gather more complete ignition history
- Potentially shadow other IOU outage & ignition review task force meetings

Long-Term / Future WMPs

- Establish material testing pilot for equipment failures

Risk Modeling Improvement Opportunities

The machine-learning model produced differentiated circuit-level estimates of outage likelihood by evaluating the combined influence of historical outage performance, weather exposure, vegetation, asset, inspection, loading, and operational characteristics. The results are intended to support relative circuit prioritization rather than predict the timing of a specific outage. Raw model probabilities were adjusted to align with Liberty's historical circuit-level outage frequencies and were then evaluated across historical weather conditions to estimate annual outage probability and the probability of an outage occurring under extreme fire-weather conditions. This approach allows the model to distinguish between general reliability exposure and the subset of outage exposure that is most relevant to wildfire risk.



The results demonstrate substantial variation in modeled likelihood across Liberty's circuits. Annual wildfire-related likelihood is concentrated among a relatively limited number of circuits, with TPZ1202 producing the highest modeled annual probability of ignition at approximately one-third. MEY3200, MULLER1296, and several circuits in the Meyers area also appear among the higher-likelihood circuits. The distribution declines relatively quickly beyond this leading group, with many circuits exhibiting substantially lower modeled probabilities. This pattern indicates that the conditions associated with elevated wildfire likelihood are not distributed uniformly across Liberty's system and supports the use of circuit-specific likelihood estimates rather than a single territory-wide ignition rate.

The results also illustrate the important difference between reliability risk and wildfire likelihood. The majority circuits have at least a 50% annual probability of experiencing at least one outage, including multiple circuits with estimated annual outage probabilities at or approaching 100 percent. However, those circuits do not necessarily have the highest probability of an outage occurring under extreme fire-weather conditions. Conversely, some circuits with only moderate overall outage frequency rank more highly for wildfire likelihood because their modeled outages are more strongly associated with the combination of dry and windy conditions used in the wildfire analysis. Accordingly, general outage performance should not be interpreted as a direct proxy for wildfire risk. Reliability likelihood describes

how often a circuit may experience an outage, while wildfire likelihood isolates the smaller subset of conditions in which an outage may be capable of initiating a consequential wildfire.

Overall, the machine-learning results provide an empirical basis for differentiating circuit likelihood and identifying where outage susceptibility and extreme fire-weather exposure overlap. The results reinforce that the circuits with the greatest reliability exposure, wildfire likelihood, and wildfire consequence will not always be the same.

Conclusion

The revised risk model methodology provides Liberty with a more transparent and decision-useful framework for evaluating wildfire risk at the circuit level. The approach combines historical outages, asset and inspection information, vegetation and weather conditions, extreme fire-weather exposure, and circuit-specific wildfire consequences to estimate annual wildfire risk. The use of both Bayesian and machine-learning likelihood methods provides complementary perspectives on outage susceptibility and creates an additional basis for reviewing the stability of circuit rankings.

The results reinforce that reliability exposure, wildfire likelihood, and wildfire consequence are related but distinct. Circuits that experience frequent outages are not necessarily those with the greatest likelihood of an outage under extreme fire-weather conditions, and circuits with elevated likelihood do not necessarily produce the greatest overall risk once consequence is considered. The final risk results should therefore be used as an integrated prioritization tool rather than interpreted through any single model input or output.

The methodology reflects the best available data and provides a defensible foundation for near-term planning, while recognizing limitations associated with circuit-level aggregation, source-data quality, limited ignition history, and assumptions used to translate outages under extreme fire weather into ignition likelihood. As Liberty's data systems mature, the framework can be updated with more complete asset attributes, improved outage and ignition cause information, additional operating history, and more granular estimates of ignition probability. This structure allows the model to support current risk-informed decisions while maintaining a clear pathway for continued validation and refinement.

Attachment B2
WMP Model Documentation_TSYL

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1 Technical Model Documentation

1.1 Purpose

The Office of Energy Infrastructure (OEIS) requires transparency in risk calculation methodologies supporting Wildfire Mitigation. Per the guidelines, OEIS has specific requirements for technical documentation, substantiation, and data governance of the models used in risk calculations for the WMP. This template outlines the required technical documentation and substantiation for the models, while the WMP Data Governance Framework covers the data governance requirements for the models.

1.2 Applicability

The applicability of the model documentation and governance applies to every model included in the Wildfire Mitigation Plan filed with the OEIS.

2 Technical Documentation

2.1 Problem or Function

2.1.1 Problem Modeled

Define the problem modeled for function performed by the program, for example, calculation of fire growth, smoke spread, people movement, etc.

The application of wildfire behavior modeling and risk analysis is used to quantify the potential impacts from possible electric utility infrastructure asset caused ignitions. The basis of this modeling is that not all ignitions (fires) are created equal, and each asset caused ignition can have substantially different consequence based on ignition location and related landscape characteristics.

The wildfire modeling and risk analysis derives a set of consequence metrics that quantify impacts. This includes potential acres burned, population impacted, number of buildings threatened, and estimated number of buildings destroyed. These are currently derived using an 8-hour simulation duration, based on a typical first burning period. Testing is underway to evaluate different fire durations based on suggestions in the most recent WMP Guidelines.

Technosylva's Wildfire Analyst™ (WFA) product is used to conduct the modeling, deliver modeling outputs, and monitor and visualize results with software applications.

The wildfire behavior modeling and risk analysis is applied to address two different, yet similar, scenarios. First, the modeling is used with historical re-analysis WRF weather data to support the mitigation planning process. The WFA FireSight, previously called Wildfire Risk Reduction Model (WRRM), is used to quantify risk metrics from millions of wildfire simulations using the numerous WRF weather scenarios defined. This wildfire consequence data is then combined with probability of failure and ignition analysis developed internally to define composite risk values to support prioritization decision making for asset hardening and related mitigation.

Secondly, the modeling is also used with daily WRF-based weather forecast data to calculate consequence based risk metrics for all assets as possible ignition sources to support operational requirements. Other key input datasets such as surface and canopy fuels, and live fuel moisture and dead fuel moisture, are developed daily using Machine Learning (ML) models to calculate the wildfire

behavior outputs as part of the risk analysis model. Wildfire risk forecasts are derived daily, or sometimes twice daily, with a multi-day outlook on an hourly basis. This information is used as input into key decision making related to operational requirements, such as PSPS, resource allocation and deployment, field operations, etc.

Note that the Technosylva Wildfire Analyst™ product is comprised of three discrete applications – FireSim, FireRisk and FireSight. "FireRisk" is the new name for the application formerly called "FireCast". This was renamed to better meet platform functionality naming consistency. Accordingly, all references to FireRisk are identical to all functionality previously provided under the name "FireCast". Also note that the platform is now called Wildfire Analyst. "Enterprise" has been removed from the product platform name. To meet PacifiCorp requirements, a subscription to all three applications is required.[1] These include:

1. WFA FireRisk – daily asset-based risk forecasting to support operational needs, such as PSPS (previously called FireCast), including all situational awareness capabilities.
2. WFA FireSim – on-demand wildfire spread modeling to support real-time incident analysis and "what if" analysis for pending weather events to support operational needs.
3. WFA FireSight – risk analysis for assets using historical fire scenarios to ensure comprehensive understanding of asset ignition probability and consequence to support mitigation planning, such as WMP prioritization and development (previously called WRRM). FireSight includes integration of outage analytics, probability of outage/failure, and probability of ignition as well as built-in integrations to support calculations for risk reduction, mitigation effectiveness and risk spend efficiency.

FireRisk and FireSim support operational needs while FireSight supports enterprise risk management and mitigation planning needs. FireSight is implemented separately from FireRisk and FireSim.

2.2 Technical Description

2.2.1 Theoretical and Mathematical Foundations

Convey a thorough understanding of the theoretical and mathematical foundations, referencing the open literature where appropriate.

The basis of the wildfire risk modeling for electric utility assets lies in the published, proven and accepted fire science for wildfire behavior modeling. The Technosylva WFA product used to create risk metrics for both operational and planning initiatives utilizes the best-in-class fire science available. Technosylva has been able to operationalize proven wildfire behavior models and validate these models through on-going collaboration with CAL FIRE and the US Forest Service Missoula Fire Laboratory as the only unique vendor selected. This collaboration provides the operational platform to test and validate a suite of wildfire behavior and risk models that are utilized for statewide intelligence and operations by CAL FIRE, and by each IOU in California for operations and mitigation.

To support the model R&D and implementation, Technosylva regularly publishes peer reviewed and accepted articles regarding these models. Technosylva has been involved in 30+ publications over the past 24 months, with 11 as the principal investigator. Some of these publications are referenced on the Technosylva web site at https://technosylva.com/scientific-research/.

The published fire science provides the theoretical foundation for the operational models, tempered by validation analysis conducted on an on-going basis, to continually refine the models to match what occurs with observed wildfire behavior. The rest of this section provides a detailed description of the theoretical and mathematical foundation for the WFA models.

2.3 Theoretical Foundation

2.3.1 Phenomenon and Physical Laws (Model Basis)

Describe the theoretical basis of the phenomenon and the physical laws on which the model is based.

Fire is a self-sustained and usually uncontrolled sequence of processes basically carried out by the combination of fuel, oxygen and heat. In forest fires (also referred to as wildland fire or wildfire), the fuel is given by the vegetation layer composed of trees, bushes and all kinds of dead and living foliage (organic matter). The oxygen is abundantly present in the atmosphere and the heat is caused by the combustion of the flame and transported mainly by radiation and convection within the vegetation.

A quick review of the process involved could be described as follows. Consider a homogeneous flammable solid material like wood to which an external heat flux has been imposed. As the solid material absorbs the heat it raises its temperature at a rate dependent on the net heat capacity of the material (mix of all the components of the solid, including water). As the temperature increases, the moisture content in the solid diminishes and eventually dries up the solid. A further increase of the temperature causes the pyrolysis process of the wood (around 550 K), the organic material decomposes into a stream of volatile gasses (smoke, carbon and oxygen) and into solid remains like char (nearly pure carbon), and ashes (incombustible minerals like calcium, potassium, etc). The pyrolyzed fuel vapor convects and diffuses, mixing with the oxygen of the atmosphere and forming a combustible mixture. The high gas temperature favors the initiation of a gas phase combustion reaction in the combustible-oxidizer mixture. The compound molecules break apart, the atoms recombine with the oxygen to form water, carbon dioxide and some other products. The whole process is ruled by many factors, the types of char and volatile, the amount of oxygen and the exact chemical reactions taking place. The temperature difference between the gasses released in the pyrolysis process and the ambient air together with the gained temperature due to the oxidation reaction (around 1000 K), generates a buoyancy flow that raises up the hot combusting gas forming the characteristic flames of the fire.

In the wildland, fire behavior deeply depends on the vegetation (type, size and vertical arrangement), terrain, wind and moisture conditions of the vegetation (dead and living material). From a descriptive perspective, wildfires main observables are the fires Rate of Spread (ROS), flame length, flame intensity, heat per unit area, flame depth, and residence time. Depending on the behavior of the fire it may be classified as surface and crown fire. Surface fires burn loose needles, moss, lichen, herbaceous vegetation, shrubs, small trees and sampling that are at or near the surface of the ground. Crown fires burn forest canopy fuels, which include live and dead foliage/ branches, lichens in trees, and tall shrubs that lie well above the surface fuels. They are usually ignited by a surface fire. Crown fires can be passive or active. Passive crown fires involve the burning of individual trees or small groups of trees (often called torching). Active crown fires, or also referred to as running crown fires, present a solid wall of flame from the surface through the canopy fuel layers.

Fire growth from an ignition point can be split into four distinct phases (Fire science 2021), in the first phase the fire starts to burn slowly as the influx of air caused by the buoyancy flow of hot gasses causes the flames to tilt inwards. Once the fire has spread enough from the ignition point, wind is able to enter

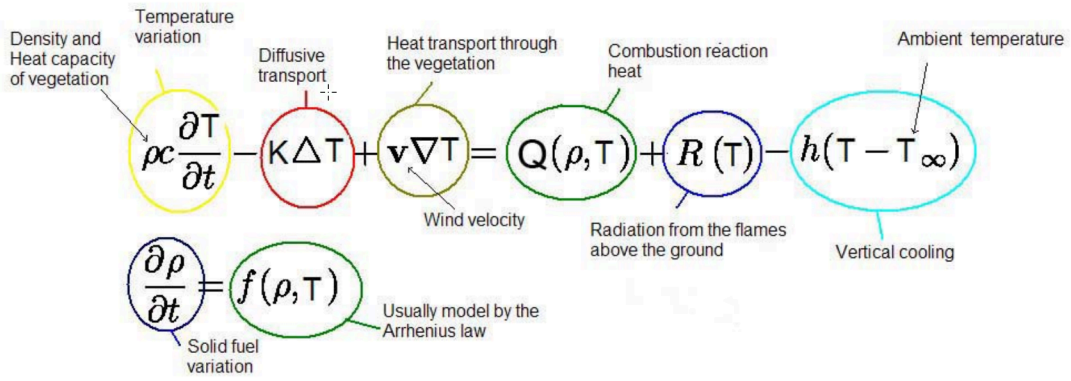
the already burned vegetation and pushes the flames away from the center and tilts them towards the unburned fuels, increasing the heat transfer, and therefore accelerating the fire. As the fire moves further away from the center, the acceleration of the fire depends more on the local characteristics of the curvilinear front. Finally, the fire may reach a steady-state when the fire line is uniform enough so that it can be considered of infinite length.

2.3.2 Governing Equations

Present the governing equations and the mathematical model employed.

Fire modeling is a highly challenging problem from both the physical and the numerical point of view, and consequently historical advances in this field have always been forced to a compromised position due to the desire of practical usefulness, computer capabilities, required input data, and existing numerical methods. It is only by the consideration of these requirements that the primary natural approaches to the problem can be understood. The primary broad approaches are physical models, quasi-empirical models, and empirical ones.

Physical models are the most complex and have the advantage to be more generally valid across different fuels and weather conditions (Cruz 2017). They are usually posed as a set of coupled differential equations derived from conservation laws and defined on a usually bidimensional domain representing the vegetation layer considered as a porous medium where the main variables develop. The degree of approximation of the initial semi-physical description of the problem, as well as the rest of physical effects considered in the modeling may vary greatly from one model to another. Despite these different approaches, a conventional 2D multiphase model, sketching vegetation temperature through a convection reaction diffusion equation, and a solid combustible material evolution in time may serve as a simple example for illustration purposes.



Example of a 2D multiphase model sketching vegetation temperature and solid combustible

Even though physical models are very promising, they are not easy to make operational because in many cases the detailed input data they need is not readily available, and because they require a lot of computer processing capability, as they usually use adaptive meshes to keep track of the burning front. Some numerical methods used for solving these models are the Finite Element Method (FEM), Finite Difference methods (FDM), etc.

Empirical and semi-empirical models are mainly based on experimental data: laboratory runs, controlled outdoor fires, or well documented wildland fires. The difference between the empirical and

semi-empirical approach is that the former ones contain no physical basis at all and are generally statistical in nature, while the later use some form of physical framework on which the statistical model is based (Andrews 2018, Sullivan 2009). These models are largely developed to support decision making and are the main operational models used today. They are typically able to predict the source dataset with mean absolute percent errors between 20 and 40% (Cruz et al. 2013)

Further review of existing fire modeling approaches can be found in Catchpole and De Mestre (1986), Weber (1991), Pastor et al. (2003), Sullivan (2009a,b,c)

2.3.3 Assumptions

Identify the major assumptions on which the fire model is based and any simplifying assumptions.

The following are some of major assumptions contained in the models

- The physical framework development is based on an idealized situation in steady state spread which may not fit some extreme behavior of fires.
- Fuels are assumed to be continuous and uniform for the scale of the input (typically between 10 to 30 meter (m) resolution)
- Fire characteristics at a point only depend on the conditions at that point (point-functional model). This means that there are certain non-local phenomena like:
    - Increase of ROS due to a concave front.
    - Fire interaction between different parts of the same fire or a different one
- Fire spread is assumed to be elliptical although there are several variations such as double ellipse, oval, egg-shape, etc.
- Weather is given hourly and is assumed to remain constant during that time. There is no interpolation in time to compute the evolution of weather between hours.
- Reliability of weather inputs in the mid-range forecast (2 to 5 days)
- Fire is not coupled with the atmosphere in any way. This may seem like a major limitation in the model as wind is a main contribution to fire spread and at present many models (specially physical ones) try to couple wind and fire. The main reasons for us not to consider the coupling is:
    - It would make it infeasible to run millions of simulations considering the coupling effect.
    - Empirical and semi-empirical models have been developed using an average wind speed as an input, so it is not clear that considering more granular wind at the front is advisable.
- Fire is always assumed to be fully developed. Fire acceleration, flashover, or decay is not considered.
- Atmospheric instability which may have a deep impact on ROS (beer 1991) is not considered in the model.
- Gusts are not considered in the model
- No interaction between slope and wind other than creating an effective or equivalent wind. This means that fire is assumed to have an elliptical shape no matter the alignment of wind and slope.
- Models have been developed with scarce empirical data. The abundance of today's fire data sources, however, is allowing us to better adjust models to observed fire patterns.
- Fuel array description of the vegetation may not perfectly describe fuel characteristics.
- Spotting is only considered in surface fires

2.3.4 Independent Review Results (see Guide ASTM E 1355)

Provide the results of any independent review of the theoretical basis of the model. Guide E1355 recommends a review by one or more recognized experts fully conversant with the chemistry and physics of the fire phenomena but not involved with the production of the model.

The core models implemented in WFA form the basis of most operational propagation models in use today (Andrews et al 1980, Gould 1991). They have been implemented in well-known software like NEXUS (Scott and Reinhardt 2001), Fire and Fuels Extension to Forest Vegetation Simulator (FFE-FVS) (Reinhardt and Crookston 2003), FARSITE (Finney 2004), Fuel Management Analyst (FMAPlus) (Carlton2005), FlamMap (Finney 2006) and BehavePlus (Andrews et al.2008). Nevertheless, forest fires are a very difficult phenomenon to simulate which depends on many different factors and typical simulations are able to predict the source dataset with mean absolute percent errors between 20 and 40% (Cruz et al. 2013)

One of the important facts in fire simulation is the definition of the fuel models, with analysis providing different results for different fuels and regions. For example, Sanders (2001) observed a pattern of over-prediction by FARSITE in fuel models 1,2, 5 by a large margin, moderate in fuel 10 and some underprediction for fuel model 8. Zigner et al (2020) used two case studies during strong winds revealing that FARSITE was able to successfully reconstruct the spread rate and size of wildfires when spotting was minimal. However, in situations when spotting was an important factor in rapid downslope wildfire spread, both FARSITE and FlamMap were unable to simulate realistic fire perimeters. Ross et al. (2006) used measurements from temperature sensors during prescribed burns in the Appalachian Mountains to recreate the fires and compared fire behavior simulated by FARSITE. They obtained a set of ROS adjustment factors that better represented the observed fire behavior obtaining a ROS adjustment factor of 1.5 and 2 for fuels 9 and 11 respectively, and a decreasing factor of 0.2 to the fuel type 6.

Apart from these reviews Technosylva has been constantly improving the accuracy and performance of the published fire models to better adjust the results to observed fire behavior. This includes a better definition of the fuel types, improved forecast of live fuel moisture content, modifications to the crown fire modeling initialization scheme, and automatic fire adjustment based on data assimilation techniques using ROS adjustment factor. In addition, Technosylva has implemented more than 21 additional models into the WFA platform to enhance accuracy and address known limitations of published fire models. These improvements include crown fire analysis, ember and spotting, urban / non-burnable area encroachment, consequence and impact quantification, etc. It is important to note that improvement of the fire modeling platform of choice necessitates not only improvements in mathematical algorithms but substantial improvements in the accuracy and resolution of input data sources. These work in concert to enhance the modeling and outputs to match observed and expected fire behavior. A robust operationalization of fire models requires constant and on-going research, testing, validation and implementation of both models and data sources.

2.4 Mathematical Foundation

2.4.1 Techniques, Procedures, Algorithms

Describe the mathematical techniques, procedures, and computational algorithms employed to obtain numerical solutions.

The fire propagation model in WFA is a point-punctual model where the fire characteristics at a given point (cell) only depends on the conditions at that cell (weather, terrain, vegetation). This fits well in fire simulation as most of wildfire characteristics mainly depend on local characteristics (Di Gregorio et al 2003), but excludes the effects of non-local phenomena.

The overall resolution is done using a Cellular Automata (CA) where space is discretized into cells (from 10 m to 30 m resolution), and physical quantities take on a finite set of values at each cell. The potential ROS at each cell at any time is given by the propagation models (surface and crown fire). CA models directly incorporate spatial heterogeneity in topography, fuel characteristics, and meteorological conditions, and they can easily accommodate any empirical or theoretical fire propagation mechanism, even complex ones (Collin et al. 2011)

Spotting is introduced as a random event where firebrands can be lifted and generate secondary ignition points ahead of the fire (in the direction of the wind).

The time evolution is done using a Minimum Travel Time (Fast-Marching) algorithm. This algorithm is similar to the well-known Dijkstra´s (1959) algorithm but more adapted to grids instead of the original model that uses graphs. This approach has been used with success in many forest fires propagation models like FlamMap (Finney 2002) and many others (CITES). The algorithm provides a solution of the Eikonal equation of a spreading curve subject to a given speed function ROS(**x**). This is done by searching for the fastest fire travel time along straight line transects of neighboring cells in the lattice. The number of neighboring cells considered determines the angle discretization of the spreading fire. The neighborhood or degrees of freedom, u, in WFA ranges from 8 cells (Moore neighborhood) to 32 cells.

2.4.2 References to Techniques and Algorithms

Provide references to the algorithms and numerical techniques.

The Technosylva WFA platform utilizes numerous models to address specific operational requirements. These models are integrated into an extendible platform that facilitates continued improvement as R&D advancements are made. The following table lists the primary models employed on WFA :

Model	Model Reference	Notes
Surface fire	Rothermel 1972, Albini 1976 Kitral IntecChile	WFA uses the core Rothermel model for fire propagation, however it can be configured for custom versions to support any empirical or semi empirical fire model. This has been done for different models employed in other countries, i.e. Chile, Canada, etc. In this regard, WFA platform is easily extended for use in unique geographies.
Crown Fire	Van Wagner (1977,1989,1993); Finney (1998); Scott and Reinhardt (2001)	Critical surface intensity and critical ROS for crown fire initialization. Expected ROS and flame intensity.
Time Evolution	Technosylva (Monedero, Ramirez 2011)	Fast-Marching method adapted to fire simulations. Minimum Travel Time algorithm with 32 degrees of freedom.

Model	Model Reference	Notes
High-Definition Wind	Forthoffer et al (2009)	High resolution wind model obtained through the integration of the USFS WindNinja software. Note: Technosylva is also the contractor for the USFS Missoula Fire Sciences Lab. for the on-going enhancement and customization of the WindNinja software. This provides Technosylva a unique understanding of the model science foundation and implementation approaches.
Wind Adjustment Factor	Andrews 2012	Wind speed conversion with height. Based on Albini and Baughman (1979); Baughman and Albini (1980); Rothermel (1983); Andrews (2012)
Fire Shape	Andrews 2018,	Unique ellipse based solely on the effective wind speed.
Live Moisture Content	Cardil et al.	Machine learning Algorithm based on historical NDVI weather reading
Dead Moisture Content	Nelson (2002)	
Spark Modeling	Technosylva	Ignition point displacement based on wind speed
Urban Encroachment	Technosylva 2016	Includes several variations of urban encroachment algorithms developed internally to facilitate spread of fires into non-burnable urban fuels. This incorporates a distance-based friction model. Based on research publications by NIST.
Spotting	Technosylva 2019	Surface spotting model for wind driven fires. Albini (1983a, 1983b); Chase (1984); Morris (1987)
Building Loss Factor	Technosylva (Cardil xxx)	Machine Learning algorithm taking into account building conditions. Based on historical damage inspection data on buildings affected by fires over the past 13 years

Many of these models were originally published from research by the USFS Missoula Fire Sciences Laboratory. Technosylva has implemented, and enhanced these models, in addition to developing new models. Most Technosylva custom developed models are supported by journal publications as part of our corporate R&D program. Some of these models are referenced on the Technosylva web site at https://technosylva.com/scientific-research/. Key references are provided below for many of the models employed in the WFA platform.

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- Gould, James. (1991). Validation of the Rothermel fire spread model and related fuel parameters in grassland fuels. Proceedings of the Conference on Bushfire Modelling and Fire Danger Rating Systems. 51-64.
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- Zigner, K.; Carvalho, L.M.V.; Peterson, S.; Fujioka, F.; Duine, G.-J.; Jones, C.; Roberts, D.; Moritz, M. Evaluating the Ability of FARSITE to Simulate Wildfires Influenced by Extreme, Downslope Winds in Santa Barbara, California. *Fire* **2020**, *3*, 29. https://doi.org/10.3390/fire3030029
- Phillips, Ross J.; Waldrop, Thomas A.; Simon, Dean M. 2006. Assessment of the FARSITE model for predicting fire behavior in the Southern Appalachian Mountains. Proceedings of the 13th biennial Southern Silvicultural Research Conference. Gen. Tech. Rep. SRS-92. Asheville, NC: U.S. Department of Agriculture, Forest Service, Southern Research Station: 521-525

2.4.3 Equations and Implementation

Present the mathematical equations in conventional terminology and show how they are implemented in the code.

Summary

The mathematical model used to simulate surface fire spread is the model developed by Rothermel (1972) with some modifications from Albini (1976) and some minor adjustments from Technosylva. It accepts the initial 13 fuel models (Anderson 1982) as well as Scott and Burgan's (2005) dynamical fuels where there is a transfer load between the herbaceous and dead classes. Among other outputs this model provides the surface fire rate of spread, flame length and flame intensity in the direction of maximum spread (head front). Crown fire is implemented using the model developed by Van Wagner (1977,1993) which computes the transition viability to crown fire, as well as the expected ROS and intensity in active crown fires. Spotting is modeled as a pseudo random event. The maximum expected spotting distance from the fire is obtained using the wind-driven model developed by (Albini 1983a; Albini 1983b; Chase 1984) and then embers are generated randomly on the front of the fire and the actual traveled distance is computed also randomly based on the maximum distance available. In this modeling there is no tracking of individual embers in the air. Wind speed profiles at different heights (2m, 10m, 20ft) are obtained through a logarithmic wind profile found in Andrews (2012). Fire is assumed to spread following an elliptical shape only dependent on the effective wind speed (Andrews 2012). The time evolution is done using a Fast-Marching method on a regularly spaced landscape grid of a Cellular Automata.

Surface Fire

The default propagation engine implemented in WFA is Rothermel's (1972) surface model with the modifications proposed by Albini (1976) and the requirements to accept Scott and Burgan (2005) fuel models. The basic equation in the model predicts the heads fire rate of spread without wind or slope:

$$R_0 = I_R \, \xi \, / \, \rho_b \varepsilon Q_{ig}$$

Here I_R is the reaction intensity (energy released rate per unit area of the fire front), ξ the propagating flux ratio, ρ_b the bulk density, ε the effective heating number, and Q_{ig} the heat of ignition. The equation is derived by applying the energy conservation to a unit volume of fuel ahead of a steadily advancing fire in a homogeneous fuel bed. In this model, the ROS may be viewed as the ratio between the heat flux received by the unburned fuel ahead of the fire (numerator) and the heat required to ignite it (denominator).

The input parameters to compute the ROS in the case of no wind or slope are the moisture content and the characteristics of the vegetation. Moisture content is given by the 1h, 10h and 100h dead moisture content, and the woody and herbaceous live moisture content. Fuels are assumed to be a mixture of different vegetation types depending on their class (dead or live) and size (less than 0.25 inch, 0.25-1 inch, 1-3 inch), with each class having different surface to volume ratio and loads. The inputs required to define a fuel type is given in the following table:

			LOAD				SAV					
Fuel	1h	10h	100h	herb	woody	1h	herb	woody	Dyn	Depth	MoistExt	heat

Table: input variables for each fuel type.

Here Dyn (dynamic) is a boolean variable to define if there should be a transfer between the herbaceous load and the dead one based on the herbaceous content. In general, SAV values (the fineness of the

fuel) strongly affects the ROS and flame length of the fire, while the fuel load does not affect the rate of spread but can have a strong effect on the flame length.

The effect of wind and slope can be incorporated in the model through a couple of dimensionless parameters depending on the midflame wind speed U and the terrain angle θ:

$$ROS= R_0 (1+\Phi_w+ \Phi_s)$$

with

$$\Phi_s= 5.275\ \beta^{-0.3}\ (\tan \theta)$$

$$\Phi_w= C\ *U^{B}\ (\beta / \beta_{op})^{-E}$$

Where β_{op} and β are the optimum and standard packing ratios respectively, and C, B, and E are parameters depending on the surface to volume ratio σ:

$$C = 7.47 * \exp(-0.133\ \sigma^{0.55});$$

$$B = 0.02526\ \sigma^{0.54}$$

$$E = 0.715 * \exp(-0.000359 * \sigma)$$

The slope and wind factors are summed together to obtain the final ROS. If they are not aligned the resultant vector defines the direction of maximum spread (which will be between the direction of wind and the direction of slope). This final slope-wind factor can also be used to compute an equivalent or effective wind speed causing the same effect as the combined effect of wind and slope. To do that we simply inverse the equation of the wind factor to obtain:

$$U_e= [\ \Phi_e\ (\beta / \beta_{op})^{E} / C\ ]^{-B}$$

The Rothermel model predicts fire characteristics (ROS, flame length, etc) only in the direction of maximum spread (head front) obtained from the combined effect of wind and slope. To compute the ROS in a direction different from the direction of maximum spread, and to be able to use the model in a 2D landscape it is assumed that a free burning fire perimeter from a single ignition point has an elliptical shape. There are several different approaches to compute the ellipse (or ellipses) eccentricity based on wind and slope (Albini [2], Anderson 1983 [6], Alexander, etc). The present implementation follows the equations in Andrews (2008) depending on the effective wind speed U_e in mi/h in the direction of maximum spread. The length to width ratio is given by:

$$L/W = 0\ .1+\ 0.25\ U_e$$

Or equivalently the eccentricity e is given by

$$e= (Z^2 – 1)^{0.5} / Z$$

so that the ROS in any direction ϕ is given by

$$ROS(\phi)=ROS\ (1-e)\ /\ (1+e)$$

One of the most important variables of fire is the amount of heat it generates as this is the main contributor to fire spread and fire severity. The amount of heat can be measured using different variables like the reaction intensity (IR), the Heat per Unit Area (HPA) or the fireline intensity. The Reaction intensity is the rate of energy release per unit area within the flaming front (with units of energy/area/time), heat per unit area is the amount of heat energy released per unit are within the

flaming front (units of energy/area), fire line intensity is the rate of heat energy released per unit time per unit length of the fire front (units of energy/distance/time). Fireline intensity is independent of the depth zone and It is calculated as the product of the available fuel energy and the ROS of the fire (Byram 1959):

$$I_B = HA \cdot ROS$$

Where The heat per unit area depends on the reaction intensity of the fire (IR) and the time that the area is in the flaming front (residence time tr)

$$H_A = I_R \cdot tr = 384 \cdot I_R / \sigma$$

In this model the flame length and Byram's intensity are closely related by:

$$FL = 0.45\, I^{0.46}$$

Where the flame length is in feet and the intensity in Btu/ft/sc.

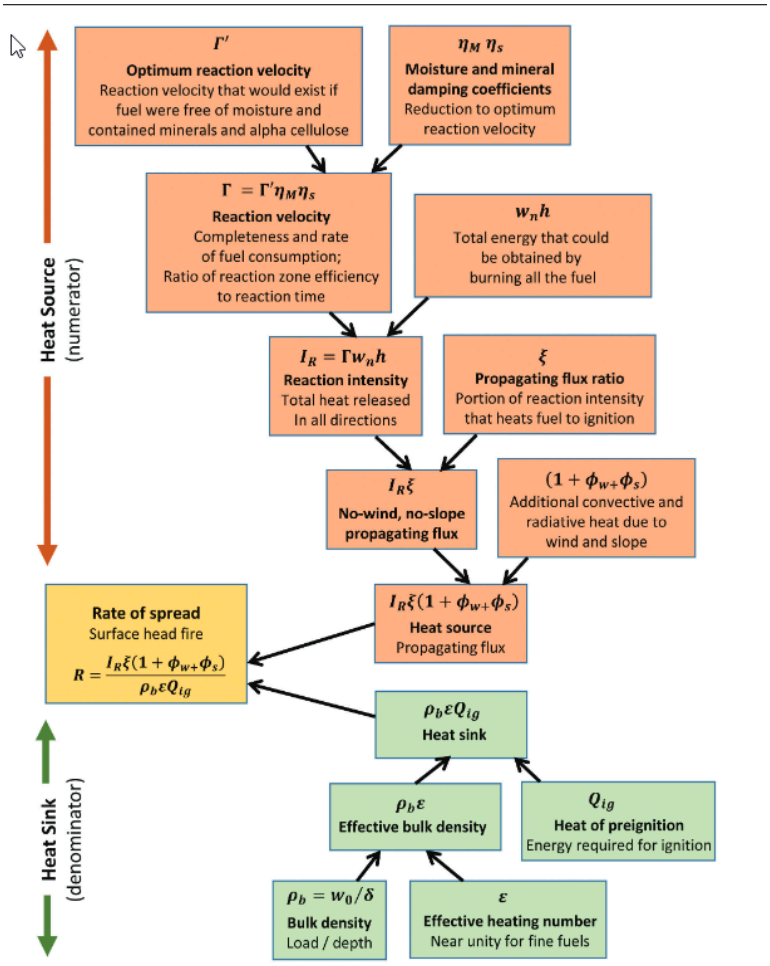


Fig X: Flow of Calculation provided in Andrews (2018)

For a much more in-depth discussion of the Rothermel surface model please read Andrews (2018) and Rothermel (1972).

Crown fire

Crown fires burn forest canopy fuels. They are usually generated by surface fires and represent a major change in fire behavior due to an increased rate of spread and heat released. Crown fires can be passive, active or conditional based on the capacity of the surface fire to move into areal fuels, and to the capacity of the burning canopy to move between individual trees.

Crown fire initiation occurs when the surface fire provides enough heat to raise the temperature of the canopy fuel to ignition temperature. In Van Wagner (1977) model, this minimum intensity is given by:

$$I_{ini} = (0.01 * CBH\ (460 + 25.9\ FMC))^{1.5}$$

Where CBH is the canopy base height (m) and FMC is the foliage moisture content of the canopy cover. Foliar moisture content (FMC) is usually not known, but it is assumed that for most species old foliage should be around 100 percent and this value has been used as a default value when no other information is available (Scott 2001). This approach however does not consider any known humidity conditions of the site and in WFA the FMC is computed based on the 100h moisture content as follows:

$$FMC = 75 + 2 \cdot m100h$$

Once the fire has transitioned to the canopy it is necessary to have a critical mass-flow rate for the fire to be self-sustained. Vang Wagner found this critical mass to be 0.05 kg m-2 sec-1 (Scott 2001) which can be used to determine a minimum crown fire rate of spread only dependent on the Canopy Bulk Density (CBD) and given by

$$R_{active} = 3 / CBD$$

Other existing models not used in WFA are Alexander (1998) which is very similar to Van Wagner (1977) but includes additional inputs like flaming residence time, plume angle and fuel bed characteristics, Cruz et at. (1999) fire transition model, and Cruz et al. (2002) crown fire spread model given by:

$$ROS = c1\ U^{c2}\ CBD \cdot C3 \cdot e^{c4 x EFM}$$

Where U is the wind at 10m, CBD the canopy bulk density, EFM is the fine dead moisture content, and C1, C2, C3, C4 are a set of regression coefficients.

The model for the ROS of crown fires was computed by Rothermel (1991) through a linear regression between observed crown ROS and the surface fire model. It states that the crown fire of an active ROS is 3.34 times the rate of spread of the surface model 10 assuming a 0.4 wind reduction factor.

$$R = 3.34(R_{10})_{40\%}$$

Based on these conditions, crown fire may be classified as:

- Surface fire if neither the intensity nor the minimum crown ROS is met
- Passive Crown fire (torching): Fire spreads through the surface fuels, occasionally torching overstory trees. Overall ROS is that of the surface fire.
- Conditional Crown: Fire cannot transition to crown, but active crown fire is possible if there was a fire transition to crown by other means
- Active Crown: Fire spreads through the overstory tree canopy if both conditions are meet

Fire Type		Active crown fire?	
		No	Yes
Transition to crown fire?	No	Surface	Conditional Crown
	Yes	Torching	Crowning

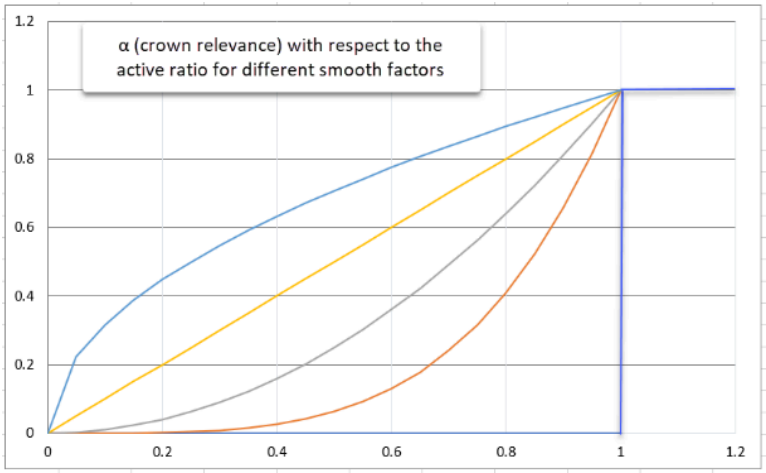
Crown fire classification as shown in BehavePlus

Van Wagner's crown fire transition and propagation models are well known and used operationally but have shown to have a significant underprediction bias when used in assessing potential crown fire behavior in conifer forests of western North America (Cruz et al. 2010). To try to correct this bias Technosylva has introduced two new parameters in the model that have been adjusted based on the analysis carried out by the scientific team using data from the last two fire seasons in California. The model introduces two new parameters 1) a crown factor multiplier for the Canopy Bulk Density (CBD) which decreases the minimum crown ROS required to have an active crown fire, and a factor that forces a smooth transition between the surface and the crown fire behavior. The final ROS of the overall fire when crown fire type is conditional or crowning is a weighted average of surface and crown ROS

$$ROS = surfROS * (1-\alpha) + \alpha * crownRos$$

Where the value α ranges from 0 to 1 and depends on the **active ratio** in the following way:

$$\alpha = activeRatio^{1/smoothFactor}$$



Example effect of the smooth factor (0 blue, 0.25 red, 0.5 gray, 1 yellow) in the crown contribution for active ratios lower than 1

At present, with WFA the crown CBD factor is set to 1.2 and the smooth factor to 0.4. This approach to provide a gradual transition in the fire's rate of spread (and flame length) from the initial onset of crowning similar to the crown fraction burned (CFB) (Alexander 1998) used in other modeling systems like FlamMap, FARSITE or Nexus, with the main difference being the smoothing function itself. Cruz et al. observes that there is no evidence of such a smooth transition between surface and crown fire regimes in the experimental data but rather an abrupt transition is observed far more commonly. In our context, however, where the main aim is to produce a forecast risk and not to simulate an individual fire we

consider that it is important to reflect the fact that the fire conditions are close to generate an active crown fire.

For a more in-depth discussion of the crown fire models please read Cruz et al (2010) Scott et al. (2006)

Wind adjustment factor

Fire simulations require wind speed at midflame to compute surface fire spread and at 20ft to compute crown fire characteristics. To convert the wind between the two heights, WFA uses the wind adjustment factor (WAF) found in Andrews (2012) and implemented in the software BehavePlus and Farsite. The model is based on the work of Albini and Baughman (1979) and Baughman and Albini (1980), using some assumptions made by Finney (1998). This implementation considers two different models for sheltered and unsheltered conditions from the overstory. As described in Andrews (2012), the unsheltered WAF is based on an average wind speed from the top of the fuel bed to a height of twice the fuel bed depth. The sheltered WAF is based on the assumption that the wind speed is approximately constant with height below the top of a uniform forest canopy. Sheltered WAF is based on the fraction of crown space occupied by tree crowns. The unsheltered WAF model is used if crown fill portion is less than 5 percent. Midflame wind speed is the 20-ft wind multiplied by the WAF.

Unsheltered WAF depends on the surface fuel bed depth (in feet):

$$WAF = \frac{1.83}{\ln ln\left(\frac{20+0.36H}{013H}\right)}$$

Sheltered WAF:

$$WAF = \frac{0.555}{\sqrt{fH}*\ln ln\left(\frac{20+0.36H}{0.13H}\right)}$$

With H, the canopy height, and f ,the crown fill portion, depending on the canopy cover (CC) and the crown ratio (CR):

$$f = CC*CR / 3$$

$$CR = (CH-CBH) / CH$$

CR is the ratio of the crown length to the total height of a tree.

Time evolution

The fire models can predict the potential ROS of the front at any point and direction but are not able to compute the evolution of the fire perimeter in time. The main models to do that are:

1) Using Huygens principle of wave propagation like in Farsite (xxx) and discretizing in time
2) Using a Minimum Travel Time Algorithm or Fast Marching method, and discretizing in space
3) Using the more general but usually slower Level Set Method.

In the context of wildfires, Huygens principle states that each point on a fire front is in itself the source of an elliptical wavelet (fire) which spreads out in an independent way in the forward direction. This approach is numerically solved by splitting the perimeter into a set of nodes, computing the evolution of those nodes in the direction normal to the perimeter based on the ROS given by the propagation model and a given time steps, and then reconstructing the front based on the position of the transported nodes. The main weakness of vector-based approaches is the need for a computationally costly algorithm for generating the convex hull fire-spread perimeter at each time step, especially in the

presence of fire crossovers and unburned islands (Ghisu et al. 2014). Raster based implementations are computationally more efficient (Glasa et al. 2008), but can suffer from significant distortion of the produced fire shape if the number of neighboring cells considered (number of possible spread directions) is low.

Spotting

Wildfires can create powerful updrafts which launch burning firebrands into the atmosphere, these firebrands are then carried horizontally by the wind landing some distance downwind from the source and creating a new ignition. Due to its unpredictable nature, fire-spotting modeling, here, is considered through a statistical approach.

Encroachment

Encroachment is a critical component in the WFA fire modeling simulations as it affects the number of buildings, assets, facilities and population impacted. It does not have a relevant effect on other impact metrics. To take advantage of enhanced algorithms for spread encroachment using adjacent fuels and fire behavior data, the non-burnable (and especially urban) fuel classification needed to be updated to provide better granularity and characterization of the type of urban/WUI. Accordingly, to test these methods an enrichment of the current fuels data was developed by Technosylva to delineate urban fuels into different types of urban and also a level of density of buildings. This enhancement of the basic Scott and Burgan fuel models is used in combination with enhanced encroachment algorithms to more accurately calculate potential impacts to buildings and population.

Urban areas have been classified into classes depending on their structure (roads, urban core, isolated, sparse) and their surrounding fuels, characterized as high versus low fire behavior fuels). Specific encroachment factors can then be applied to each grouping.

Spark Modeling

Electrical failures can cause sparks and produce an ignition meters away from the asset location. To take this into account, the WFA allows the ignition point location to be displaced if the underlying vegetation type is either non-combustible or WUI. This displacement is in the direction of the wind and is proportional to the wind speed. The displacement distance and wind speed algorithm has been developed using expert opinion from electric utility engineers familiar with asset failure and ignition probability.

Weather

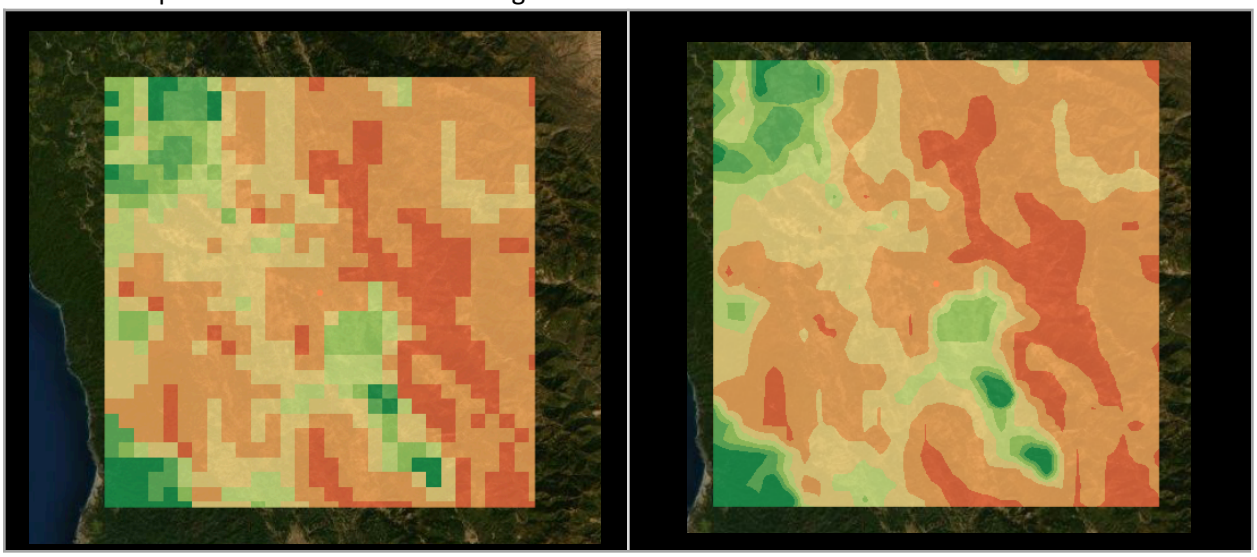
WFA requires historical daily weather data to run the fire simulations. The minimum required variables are the wind speed at 10m, the dead moisture content, and the live moisture content. More explicitly:

- Northward 10m wind speed
- Eastward 10m wind speed
- Dead moisture content 1hr
- Dead moisture content 10hr
- Dead moisture content 100hr
- Herbaceous moisture content

- Woody moisture content

The dead moisture may be given by the client or may be computed based on the Nelson model. Similarly, the herbaceous moisture content may be provided by the client or may be computed using Technosylva's Machine Learning algorithm based on historical NDVI weather reading. The Technosylva DFM model has been developed to meet customer needs using the latest modeling approaches. The input wind speed required by the propagation model is 20ft; to convert the initial 10m wind speeds to 20ft, we use a logarithmic profile from Andrews (2012) leading to a 13% wind speed reduction.

Weather data is obtained from the Weather Research and Forecasting (WRF) Model weather forecast data. The forecast weather has a 2 km resolution which can lead to sharp changes in weather conditions between neighboring cells. In order to increase accuracy and meet the underlying 30m cell size resolution of the fuels data, weather data is interpolated spatially using a bilinear interpolation scheme. The smoothing of the source weather data ensures that integration with the wildfire behavior models results in outputs that do not have hard edges in the data.



Left: Initial weather definition. Right interpolated weather definition

Impact and consequence value calculation

Wildfire spread modeling is undertaken with asset ignition locations to derive potential impacts. The output impact values (risk metrics) are assigned back to the asset ignition point location. Using this approach allows us to differentiate between the risk output associated with different assets (and their ignition locations) using the same weather data although weather values may vary based on spatial location and time of day (hourly). For both operational and mitigation applications, the wildfire spread modeling is conducted using High Performance Computers (HPC) and typically involves hundreds of millions of spread simulations. The amount of simulation will vary depending operational use with daily forecasts versus mitigation planning use with hundreds of weather scenarios.

The main goal for the WFA simulations is to create a forecast risk associated to each ignition point and surrounding area. This is done by running individual simulations and associating the following main risk metrics back to each ignition point. The following baseline risk metrics are calculated from the spread simulations

- Acres Burned (referred to as Fire Size Potential)
- Number of Buildings Threatened
- Estimated Number of Buildings destroyed
- Population impacted

Numerous conventional fire behavior outputs are also calculated, the most important being:

- Rate Of Spread (ROS)
- Flame Length (FL)
- Fire Behavior Index (FBI) – combination of ROS and FL

2.4.4 Limitations (see Guide ASTM E 1895)

Identified the limitations of the model based on the algorithms and numerical techniques.

The Technosylva WFA platform Is an integration of numerous speciality models designed to address specific scientific requirements and methods.

The following assumptions applied to the models used in WFA:

- The physical framework development is based on an idealized situation in steady state spread
- Rate Of Spread at a point only depends on the conditions at that point (point-functional models). This means that there is no increase in speed due to non-local contributions of the fire front.
- Fire model is not directly coupled with the atmosphere. Fire will not modify local atmosphere. However, this is being addressed with seamless integration with the WRF-SFIRE model in development at San Jose State University, Wildfire Interdisciplinary Research Center. WRF-SFIRE is an option available to WFA customers to address specific convection based fire scenarios.
- Fire is always assumed to be fully developed with fire acceleration, flashover, or decay not being considered.
- Atmospheric instability, which may have a deep impact on ROS (Beer 1991), is not considered in the model in any way.
- Gusts are not considered in the model
- No interaction between slope and wind other than creating an effective or equivalent wind. This means that fire is assumed to have an elliptical shape no matter the alignment of wind and slope.
- Experimental data is scarce and the empirical adjustment of models have been based on wind tunnel experiments and a few well documented fires
- Fuel array description of the vegetation may not perfectly describe fuel characteristics.
- Spotting is only considered in surface fires

2.5 Data Libraries

Provide background information on the source, contents, and use of data libraries.

This section provides a brief summary of the key input datasets required for wildfire behavior analysis and risk analysis. The following categories of input data are:

1. Landscape characteristics
2. Weather and atmospheric data

3. Fuel moisture
4. Values at risk (highly valued resources and assets)
5. Possible ignition sources
6. Fire activity

2.5.1 Landscape Characteristics

This includes a range of possible data that describe the characteristics of the landscape. The most important data are related to surface and canopy fuels, and vegetation. There are many publications available that describe these datasets, many from the USFS Missoula Fire Lab. Most use the Scott & Burgan 2005 Fuels Model Set standard for classification of fuels data.

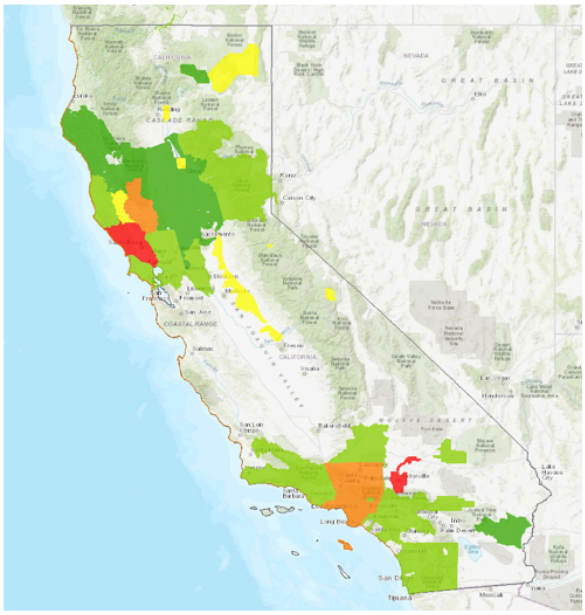
Standard fire behavior analysis input layers are:

1. Terrain – elevation, slope, aspect
2. Surface fuels (Scott & Burgan 2005)
3. Canopy fuels
    a. Canopy height
    b. Canopy base height
    c. Canopy bulk density
    d. Canopy closure
4. WUI and and Non Forest Land Use classes (Technosylva, 2020)

2.5.2 Surface and Canopy Fuels

For these layers, data developed by Technosylva is used. Technosylva provides an annual fuel updating subscription where initial fuels is developed using advanced remote sensing object segmentation methods using high resolution imagery, available LiDAR & GEDI, and other standard imagery sources, such as NAIP , Sentinel 2 and Landsat. This is supplemented with in-the-field surveys to verify the fuels for possible areas of concern and to validate the fuels classification. Surface and canopy fuels data is critical for accurate fire behavior modeling, so it is paramount that this data is up-to-date, and when used, results in the observed and expected fire behavior.

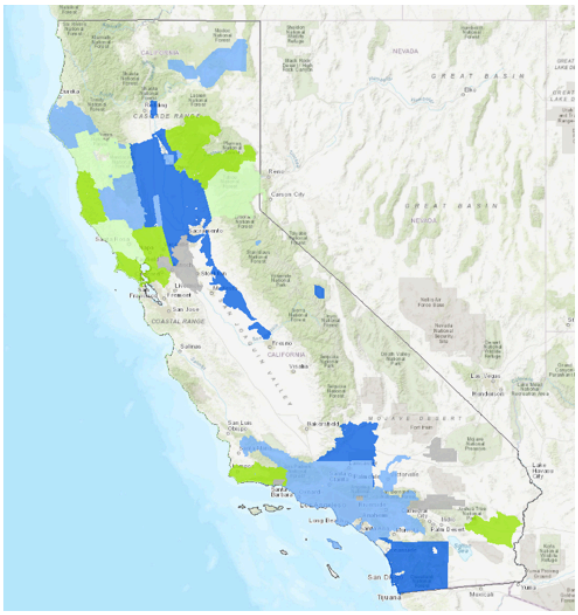
Survey Date



Survey Date
- 2019
- 2018
- 2017
- 2016
- 2013

Summary
- 2019 → 14,906,880 ac
- 2018 → 26,874,880 ac
- 2017 → 4,423,040 ac
- 2016 → 6,377,600 ac
- 2013 → 2,319,360 ac

Point Cloud Density



Point Cloud Density (point/m2)
- 0 - 5
- 5 - 10
- 10 - 15
- 15 - 30
- Unknown

LIDAR Data used for Technosylva Fuels 2021, with capture date and points density

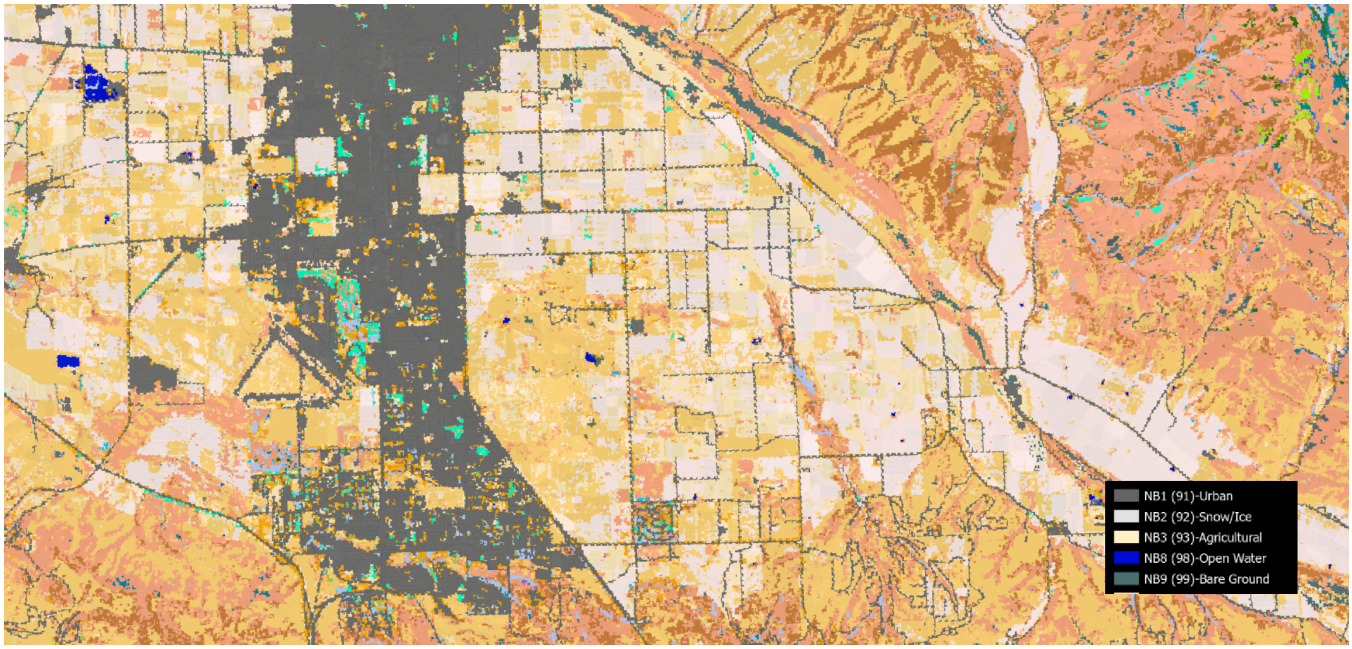
Surface and canopy fuels are updated throughout the year, to accommodate changes to the fuels, typically monthly during fire season. This ensures that all major disturbances, such as fires, urban growth, landslides, etc. are updated in the fuels data. A variety of methods, including burn severity analysis, are used to update the fuels. Up to date fuels data is critical to ensuring the fire behavior outputs from our modeling are accurate, as it is a key input into risk analysis.

Technosylva continually tests new fuels datasets that become available from other sources, such as LANDFIRE, federal risk assessment regional projects, and independent sources, such as the California Forest Observatory data. Unfortunately, the publicly available data does not perform at the level required when confronted with operational testing. In general, these publicly available data do not result in fire behavior outputs that facilitated accurate predictions. Ultimately with any fuels dataset, the quality and accuracy of the fuels is measured on whether it produces 'observed and expected fire behavior'. Fortunately, Technosylva is able to test this data, and other fuels data including their custom data, operationally on a daily basis with CAL FIRE and the IOUs against active wildfires to see how it performs.

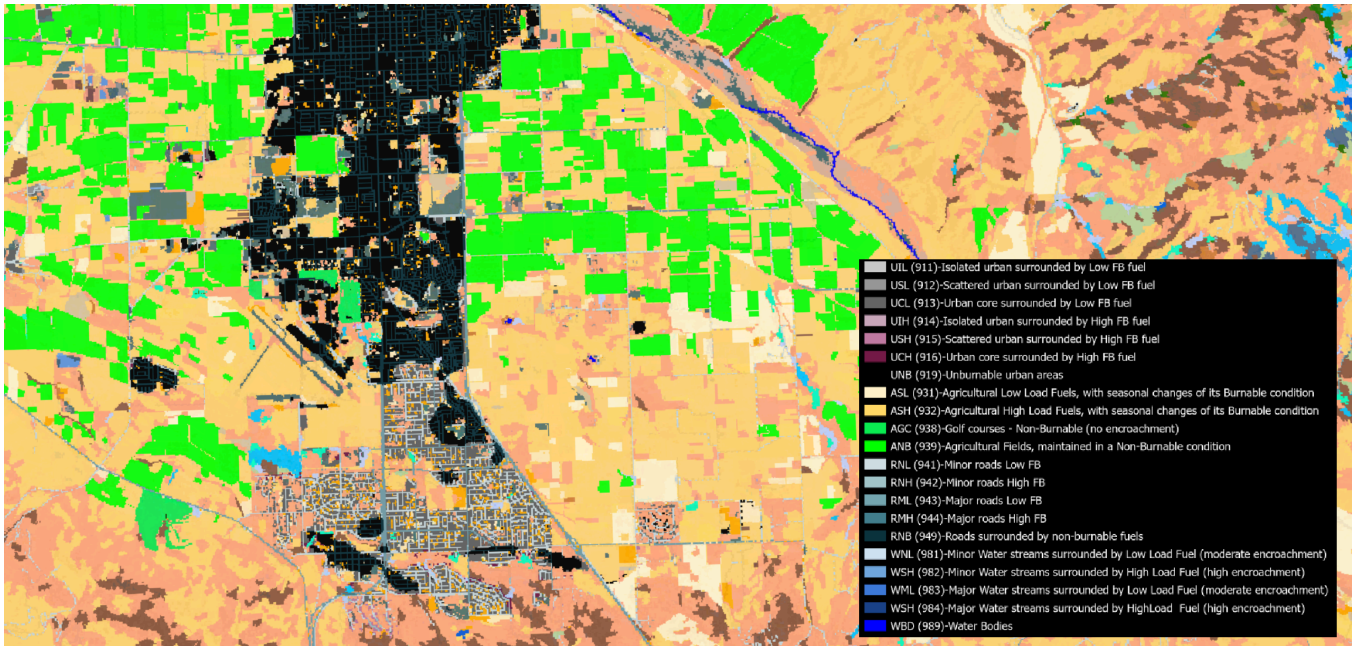
Updates to the fuels, and algorithms that use the fuels data for fire behavior modeling are on-going with us, as we continue to enhance the data and algorithms to match observed fire behavior across the state. These methods and algorithms are proprietary.

WUI and Non-Forest Fuels Land Use classes are based on a Technosylva proprietary method that characterizes WUI and other land uses classes that have been a typical limitation of the Scott and Burgan classification, as they are defined in general non burnable classes. In combination with the Surface Fuels, this provides a solid foundation for fire behavior and impact analysis.

The following two figures present an example of publicly available LANDFIRE data commonly used for fire modeling, and the custom Technosylva fuels used.



LandFire Fuels – Non Burnable Classes



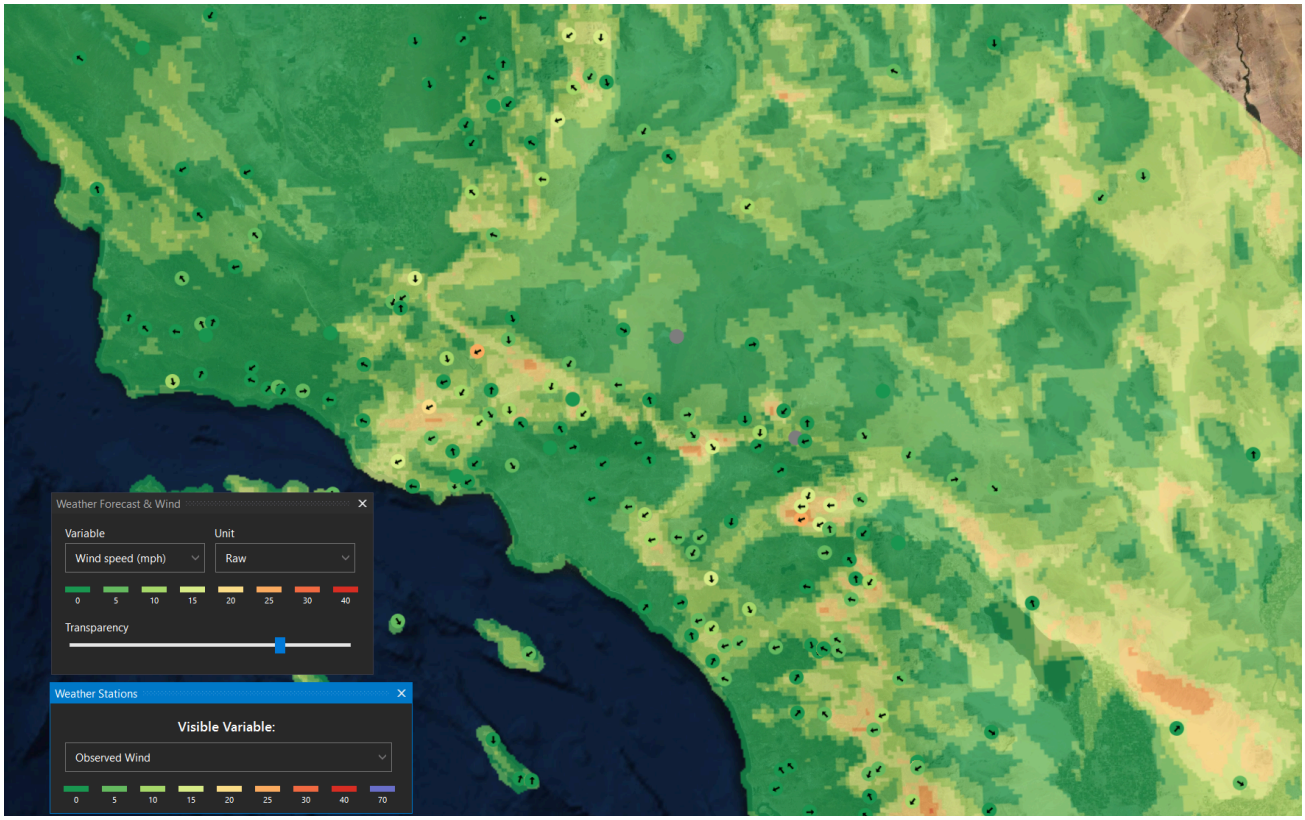
Technosylva Fuels Dec 2021 – WUI and Non-Forest Fuels Classes

2.5.3 Weather and Atmospheric Data

WRF data is developed using third party weather and predictive services experts available through commercial providers. Data is 2 km spatial resolution and hourly (temporal) for a multi-day period, up to five+ days. Multiple forecasts are generated daily.

Weather observation data can also be used along with, or independently, to support fire behavior analysis. This data is typically available through published weather stations on MesoWest, or through commercial providers, such as Synoptic. The methods of how this data can be integrated within the Technosylva software and processes is proprietary.

The following figure shows a typical 2km WRF model of wind speed overlaid with weather stations data (WFA software example).



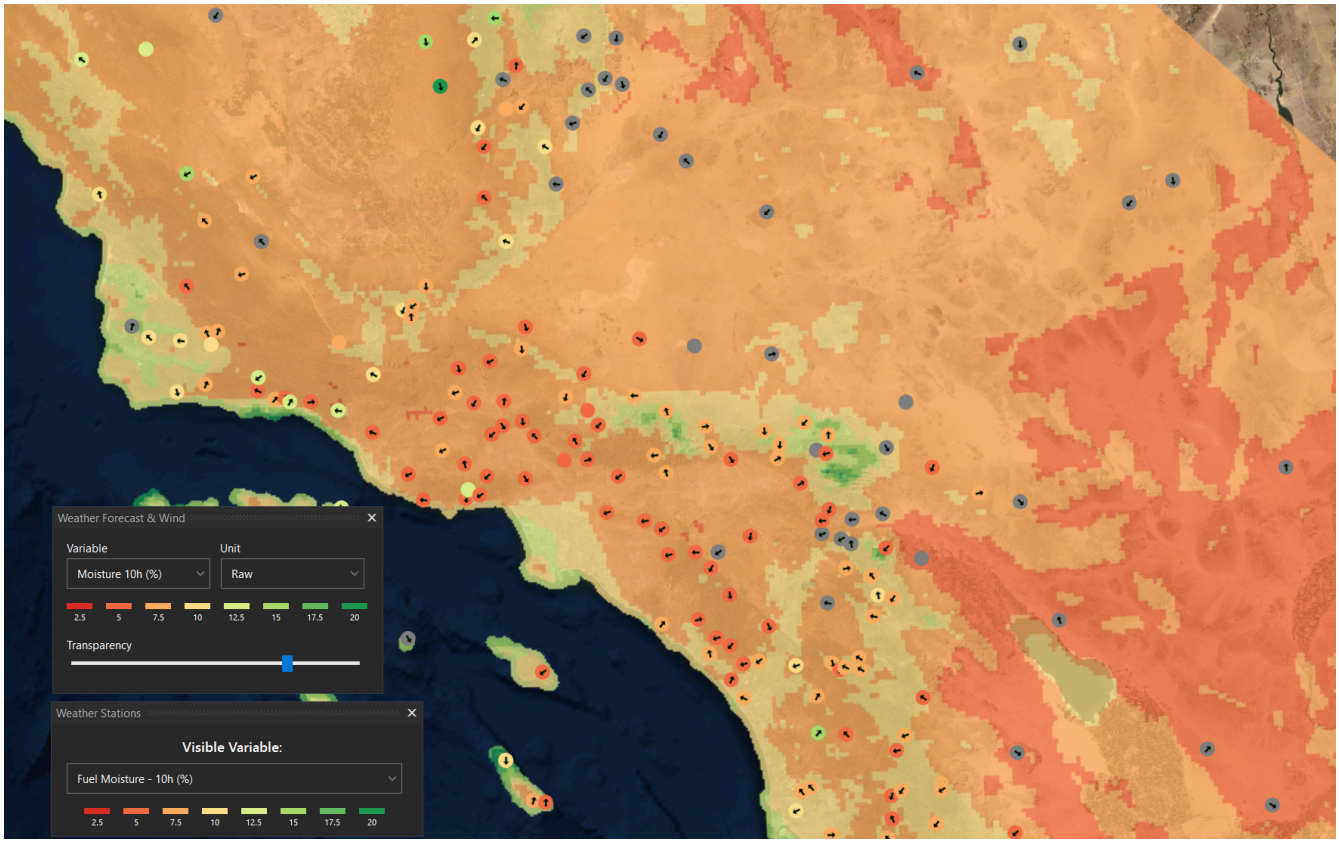
Predicted (WRF model) and Observed Wind (Weather Stations, Synoptic)

2.5.4 Fuel Moisture

Fuel moisture data is also a key input into fire behavior modeling. Fuel moisture can be characterized as either Dead or Live fuel moisture. Standard methods for measuring and quantifying fuel moistures are well documented in publications by the USFS Missoula Fire Lab and other research agencies.

However, to date the ability to accurately predict live and dead fuel moistures at high resolution has been limited. Only a few IOUs and commercial vendors are producing daily estimates that can be integrated into fire modeling. Technosylva produces both a dead and live fuel moisture data product that combines historical and current sample data with remotely sensing imagery in a machine learning model to estimate daily data products. These methods are proprietary although they are substantiated with several publications and on-going collaboration between the IOUs, Technosylva and fire weather and behavior research agencies. This fuel moisture data product is used by CAL FIRE and several IOUs across seven western US states.

The following figure shows the Technosylva Dead Fuel Moisture overlaid with weather stations data (WFA software example).



Predicted (WRF model) and Observed 10-hr Fuel Moisture (Weather Stations, Synoptic)

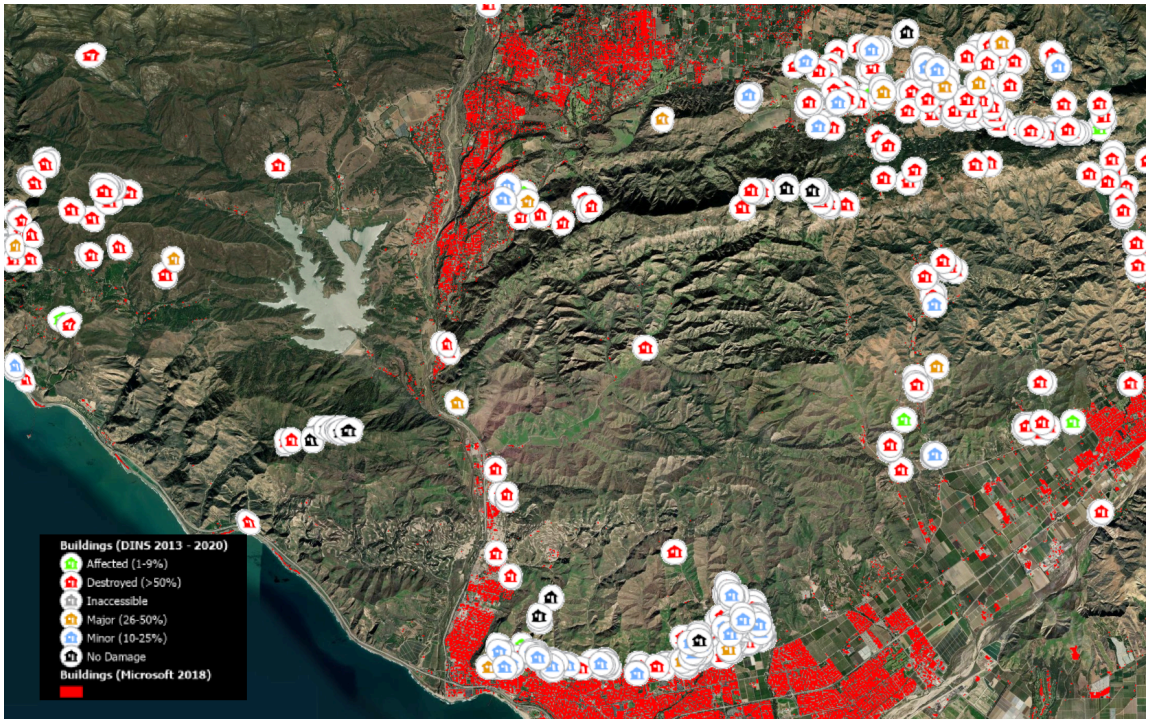
2.5.5 Values at Risk

Values-at-Risk data reflects the resources and assets that exist across that landscape that we are concerned about. Typically, 'resources' refers to natural items while 'assets' refers to man made items. Wildfire modeling is used to identify the "risk" associated with resources and assets, with risk representing the possibility of loss or harm occurring due to wildfire.

VAR data is typically characterized into public safety or financial impacts. Technosylva IOU customers use similar input datasets for VAR, such as population count (location), building footprints, and critical facilities. A variety of datasets exist to define the location and characteristics of these VAR, each with varying temporal and spatial accuracy. Census data is a common source for population data along with ORNL LandScan data (population count). LandScan has become a de facto standard for static wildfire risk assessments across the Nation in the past 10 years. It is available through the Dept. of Homeland Security HSIP program for certified vendors of government agencies, or the agencies themselves. It is typically updated every 2 years with a 90 meter spatial resolution of population count. Technosylva currently uses the latest 2021 LandScan data for calculating population impacts.

The Microsoft Buildings Footprint dataset is a publicly available free data source used as a starting point by many vendors and agencies. Technosylva has taken this data and updated it using local high resolution imagery data sources to enhance the data. The original Microsoft data is a good starting point, however it does have holes with missing data and some misrepresentation of buildings with natural features. This data was updated in 2020 by Microsoft. This provides the primary source for the buildings data used by Technosylva.

Population and buildings are the two primary datasets used as input into wildfire risk analysis, although most IOU customers add confidential data to derive more detailed consequence metrics. These are proprietary to the IOUs and cannot be shared by Technosylva.



Buildings (Microsoft 2020) and Damaged Inspections data (DINS) from CAL FIRE

2.5.6 Possible Ignition Sources

Wildfire ignition data varies greatly depending on the organization and purpose of the wildfire risk analysis. Traditionally, agency driven risk assessments will use historical fire location data to create Historical Fire Occurrence datasets, reflecting ignition density over a specific time period. This data is obtained from federal and state fire reporting systems.

IOUs are often concerned with using their assets as possible ignition sources, in equipment failure scenarios or extreme weather events, where a spark from an electric utility asset may cause a fire ignition. Risk can be assessed related to the probability of ignition for electric utility assets, or more commonly with the potential spread and impacts of a wildfire ignited by an asset. Technosylva provides integration of both ignition and spread analysis to derive risk metrics using VAR data. This focuses on assigning possible consequence back to the electric utility assets to identify those assets more prone to having significant impacts should a wildfire ignite. Different proprietary methods exist to integrate and model probability of ignition data for electric utility assets with consequence modeling. Referred to as "asset wildfire risk" this information can be used to support operational decisions, such as PSPS, resource allocation and placement, and stakeholder communication, in addition to short and long term mitigation planning efforts, reflected in IOU WMPs. The weather and fuels inputs will vary depending on the purpose of these risk analyses.

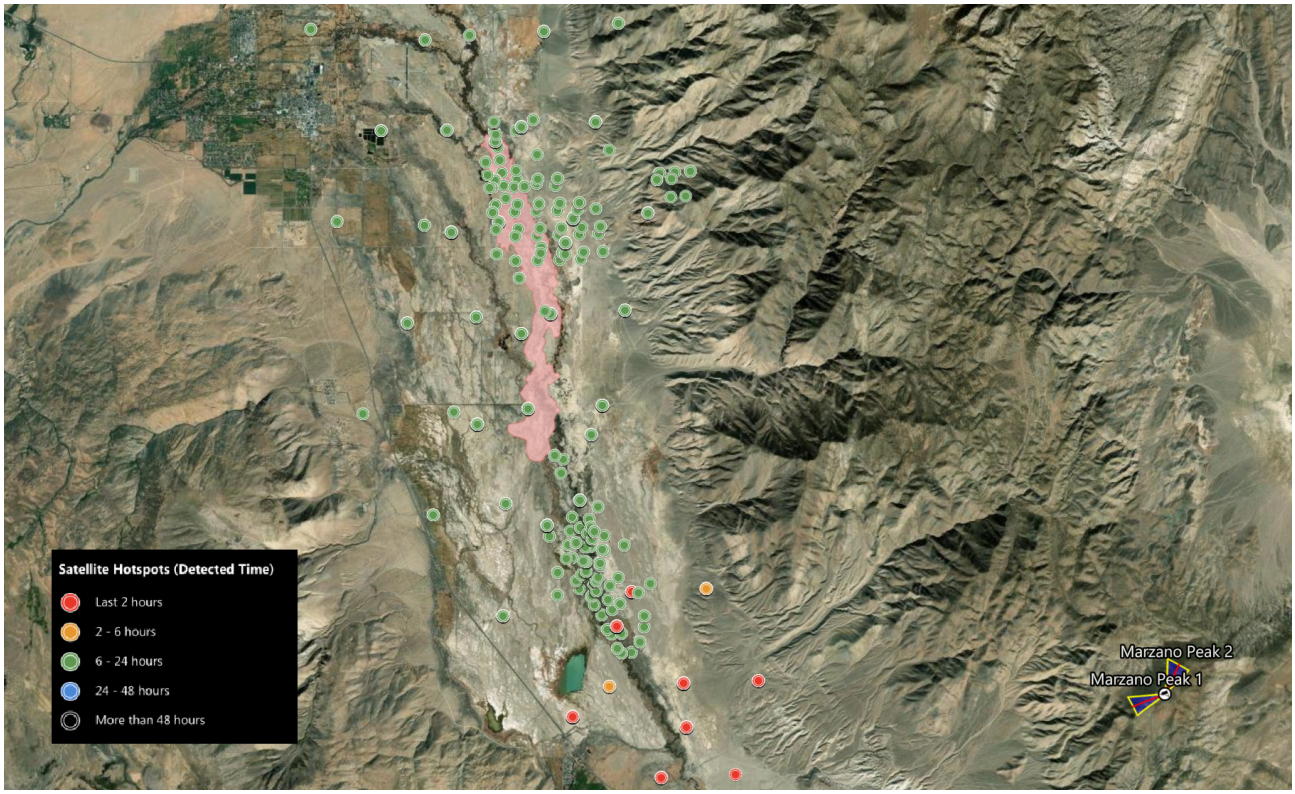
IOUs and agencies are also concerned with non-asset wildfire ignitions and the risk associated with these ignitions due to possible spread and potential impacts. Technosylva has developed proprietary methods for deriving territory wide risk that integrates millions of possible ignition points with wildfire spread modeling to derive standard risk outputs, similar to "asset risk" metrics. These output metrics vary greatly depending on the customer and purpose for using the risk data. The methods and outputs are proprietary.

2.5.7 Fire Activity

The fire activity data used to support operational situational awareness is captured from different sources:

- VIIRS and MODIS Satellite hotspots, from public sources (FIRMS)
- GOES 16 and 17 data based on agreement with providers to the IOUs
- Lighting data also from IOU's providers
- Fire Perimeters from Open Wildfire data from NIFC
- Fire activity from National Guard data from Fire Guard program
- Alert Wildfire Cameras integration

The following figure shows an example of Fire Activity data integrated into the Technosylva WFA system. All data is temporal and displayed color coded based on a selected time from the software timeline.



Hotspots, Fire Perimeters and Alert Wildfire Cameras

2.5.8 Summary of Input Data Sources

The following table presents a summary of the data sources used in the wildfire risk analysis. Some data varies slightly depending on mitigation versus operational use.

DATASET	SPATIAL RESOLUTION (meters)	TEMPORAL RESOLUTION	DATA VINTAGE	SOURCE
Landscape Characteristics				
TERRAIN	10	YEARLY		USGS
SURFACE FUELS	30/10	PRE FIRE SEASON, MONTHLY UPDATE IN FIRE SEASON, END OF FIRE SEASON	2020	TECHNOSYLVA
WUI AND NON FOREST FUELS LAND USE	30/10	TWICE A YEAR	2020	TECHNOSYLVA
CANOPY FUELS (CBD,CH,CC,CBH)	30/10	PRE FIRE SEASON, MONTHLY UPDATE IN FIRE SEASON,	2020	TECHNOSYLVA

DATASET	SPATIAL RESOLUTION (meters)	TEMPORAL RESOLUTION	DATA VINTAGE	SOURCE
		END OF FIRE SEASON		
ROADS NETWORK	30	YEARLY		USGS
HYDROGRAPHY	30	YEARLY		USGS
CROPLANDS	30	YEARLY	1997	USDA
Weather and Atmospheric Data				
WIND SPEED	2000	HOURLY / 124 HOUR FORECAST	1990	ADS/DTN
WIND DIRECTION	2000	HOURLY / 124 HOUR FORECAST	1990	ADS/DTN
WIND GUST	2000	HOURLY / 124 HOUR FORECAST	1990	ADS/DTN
AIR TEMPERATURE	2000	HOURLY / 124 HOUR FORECAST	1990	ADS/DTN
SURFACE PRESSURE	2000	HOURLY / 124 HOUR FORECAST	1990	ADS/DTN
RELATIVE HUMIDITY	2000	HOURLY / 124 HOUR FORECAST	1990	TECHNOSYLVA
PRECIPITATION	2000	HOURLY / 124 HOUR FORECAST	1990	ADS/DTN
RADIATION	2000	HOURLY / 124 HOUR FORECAST	1990	ADS/DTN
WATER VAPOR MIXING RATIO 2m	2000	HOURLY / 124 HOUR FORECAST	1990	ADS/DTN
SNOW ACCUMULATED - OBS	1000	DAILY	2008	NOAA
PRECIPITATION ACCUMULATED - OBS	4000	DAILY	2008	NOAA
BURN SCARS	10	5 DAYS	2000	NASA/ESA
WEATHER OBSERVATIONS DATA	Points	10 MIN	1990	SYNOPTIC
Fuel Moisture				
HERBACEOUS LIVE FUEL MOISTURE	250	DAILY / 5-DAY FORECAST	2000	TECHNOSYLVA

DATASET	SPATIAL RESOLUTION (meters)	TEMPORAL RESOLUTION	DATA VINTAGE	SOURCE
WOODY LIVE FUEL MOISTURE	250	DAILY / 5-DAY FORECAST	2000	TECHNOSYLVA / ADS
1 hr DEAD FM	2000	HOURLY / 124 HOUR FORECAST	1990	TECHNOSYLVA / ADS
10 hr DEAD FM	2000	HOURLY / 124 HOUR FORECAST	1990	TECHNOSYLVA / ADS
100 hr DEAD FM	2000	HOURLY / 124 HOUR FORECAST	1990	TECHNOSYLVA / ADS

DATASET	SPATIAL RESOLUTION (meters)	TEMPORAL RESOLUTION	DATA VINTAGE	SOURCE
Values at Risk				
BUILDINGS	Polygon footprints	YEARLY	2020-21	MICROSOFT/TECHNOSYLVA
DINS	Points	YEARLY	2014-21	CAL FIRE
POPULATION	90	YEARLY	2019	LANDSCAN,ORNL
ROADS	Vector lines	YEARLY	2021	CALTRANS
SOCIAL VULNERABILITY	Plexels	YEARLY	2021	ESRI GEOENRICHMENT SERVICE
FIRE STATIONS	Points	YEARLY	2021	ESRI, USGS
BUILDING LOSS FACTOR	Building footprints	YEARLY	2022	TECHNOSYLVA
CRITICAL FACILITIES	Points	YEARLY	2021	FRAP – CAL FIRE
Potential Ignitions locations				
IOU DISTRIBUTION & TRANSMISSION LINES	Linear segments	Updated quarterly	2022	IOUs
IOU POLES & EQUIPMENT	Points	Updated quarterly	2022	IOUs
Fire Activity				
HOTSPOTS MODIS	1000	TWICE A DAY	2000	NASA
HOTSPOTS VIIRS	375	TWICE A DAY	2014	NASA
HOTSPOTS GOES 16/17	3000	10 MIN	2019	NASA
FIREGUARD	Polygons	15 MIN	2020	NATIONAL GUARD
FIRE SEASON PERIMETERS	Polygons	DAILY	2021	NIFS
HISTORIC FIRE PERIMETERS	Polygons	YEARLY	1900	CAL FIRE
ALERT WILDFIRE CAMERAS	Live Feeds	1 min	Real Time	AWF Consortium
LIGHTING STRIKES	1000	1 MIN	Real Time	EARTH NETWORKS / OTHERS

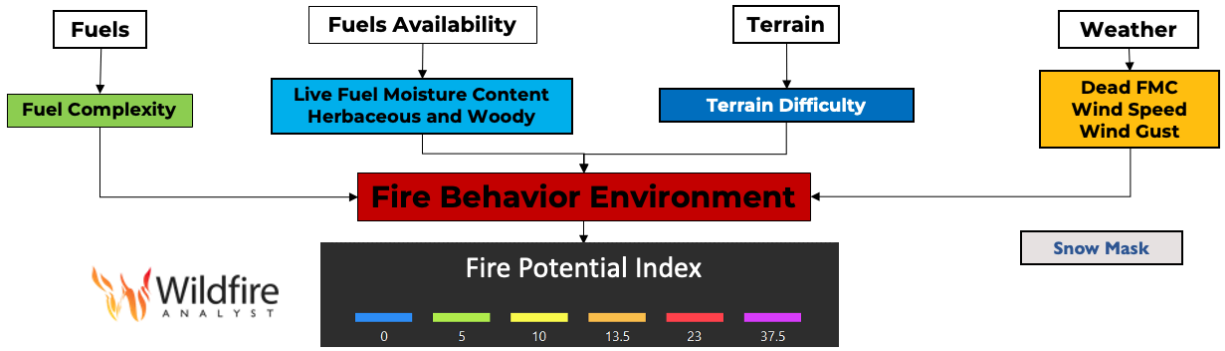
2.5.9 Fire Potential Index (FPI)

FPI quantifies the fire activity potential over the territory aiming to assist operational decision-making to reduce fire threats and risks. FPI allows agencies to easily analyze the short-term fire danger that could exist across the service territory and better communicate the wildfire potential on any given day and time, promoting safe and reliable operations.

Hexel-based (h3) FPI is a forecast product, which is produced on a daily basis, calculated every 3 hours at different h3 resolutions from level 4 to 8 (182 ac and 1km resolution approximately). One of the main advantages of this index is that it was calibrated with real fires (2012 to 2022) using VIIRS hotspots as a proxy of fire activity.

FPI estimates the expected daily number of VIIRS hotspots in a h3-hexel level 6.

FPI comprises several variables including fuels, terrain and weather:



Technosylva has integrated FPI into its operational decision-making WFA enterprise to facilitate its use operationally.

FPI promotes proactive and reactive operational measures through standard operating procedures aiming to reduce the likelihood facilities and assets will be the source of ignition for a fire when FPI is high or extreme.

FPI can be used to inform operation decisions (restrictions on the type of work being performed), as an input to PSPS decision-making and to make risk informed mitigation decisions.

Fire Potential Index products developed for electrical utilities usually include weather data: wind speed, wind gusts, and both dead and live fuel moisture content. Technosylva's FPI also includes the Fuel Complexity (fuel structure, load and age) and Terrain Difficulty. These are key inputs of the classical fire triangle that explain fire behavior.

Technosylva's Fire Potential Index (FPI) has been empirically trained and validated with real fire activity. The product is hexel-based (h3) allowing a better temporal and spatial analysis of outcomes, including the analysis by district or any administrative division.

Appendix C
Additional Maps

Appendix C: Additional Maps

In this appendix, the electrical corporation must provide the additional maps required by the Guidelines. As stated in the General Directions, if any additional maps needed for clarity (e.g., the scale is insufficiently large to show useful detail), the electrical corporation must either provide those additional maps in this appendix or host applicable geospatial layers on a publicly accessible web viewer. If the electrical corporation chooses the latter option, it must refer to the specific web address in appropriate places throughout its WMP. Additionally, the electrical corporation must host these layers until the submission of its 2026-2028 WMP or until otherwise directed by Energy Safety. The electrical corporation may not modify these publicly available layers without cause or without notifying Energy Safety.

Liberty does not have additional maps to provide with this 2027 WMP.

Appendix D
Critical Issues and Areas for Continued Improvement

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1. Liberty Responses to Energy Safety Critical Issues from 2026-2028 Base WMP

1.1 Critical Issue RN-LU-26-01: Liberty's risk modeling framework and calculations overemphasized Public Safety Power Shutoff (PSPS) and outage risk

Critical Issue Title: Liberty's risk modeling framework and calculations overemphasized Public Safety Power Shutoff (PSPS) and outage risk.

Required Remedies: Liberty must revise its 2026-2028 Base WMP to include:

- A plan to adjust its wildfire and outage risk scoring methodology to account for current shortcomings in calculating and scaling outage risk for implementation by Liberty's next WMP Update. This plan must address all of the following:
    - Correction and recalibration of the third-party risk model;
    - Evaluation of current scaling and weighting of various consequence metrics for both wildfire and outage program risks, including discussion of the validity of current methods and changes made based on that evaluation;
    - Migration to summation of wildfire and outage risk scores, as opposed to averaging, based on more accurate and proper scaling of the two risk scores;
    - Coordination with other electrical corporations to determine methodology for scaling and weighting of risk metrics; AND
    - Implementation timeline and milestones of a new methodology version.
- For the interim, a recalculation of all risk score calculations and rankings using only wildfire risk throughout its 2026-2028 Base WMP and make mitigation activity adjustments accordingly.

Remedy Response:

For Liberty's 2027 WMP, Liberty has built a fundamentally new model, rather than adjusting the methodology of the previous model. To assist with this substantial modeling effort, Liberty retained Filsinger Energy Partners ("FEP"), an industry leader in electric utility wildfire risk modeling. Overall utility risk is now the sum of wildfire risk and outage program risk, and both are denominated in dollars. The use of scaling and weighting is no longer relevant for the consequence components of Liberty's risk model because consequences are denominated in dollars. See Section 5 for documentation on the benchmarking process Liberty relies on to assign dollar values to consequences.

Correction and calibration of the third-party model: Liberty no longer uses the previous Direxyon Risk Assessment Tool (DRAT). Liberty has now rebuilt the ignition likelihood portion of the risk model by using a machine-learning predictive model fitted on actual Liberty outage events. See Section 5 for documentation of the probability of outage and ignition likelihood modeling steps.

Liberty has calibrated the outputs of its risk model, as opposed to taking the raw outputs as default. Section 5 provides discussion and analysis of actual fires within or near Liberty's service territory that are used to calibrate consequence estimates provided by Technosylva's wildfire simulation tools. Specifically, the consequence scaling factor is calculated as a ratio of such actual monetized losses against the losses estimated by Technosylva's 8-hour fire spread simulations.

Evaluation of current scaling and weighting: In the prior risk model, wildfire consequence and outage consequence were evaluated on a similar scale ranging from zero to one. Weighting the two risk components evenly at 50%, along with the higher frequency of outages, led to unreasonable model outputs where outage program risk was larger than wildfire risk. In Liberty's new risk model, consequences are expressed in dollars, thus the monetized consequence parameters act as the new weights in the risk model. Liberty derives its monetized consequence parameter for the reliability element of outage program risk by using Berkeley Lab's ICE calculator, which sufficiently balances the consequences of outages against the consequences of wildfire events.

Migration to summation: Liberty calculates overall utility risk as the sum of wildfire risk and outage program risk. Averaging is no longer used in the calculation of overall utility risk.

Benchmarking with peer utilities: Liberty benchmarked against peer California utilities at two key stages of the risk modeling process (see Sections 5 and 6):

1. Monetized consequence parameters
2. Mitigation effectiveness

The monetized consequence parameters are most pertinent to this critical issue, as they effectively act as weights in the evaluation and prioritization of different consequence attributes. Mitigation effectiveness is discussed in more detail in below critical issues.

Implementation timeline and milestones: The new risk model has been implemented for the 2027 WMP. Liberty identifies areas that it will continue to refine in its RAI plan, including circuit-segment analysis, quantification of PEDS-related outage program risk, and probabilistic treatment of extreme fire weather.

Recalculation using only wildfire risk: Liberty provides new circuit-level risk outputs in Section 5, differentiated by both wildfire and outage program risk.

Results: Liberty's highest ranked circuit now accounts for approximately 18 percent of overall utility risk, compared to the 87 percent Energy Safety identified for MEY3400. Outage program risk now represents approximately 13 percent of Liberty's total overall utility risk, and wildfire risk is the larger component by a factor of more than six. Liberty's risk remains relatively concentrated in the South Lake Tahoe area, but it is concentrated to a much lesser degree solely on one circuit (87 percent vs 18 percent). The highest ranked circuit is intuitively located where the Mountain View Fire ignited in 2020, and the next highest ranked circuits are located in or near South Lake Tahoe, which is where Liberty's only Tier 3 HFTD designation exists.

Liberty provides its updated calculations from its new risk model in the following tables and figures in its 2027 Base WMP:

- Table 5-5: Liberty Top-Risk Circuits;
- Table 6-1: Circuit Prioritization List Based on Overall Utility Risk;
- LU Table 6-1: Initiative Activities for Risk Drivers of Prioritized Circuits;
- Figure 6-2: Projected Overall Service Territory Wildfire Risk;
- Table 6-3: Risk Impact Activities;
- Table 6-4: Summary of Risk Reduction for Top Circuits;
- Table 8-1: Liberty Grid Design, Operation and Maintenance Targets by Year, 2026-2028;
- Table 9-1: Liberty Vegetation Management Targets by Year (Non-inspection Targets);
- Table 9-2: Liberty Vegetation Management Inspections and Pole Clearing Targets by Year; and
- Table 10-1: Situational Awareness WMP Initiative Targets

1.2 Critical Issue RN-LU-26-02: Liberty's description of its risk model validation reporting and internal review processes were vague and lacked the detail necessary for progress tracking

Critical Issue Title: Liberty's description of its risk model validation reporting and internal review processes were vague and lacked the detail necessary for progress tracking.

Required Remedies: Liberty must revise its 2026-2028 Base WMP to include:

- Documentation from Liberty's internal Risk Focus Group, including:
    - Dates the group met;
    - Topics covered during those meetings;
    - Results of those meetings, including any changes made to risk model methodology; AND
    - Any documentation related to risk models, including findings and reports, that the Risk Focus Group generated.
- A risk assessment improvement plan, with milestones and timelines, to evaluate and validate its current risk model methodologies and outputs for Liberty to implement by the next WMP Update. This plan must include:
    - Evaluation of the risk modeling methodologies implemented by Liberty's third-party vendors;
    - Evaluation of the accuracy of risk model outputs; AND
    - Implementation of an ongoing risk assessment improvement plan to continue to evaluate and validate risk models.

Remedy Response:

1. Documentation from Liberty's Internal Risk Focus Group

To address this critical issue, Liberty formalized its Risk Focus Group ("RFG") through developing an official group charter and meeting documentation procedures (chartered on May 7, 2026). Liberty's RFG is chaired by its President and involves nine voting members. A detailed summary of RFG meetings, topics, and voting actions are provided in Table D- 1 below:

Table D- 1: Risk Focus Group 2026 Meeting Summary

Date	Topics covered	Results, including risk model methodology changes
17-Mar	Kickoff. Opening comments on the Draft Decision, Charter development, FEP engagement, Firescape proposal	Charter drafting assigned, target of May 29. Site visit set with FEP. No motions, pre-Charter
2-Apr	Final decision denying the 2026-2028 WMP, workplan, monthly Energy Safety cadence	Workplan adopted as the tracking basis. FEP asked to bucket improvements into immediate, pre-filing, and long term. No motions, pre-Charter
16-Apr	Data requests, benchmarking metrics, EFD pilot, tail adjustments	Tail risk adjustment identified as a key methodology decision. No motions, pre-Charter
23-Apr	Data requests, physics and machine learning models, Technosylva clarifications, meeting cadence	FEP confirmed both a physics model and a Liberty-specific machine learning model with documentation for each. Cadence moved to weekly. No motions, pre-Charter
30-Apr	Data requests, fragility curves, tree mortality, LiDAR, EFD, risk spend efficiency	Data gaps assigned to owners. No motions, pre-Charter
7-May	Charter, high impedance fault detection pilot, FEP model development	Charter adopted. FEP to bring model variables forward weekly for approval
14-May	Action items, data requests, model progress	Egress, climate change, and tree mortality discussed
21-May	Consequence, reliability, and financial variables, risk-informed decision making framework	California adjusted value of statistical life adopted for safety monetization. ICE 2.2, $1M per structure, and SCE acres burned recommended, held for vote after quorum was lost
28-May	Model granularity and data quality, May 21 variables, PSPS likelihood	Circuit level granularity retained. ICE 2.2, $1M per structure, and $2,336 per acre burned adopted. Simplified PSPS likelihood adopted, historical events plus a minimum threshold for circuits with no PSPS history, with a climate change adjustment
4-Jun	PSPS consequence, PEDS outage risk, Gridscope business case	Adopted SCE ratios for serious injuries per customer de-energized, a 17-hour PSPS duration, and $550 per event per customer. PEDS risk deferred to the improvement plan, with a question to Energy Safety on excluding it for 2027. Gridscope pilot approved
9-Jun	Risk scaling, Mountain View Fire, expected against tail risk	Scaling of Technosylva outputs to observed fire costs identified as a needed methodology change, vote scheduled
11-Jun	Consequence scaling vote, Technosylva QA/QC	Consequence scaling factor of 1.27 approved. Technosylva, CalFire, and USFS outputs compared, field validation recommended where the three diverge
16-Jun	Mitigation effectiveness analysis and assumptions	Benchmarking adopted as the effectiveness approach. Covered conductor confirmed as 3-ply, with the same cause code effectiveness for existing and proposed assets. ICE 2.2 produced a combined $2.63 per CMI for review
18-Jun	CMI approval, financial unit costs, initial mitigation effectiveness	$2.63 per CMI approved. Financial unit costs approved. Scaling factor revised from 1.27 to 1.26. PG&E identified as the closest benchmarking match

Date	Topics covered	Results, including risk model methodology changes
23-Jun	Probability of failure, machine learning and statistical	Model structure reviewed, probability of outage and probability of ignition, extreme fire weather derived from fire history, weather, and Liberty PSPS events. Asset Health Index reviewed. Deeper technical review scheduled
26-Jun	Mitigation effectiveness framework	PG&E confirmed as the benchmark, with cause code alignment to Energy Safety and PG&E drivers and sub-drivers. Overhead and covered conductor to yield a circuit specific score, PSPS and EPSS to be programmatic
30-Jun	Initial risk results, benefit-cost ratio framework	BCR framework reviewed
2-Jul	WMP outline, hardened circuit and SAIDI analysis	Section 5, 6, 8, Appendix B, and Appendix D drafting assigned, drafts due July 31. Distribution set as the impact focus, with a separate score for transmission
7-Jul	Traditional hardening against covered conductor, remaining model variables, BCR results	Real discount rate of 4.51% approved. Inflation set at 2.93% and WACC at 7.44%. Maturity adjustment strategy approved, using IWRMC maturity model scores, giving PSPS 75% and SRP 56%
9-Jul	Traditional hardening analysis, risk and BCR results, chapter outline	Underground effectiveness strategy approved, PG&E values excluding secondary with a maturity adjustment. Asset life rounding approved, 60 years for overhead and underground. Dashboard access issued to Liberty for scenario testing
14-Jul	Overhead effectiveness value, SRP circuit confirmation	Overhead hardening effectiveness of 23% approved, derived empirically from Liberty pole replacement and outage data using a treatment and control comparison, applied to asset drivers only
16-Jul	Risk and BCR review, risk model improvement plan	Residential $0.08 and non-residential $23.47 per CMI approved, replacing the blended $2.63 value. One PSPS event per feeder per year confirmed as an assumption, with circuit specific likelihood routed to the improvement plan. Present value of benefits confirmed as excluded, to be disclosed in the WMP. Improvement plan items sorted into short- and long-term commitments
21-Jul	Risk modeling overview, fire partner meeting preparation	Overhead hardening unit costs reviewed
23-Jul	Energy Safety presentation status, fire partner collaboration	Presentation structured around the five critical issues and where each is addressed in the 2027 WMP
30-Jul	Overhead infrared finding prioritization, 2027 initiatives, fire partner meeting review	C2 Group thermal priority levels approved. Fire partner feedback on wind thresholds and tree mortality taken up, with interest in aligning thresholds to PEDS and PSPS device settings
6-Aug	Capital plan, risk ranking and circuit prioritization	Pole replacement target of 300 per year approved, 5 in favor and 1 opposed. Covered conductor target of 8 miles and four projects approved unanimously, MEY3400, MEY3300, CAL2501, and TPZ1202. Prioritization screens approved unanimously, circuits above 5% of total overall utility risk and above $2M per mile of overhead risk

2. Risk Assessment Improvement Plan

Liberty is committed to improving its risk model methodologies and outputs. Liberty's updated Risk Assessment Improvement Plan is found in Section 5. Liberty has identified and committed to many areas of improvement surrounding risk modeling capabilities. Key opportunities include moving to the circuit-segment unit of analysis, quantifying PEDS outage program risk, probabilistically modeling extreme fire weather, incorporating circuit-specific capital cost estimates, and improving the benefit-cost methodology to incorporate a time-series structure to avoided risk impacts and incurred costs.

1.3 Critical Issue RN-LU-26-03: Liberty's risk reduction assessment lacked maturity and did not accurately assess mitigation activities' effectiveness

Critical Issue Title: Liberty's risk reduction assessment lacked maturity and did not accurately assess mitigation activities' effectiveness.

Required Remedies: In its revised 2026-2028 Base WMP, Liberty must:

- Recalculate risk reduction values using only wildfire risk and excluding outage risk.
    - Identify risk reduction values that are still statistically non-significant and do not report negative risk reduction values unless the mitigation activity increases utility risk.
- Provide its evaluation of the number of risk model scenarios and validation necessary for more accurate representations of mitigation activity effectiveness values. This evaluation must include determining the number needed, calculated using only wildfire risk and excluding outage risk, in which the outputs begin converging towards a significant average, and the cost-benefit for running additional scenarios.
- Provide new versions of the following figure and tables with the updated values for risk reduction or mitigation effectiveness based on running additional scenarios:
    - Figure 6-2: Projected Overall Service Territory Risk;
    - Table 6-4: Risk Impact Activities;
    - Table 8-1: Liberty Grid Design, Operation and Maintenance Targets by Year, 2026-2028;
    - Table 9-1: Liberty Vegetation Management Targets by Year (Non-inspection Targets);
    - Table 9-2: Liberty Vegetation Management Inspections and Pole Clearing Targets by Year; AND
    - Table 10-1: Situational Awareness WMP Initiative Targets.

Remedy Response:

Risk reduction is now calculated in dollars, mitigation effectiveness parameters are documented and benchmarked, and the model does not produce the negative or statistically non-significant values that Energy Safety identified.

Recalculation of risk reduction: Liberty calculates risk reduction as the product of mitigation effectiveness and the risk that the mitigation is applied to. For grid hardening initiatives, these

are primarily applied to the “no-build” baseline, in which PSPS and PEDS have already brought down risk.

Modeled wildfire risk reduction cannot take a negative value. Liberty reports wildfire risk reduction and overall utility risk reduction separately, where overall utility risk is the sum of wildfire and outage program risk. Liberty’s risk model does reflect that some mitigations can reduce wildfire risk while increasing outage program risk. For example, PSPS reduces wildfire risk, but its overall effectiveness is diminished due to the accompanying increase in outage program risk. Liberty reports this in WMP Table 6-4.

Liberty provides a detailed set of equations in Section 6 to document how Liberty estimates the anticipated risk reduction from overhead hardening with covered conductor.

Mitigation effectiveness values: Liberty presents its mitigation effectiveness parameters in Section 6. Liberty benchmarked effectiveness values across PG&E, SCE, SDG&E, and Portland General Electric. Overhead hardening with covered conductor varies by risk sub-driver, so a circuit's own outage cause mix determines the effectiveness applied to it. Overhead hardening without covered conductor is derived empirically from Liberty’s own outage records rather than from benchmarking. As additional data on risk events and deployments is collected, as identified in the RAI plan, Liberty will prioritize empirically evaluating the effectiveness of mitigations.

Risk model scenarios and related issues: Liberty's new risk model does not generate outputs by running repeated simulations, so the number of scenarios is no longer a parameter of the model. The probability of outage model produces an expected annual outage probability for each circuit from a fitted predictive model rather than a distribution of sampled outcomes. Wildfire consequence relies on Technosylva’s 100th percentile. Neither component introduces run-to-run variation, which is what produced the negative and statistically non-significant risk reduction values in Liberty’s prior model.

Liberty addresses parameter uncertainty through sensitivity analysis, as described in Section 6. Liberty’s risk model dashboard allows consequence values, mitigation effectiveness parameters, and unit costs to be varied directly, and the resulting effects on risk, risk reduction, and benefit-cost ratios are updated immediately. Looking ahead, Liberty will assess the potential for re-introducing Monte Carlo analysis to describe this parameter uncertainty.

Liberty defers quantification of model uncertainty in the current version of the risk model, which would involve alternative specifications of the probability of outage model or the use of wildfire spread models beyond Technosylva’s offerings.

Liberty provides updated values for risk reduction or mitigation effectiveness based on its new risk model in the following figure and tables:

- Table 5-5: Liberty Top-Risk Circuits;
- Table 6-1: Circuit Prioritization List Based on Overall Utility Risk;
- LU Table 6-1: Initiative Activities for Risk Drivers of Prioritized Circuits;
- Figure 6-2: Projected Overall Service Territory Wildfire Risk;
- Table 6-3: Risk Impact Activities;
- Table 6-4: Summary of Risk Reduction for Top Circuits;
- Table 8-1: Liberty Grid Design, Operation and Maintenance Targets by Year, 2026-2028;
- Table 9-1: Liberty Vegetation Management Targets by Year (Non-inspection Targets);
- Table 9-2: Liberty Vegetation Management Inspections and Pole Clearing Targets by Year; and
- Table 10-1: Situational Awareness WMP Initiative Targets

1.4 Critical Issue RN-LU-26-04: Liberty's response to area for continued improvement LU-23B-06 "Effectiveness of Sensitive Relay Profile (SRP) and Traditional Hardening," was insufficient

Critical Issue Title: Liberty's response to area for continued improvement LU-23B-06 "Effectiveness of Sensitive Relay Profile (SRP) and Traditional Hardening," was insufficient.

Required Remedies: In its revised 2026-2028 Base WMP, Liberty must:

- Provide the ignition reduction effectiveness for the projects and activities it outlines in Table 1-2. Liberty must provide, including but not limited to, ignition reduction effectiveness for covered conductor without SRP, undergrounding without SRP, undergrounding, covered conductor, normal replacement baseline, and normal replacement without SRP.
- Demonstrate how it considered various ignition risk drivers, deployment time, and resources, and provide performance comparison in forested versus non-forested areas, and risk model output of riskiest areas, as per the requirements of area for continued improvement LU-23B-06.
- Discuss how it uses its analysis to determine and set covered conductor targets. This includes explaining the methodology used to prioritize covered conductor deployment at the circuit-segment level.

Remedy Response:

Ignition Reduction Effectiveness: In its response to area for continued improvement LU-23B-06, Liberty calculated the ignition reduction effectiveness for two projects in Appendix D: Table 1-2, the Tahoe Vista Rule 20 project and the Stateline Resiliency project. After redeveloping its risk model, Liberty is providing an updated table that includes the ignition reduction effectiveness of various scenarios for the Stateline Resiliency project. These scenarios include probability of fire calculations of no replacement with and without SRP as well as normal replacement (bare wire), covered conductor, and underground conductor with and without SRP.

Given Liberty's risk model has been overhauled, it is worth clarifying how the risk model is used to calculate the following values. First, Liberty focuses purely on the wildfire risk component of the unmitigated baseline, which is the approximately $700 million value noted in Section 6. It is important to note that this is not the baseline from which Section 6 reports benefit-cost ratios. Liberty calculates benefit-cost ratios from the no-build baseline, which already factors in risk reductions present from PEDS/SRP/PSPS.

Second, Liberty's risk model is specified at the circuit level, so Liberty filters the risk model outputs to two feeders ($9.7 million unmitigated baseline wildfire risk). Third, Liberty applies the mitigation effectiveness parameters cited in Section 6 (0.56 for SRP, 0.63 sub-driver weighted average for covered conductor, 0.95 for undergrounding, and 0.23 for overhead hardening with pole replacement for asset-related outages).

When SRP is layered in combination with a mitigation, Liberty calculates the remaining risk in the scenario sequentially, first by applying 0.56 from SRP and then by applying the mitigation effectiveness of the accompanying mitigation to the intermediate risk leftover from SRP.

The scenario of not replacing the conductor without SRP enabled was used as the baseline against which all other scenarios were compared. See Table D- 2 below for the ignition reduction effectiveness results.

Table D- 2: Effectiveness of Activities for the Stateline Resiliency Project

Scenario	**Wildfire Risk $ millions-yr**	**% Wildfire Risk Reduction**
No Replacement Without SRP (baseline)	$9.7 million	0%
No Replacement With SRP	$4.3 million	56%
Covered Conductor Without SRP	$3.6 million	63%
Normal Replacement Without SRP	$8.4 million	13%
Covered Conductor With SRP	$1.6 million	84%
Normal Replacement With SRP	$3.7 million	62%
Underground Conductor Without SRP	$0.5 million	95%
Underground Conductor With SRP	$0.2 million	98%

Project considerations, covered conductor targets, among other factors: Covered conductor project selection is discussed in detail in Sections 6 and 8. Project selection begins with Liberty's new risk model, which identifies Liberty's riskiest circuits both in terms of aggregate risk and on a per-mile basis. This creates a prioritized list of circuits for which Liberty currently evaluates two capital-intensive hardening measures, overhead hardening with covered conductor and undergrounding. These grid hardening measures are compared on the basis of benefit-cost ratios. Operations and engineering subject matter experts then evaluate an extensive set of feasibility constraints, as discussed in WMP Sections 6 and 8. These primarily include permitting, terrain and access, and seasonal work schedules related to heavy annual snowfall and snowpack.

Liberty's risk model does not currently differentiate SRP or covered conductor mitigation effectiveness by forested versus non-forested areas. However, Liberty's risk model does

incorporate a machine-learning probability of outage model that leverages LiDAR data on vegetation characteristics surrounding spans. The mitigation effectiveness of covered conductor varies by sub-driver, which includes vegetation contact, so a circuit with more frequently predicted vegetation-related outages will account for the specific mitigation effectiveness of covered conductor against vegetation outages (assumed value of 0.72).

This process results in a set of covered conductor projects for the WMP cycle. See Sections 6 and 8 for more detail on the projects for this WMP cycle and where the projects rank in terms of Liberty's estimated wildfire and outage program risk.

Table D- 3 provides a comparison of deployment time considerations for grid hardening initiatives.

Table D- 3: Summary of Project Timelines for Grid Hardening Initiatives

Mitigation	Initiate	Planning	Schedule	Execute	Total Duration
Sensitive Relay Profile (SRP)	1-2 months	1-2 months	1-2 months	1-3 months	4-8 months
Traditional Overhead Hardening	2-3 months	4-9 months	4-9 months	4-12 months	12-30 months
Covered Conductor	2-3 months	9-18 months	9-18 months	4-9 months	24-48 months
Undergrounding	3-6 months	12-24 months	12-24 months	9-18 months	36-72 months

1.5 Critical Issue RN-LU-26-05: Liberty's response to area for continued improvement LU-25U-04 "Cost-Benefit Analysis for the Stateline Resiliency Project," was insufficient

Critical Issue Title: Liberty's response to area for continued improvement LU-25U-04 "Cost-Benefit Analysis for the Stateline Resiliency Project," was insufficient.

Required Remedies: In its revised 2026-2028 Base WMP, Liberty must:

- Provide an explanation of its current cost-benefit analysis and decision-making process for its undergrounding programs including the following:
    - Lessons learned from the Tahoe Vista Project; AND
    - The cost-benefit analysis and cost-benefit ratios broken down by activity (i.e., undergrounding, covered conductor, SRP, covered conductor in combination with SRP, and traditional hardening in combination with SRP) for the 1.2 circuit-miles of overhead distribution on the 2300 and 2200 circuits known as the Stateline Resiliency Project.
- Provide the required documentation to support its methodology, calculations, and estimates used to determine the cost values as required by LU-25U-04.

Remedy Response:

Lessons learned from the Tahoe Vista Rule 20 Project: The Tahoe Regional Planning Agency (TRPA) imposes a "construction season" for the Lake Tahoe Basin, which effectively limits when major earthwork, grading, and ground-disturbing construction can occur because of weather, runoff and environmental protection concerns. In addition to the limited window that such work is permitted to be done in the area, Caltrans permitting delays caused the Tahoe Vista Rule 20 Project to be deferred.

While Liberty had strong early coordination with Caltrans and proactively engaged contractors, Liberty identified several areas to further streamline similar projects going forward. These include securing MSAs with qualified civil contractors in advance to reduce procurement cycle time, confirming contractor availability earlier in the season, refining how and when RFPs are issued so contractors have sufficient information to bid even while Caltrans permit conditions are still being finalized, improving early understanding of Caltrans traffic-control and lane-closure requirements during project development, and engaging civil contractors during design to align constructability and permit feasibility before bid and award. These refinements will help avoid compression of the permit–procurement timeline and better position future

undergrounding and Rule 20 projects for successful execution within the short seasonal work window.

Cost Benefit Analysis: Table D- 4 provides the cost benefit analysis for the Stateline Resiliency Project. Liberty calculates the following benefit-cost ratios using its new risk model, described in detail in Sections 5 and 6. It is important to underscore that Liberty's benefit-cost ratios are calculated against the "no-build" baseline, which already factors in the use of SRP and PSPS. Therefore, Liberty does not report benefit-cost ratios for covered conductor or undergrounding without SRP because the comparison would be based on differing baselines.

Liberty's wildfire risk effectiveness values are calculated in Liberty's previous response RN-LU-26-04 and reported again in the below table for reference.

Liberty has only quantified benefit-cost ratios for overhead hardening with covered conductor and for undergrounding. Therefore, the benefit-cost ratio column is limited to the two candidate grid hardening mitigations.

The estimated cost of the project by hardening measure is calculated using per-mile capital cost parameters divided by project lifetime to annualize the project cost. See Section 6 for more detail on the cost modeling at the circuit level.

The Stateline Resiliency Project is in South Lake Tahoe, which adds costs due to more forest, complex permitting requirements, additional considerations for limited operating periods, and traffic management. Liberty has not accounted for circuit or project-specific costs in the following benefit-cost analysis. However, Liberty has identified circuit or region-specific unit costs as an opportunity item in Liberty's RAI plan.

Benefit-cost ratios are calculated as the wildfire risk reduction in the numerator (which is the difference between the wildfire risk for "No Replacement Without SRP" and the corresponding scenario in the response to RN-LU-26-04) and the estimated cost in the denominator.

Liberty notes that the mechanics of its risk model primarily focus on the "no-build" baseline in which existing mitigations are delivering estimated risk reductions, including SRP. Conceptually, Liberty does not evaluate the economics and risk reduction of initiatives with and without SRP because Liberty takes the existing deployed SRP capabilities as given when performing benefit-cost analysis.

Table D- 4: Cost Benefit Analysis of Stateline Resiliency Project

Scenario	% Wildfire Risk Reduction	Estimated Cost ($ thousand-yr)	Benefit-Cost Ratio
No Replacement Without SRP (baseline)	0%	-	-
Normal Replacement With SRP	62%	-	-
Normal Replacement Without SRP	13%	-	-
Covered Conductor With SRP	84%	$100 thousand-yr	38
Covered Conductor Without SRP	63%	-	-
No Replacement With SRP	56%	-	-
Underground Conductor With SRP	98%	$270 thousand-yr	19
Underground Conductor Without SRP	95%	-	-

1.6 Critical Issue RN-LU-26-06: Liberty's response to area for continue improvement LU-23B-10 "Distribution Detailed Inspection Frequency," was insufficient

Critical Issue Title: Liberty's response to area for continue improvement LU-23B-10 "Distribution Detailed Inspection Frequency," was insufficient.

Required Remedies: In its revised 2026-2028 Base WMP, Liberty must:

- Provide a plan, including an implementation timeline, to increase its detailed distribution inspection frequency on its entire system during the 2026-2028 WMP cycle. If Liberty can identify areas or circuits of relatively higher wildfire risk on its system, it may instead provide a plan, including an implementation timeline, to increase its detailed distribution inspection frequency on the identified areas or circuits.
- Provide a plan, including a timeline, to pilot or implement additional inspection programs that proactively identify Level 1 and 2 conditions, as defined by GO 95, during the 2026-2028 WMP cycle.
- Provide an analysis of Level 1 and 2 conditions found on its highest wildfire risk circuits as required by LU-23B-10. This analysis must include the number of findings and the date of the most recent detailed inspection of the following circuits: LOY619, T621, RUS7900, CAL2501, T609, T111, T629, GLS7600, RK7202, TAH7200, T640, CEM41, T608, POR3100, SQV8300, HOB7700, T619, CEM42, T132, POR3200, STL2200, WSH201, STL3101.

Remedy Response:

1. Plan to increase Liberty's detailed distribution inspection frequency during the 2026-2028 WMP cycle.

Beginning in 2026, Liberty plans to add annual drone inspection for all distribution and transmission circuits within its HFTD-3 zone. HFTD-3 is designated by the California Public Utilities Commission as having extreme wildfire risk. Based on the updated risk assessments performed as part of this revision notice, to include only wildfire risk, there is notable overlap between the riskiest circuits and circuits located within the HFTD-3 zone. Liberty will focus this incremental drone inspection program on the HFTD-3 zone. However, as Liberty's risk assessment results continue to mature per the Risk Assessment Improvement Plan, Liberty will consider adjusting its drone inspection program based on the risk results. This incremental detailed drone inspection program is intended to proactively identify Level 1 and 2 conditions, as defined by General Order 95.

2027 Update: Liberty worked with an experienced third-party and performed drone inspections for its distribution and transmission circuits within its HFTD-3 zone. The inspections took place in July and August 2026. As of mid-August 2026, approximately 1,700 assets were inspected, with 57 still awaiting FAA approval. Those 57 assets are immediately adjacent to the south end of the runway at the Lake Tahoe Airport. The team is hopeful to obtain approval soon and to complete those inspections. Liberty considers drone inspections a form of detailed inspection. Based on condition find rates for Level-1 and Level-2, when comparing traditional ground-based detailed inspections and aerial drone inspection, aerial drone inspection has a higher condition find rate. The find rate is notably higher for Level-1 conditions and triple for Level-2 conditions. Liberty recognizes that the sample size for the aerial drone program is smaller than that for traditional ground-based inspection, but these early indications signal that drone inspections are more detailed.

2. Plan to implement additional inspection programs that proactively identify Level 1 and 2 conditions during the 2026-2028 WMP cycle.

Liberty is planning to utilize drone inspections to identify Level 1 and 2 conditions as well. As part of this effort, Liberty has connected with drone inspection service vendors as well as other utilities performing drone inspections to educate itself on best practices and areas of improvement in the use of drone inspections. For example, in October of 2025, Liberty sent a request for information to nearly two dozen inspection service vendors to assess what services and capabilities best suit Liberty's needs. Subsequently, Liberty will be initiating a request for proposal in December 2025. Liberty has requested that the drone services include thermal detection capabilities.

Liberty plans to identify and work with a full-service drone inspection entity by Spring 2026. The plan is to implement annual, detailed drone inspection on all distribution and transmission circuits within Liberty's HFTD-3 zone, beginning in 2026. There are approximately 127 miles of transmission and distribution circuits, including approximately 1,682 poles, in Liberty's HFTD-3 zone.

2027 Update: Based on the success of the 2026 drone inspections, Liberty will implement drone inspection as a permanent staple of its inspection programs going forward. Liberty plans to perform drone inspections in 2027, again focusing on the HFTD-3 area. Liberty wants to compare find rates between 2026 and 2027, of the same assets. Additionally, Liberty plans to perform the drone inspections in Q2, rather than in Q3, further ahead of peak fire season.

Based on the success, Liberty may consider further expansion of the program, beyond HFTD-3, or perhaps a shift to the riskiest circuits based on overall utility risk and risk per mile. Liberty will detail any changes to the plan as part of the 2028-2031 WMP.

3. Analysis of Level 1 and 2 conditions found on Liberty's highest wildfire risk circuits.

LU-23B-10 required that if Liberty elected not to adopt a risk-based approach, then Liberty must demonstrate that its existing program adequately addresses risk through an analysis of Level 1 and 2 conditions found during detailed inspections of its highest risk circuits. Because Liberty is implementing an annual drone inspection program of its HFTD-3 zone beginning in 2026, this analysis may not be required. However, because this Revision Notice requires this analysis, refer to Table D- 5, which includes the number of Level 1 and 2 findings, and the date of the most recent detailed inspection for the circuits requested.

Analysis identified that after the detailed inspection of 2020, which included a detailed inspection of Liberty's entire system, there have been approximately 19% fewer Level 1 and 2

conditions recorded in the sum of the years following (2021 through year-to-date 2025). Liberty correlates the decrease in identified conditions with the investments made in the system throughout this same period. This aligns with the improvement seen in these same years regarding the System Average Interruption Duration and Frequency Indexes (SAIDI and SAIFI). Both SAIDI and SAIFI have been steadily improving, including a 36-percent drop in minutes for both indices between 2021 and 2024, when considering the performance of the entire system.

In addition, as depicted in the workbook, 35-percent of the Level 2 conditions were directly related to issues with the poles themselves. Liberty has aggressively executed its pole replacement program. For example, 83 percent of the Level 2 conditions identified are corrected with a new pole and associated hardware. Once a pole and its associated hardware is replaced, it is far less likely that a Level 1 or 2 condition will return for quite some time. Liberty's pole replacement program is an effective tool for addressing Level 2 conditions and reducing the risk of wildfire ignitions.

Liberty has made significant efforts in maintaining its entire system, which includes the detailed inspection of the entire system. This is demonstrated by the upward trend in reduced identified conditions. In continuation of its efforts, Liberty will commence the annual drone inspection program of the HFTD-3 zone. Liberty will also continue to evaluate the effectiveness of inspections and subsequent programs to address identified condition codes.

2027 Update: For the 2026 drone inspection program, Liberty considered the HFTD-3 to be the highest wildfire risk circuits. Based on condition find rates for Level-1 and Level-2, when comparing traditional ground-based detailed inspections and aerial drone inspection, all performed year-to-date in 2026, aerial drone inspection has a higher condition find rate. The find rate is notably higher for Level-1 conditions and triple for Level-2 conditions. Liberty recognizes that the sample size for the aerial drone program is smaller than that for traditional ground-based inspection, but these early indications signal that drone inspections are more detailed. Liberty will explore opportunities to expand the drone inspection program based on risk and will present any changes as part of the 2028-2031 WMP.

Table D- 5: 2025 Analysis of Level 1 and 2 Conditions Found on Liberty's Highest Risk Circuits

Overhead Detailed Inspections				5 Most Frequent Condition Codes			
Circuit	**Most Recent Inspection Date**	**Priority Level 1 Assets**	**Priority Level 2 Assets**	**Priority**	**Count**	**Condition Codes**	**Notes**
111	7/25/2024	0	27	Level 2	21 8 1	Guys/Guards Broken/Loose Work Space/Climbing Space Crossarm Needs Replacing	
132	4/1/2022	1	4	Level 1 Level 2	1 1 1 1 1	Hardware Issue Pole Needs Replaced Guys/Guards Broken/Loose Insulators Need Replacing Tree / Vegetation Issue	Pin broken and insulator inverted
608	4/6/2022	0	46	Level 2	21	Pole Cracked Pole Needs Replaced Pole Top Split Crossarm Broken / Loose Crossarm Needs Replacing	
609	12/29/2022	0	16	Level 2	8 7 6 5 5	Guys / Guards Broken / Loose High Voltage Sign Problem Pole Needs Replaced Pole Cracked Pole Stub	
619 (includes LOY619)	2/9/2022	0	1	Level 2	1	Crossarm Broken/Loose	
629	11/23/2022	0	12	Level 2	4 4 3 3 3	Guys / Guards Broken / Loose Insulators Need Replacing Bare Jumpers High Voltage Sign Problem Need Stirrups	
640	9/10/2024	0	13	Level 2	11 1 1 1	Guys/Guards Broken/Loose Conductor Issue Crossarm Braces Falling Off Crossarm Needs Replacing	

Overhead Detailed Inspections				5 Most Frequent Condition Codes			
Circuit	Most Recent Inspection Date	Priority Level 1 Assets	Priority Level 2 Assets	Priority	Count	Condition Codes	Notes
CAL204 (renamed CAL2501)	9/7/2022	0	17	Level 2	11 9 8 7 6	Need Stirrups Pole Top Split Pole Cracked Bare Jumpers Pole Needs Replaced	
CEM41	9/24/2020	0	7	Level 2	3 2 1 1 1	Other Hardware Issue (Describe) Pole Needs Replaced Crossarm Broken / Split / Loose Crossarm Needs Replacing High Voltage Sign Problem	Conductor not properly secured
CEM42	9/24/2020	0	5	Level 2	3 1 1 1	Tree / Vegetation Issue Other Conductor Issue (Describe) Pole Leaning / Unsafe to Climb Pole Needs Replaced	Preform tie coming off center phase
GLS7600	11/9/2024	0	2	Level 2	1 1	Guys/Guards Broken/Loose Insulators Need Replacing	
HOB7700	9/19/2020	0	3	Level 2	2 1 1 1 1	Pole Needs Replaced Other Other Conductor Issue (Describe) Pole Cracked Pole Rot	 East side phase tie wire is loose East side phase tie wire is loose
POR3100	11/11/2024	0	4	Level 2	1 1 1 1	Clearance Crossarm Needs Replacing Guys/Guards Broken/Loose Insulators Need Replacing	
POR3200	11/11/2024	0	58	Level 2	16 10 10 8 5	Guys/Guards Broken/Loose Clearance Crossarm Needs Replacing Ground Molding Damaged/Missing Conductor Issue	
RUS7900	2/27/2025	0	2	Level 2	1 1	Conductor Issue Guys/Guards Broken/Loose	

Overhead Detailed Inspections				5 Most Frequent Condition Codes			
Circuit	Most Recent Inspection Date	Priority Level 1 Assets	Priority Level 2 Assets	Priority	Count	Condition Codes	Notes
SQV8300	9/4/2024	0	11	Level 2	3 3 2 1 1	Clearance Guys/Guards Broken/Loose Insulators Need Replacing Conductor Issue Equipment Anchors	
STL2200	3/21/2025	0	3	Level 2	3 2 1	Crossarm Needs Replacing Insulators Need Replacing Clearance	
STL3101	9/17/2020	0	85	Level 2	36 31 25 24 23	Pole Top Split Bare Jumpers Need Stirrups Grey Wire Pole Cracked	
TAH7200	6/18/2024	0	8	Level 2	4 2 1 1	Guys/Guards Broken/Loose Crossarm Needs Replacing Conductor Issue Insulators Need Replacing	
TRK7202	11/12/2024	0	19	Level 2	10 4 4 2 1	Guys/Guards Broken/Loose Insulators Need Replacing Work Space/Climbing Space Conductor Issue Equipment Anchors	
WSH201	10/31/2025	0	6	Level 2	3 1 1 1 1	Crossarm Needs Replacing Conductor Issue Crossarm Braces Falling Off Guys/Guards Broken/Loose Insulators Need Replacing	

2027 Update: Liberty's new risk model ranks the highest wildfire risk circuits as TPZ1202, MEY3400, MEY3200, STL3501, STL3101, MEY3500, MULLER1296, CAL2501, CEM41, and STL2300 in decreasing order of percent system risk. On these circuits, Liberty has noticed a strong decline in Level 2 findings during inspections occurring after 2022. This decrease is visible in circuits shared between the previous highest wildfire risk circuits (Table D- 5), and the current highest risk circuits (Table D- 6). STL3101 had 7 priority level 2 assets found during its 2025 inspections, down from 85 level 2 assets in 2020, a 92% decrease. Similarly, CEM41 had 3 priority 2 assets found during its 2025 inspections, down from 7 in 2020, a 57% decrease.

The decrease in level 2 findings can be attributed to Liberty's training of inspectors as well as the execution of its pole replacement and GO repairs programs. Inspector training and review of inspections has increased greatly since 2020; this is due in part to Liberty's implementation of a QA/QC of inspections program in 2023. Liberty has also aggressively executed its pole replacement program and GO repairs program and has replaced over 1800 poles from 2023-2025, making over 10,000 repairs at the same time.

As mentioned previously, the 2026 drone program had a higher condition find rate for level 2 and level 1s. These inspections are not included in Table D- 6 as they do not cover any complete circuits but partial circuits where the assets are in HFTD Tier 3. Drone inspections are also in their pilot year, so have no other year for comparison, but do seem to indicate a higher condition find rate compared to detailed inspections. As Liberty repeats its drone program in HFTD 3 and eventually expands based on risk, further analysis can be performed.

Table D- 6: 2026 Analysis of Level 1 and 2 Conditions Found on Liberty's 2027 Highest Risk Circuits

Overhead Detailed Inspections				5 Most Frequent Condition Codes		
Circuit	**Most Recent Inspection Date**	**Priority Level 1 Assets**	**Priority Level 2 Assets**	**Priority**	**Count**	**Condition Codes**
CAL204 (renamed CAL2501)	9/7/2022	0	17	Level 2	11	Need Stirrups
					9	Pole Top Split
					8	Pole Cracked
					7	Bare Jumpers
					6	Pole Needs Replaced
CEM41	12/10/2025	0	3	Level 2	2	Ground Molding Damaged/Missing
					1	Conductor Issue
MEY3200	7/30/2024	1	85	Level 1	1	Clearance
				Level 2	33	Clearance
					13	Crossarm Needs Replacing
					10	Lid/Door Inoperable
					9	Oil Leaks
					8	Guys/Guards Broken/Loose
MEY3300	7/15/2026	0	63	Level 2	27	Ground Molding Damaged/Missing
					10	Conductor Issue
					5	Guys/Guards Broken/Loose
					4	Hardware Issue
					4	Clearance
MEY3400	12/2/2022	1	223	Level 1	1	Grey Wire
				Level 2	145	Pole Cracked
					144	Pole Needs Replaced
					128	Pole Top Split
					72	Pole Rot
					67	Bare Jumpers
MEY3500	11/13/2024	0	51	Level 2	15	Bare Equipment Jumpers
					15	Need Stirrups
					10	Idle hardware
					9	Clearance
					6	Guys/Guards Broken/Loose

Overhead Detailed Inspections				5 Most Frequent Condition Codes		
Circuit	**Most Recent Inspection Date**	**Priority Level 1 Assets**	**Priority Level 2 Assets**	**Priority**	**Count**	**Condition Codes**
MULLER1296	11/21/2022	0	210	Level 2	153 147 132 92 51	Pole Needs Replaced Pole Cracked Pole Top Split Pole Rot Need Stirrups
STL2300	9/11/2024	0	10	Level 2	2 2 2 2 1	Clearance Conductor Issue Oil Leaks Work Space/Climbing Space Guys/Guards Broken/Loose
STL3101	12/12/2025	0	7	Level 2	2 1 1 1 1	Insulators Need Replacing Ground Molding Damaged/Missing Clearance Conductor Issue Crossarm Needs Replacing
STL3501	9/12/2024	0	42	Level 2	9 6 6 6 5	Guys/Guards Broken/Loose Insulators Need Replacing Clearance Conductor Issue Equipment Anchors
TPZ1202	7/16/2026	0	20	Level 2	5 5 5 5 2	Crossarm Needs Replacing Ground Molding Damaged/Missing Hardware Issue Insulators Need Replacing Equipment Arm

1.7 Critical Issue RN-LU-26-07: Liberty's response to area for continued improvement LU-25U-06 "Additional Inspection Practices," was insufficient

Critical Issue Title: Liberty's response to area for continued improvement LU-25U-06 "Additional Inspection Practices," was insufficient.

Required Remedies: In its revised 2026-2028 Base WMP, Liberty must:

- Update its response to area for continued improvement LU-25U-06 to discuss:
    - How it selected the assets to be inspected during its infrared pilot;
    - The success criteria used in the infrared pilot;
    - Why it did not elect to expand the infrared pilot; AND
    - Why it did not elect to implement infrared inspections as a continuous program.

Remedy Response:

1. How Liberty selected the assets to be inspected during its infrared pilot.

Quanta Aviation is a vendor that specializes in managing, coordinating, and serving electric power aviation operations. Utilizing Quanta Aviation services, Liberty completed 0.1 miles of drone inspections on its transmission assets during the infrared pilot. The criteria for the pilot were qualitative and focused on understanding how a drone can perform the inspection and if the drone can produce results equal to or better than ground-based infrared inspection. The inspections were performed on and around transmission riser poles so that Liberty could identify hot spots on the potheads, arrestors, connections and other associated hardware. Liberty's decision to select these assets for the pilot was guided by subject matter experts who have experience with ground-based infrared inspection with these types of assets. Liberty was able to compare the results of the pilot to assess the reliability of the infrared inspection.

Furthermore, Liberty piloted the use of drones for demand response inspection including 1.4 miles of inspection on the various distribution and sub-transmission circuits, including the Tahoe City 7300, Truckee 7202, and T609 lines. The drone was piloted by Liberty's inspector and focused on the qualitative capability and efficiency of the drone.

Liberty also piloted the use of drones to perform 2.2 miles of detailed inspection on the Washoe 201 circuit. The inspection was performed by Liberty's inspector and focused on the qualitative capability and efficiency of the drone.

2027 Update: Although not applicable to this question, Liberty included infrared inspection as part of the 2026 drone inspection program for the HFTD-3. Liberty included thermography

inspections for transformers, reclosers, and capacitor banks. As of mid-August, thermal capture is 100%, and thermal inspection is 54%. Approximately 400 assets were inspected, but there were zero findings. Liberty will perform drone inspection again in 2027 but has not yet determin**ed** if those aerial inspections will include infrared.

2. The success criteria used in Liberty's infrared pilot.

The criteria Liberty used for the infrared pilot was whether the drone was able to successfully and safely perform an infrared inspection in a manner that was equal to or better than a ground-based inspection.

Although the infrared pilot identified zero thermal or visual anomalies during the inspection, the drone was able to successfully and safely inspect the assets from multiple angles, including detection for hot spots.

2027 Update: For the 2027 drone inspections, Liberty developed the thermal inspection criteria with its drone inspection vendor after reviewing and comparing the overhead infrared finding limits used by PG&E and SCE. Liberty adopted a hybrid approach that incorporated applicable elements of both utilities' frameworks and was tailored to Liberty's system and program needs. The proposed criteria were reviewed by Liberty's Risk Focus Group and formally adopted for use in the program. Below is an overview of those criteria.

Categories	Temperature Differential (ΔT °F)	Priority Level	Repair Timeline
Category 1	ΔT is ≥ 100 °F	Level 1	24 Hours
Category 2	75 °F ≤ ΔT < 100 °F	Level 2	7 Days
Category 3	50 °F ≤ ΔT < 75 °F	Level 2	30 Days
Category 4	10 °F ≤ ΔT < 50 °F	Level 2	6 Months

3. Expansion of the infrared pilot.

Liberty has been cautious to expand its drone infrared inspection program because Liberty wanted healthy maturation and prudency of drone inspection service capabilities and efficiencies. That said, after performing these pilots and speaking with drone inspection service vendors as well as other utilities performing drone inspections, Liberty plans to add annual drone inspection for all distribution and transmission circuits within its HFTD-3 zone beginning in 2026. Liberty plans to evaluate infrared detection as part of the full-service agreement with the selected vendor.

2027 Update: Approximately 400 assets were thermally inspected in 2026, but there were zero findings. Liberty will be performing drone inspection again in 2027 but has not yet made a determination if those aerial inspections will include infrared.

4. Implementation of infrared inspections as a continuous program.

Liberty plans to add annual drone inspection for all distribution and transmission circuits within its HFTD-3 zone beginning in 2026. Liberty plans to evaluate infrared detection as part of the full-service agreement with the selected vendor.

Liberty has updated its response to LU-25U-06 in Appendix D of its 2026-2028 Base WMP.

2027 Update: Approximately 400 assets were thermally inspected in 2026, but there were zero findings. Liberty will be performing drone inspection again in 2027 but has not yet made a determination if those aerial inspections will include infrared.

1.8 Critical Issue RN-LU-26-08: Liberty's targets for Vegetation Management Inspection Program – Detailed (WMP-VM-INSP-01) were not aligned with the program's scope of work commitment

Critical Issue Title: Liberty's targets for Vegetation Management Inspection Program – Detailed (WMP-VM-INSP-01) were not aligned with the program's scope of work commitment.

Required Remedies: In its revised 2026-2028 Base WMP, Liberty must:

- Revise its Vegetation Management Inspection Program – Detailed (WMP-VM-INSP-01) targets in Table 9-2 to be for its whole territory every three years, consistent with the scope of its inspection activities.

Remedy Response:

In its 2027 Base WMP, Liberty has included Vegetation Management Inspection Program – Detailed (WMP-VM-INSP-01) targets in Table 9-2 to cover the full scope of its detailed inspection protocol, aligning with its 3-year cycle plan for the entire overhead system.

1.9 Critical Issue RN-LU-26-09: Liberty's pole clearing targets did not adhere to WMP Guidelines

Critical Issue Title: Liberty's pole clearing targets did not adhere to WMP Guidelines.

Required Remedies: In its revised 2026-2028 Base WMP, Liberty must:

- Create two separate pole clearing targets each year for 2026, 2027, and 2028. For each year, the WMP must include one target for (1) work performed in compliance with PRC section 4292, and (2) another target for work outside of PRC section 4292, in accordance with the WMP Guidelines.
- Include a narrative in Section 9.4.1 of its pole clearing activities that are (1) performed in compliance with PRC section 4292 and (2) performed outside the requirements of PRC section 4292.

Remedy Response:

Liberty has updated its pole clearing initiative targets into Pole Clearing-PRC 4292 Required (WMP-VM-VFM-01-R), and Pole Clearing-Discretionary (WMP-VM-VFM-01-D). This change is reflected in Table 9-2 of Liberty's 2027 Base WMP. Approximately 4,500 poles require clearing for PRC 4292, and approximately 400 poles in Federal Responsibility Areas (FRA) are cleared as a discretionary measure.

Liberty provides a narrative of its pole clearing activities in section 9.4.1 and also explains its scheduling methodology and how risk is considered in its scheduling of pole clearing activities in section 9.4.3.

Because most of Liberty's service area falls within Tier 2 and Tier 3 High Fire Threat Districts (HFTD), implementation of its annual pole clearing project is based on seasonal access and fire risk. Work typically occurs between April and July, beginning in lower elevation areas where access is easier, and fuels dry earlier in the season. As snowpack recedes, crews transition to higher elevation terrain, including the Tahoe Basin, with Tier 3 HFTD poles receiving top priority.

Quality control is an integral part of the program. Liberty inspects a sample of at least 12 percent of all poles cleared each year. Poles identified during inspections as needing additional work are re-cleared as necessary throughout the fire season.

1.10 Critical Issue RN-LU-26-10: Liberty's proposed unit of measurement for its wood and slash management target did not support its scope of work

Critical Issue Title: Liberty's proposed unit of measurement for its wood and slash management target did not support its scope of work.

Required Remedies: "In its revised 2026-2028 Base WMP, Liberty must:

- Revise its wood and slash management target in Table 9-1 so that the unit of measurement aligns with the activities described in Section 9.5 of its 2026–2028 Base WMP (e.g., the mass or volume of woody material removed from project locations). OR
- Include a narrative in Section 9.5 explaining how the number of acres treated as part of Liberty's wood and slash management initiative target (WMP-VM-VFM-02) will be calculated throughout the 2026-2028 WMP cycle.

Remedy Response: Liberty has updated Section 9.5 of its 2027 Base WMP to explain how acres treated are calculated and how the annual target is determined. Historical tree removal and wood management data were analyzed to establish the target, and acres were selected as the unit of measure to align with how other agencies track fuel management work in the service area. Acreage is tracked through completed work orders for wood removal and firewood bucking, as well as partnership projects involving mastication, forest thinning, and other fuel reduction activities. When multiple trees are treated at the same location, acreage is counted only once.

2. Liberty Progress on Energy Safety Areas of Continued Improvement from 2025 WMP Update

This section provides required progress on the Areas of Continued Improvement ("ACIs") identified by Energy Safety in its Final Decision on Liberty's 2025 WMP Update.[1]

2.1 ACI LU-25U-01: PSPS and Wildfire Risk Trade-Off Transparency

Description: Liberty's PSPS risk model is still in development. Liberty has not provided sufficient detail on how PSPS risk impacts its decision-making compared to wildfire risk.

Required Progress: In its 2026-2028 Base WMP, Liberty must:

- Provide a description of how it plans to quantify PSPS risk and integrate PSPS risk into its overall risk assessment once its PSPS risk model is in place. This must include how Liberty plans on analyzing the trade-offs between PSPS risk and wildfire risk.
- Develop and provide a timeline and milestones for implementing PSPS risk calculations into its suite of risk modeling tools. This must include a description of where PSPS risk impacts Liberty's current decision-making framework and process.
- Describe how Liberty expects PSPS risk will impact the outputs (circuit risk rankings) of its overall risk model and associated prioritization of mitigation initiatives.

Liberty Response: Liberty provides updates on its PSPS risk calculations in Section 5.2 of its 2027 Base WMP. Liberty explains where PSPS risk impacts Liberty's decision-making framework and the impact of PSPS risk on the risk model outputs and associated prioritization of mitigation initiatives in Section 6.1 of its 2027 Base WMP. Specifically, Liberty prioritizes circuits for mitigation based on Overall Utility Risk, which is a function of wildfire and PSPS risk. In addition, the methodology for quantifying PSPS impacts is now in line with peer utilities and reflects the Liberty operating system constraints for outage size and duration.

[1] Energy Safety Decision on Liberty 2025 WMP Update, April 8, 2025.

2.2 ACI LU-25U-02: Vendor Fire Risk Model Implementation Milestones and Dates

Description: While Liberty provided a high-level summary of its risk modeling updates, it did not provide a detailed, concrete breakdown of the steps it plans to implement or specific target completion dates for each of the steps involved in updating its models.

Required Progress: In its 2026-2028 Base WMP, Liberty must:

- Provide updates on the progress made for implementing new models as shown in Figure 5-2: Timeline of Liberty's Risk Modeling Plan of its 2025 WMP Update,224 including dates of actual completion and any new updates not captured in this timeline.
- Provide Liberty's latest timeline for risk model implementation with milestones and associated target dates of completion, including a detailed breakdown of the various components and objectives required to complete a given task, and interim measures used for decision-making while implementation is in progress.
- Explain how Liberty is using the results from the Direxyon Risk Assessment Tool (DRAT) to determine the prioritization of its mitigations, including the determination of highest risk circuits and selection of mitigation activities.

Liberty Response: Liberty provides updates on the development of its new risk model in Section 5.2 of its 2027 Base WMP. Additionally, Liberty presents its risk model improvement plan in Section 5.7 of its 2027 Base WMP, including timelines for additional enhancements of its risk model. Liberty explains how it uses the results of its new risk model to determine the prioritization of its mitigations, including the determination of highest risk circuits and selection of mitigation activities, in Sections 6.1 and 6.2 of its 2027 Base WMP.

2.3 ACI LU-25U-03: Cross-Utility Collaboration on Best Practices for Inclusion of Climate Change Forecasts in Consequence Modeling, Inclusion of Community Vulnerability in Consequence Modeling, and Utility Vegetation Management for Wildfire Safety

Description: In response to LU-23-05, Liberty participated in past Energy Safety-sponsored scoping meetings on these topics. However, Liberty did not report on any additional WMP-related collaboration with the other California IOUs as of its 2025 WMP Update submission.

Required Progress: In its 2026-2028 Base WMP, Liberty must continue its existing collaboration efforts and demonstrate that it has made efforts to specifically collaborate with PG&E, SDG&E, SCE, BVES, and PacifiCorp, where appropriate and relevant to each IOU's interests. Liberty must also document how its collaboration efforts with the other California IOUs impacted the WMP initiatives presented in its 2026-2028 Base WMP.

Liberty must also continue to participate in all Energy Safety Safety-organized activities related to best practices for:

- Inclusion of climate change forecasts in consequence modeling.
- Inclusion of community vulnerability in consequence modeling.
- Utility vegetation management for wildfire safety.

Liberty Response:

<u>Collaboration with PG&E, SDG&E, SCE, BVES, and PacifiCorp</u>

Liberty collaborates with other utilities, including PG&E, SDG&E, SCE, BVES, and PacifiCorp through monthly meetings focusing on Energy Safety activities and other WMP-related topics such as:

- Joint Utility ACI working groups;
- Inspection programs;
- Vegetation management programs;
- Quality control programs;
- Internal and contract resources;
- Remote sensing technologies; and
- Optimization of the off-cycle HFTD inspections.

Inclusion of climate change forecasts in consequence modeling

Liberty will continue to participate in Energy Safety-organized activities related to best practices for inclusion of climate change forecasts in consequence modeling.

Inclusion of community vulnerability in consequence modeling

Liberty will continue to participate in Energy Safety-organized activities related to best practices for inclusion of community vulnerability in consequence modeling.

Utility vegetation management for wildfire safety

Liberty will continue to participate in Energy Safety-organized activities related to best practices for utility vegetation management for wildfire safety.

In addition to meetings driven by Energy Safety, Liberty participates in WMP-related collaboration with other California IOUs through various industry-related organizations, working groups, and events throughout the year to share best practices and further knowledge on these topics. This additional collaboration includes:

- Joint IOU Wildfire Program Management Group
- International Wildfire Risk Mitigation Consortium
- Utility Arborist Association
- Trees & Utilities Conference
- Utility Wildfire, Weather, and Analytics Summit
- Statewide Access and Functional Needs (AFN) Advisory Council
- Annual National AFN Symposium

2.4 ACI LU-23B-06: Effectiveness of Sensitive Relay Profile ("SRP") and Traditional Hardening

Description: Liberty stated that it is not pursuing more installation of covered conductor due to implementation of SRP and the use of traditional hardening but does not adequately demonstrate the effectiveness or comparability of SRP versus covered conductor.

Required Progress: In its 2026-2028 Base WMP, Liberty must:

- Provide its calculations for ignition reduction effectiveness for covered conductor compared to SRP, traditional hardening, and SRP in combination with traditional hardening. This must demonstrate considerations of various ignition risk drivers, deployment time and resources, performance comparison in forested versus non-forested areas, and risk model output of riskiest areas.
- Use the analysis performed to set its covered conductor targets as appropriate.

Liberty Response: . Liberty is pursuing more installation of covered conductor as discussed in Section 8. Liberty expects covered conductor to comprise a significant portion of its wildfire mitigation work into the future based on BCR results. Liberty provides mitigation effectiveness parameters for SRP, overhead hardening without covered conductor, and overhead hardening with covered conductor in Table 6-2 of Liberty's 2027 WMP. In addition, in response to Critical Issue RN-LU-26-04, Liberty shows how applying SRP mitigation effectiveness parameters in addition to hardening effectiveness parameters produces a combined risk reduction relative to the "unmitigated baseline" scenario. Liberty presents overhead hardening with covered conductor targets in Table 8-1 of the 2027 WMP, including discussion of how Liberty's new risk model outputs inform project selection.

2.5 ACI LU-25U-04: Cost-Benefit Analysis for the Stateline Resiliency Project

Description: Liberty's updated target, projected expenditure, and project changes to its undergrounding initiative in 2025 raise concerns about the cost-benefit ratio of undergrounding in its service territory.

Required Progress: In its 2026-2028 Base WMP, Liberty must:

- Discuss its undergrounding cost-benefit analysis evaluation and decision-making process, including consideration of feasibility and resource use efficiency, and its plan to improve on this process based on lessons learned. This discussion must include lessons learned from the Tahoe Vista project.
- Provide cost-benefit analysis and cost-benefit ratios for hardening the Stateline Resiliency Project through undergrounding, covered conductor, SRP, covered conductor in combination with SRP, and traditional hardening in combination with SRP. This analysis must consider the risk drivers present on the affected circuits, the effectiveness of each mitigation at addressing the present risk drivers, the estimated capital cost of each initiative activity, and the time required to implement each initiative activity. For each hardening scenario, Liberty must provide the estimated circuit risk scores after hardening. Liberty must also provide documentation to support the methodology, calculations, and estimates used to determine the cost values applied in its cost benefit analysis.

Liberty Response: Liberty provides a detailed response regarding the previously scoped Stateline Resiliency Project above in response to Critical Issue RN-LU-26-05, including lessons learned from the Tahoe Vista Rule 20 Project. Using Liberty's new risk model, the response provides estimated benefit-cost ratios for undergrounding and overhead hardening with covered conductor.

The benefit-cost ratios are calculated using the methodology set forth in Section 6.1, including capital cost assumptions and mitigation effectiveness parameters. Section 6.1 also discusses limitations of Liberty's current benefit-cost methodology, including the current annualized framework as opposed to time-series and present value structure. Liberty provides detailed sets of equations in Sections 5 and 6 of the 2027 WMP to document each calculation step.

Liberty provides timelines for grid hardening initiatives in Table 1-3 of its response to Critical Issue RN-LU-26-04 as well as modeled risk scores (now measured in dollars) pre- and post-mitigation.

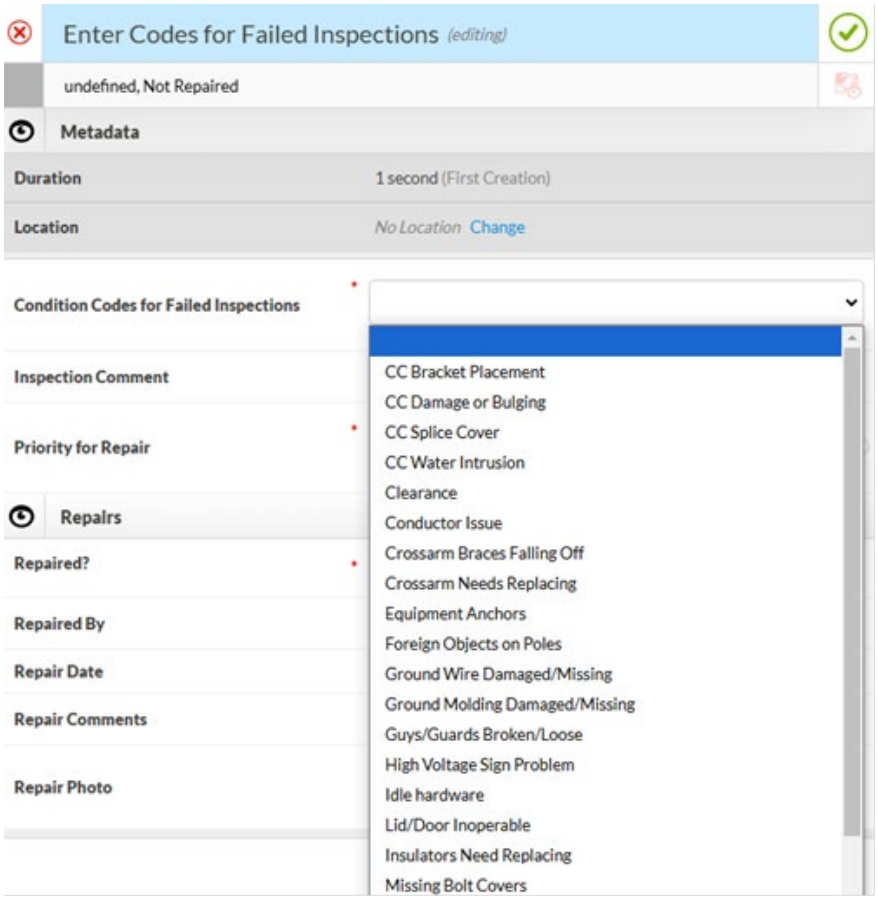
2.6 ACI LU-25U-05: Conductor Inspections and Maintenance

Description: In its 2025 Update, Liberty stated that it is adding water intrusion, splice covers, surface damage/bulging, and bracket placement to its detailed inspection checklist. These criteria had not been added as of October 8, 2024. Liberty must tailor its inspection practices to address failure modes specifically related to covered conductor.

Required Progress: In its 2026-2028 Base WMP, Liberty must demonstrate that it has added checks for water intrusion, splice covers, surface damage/bulging, and bracket placement to its detailed inspection checklist. If Liberty determines any or all the preceding changes are unnecessary, then it must provide how its current inspection and maintenance processes address covered conductor failure modes.

Liberty Response: Liberty added the covered conductor criteria for water intrusion, splice covers, surface damage/bulging, and bracket placement to its detailed asset inspection checklist in June 2024. Refer to Figure D- 1 for a screenshot of Liberty's detailed inspection checklist, which includes the required covered conductor criteria.

Figure D- 1: Screenshot of Liberty's Detailed Asset Inspection Checklist



2.7 ACI LU-23B-10: Distribution Detailed Inspection Frequency

Description: Liberty performs the minimum frequency of detailed inspections required by GOs 95 and 165. Liberty must strive to adopt a risk-based approach by increasing the frequency of detailed inspections on assets that have the highest risk according to its risk model.

Required Progress: In its 2026-2028 Base WMP, Liberty must either:

- Outline a plan to update its detailed inspections in higher risk areas, including:
    - An analysis for determining the updated frequency for performing detailed inspections.
    - Prioritization of higher risk areas based on risk analysis and risk model output, including HFTD Tier 3 lands.
    - Updates to inspection checklists to account for equipment or configurations that may pose greater wildfire risk.
    - A plan to obtain any needed workforce for performing more frequent inspections; OR
- Demonstrate that its existing inspection program adequately addresses risk. This must include analysis of the following:
    - Number of Level 1 and Level 2 issues found during detailed inspections of its highest risk circuits.

Liberty Response: Nearly all of Liberty's service territory lies within High Fire Threat District (HFTD) Tier 2 or Tier 3; therefore, Liberty treats the entire system as a high fire risk area when scheduling detailed inspections. Liberty's program incorporates a risk-based approach by using additional patrol inspections during high-risk events and performing other discretionary inspections of electric lines and equipment based on environmental exposure.

Liberty's inspection program complies with California Public Utilities Commission (CPUC) General Order ("GO") 165, which mandates detailed inspections of electric distribution facilities at intervals not exceeding five years. Patrol inspections to identify hazards are conducted more frequently in the normal course of business. Liberty adheres to these standards by conducting comprehensive detailed inspections on a five-year cycle. These detailed inspections are supplemented with routine patrol inspections for the remainder of the system to address risk on areas not immediately due for detailed inspections. This approach provides 100% coverage of the entire system on an annual basis.

In its Base 2026-2028 WMP, Liberty is implementing an optimized detailed asset inspection schedule to make the number of inspections completed consistent year over year. Liberty's

previous inspection schedule was based on inspecting 20% of the circuit miles in its system each year. Liberty has updated its inspection scheduling process to account for two factors:

1) Liberty's assets are not distributed evenly across its service territory. That is, some areas of its system have a much higher density of electric assets than others.
2) Liberty's past inspection process scheduled inspection of distribution and transmission assets at different times and did not account for proximity of distribution assets to transmission assets.

Liberty's inspection schedule is still based on a five-year cycle; however, it is now basing its target calculation on the number of electric assets rather than circuit miles. Liberty is now also simultaneously inspecting distribution and transmission assets that are in the same corridor of its system. Both changes will optimize inspection efforts and improve consistency of completed inspections year over year.

2027 Update: As previously discussed, in 2026, Liberty worked with an experienced third party and, as of mid-August 2026, performed incremental aerial drone inspections for 97% of its distribution and transmission circuits within its HFTD-3 zone. The remaining 3% includes 57 assets immediately adjacent to the south end of the runway at the Lake Tahoe Airport in South Lake Tahoe. Liberty is waiting for FAA approval to complete the aerial inspection of those assets. Liberty expects to achieve 100% aerial inspection of its HFTD-3 assets by September 15, 2026. As a part of this aerial inspection program, Liberty also included infrared inspection of all overhead transformers, capacitor banks, and reclosers located in the HFTD-3. Liberty considers these aerial drone inspections to be detailed inspections. These aerial inspections are entirely incremental to the existing ground-based detailed inspection and patrol inspections that are performed, on a 5-year and annual basis, respectively.

For 2027, Liberty plans to perform this incremental aerial drone inspection program again on its HFTD-3 assets. Liberty wishes to compare the results of the inspections in back-to-back years. That said, in 2027, Liberty will begin exploring opportunities to both expand the aerial drone inspection program as well as prioritize the inspections on assets other than the those located in the HFTD-3. For example, Liberty may shift inspections to the riskiest circuits based on overall utility risk and risk-per-mile. Based on the evaluation, the cycles for the traditional ground-based detailed and patrol inspection may change as well. The updates to this program will be included in the 2028-2031 WMP.

2.8 ACI LU-25U-06: Additional Inspection Practices

Description: In its 2023-2025 Base WMP, Liberty stated that it planned to incorporate three technologies (LiDAR, infrared, and drone inspections) during the 2023-2025 WMP cycle. Energy Safety required Liberty to define the pilot program scopes and provide timelines and milestones for each technology. In its 2025 WMP Update, Liberty did not provide timelines and milestones.

Required Progress: In its 2026-2028 Base WMP, Liberty must:

- Provide a timeline for each technology. The timeline must include start and end dates for the planning, execution, and analysis phases of each pilot.
- Provide and explain the pilot scope for each technology, including how the scope is selected to ensure that Liberty has timely and usable outputs.
- Define how it will determine the success of each pilot and provide the criteria that it will use for each pilot to determine whether to make the pilot a continuous program.

Liberty Response: Throughout the 2023-2025 WMP cycle, Liberty piloted infrared inspections, LiDAR inspections, and drone inspections as other discretionary asset inspections. Below are updates on each technology and pilot:

- Infrared inspections: In 2023, Liberty piloted and completed 0.1 miles of fixed wing drone infrared inspections on its transmission assets. The inspections were performed on 120kV and 60kV riser poles to identify hot spots on the potheads, cable and other associated hardware at the riser locations. No discrepancies were noted during these inspections. Liberty does not plan to conduct additional infrared inspections during the 2026-2028 WMP cycle.
- Drone inspections: Liberty piloted one mile of drone inspections in 2024, utilizing an internal drone and pilot. Liberty identified benefits for drone inspections for outage management due to hazardous winter conditions, including affected infrastructure in avalanche zones. In winter conditions, avalanche hazards often prevent qualified staff from accessing these remote locations to inspect facilities prior to re-energization. Using a drone in these situations can expedite restoration efforts and/or identification of hazardous conditions that are causing the outage, which enables Liberty to properly plan its repair work. Liberty will continue to set a target for drone inspections in its other discretionary asset inspection WMP initiative.
- LiDAR inspections: Liberty performed a LiDAR inspection of its system in 2024, focusing on gaining increased visibility and data for mapping tree attachments and secondary wires. The data acquired from the LiDAR inspection was used to update the inventory of tree attachments in Liberty's GIS. The data was also uploaded into the Direxyon Risk

Assessment Tool, described in Section 5 of Liberty 2026-2028 WMP, to assess risk impacts from tree attachment removal and open wire/grey wire secondary removal initiatives.

Liberty does not plan any additional pilot projects for its other discretionary asset inspections WMP initiative.

2027 Update:

- Infrared inspections: Liberty included infrared inspection as part of the 2026 drone inspection program for the HFTD-3. Liberty included infrared for transformer, reclosers, and capacitor banks. As of mid-August, thermal capture is 100%, and thermal inspection is 54%. Approximately 400 assets were inspected, but there were zero findings. Liberty wishes to execute inspection programs with reasonable find rates but appreciates that zero findings is promising. Liberty will perform drone inspection again in 2027 but has not yet determined if those aerial inspections will include infrared.
- Drone inspections: Liberty worked with a third-party and performed drone inspections for its distribution and transmission circuits within its HFTD-3 zone. The inspections took place in July and August 2026. As of mid-August 2026, approximately 1,700 assets were inspected, with 57 still awaiting FAA approval. Those 57 assets are immediately adjacent to the south end of the runway at the Lake Tahoe Airport. Liberty hopes to obtain approval soon and to complete those inspections. Liberty considers drone inspections a form of detailed inspection. Based on condition find rates for Level-1 and Level-2, when comparing traditional ground-based detailed inspections and aerial drone inspection, aerial drone inspection has a higher condition find rate. The find rate is notably higher for Level-1 conditions and triple for Level-2 conditions. Liberty recognizes that the sample size for the aerial drone program is smaller than that for traditional ground-based inspection, but these early indications signal that drone inspections are more detailed. Because of the success in 2026, Liberty has established drone inspection as a permit staple of its inspection program going forward and will be performing the program again in 2027. During 2027, Liberty will evaluate opportunities to expand and/or reprioritize the program to further improve.
- LiDAR inspections: Liberty performs a system-wide LiDAR inspection of vegetation along overhead transmission and distribution lines on an annual basis. Aside from the benefits previously mentioned and provided to the vegetation management program as discussed in Section 9, this LiDAR data is also uploaded into the new Risk Model to

inform outage likelihood, due to vegetation risk, to improve outage risk accuracy for each circuit.

2.9 ACI LU-25U-07: Reliability Impacts of SRP

Description: Liberty has not demonstrated an understanding of the reliability impacts of using SRP.

Required Progress: In its 2026-2028 Base WMP, Liberty must:

- Provide the following information for 2024 outages that occurred while SRP settings were enabled in a spreadsheet format:
    - Circuit impacted by outage.
    - Circuit segment impacted by outage.
    - Cause of outage (in line with QDR Table 6 drivers).
    - Number of customers impacted.
    - Number of customers impacted belonging to vulnerable populations (such as customers with access and functional needs and Medical Baseline customers).
    - Duration of outage.
    - Response time to outage.
    - Customer minutes of interruption.
- Provide Liberty's calculations on the effectiveness of the SRP implementation. This must demonstrate calculations of avoided ignitions based on outages that occurred.
- Discuss any expected changes in SRP implementation based on the above, including percentages of coverage across Liberty's territory and SRP enablement thresholds used by Liberty.

Liberty Response:

Table D- 7: Liberty 2024 and 2025 Outages Occurring While SRP Settings Enabled

Year	Circuit Impacted	Circuit Segment Impacted	Cause of Outage	Customers Impacted	AFN Customers Impacted	MBL Customers Impacted	Outage Duration (minutes)	Outage Response Time (minutes)	Customer Minutes Interrupted
2024	TRK7203	Downstream of TRK7203 CB	Unknown	1,710	369	7	183	N/A	312,233
2024	Meyers 3300 (MEY3300)	Downstream of MEY3300R4	Downed wire	19	5	0	128.58	N/A	2,438
2025	TPZ1202	Downstream of TPZ1202-R1	Weather	680	226	13	116	N/A	78,813
2025	TPZ1202	Downstream of TPZ 1202-R1 and 1202-R3	Weather	697	233	13	282	N/A	168,404.4
2025	TPZ1202	Downstream of TPZ 1202-R3	Weather	81	39	1	86.43	N/A	6,932.4
2025	CEM41	Downstream of CEM 41 CB	Weather	273	124	6	165.57	N/A	45,199.8
2025	TPZ1202	Downstream of TPZ 1202-R1	Weather	721	247	13	73	N/A	52,441

Liberty's calculations on the effectiveness of SRP implementation

Liberty calculates the effectiveness of SRP based on a benchmarking analysis of peer utilities and a maturity adjustment, as shown in Table 6-2 of Liberty's 2027 WMP. As Liberty gathers more data from its SRP implementation, Liberty will continue to refine mitigation effectiveness parameters in Liberty's risk model.

Changes in SRP Implementation

Liberty has completed its initial implementation of the SRP program by installing SRP on 31 out of 43 feeders with an additional 6 feeders protected by NV Energy's Fast-Trip Fire Mode (FTFM), which is analogous to SRP, and another three feeders that do not have plans to have SRP settings installed due to them being underground. In 2027, Liberty plans to install three automatic reclosers to expand SRP coverage and add Liberty-owned and operated protective devices to those feeders currently protected by NV Energy. Additionally, Liberty will continue to review one-third of its existing circuits to seek opportunities to improve and expand the program

Severe Fire Danger Index ("SFDI") is used to help determine when to enable SRP Fast Trip settings on circuits to mitigate wildfire risk. When SFDI is "Severe," Liberty will put circuits into "Extreme Fire Mode" to enable Fast Trip settings. In addition, Red Flag Warnings, issued by the National Weather Service, could warrant Extreme Fire Mode settings. Red Flag conditions are generally correlated with Severe SFDI. The circuits will remain in Extreme Fire Mode until SFDI is no longer "Severe" or a Red Flag Warning is no longer in effect. Liberty provides additional details regarding SFDI in Section 10.6 Fire Potential Index of this 2027 WMP.

2.10 ACI LU-25U-08: Evaluation of High Impedance Fault Detection

Description: In response to LU-23-16, Liberty cited the University of Nevada Reno (UNR) study's recommendation to pursue a fast-tripping scheme and not pursue High Impedance Fault Detection (HIFD) technology. Liberty has not demonstrated how this approach will effectively mitigate high impedance faults, like fallen conductors, given its limited plan to enable SRP settings for only 10-12 days per year. Additionally, Liberty has not presented a comprehensive solution for detecting fallen conductors, an issue that SRP settings alone cannot resolve.

Required Progress: In its 2026-2028 Base WMP, Liberty must:

- Provide a detailed explanation of how the fast-tripping scheme will detect fallen conductors without HIFD, particularly how relay thresholds and settings will be used to detect fallen conductors.
- Provide a detailed explanation of how enabling SRP settings 10-12 days per year provides sufficient reduction of wildfire risk due to fallen conductors.
- Present alternative or complementary strategies to detect fallen conductors and describe how these approaches will be integrated with the current fast-tripping scheme.
- Outline a clear, measurable implementation plan to address fallen conductor detection, including a timeline to implement, the strategies or combination of strategies to be implemented, how strategies will be validated, and coordination with other electrical corporations to adopt best practices and technologies for mitigating this risk.

Liberty Response: Liberty agrees that fast-tripping schemes will not reliably detect fallen conductors and high impedance faults without HIFD. Enabling SRP settings 10-14 days per year does not provide sufficient reduction in wildfire risk due to fallen conductors. Liberty's alternative strategy is to utilize the Sensitive Earth Fault ("SEF") protection module on three-wire uni-grounded wye feeders. This scheme utilizes a ground element that is set relatively low (20-40A pickup) with a definite time-delay of 2-4 seconds. This scheme has been a standard for three-wire circuits since the system was owned by NV Energy.

To address this ACI, Liberty will compare its SEF implementation on three-wire circuits to other utilities to align with their strategies. If sufficient operational data is not available, Liberty will seek operational data from the other utilities. For Liberty's small amount of four-wire distribution where SEF protection is not feasible, Liberty will evaluate alternative methodologies and adopt best practices and technologies for mitigating this risk. Liberty will report its findings and provide a corrective action plan by Q2 of 2026.

2027 Update: Liberty completed a comparative study of its SEF implementation on three-wire circuits to benchmark against other electric corporations' programs. As a result, Liberty updated its protection philosophy by lowering the ground pickup further (5A pickup) and increasing the time-delay. Additionally, Liberty is developing its Early Fault Detection (EFD) program by installing 1,000 GridScope multi-sensor units late in 2026.

To address high-impedance fault detection on its four-wire system, Liberty will install Schweitzer Engineering Laboratories ("SEL's") Hi-Z module on one of its four wire feeders to observe its effectiveness in late 2026.

2.11 ACI LU-25U-09: Weather Station Optimization

Description: Liberty plans to use a weather station optimization tool to identify spatial gaps in its weather station network and determine if additional weather stations are needed. Liberty must report on its progress as it completes the assessment.

Required Progress: In its 2026-2028 Base WMP, Liberty must:

- Describe how the weather optimization tool was used to assess the density of weather stations in its service territory.
- Summarize the results of the assessment.
- Provide any locations identified for additional weather station installations.
- Include the number of weather stations planned for future installations of weather stations, based on the assessment.

Liberty Response: The weather optimization tool is used to create similarity scores between areas with weather stations compared to areas without weather stations. A low similarity to weather station areas indicates places to add weather stations and improve coverage.

Data inputs into the model include:

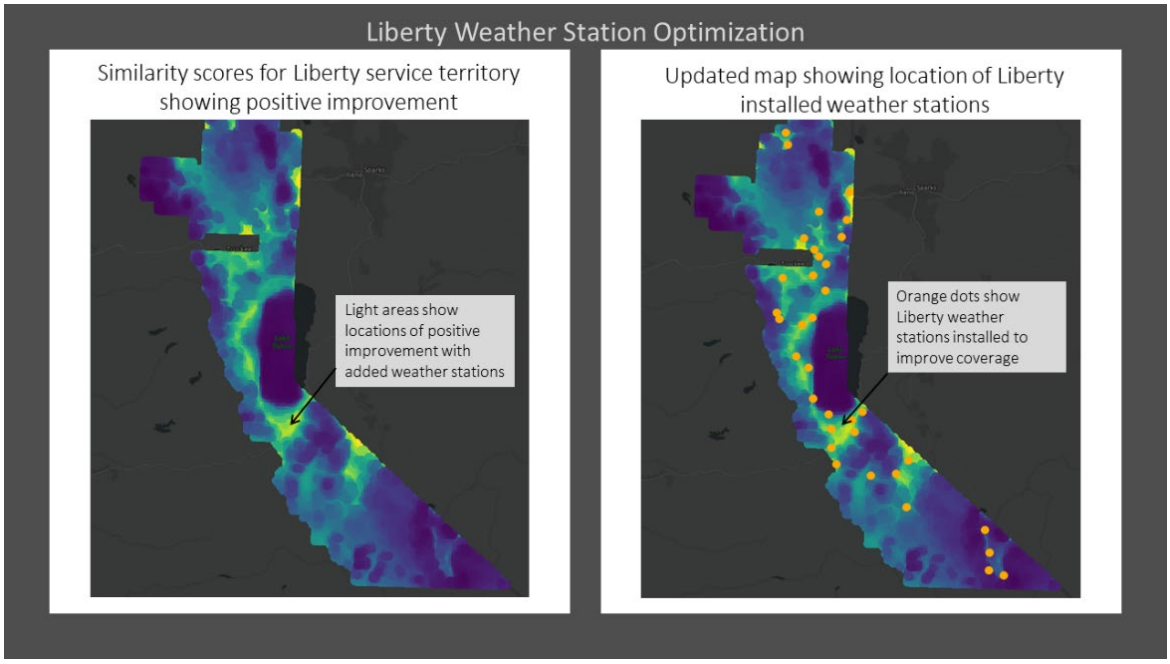
- Coordinates of existing weather stations
- Coordinates of locations without weather stations
- Climate data layers for service territory

Model output:

- Raster for service territory with similarity scores

The results of the assessment demonstrated a positive improvement in similarity scores for Liberty's service territory. Refer to Figure D- 2. All planned weather station installations to improve coverage have been completed. No additional weather stations are currently planned. To maintain the optimized weather station network in support of Liberty's robust weather monitoring and situation awareness program, weather station maintenance and calibration is performed annually. For details on Liberty's weather stations please see Section 10.2.1 and 10.5.5.

Figure D- 2: Liberty Weather Station Optimization Similarity Scores



Appendix E
Referenced Regulations, Codes, and Standards

Appendix E: Referenced Regulations, Codes, and Standards

In this appendix, the electrical corporation must provide in tabulated format a list of referenced codes, regulations, and standards.

Name of Regulation, Code, or Standard	**Brief Description**
Public Utilities Code § 8386	Law that requires electric corporations to submit wildfire mitigation plans.
Public Utilities Code section 768.6	Statute related to emergency and disaster preparedness plans.
General Order 166	Standards for Operation, Reliability, and Safety During Emergencies and Disasters.
Government Code section 8593.3	The California Government Code Section 8593.3 defines Access and Functional Needs as "Individuals who have: Developmental, intellectual, or physical disabilities; Chronic conditions or injuries; Limited English proficiency or non-English speaking; Or individuals who are: older adults, children, or pregnant; living in institutional settings; or Low-income, homeless, and/or transportation disadvantaged."
Public Resources Code § 4292	CAL FIRE requires 10 feet of minimum clearance around the base of the pole cleared of all flammable vegetation down to bare soil and the removal of all dead tree branches within this cylinder up to the cross-arm (within the State Responsibility Area).
Office of Energy Safety ("OEIS") Energy Safety Policy Division Process Guidelines	This document establishes guidelines outlining the process for disposition of Wildfire Mitigation Plans (WMPs) and details the public participation process and submission requirements.
OEIS Wildfire Mitigation Guidelines	OEIS has authority under Government Code section 15475.6 to "adopt guidelines setting forth the requirements, format, timing, and any other matters required to exercise its powers, perform its duties, and meet its responsibilities described in Sections 326, 326.1, and 326.2 and Chapter 6 (commencing with Section 8385) of Division 4.1 of the Public Utilities Code

Name of Regulation, Code, or Standard	Brief Description
OEIS Decision on Liberty 2026-2028 Base Wildfire Mitigation Plan	This Decision represents OEIS' assessment of Liberty's 2026-2028 Base WMP and identifies critical issues for Liberty to address in a 2027 Base WMP.
OEIS Final Data Guidelines (Version 4.0)	Data Guidelines that set forth the required standards, schemas, and guidance on data preparation, submittal, and schedule for submission of Quarterly Data Report (QDR), Geographic Information Systems (GIS) data, and tabular Wildfire Mitigation Data to Energy Safety in support of its oversight and enforcement of electrical corporations' compliance with wildfire safety.
General Order 95	Overhead electric line design, construction, and maintenance requirements in order to ensure adequacy of service and safety; covers topics such as proper grounding, clearances, strength requirements, and tree trimming.
General Order 165	Inspection requirements for transmission and distribution facilities in order to ensure safety and high-quality electrical service; sets maximum allowable inspection cycle lengths, scheduling and performance of corrective action, record-keeping, and reporting.
General Order 174	Inspection requirements for substations to promote the safety of workers, the public, and enable adequacy of service.
California Standardized Emergency Management Systems ("SEMS")	The California Emergency Services Act 2021 Edition ("ESA") requires SEMS for managing multiagency and multijurisdictional responses to emergencies in California.
National Incident Management System ("NIMS")	NIMS provides guidelines for government, nongovernmental organizations and the private sector to work together to prevent, protect against, mitigate, respond to and recover from emergency management incidents.
Resolution WSD-011	California Public Utilities Commission ("CPUC") Resolution implementing the requirements of Public Utilities Code Sections 8389(d)(1), (2) and (4), related to catastrophic wildfire caused by electrical corporations subject to the Commission's regulatory authority.

Name of Regulation, Code, or Standard	Brief Description
R.18-10-007	Order Instituting Rulemaking (OIR) to Implement Electric Utility Wildfire Mitigation Plans Pursuant to Senate Bill 901 (2018).
R.20-07-013	OIR to Further Develop a Risk-based Decision-making Framework for Electric and Gas Utilities.
D.20-03-004	Decision on community awareness and public outreach before, during and after a wildfire, and explaining next steps for other Phase 2 issues. Decision in Rulemaking 18-10-007 requiring IOUs to conduct community awareness and public outreach before, during, and after a wildfire in any language that is “prevalent” in its service territory or portions thereof.
D.19-05-042	CPUC Decision Adopting De-Energization (Public Safety Power Shutoff) Guidelines (Phase 1 Guidelines).
D.20-05-051	CPUC Decision Adopting Phase 2 Updated and Additional Guidelines for De-Energization of Electric Facilities to Mitigate Wildfire Risk.

Appendix F
Liberty's 2026 AFN Plan

BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

Order Instituting Rulemaking to Examine Electric Utility De-Energization of Power Lines in Dangerous Conditions.	Rulemaking 18-12-005 (Filed December 13, 2018)

LIBERTY UTILITIES (CALPECO ELECTRIC) LLC'S (U 933-E) PLAN TO SUPPORT ACCESS AND FUNCTIONAL NEEDS POPULATIONS DURING DE-ENERGIZATION EVENTS

2026 AFN PLAN

Jordan Parrillo
Manager of Regulatory Affairs
Liberty Utilities (CalPeco Electric) LLC
701 National Ave, Tahoe Vista, CA 96148 Telephone: 530-721-7818
jordan.parrillo@libertyutilities.com

Dated: February 2, 2026

BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

Order Instituting Rulemaking to Examine Electric Utility De-Energization of Power Lines in Dangerous Conditions.	Rulemaking 18-12-005 (Filed December 13, 2018)

LIBERTY UTILITIES (CALPECO ELECTRIC) LLC'S (U 933-E) PLAN TO SUPPORT ACCESS AND FUNCTIONAL NEEDS POPULATIONS DURING DE-ENERGIZATION EVENTS 2026 AFN PLAN

Liberty Utilities (CalPeco Electric) LLC (U 933-E) ("Liberty") hereby submits its 2026 Access and Functional Needs Plan for Public Safety Power Shutoff Support Pursuant to Commission Decision in Phase Three of R.18-12-005, attached hereto as Attachment A.

Respectfully submitted,

/s/ Jordan Parrillo

Jordan Parrillo
Manager of Regulatory Affairs
Liberty Utilities (CalPeco Electric) LLC
701 National Ave, Tahoe Vista, CA 96148
Telephone: 530-721-7818
jordan.parrillo@libertyutilities.com

Dated: February 2, 2026

Attachment A
Liberty's 2026 Access and Functional Needs Plan



Liberty Utilities (CalPeco Electric) LLC (U 933-E)

Liberty's Plan to Support Populations with Access and Functional Needs ("AFN") During PSPS

February 2, 2026

EXECUTIVE SUMMARY

During extreme weather conditions, utilities may temporarily turn off power to specific areas to protect the safety of our customers and communities, enacting a Public Safety Power Shutoff (PSPS). This continues to be a necessary tool of last resort to prevent our electric systems from becoming a source of wildfire ignition. To support individuals with Access and Functional Needs (AFN) during PSPS, each of the Joint Investor-Owned Utilities (IOUs)[1] developed its respective 2026 Annual AFN PSPS Plan ("AFN Plan" or "Plan") with assistance from regional and statewide AFN stakeholders, representing a broad spectrum of expertise. The Plan leverages the Six-Step Planning Process in the Federal Emergency Management Agency (FEMA) Developing and Maintaining Emergency Operations Plans Comprehensive Preparedness Guide 101.[2]

The Joint IOUs are committed to addressing the needs of individuals with AFN before, during, and after a PSPS and have established a partnership with the AFN Collaborative Council and the Joint IOU Statewide AFN Advisory Council (AFN Statewide Council)[3] to seek guidance and address the "Why," "Who," "What," and "How" to better mitigate risk and support individuals with AFN.

The Joint IOUs acknowledge and sincerely thank the AFN Collaborative Council and AFN Statewide Council for their guidance and commitment in developing the 2026 AFN Plan.

WHY

As climate conditions change, the threat of wildfires in California continues to grow. One critical tool used to prevent wildfires is PSPS, in which an IOU may temporarily shut off power to a neighborhood during dangerous weather conditions to prevent the electric system from becoming a source of ignition. These safety shutoffs are a measure of last resort for keeping customers and communities safe. A PSPS, although necessary, disrupts the everyday lives of impacted individuals, including those with AFN and/or those who may be electricity dependent, which will be discussed further in this Plan. The purpose of this Plan is to mitigate the impact of PSPS on individuals with AFN.

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1 San Diego Gas & Electric (SDG&E), Southern California Edison (SCE), and Pacific Gas & Electric Company (PG&E).

2 For details on how to develop and maintain Emergency Operations Plans, visit: Developing and Maintaining Emergency Operations Plans Comprehensive Preparedness Guide (fema.gov).

3 As of 2025, the Core Planning Team has transitioned and now listed as the AFN Statewide Council. See Appendix A for members of the AFN Statewide Council and Collaborative Council

WHO

Liberty has made progress in identifying individuals with AFN across their respective service areas, identifying approximately 15,044[4] households within its service territory through community outreach efforts, leveraging program enrollment and internal data, and promoting self-identification. To support and target individuals that are electricity dependent, the Joint IOU Statewide AFN Advisory Council and AFN Core Planning Team[5] developed a definition of Electricity Dependent Individuals[6] that this Plan seeks to support. That definition remains unchanged since 2022.

Electricity Dependent Definition: Individuals who are at an increased risk of harm to their health, safety, and independence during a PSPS for reasons including, but not limited to:

- Medical and Non-Medical
- Behavioral, Mental, and Emotional Health
- Mobility and Movement
- Communication

Liberty understands that there is more work to be done and will continue these efforts to identify additional individuals with AFN in 2026.

WHAT & HOW

Through participation in the AFN Collaborative Council and AFN Core Planning Team, Liberty remains informed of the IOUs' goals, objectives, and potential opportunities for enhancements. Liberty learns from feedback and best practices shared by other IOUs. These groups have shaped programs and support, and their engagement has led to measurable improvements.

Liberty's overarching goal is to mitigate the impacts of PSPS events on individuals with AFN through specialized customer outreach, education, assistance programs, and services. To assess the effectiveness of these efforts, the following key performance indicators (KPIs) are used:

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4 Represents total count of AFN designations including Medical Baseline in Liberty's database.

5 *See* Appendix B for a list of the members of the Joint IOU Statewide AFN Advisory Council and AFN Core Planning Team.

6 IOUs will strive to implement this proposed definition contingent on operational feasibility and in alignment with AFN identification requirements with the CPUC's PSPS decisions. *See e.g.* D.21-06-034, Appendix A at A8–A9; D.20-05-051, Appendix A at A8; D.19-05-042, Appendix A at A12-A14, A20-A21. The IOUs will continue to collaborate with AFN stakeholders to refine this definition as appropriate.

1. The percentage of individuals with AFN who were aware of what support and resources were available to them during a PSPS.

2. The percentage of individuals with AFN who were able to use necessary medical equipment to maintain necessary life functions for the duration of any PSPS that affected them.

3. The percentage of individuals who utilize mitigation services reported they were satisfied with the level of support received.

INTRODUCTION

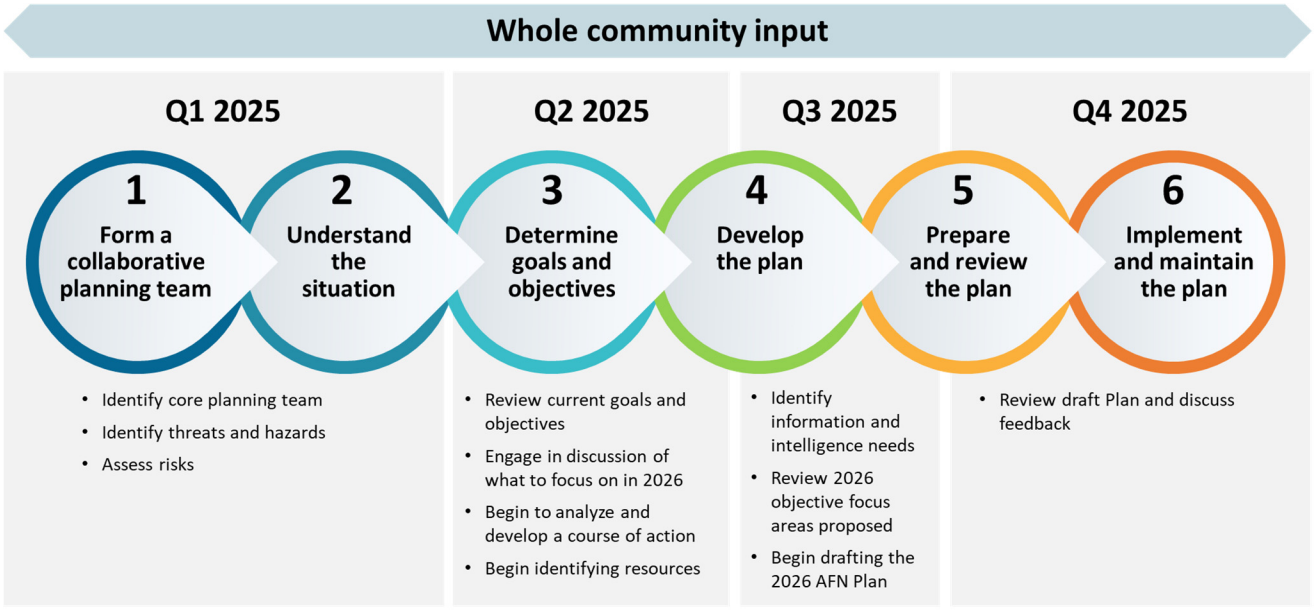
In accordance with the California Public Utilities Commission (Commission or CPUC) Decision (D.) 21-06-034 Phase 3 OIR Decision Guidelines and using the Six-Step Planning Process in FEMA's Developing and Maintaining Emergency Operations Plans Comprehensive Preparedness Guide 101, the Joint IOUs worked collaboratively with the AFN Core Planning Team to implement the "Whole Community"[7] approach to develop an overarching Joint IOU Statewide strategy to meet the diverse needs of individuals with AFN.

Liberty will provide the CPUC with quarterly updates regarding progress towards meeting the established objectives and the impact of their efforts to address this population before, during, and after PSPS, while optimizing opportunities for consistency statewide to the extent possible.

Section 1 below provides a high-level overview of the IOUs' shared vision for the 2026 AFN Plan and Sections 2-3 provide details for Liberty's AFN Plan. The Joint IOUs will continue benchmarking to create a consistent response across the IOU service area where possible, recognizing that resources may not be available consistently across the state.

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[7] Whole Community approach as defined by FEMA, refers to preparedness as a shared responsibility and involvement of everyone, including but not limited to individuals and families with access and functional needs. Complete definition *available at* www.fema.gov/about/glossary (scroll down to "Whole Community").



1. SUBJECT MATTER EXPERTS (ENGAGE THE WHOLE COMMUNITY)

FEMA Step 1, Form a Collaborative Planning Team. Engaging in community-based planning—planning that is for the whole community and involves the whole community—is crucial to the success of any plan.

A Core Planning Team, comprised of volunteers from the Statewide Council and the Joint IOUs, was created to develop the annual Access and Functional Needs (AFN) Plan. To encourage more of a "whole community approach" the Joint IOUs began leveraging the 2025 Statewide Council quarterly meetings for the development of the 2026 AFN plan. This new approach increased transparency and stakeholder participation while alleviating the time constraints typically faced during Q4 planning. The new structure removed the need for a separate Core Planning Team and maintains adherence to the 6-Step FEMA planning process.

The Joint IOU Statewide AFN Advisory Council is comprised of eighty-nine organizations representing the diverse needs of the AFN community. The table below reflects the organizations involved in the development of the 2026 AFN Plan.

Table 1 Engaging the Whole Community

Planning Group	Participants/Stakeholders
AFN Collaborative Council (per the Phase 3 OIR PSPS Decision) - (see appendix A for full list):	California Foundation for Independent Living Centers (CFILC)
	California Health & Human Services (CHHS)
	California Office of Emergency Services (Cal OES)
	Disability Rights California (DRC)
	Disability Rights Education & Defense Fund (DREDF)
	State Council on Developmental Disabilities (SCDD)
	2-1-1[1]
AFN Statewide Council (See appendix B for full list of invited participants):	Bear Valley Electric Services (BVES)
	California Association of Area Agencies on Aging (C4A)
	California Department of Developmental Services (DDS)
	California Department of Rehabilitation (DOR)
	California Department of Social Services (DSS)
	California Public Utilities Commission (CPUC)
	County Welfare Directors Association of California (CWDA)
	Deaf Link
	Disability Action Center (DAC)
	Disability Policy Consultant
	Disability Rights California (DRC)
	Eastern Los Angeles Regional Center (ELARC)
	Hospital Council
	Interface Children & Family Service
	Kern Regional Center (KERNRC)
	Liberty Utilities
	North Los Angeles County Regional Center (NLACRC)
	PacifiCorp
	Redwood Coast Regional Center (RCRC)
	San Diego Regional Center (SDRC)
	San Gabriel/Pomona Regional Center (SGPRC)
Joint IOUs	San Diego Gas & Electric (SDG&E)
	Southern California Edison (SCE)
	Pacific Gas & Electric (PG&E)

As a key component to engaging the Whole Community in planning, Liberty will continue to participate in and observe the AFN Collaborative Council, the Joint IOU Statewide AFN Advisory Council, and other regional and statewide AFN experts such as community-based organizations (CBOs), healthcare partners, and local government agencies. These groups serve as thought leaders and offer insights, feedback, and input on the IOUs' customer strategy, programs, and priorities. Liberty seeks to

conduct regular meetings with these subject matter experts to actively identify issues, opportunities, and challenges related to Liberty's ability to mitigate the impacts of wildfire safety strategies, namely PSPS.

The planning process presented provides opportunities to collect feedback and implement strategic improvements with details included in specific IOU plans. Liberty continues to look at program offerings, conduct outreach and education, as well as continue to support program awareness to eligible populations.

1.1. PURPOSE, SCOPE, SITUATION OVERVIEW, AND ASSUMPTIONS

1.1.1 Purpose/Background - WHY

The Plan focuses on mitigating the impacts of PSPS for individuals with AFN. Liberty intends to build on this Plan and strive for continuous improvement based on insights from the experts and feedback channels outlined in this Plan.

Each IOU's respective 2026 AFN Plan addresses the following:

- Who Liberty needs to communicate with
- What resources and services are needed during PSPS
- How Liberty communicates with individuals with AFN
- How Liberty makes resources and service available to individuals with AFN

1.1.2 Scope - WHO

Liberty and the CPUC use the definition of AFN as defined by the California Government Code §8593.3: "individuals who have developmental or intellectual disabilities, physical disabilities, chronic conditions, injuries, limited English proficiency, or who are non-English speaking, older adults, children, people living in institutionalized settings, or those who are low income, homeless, or transportation disadvantaged, including, but not limited to, those who are dependent on public transit and those who are pregnant."[8]

Acknowledging that the California Government code definition of AFN is broad, the CPUC authorized the IOUs to follow the FEMA 6-Step Process by engaging the Whole Community through the Joint IOU Statewide AFN Advisory Council to create a common definition of "Electricity Dependent." Therefore, the IOUs use this common definition to help inform new enhancements to programs and resources that are currently available.

Electricity Dependent: Individuals who are at an increased risk of harm to their health, safety, and independence during a Public Safety Power Shutoff, for reasons including, but not limited to:

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[8] *See also* D.19-05-042 at p. 28.

- Medical and Non-Medical
- Behavioral, Mental, and Emotional Health
- Mobility and Movement
- Communication

Examples of Electricity Dependent include, but are not limited to:

- **Medical and Non-Medical:**
    - Respiratory equipment: oxygen, respirator, inhalation therapy, apnea monitoring, suction, machines, airway clearance, airway clearance vests, cough assistive devices, hemodialysis
    - Nutritional equipment: gastric feed tube, specialized diet meal preparation equipment (e.g., feeding pumps, blenders)
    - Heating/cooling equipment: refrigeration, body temperature regulation
- **Behavioral, Mental, and Emotional Health:**
    - Powered equipment supporting regulation of emotional behaviors (e.g., sensory lights)
- **Mobility and Movement Equipment:**
    - Moving and positioning equipment: Lifts, mobility tracking system, power wheelchairs and mobility scooter, in home chair lift, electric bed
- **Communication:**
    - Augmentative communication devices (e.g., tablets, wearables, eye gaze), alert systems
    - Powered equipment for hearing or vision support (e.g., alert systems)

1.1.3 Situational Overview

FEMA Step 2, Understand the Situation – Understanding the consequences of a potential incident requires gathering information about the potential AFN of residents within the community.

The "Understand the Situation" phase continues with identifying risks and hazards. This assessment helps a planning team decide what hazards or threats merit special attention, what actions must be planned for, and what resources are likely to be needed.

The AFN Statewide Council has identified the following key risks of PSPS:

- Individuals with AFN are unable to use power for devices or equipment for health, safety, and independence due to a PSPS.

During the planning process, the AFN Core Planning Team emphasized that the needs of individuals with AFN extend well beyond medical devices alone and that the risks are as diverse as the population. Liberty recognizes that the impacts of PSPS are dynamic and are committed to supporting customers before, during, and after a PSPS.

1.1.3.1 AFN Population– AFN Identification/Heat Map

Liberty has made progress in identifying the Electricity Dependent individuals with AFN through program enrollments and enabling self-identification. Each IOU identifies the following customers in their respective databases as AFN:

- Customers enrolled in the following programs:
    - California Alternate Rates for Energy (CARE)
    - Medical Baseline (MBL),
- Customers who self-identify as:
    - Customers with disabilities
    - Customers with chronic conditions or injuries
    - Customer with limited English proficiency; or
    - Transportation disadvantaged customers
- Older adults
    - Liberty has a customer data process to identify elderly customers as AFN

Table 2 below accounts for the number of customers identified as AFN in each utility service area, as well as those most likely to experience a PSPS.

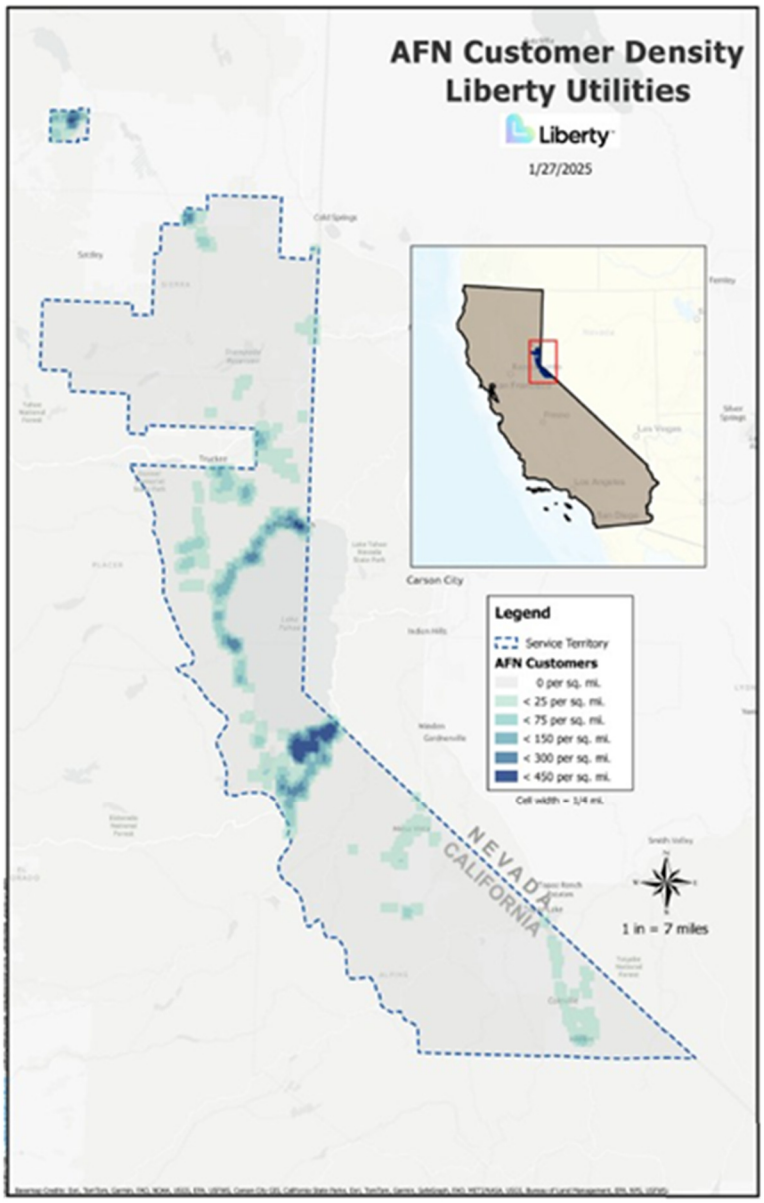
Table 2 Joint IOU Access & Functional Needs Individuals[9]

	MBL Individuals	Individuals Identified as AFN	Percentage of Individuals Identified as AFN base of Total Residential Customer Base
Liberty	**Total: 262**	**Total: 14,782**	34%

Liberty's AFN density map, depicted below, allows for quick identification of geographical areas with larger populations of individuals with AFN.[10] These maps enable the utilities to strategically allocate resources by geography such as staffing a support site or Customer Resource Center for individuals who are experiencing a PSPS. See **Figure 1.**

[9] Data collected as of January 2026.
[10] *See* Section 1.1.2 for definition.

Figure 1 Service Area Map of Liberty Customers with AFN



In 2026, the IOUs will continue identifying individuals who are electricity dependent above and beyond those enrolled in the Medical Baseline Allowance Program, through direct outreach to customers in Liberty's service area.

1.1.4 Planning Assumptions

Below are the initial planning assumptions used when developing the annual AFN Plan:

- For PSPS, every effort is made to provide notification in advance of power shutoff
- Resources are available to individuals with AFN regardless of advanced notification

- Effective support of individuals with AFN requires a Whole Community approach (e.g., utilities, Community Based Organizations, non-profits organizations, government agencies)
- PSPS may occur concurrently with unrelated emergencies (e.g., active wildfires, earthquakes, floods, tsunamis, cyber-attacks, technological hazard incidents)
- The IOUs will continue to create a consistent statewide response with our support services (e.g., food support, accessible transportation, Community Resource Centers (CRCs), etc.) to PSPS, acknowledging there are different needs based on geographic areas
- The scope of PSPS can increase or decrease as weather conditions are monitored across the service area

1.2 Operational Priorities - WHAT

FEMA Step 3: Operational priorities – specifying what the responding organizations are to accomplish to achieve a desired end-state for the operation.

The goal of the AFN Plan is to mitigate the impacts of PSPS on individuals with AFN served by Liberty through continuation of customer outreach, education, assistance programs, and assessment of opportunities for improvement.

Liberty will continue our commitment to mitigating impacts of PSPS by focusing on key objectives identified through the 2026 planning meetings. Progress will be reported out within the Liberty Quarterly updates. 2026 Key Objectives:

- Increase awareness of IOU programs and services available before, during, and after a PSPS
- Continue to identify individuals who are Electricity Dependent
- Identify new enhancements to programs and resources needed to mitigate the impacts of PSPS
- Coordinate and integrate resources with state, community, and utility to minimize duplication

1.3 Plan Development

FEMA Step 4: Plan Development - Develop and Analyze Courses of Action – This step is a process of generating, comparing, and selecting possible solutions for achieving the goals and objectives identified in Step 3.

Liberty will continue to prudently deliver consistent services and resource offerings within

the plan development framework. The programs and eligibility may differ by service area.

Recommendations to meet the Key Objectives for 2026:

Increase awareness of Liberty programs and services available before, during, and after a PSPS

- Liberty will continue to identify opportunities to participate in outreach events and connect with CBOs to engage to share utility preparedness messaging.
- Liberty will continue to maintain relationships with CBOs as trusted messengers for outreach information.
- Liberty will assess opportunities to improve access to materials that facilitate simple outreach and message consistency.

Continue to identify individuals who are Electricity Dependent

- Liberty will continue to refine outreach tactics through collaborative efforts to increase awareness of AFN identification and customer assistance programs with local partners (*e.g.*, CBOs, collaborative outreach, presentations).
- Liberty will continue to share preparedness materials and AFN self-identification information with customers through established communication channels.

Identify new enhancements to programs and resources needed to mitigate the impacts of PSPS

- Liberty is planning to implement a backup battery program for MBL customers in 2026 and plans to issue an RFP in Q1 2026.

Coordinate and integrate resources with state agencies, community-based organizations, and the utilities to minimize duplication

- Liberty will continue to engage with state agencies, community based organizations, and public safety partners through inclusion in PSPS planning efforts and regular communication throughout the year.

1.4 Plan Preparation and Review

FEMA Step 5, Prepare and Review the Plan – This step is a process of preparing the document and getting it ready for implementation.

Prior to finalizing the 2026 AFN Plans, the Joint IOUs provided members of the AFN Collaborative Council and AFN Statewide Council a draft plan for their review. As a result, each of the IOUs will file their respective 2026 AFN Plans with the CPUC by January 31, detailing its programs to support individuals and communities with AFN before, during, and after PSPS.

1.5 Plan Implementation

FEMA Step 6, Implement and Maintain the Plan – This step is the final step which is an ongoing process of training personnel to perform tasks identified in the plan, exercising, and evaluating plan effectiveness, and revising and maintaining the plan.

Upon filing the AFN plan, Liberty will pursue progress on goals and objectives as specified in the Plan. Additionally, Liberty will provide quarterly updates on progress made and report on performance through identified success measures and metrics.

1.6 Research and Surveys

In 2026, Liberty will continue to collaborate and share best practices as they solicit feedback about PSPS resources offered to individuals with AFN through a variety of channels including participation in the AFN Council and engagement with local stakeholders.

Liberty will continue engagement with local governments, tribes, and critical facilities; presentations for customers and communities; wildfire and PSPS awareness surveys; feedback via digital channels; PSPS Tabletop Exercises; and notification message testing.

Liberty is committed to continuously assessing the needs of individuals with AFN before, during, and after a PSPS; considering feedback from trusted networks and established relationships with community based organizations, local governments, and tribal contacts supporting AFN populations.

1.7 Success Measures and Metrics

In 2026, Liberty will continue to use the Key Performance Indicators (KPIs) that were developed with the AFN Core Planning Team for the 2022 AFN Plan. These KPIs seek to measure the impacts of PSPS on individuals with AFN, awareness of support programs, and satisfaction of services offered.

Key Performance Indicators to measure the impact[11]:

1. The percentage of individuals with AFN who were aware of what support and resources were available to them during a PSPS.

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[11] Metrics related to KPI 4 are reported in section 2.1.6 and PSPS Post-Season surveys.

2. The percentage of individuals with AFN who were able to use necessary medical equipment to maintain necessary life functions for the duration of any PSPS that affected them.
3. The percentage of individuals who utilize mitigation services (e.g. 211 support, CRC centers, battery programs) reported they were satisfied with the level of support received.

Appendix A

ACCESS AND FUNCTIONAL NEEDS COLLABORATIVE COUNCIL:

Name	Organization	Title
Aaron Carruthers[12]	State Council on Developmental Disabilities (SCDD)	Executive Director
Alana Hitchcock	California 211	Executive Director
Andy Imparato	Disability Rights California (DRC)	Executive Director
April Johnson	San Diego Gas & Electric (SDG&E)	Customer Programs Supervisor
Audrey Williams	California Public Utilities Commission (CPUC)	Project and Program Supervisor
Aurora Cantu	Southern California Edison (SCE)	Senior Advisor, PSPS Customer Support and Accessibility
Britney Gaines	California Public Utilities Commission (CPUC)	Research Data Specialist
Chris Zenner[13]	Pacific Gas & Electric Company (PG&E)	Vice President, Residential Services & Digital Channels
Christina Rathbun	San Diego Gas & Electric (SDG&E)	Access and Functional Needs Project Manager
Dana Golan	San Diego Gas & Electric (SDG&E)	Vice President of Customer Services
Danielle Finch	San Diego Gas & Electric (SDG&E)	Director of Customer Success

[12] Aaron Carruthers is the Co-Chair of the AFN Collaborative Council.

[13] Chris Zenner is the Co-Chair of the AFN Collaborative Council, PG&E Vice President of Customer Channels and Services.

Name	Organization	Title
Hollie Bierman	San Diego Gas & Electric (SDG&E)	Director, Customer Programs
James Cho	California Public Utilities Commission (CPUC)	Program Manager
James Dui	California Public Utilities Commission (CPUC)	Public Utilities Regulatory Analyst
Jendy Burchfield	Southern California Edison (SCE)	Vice President, Customer Operations
Jennifer Guenther	Liberty	Senior Regional Manager - West
Jennifer Ocampo	Southern California Edison (SCE)	Senior Advisor, Access and Functional Needs
Jenny Limones	Pacific Gas & Electric Company (PG&E)	AFN Program Specialist, Expert
John Hagoski	San Diego Gas & Electric (SDG&E)	Customer Programs Advisor
Jordan Davis	Disability Rights California (DRC)	Attorney
Junaid Rahman	California Public Utilities Commission (CPUC)	Senior Regulatory Analyst
Karen Mercado	Disability Rights California (DRC)	Senior Administrative Assistant - Executive Unit
Kate Marrone	Liberty	Regulatory Analyst
Katelin Scanlan	San Diego Gas & Electric (SDG&E)	Manager, Customer Engagement
Kayla Price	Bear Valley Electric Services (BVES)	Customer Service Supervisor

Name	Organization	Title
Lisa Corbly	Pacific Power	Emergency Management
Lizz Stout	Pacific Gas & Electric Company (PG&E)	Program Manager, Principal
Lori Blackwell	Southern California Edison (SCE)	Principal Manager, Outage and PSPS
Maria Jaya	California Public Utilities Commission (CPUC)	Researcher
Matthew Fehse	San Diego Gas & Electric (SDG&E)	Access and Functional Needs Regulatory and Compliance Advisor
Michelle Uzeta	Disability Rights Education and Defense Fund	Interim Executive Director
Moustafa Abou-Taleb	California Public Utilities Commission (CPUC)	Public Utilities Regulatory Analyst
Nicholas Raft	Liberty	Regulatory Analyst
Paul Marconi	Bear Valley Electric Services (BVES)	President, Treasurer, & Secretary, Board Director
Pooja Kishore	PacifiCorp	Renewable Compliance Officer
Robb Henderson	San Diego Gas & Electric (SDG&E)	Communications Advisor
Robert Carbajal	Southern California Edison (SCE)	Senior Manager, Customer PSPS Compliance and Strategy
Robert Hand	California Foundation for Independent Living Centers (CFILC)	Interim Executive Director

Name	Organization	Title
Rosa Perea	Southern California Edison (SCE)	Senior Manager, PSPS Support and Accessibility
Sarah Lee	Southern California Edison (SCE)	Senior Advisor, Public Safety
Sean Matlock	Bear Valley Electric Services (BVES)	Energy Resource Manager / Assistant Corporate Secretary
Tawny Re	Bear Valley Electric Services (BVES)	Customer Program Specialist
Tom Smith	Pacific Gas & Electric Company (PG&E)	Sr. Manager, LCE Planning & Operations
Vance Taylor	California Governor's Office of Emergency Services (Cal OES)	Chief, Office of Access and Functional Needs

JIOU STATEWIDE ADVISORY COUNCIL PARTICIPANTS:

Name	Organization	Title
Adam Willoughby	California Department of Aging (CDA)	Asst. Director of Legislation and Public Affairs
Alana Hitchcock	California 211	Executive Director
Alexandria (Giobbi) Moffat	San Diego Gas & Electric (SDG&E)	Director of Clean Transportation
Alicia Menchaca	Bear Valley Electric Services (BVES)	Rate Analyst

Name	Organization	Title
Alyson Feldmeir	California Foundation for Independent Living Centers (CFILC)	Disability Disaster Access and Resource Manager
Amanda Kirchner	County Welfare Directors Association of California (CWDA)	Legislative Director
Annabel Vera	California Department of Social Services (DSS)	Program Analyst
Anthony Hoang	San Gabriel/Pomona Regional Center	Emergency Coordinator
April Johnson	San Diego Gas & Electric (SDG&E)	Customer Programs Supervisor
Aurora Cantu	Southern California Edison (SCE)	Senior Advisor, PSPS Customer Support and Accessibility
Carolyn Nava	Disability Action Center (DAC)	Executive Assistant
Chris Bober	Pacific Gas & Electric Company (PG&E)	Director, Customer Care
Chris Garbarini	California Department of Developmental Services (DDS)	Senior Emergency Services Coordinator
Chris Zenner	Pacific Gas & Electric Company (PG&E)	Vice President, Residential Services & Digital Channels
Christina Mills	California Association of Area Agencies on Aging (C4A)	Executive Director
Christina Rathbun	San Diego Gas & Electric (SDG&E)	Access and Functional Needs Project Manager
Dan Heller	Deaf Link	President

Name	Organization	Title
Dan Okenfuss	California Foundation for Independent Living Centers (CFILC)	Public Policy Manager
Danielle Finch	San Diego Gas & Electric (SDG&E)	Director of Customer Success
Eleonore Yotsov	PacifiCorp	Director, Emergency Management, PacifiCorp
Eric Schwarzrock	Liberty	President
Evan Duffey	Pacific Gas & Electric Company (PG&E)	Manager, Forecasting and Operations
Gina Esparza	Eastern Los Angeles Regional Center (ELARC)	Emergency Management Coordinator
Greg Oliva	California Department of Social Services (DSS)	Assistant Deputy Director, Central Operations, Community Care Licensing Division
James Cho	California Public Utilities Commission (CPUC)	Program Manager
James Dui	California Public Utilities Commission (CPUC)	Senior Utilities Engineer
Jeana Arnold	Pacific Gas & Electric Company (PG&E)	ADA Specialist, Expert
Jendy Burchfield	Southern California Edison (SCE)	Vice President, Customer Operations
Jennifer Guenther	Liberty	Senior Regional Manager - West
Jennifer Nerida	Pacific Gas & Electric Company (PG&E)	Senior ADA Specialist

Name	Organization	Title
Jennifer Ocampo	Southern California Edison (SCE)	Senior Advisor, Access and Functional Needs
Jenny Limones	Pacific Gas & Electric Company (PG&E)	AFN Program Specialists, Expert
Jonathan Malicdem	Department of Social Services (DSS)	Unknown
Jordan Davis	Disability Rights California (DRC)	Attorney
Jordan Parrillo	Liberty	Manager of Regulatory Affairs
Joseph Grounds	Kern Regional Center (KERNRC)	Emergency Services Officer
Josh Gleason	California Department of Social Services (DSS)	Unknown
JR Antablian	California Department of Social Services (DSS)	Chief, Disaster Services Branch
June Isaacson Kailes	Disability Policy Consultant	Disability Policy Consultant
Karey Morris	Kern Regional Center (KERNRC)	HR Manager
Kate Marrone	Liberty	Customer Care Manager
Katelin Scanlan	San Diego Gas & Electric (SDG&E)	Manager, Customer Engagement
Kay Chiodo	Deaf Link	CEO
Kayla Price	Bear Valley Electric Services (BVES)	Customer Service Supervisor

Name	Organization	Title
Kelly Brown	Interface Children & Family Services	Community Information Officer
Kendall Skillicorn	California Department of Social Services (DSS)	Bureau Chief, Department Operations Bureau
Kevin Sharp	Pacific Gas & Electric Company (PG&E)	Customer Insights Strategies
Kristopher Bourbois	San Diego Gas & Electric (SDG&E)	Financial Planning - Senior Business Analyst II
Larry Grable	Service Center for Independent Living (SCIL)	Executive Director
Lauren Giardina	Disability Rights California (DRC)	Executive Director Managing Attorney
Leora Filosena	California Department of Social Services (DSS)	Deputy Director, Adult Programs Division
Lisa Corbly	Pacific Power	Emergency Management Specialist
Lizz Stout	Pacific Gas & Electric Company (PG&E)	AFN Program Manager
Lori Blackwell	Southern California Edison (SCE)	Principal Manager, Outage and PSPS
Malorie Lanthier	North Los Angeles County Regional Center	IT Director
Maria Aliferis-Gierde	Department of Rehabilitation (DOR)	Executive Officer, California Committee on Employment of People with Disabilities
Maria Jaya	California Public Utilities Commission (CPUC)	Researcher

Name	Organization	Title
Matt Fehse	San Diego Gas & Electric (SDG&E)	Access and Functional Needs Regulatory and Compliance Advisor
Mayra Alvarado	North Los Angeles County Regional Center	Manager
Miguel Larios	San Diego Regional Center (SDRC)	Director, Community Services
Moustafa Abou-Taleb	California Public Utilities Commission (CPUC)	Safety Policy Division
Nguyen Quan	Bear Valley Electric Services (BVES)	Regulatory Affairs
Nicole Pacheco	California Council of the Blind (CCB)	Operations Manager
Paul Marconi	Bear Valley Electric Services (BVES)	President, Treasurer, & Secretary
Pooja Kishore	PacifiCorp	Renewable Compliance Officer
Rick Yrigoyen	California Department of Social Services (DSS)	Staff Services Manager
Robb Henderson	San Diego Gas & Electric (SDG&E)	Communications Advisor
Robert Carbajal	Southern California Edison (SCE)	Senior Manager, Customer PSPS Compliance and Strategy
Ron Lee	Redwood Coast Regional Center	Emergency Management Coordinator
Ronald Moore	Bear Valley Electric Services (BVES)	Regulatory Affairs

Name	Organization	Title
Rosa Perea	Southern California Edison (SCE)	Senior Manager, PSPS Support and Accessibility
Samuel Jain	Disability Rights California (DRC)	Senior Attorney
Sarah Harris	California Department of Rehabilitation	Section Chief, Independent Living and Assistive Technology
Scott O'Connell	Red Cross	Regional Disaster Officer
Sean Matlock	Bear Valley Electric Services (BVES)	Energy Resource Manager / Assistant Corporate Secretary
Seneca St. James	California Department of Developmental Services (DDS)	Community Program Specialist III
Serra Rea	California Foundation for Independent Living Centers (CFILC)	DDAR Manager
Sheri Farinha	NorCal Services for Deaf and Hard of Hearing	Chief Executive Officer
Staphany Lu	San Diego Regional Center (SDRC)	Emergency Management Coordinator
Stephanie Tews Sheldrick	Pacific Gas & Electric Company (PG&E)	Director, Customer Experience & Insights
Sydney Schellinger	California Department of Aging (CDA)	Senior Emergency Services Coordinator
T. Abraham	Hospital Council	Regional Vice President
Tamara Rodriguez	California Department of Developmental Services (DDS)	Officer, Emergency Preparedness & Response

Name	Organization	Title
Tawny Re	Bear Valley Electric Services (BVES)	Customer Program Specialist
Tiffany Swan	San Diego Regional Center (SDRC)	Community Services Home and Community Based Services Specialist
Tom Smith	Pacific Gas & Electric Company (PG&E)	Sr. Manager, LCE Planning & Operations
Victor Duron	Department of Rehabilitation	Acting Director
Yvonne Gratianne	San Gabriel/Pomona Regional Center	Communications and Public Engagement Officer
Zeus Ferrao	Southern California Edison (SCE)	Customer Insights Project Manager, Advisor

2. CONCEPT OF OPERATIONS

Public Safety Power Shutoff Events

In response to extreme weather conditions, Liberty enacted PSPS in its service territory on November 5, 2025. During PSPS events, Liberty's goal is first and foremost to protect the community by promoting safety and minimizing the potential risk presented by fire weather conditions. In doing so, Liberty also considers the potential disruption that occurs to its AFN and electricity dependent customers when there is de-energization. As such, Liberty only utilizes PSPS as an option of last resort. To mitigate the potential impact on AFN customers, Liberty works with local public safety partners throughout each of these PSPS events.

Previously, Liberty has enacted PSPS on November 11, 20, and 22 of 2024. Prior to these PSPS events, Liberty had experienced potential PSPS events, but conditions had not risen to the level where a PSPS needed to be implemented.

Specific details regarding Liberty's 2024 PSPS events are available on Liberty's website.[10]

2.1 Preparedness/Readiness (Before Power Shutoff)

2.1.1 AFN Identification Outreach

In 2026, Liberty plans to execute AFN identification outreach via a variety of channels, including CBO outreach and targeted customer outreach to encourage AFN self-identification, customer program enrollment, and increased awareness of AFN resource availability. More information on customer preparedness outreach can be found in Section 2.1.6.

2.1.2 AFN Support Resources

211 Care Coordination and Referral Service

In 2021, Liberty launched a webpage dedicated to 211 customer resource information that remains available. Liberty does not currently participate in 211 Care Coordination contracts; however, 211 partnership continues to be an area of further exploration in 2026 where available. Currently, El Dorado and Sierra counties do not have active 211 services in place, and there are varying degrees of support in other counties served by Liberty.

In 2023, Liberty established new relationships with Connecting Point in Nevada and Placer Counties, resulting in ongoing 211 inclusion in tabletop exercises. Liberty continues to maintain CBO and agency connections throughout the service territory, including areas where 211 is not yet active.

Resource Planning and Partnerships

In 2025, Liberty continued to maintain its partnerships with local agencies and CBOs and intends to continue to expand these partnerships in 2026. For example, Liberty has continued its effort to collaborate with senior nutrition providers throughout its service territory by providing them with emergency shelf-stable meal boxes including food items, customer assistance program information, AFN

self-identification information, and PSPS preparedness deliverables.

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[10] For details regarding Liberty's 2024 PSPS events, visit Liberty's Wildfire Mitigation Website

The most recent round of shelf-stable food items was delivered in Q4 of 2025.

Additionally, Liberty continues to seek collaborative opportunities to provide resource support for AFN communities beyond elderly populations.

Liberty is also participating in monthly coordination meetings with the other California Small Multi-Jurisdictional Utilities ("SMJUs") to discuss best practices and learning opportunities related to serving AFN communities.

2.1.3 Back-Up Power

Medical Baseline Backup Battery Program in Development

To support resiliency for its customers that depend on power for life sustaining medical devices, Liberty is working to establish a program to offer eligible Medical Baseline customers a free portable backup battery in 2026. Liberty has finalized its Statement of Work ("SOW") and Request for Proposals ("RFP") materials for this program and plans to initiate an RFP in February of 2026.

2.1.4 Customer Assistance Programs

Medical Baseline ("MBL") Allowance Program

Liberty's MBL Program provides an increase in the baseline allowance to qualified residential customers. Liberty performs program outreach through bill inserts, radio, social media, digital advertisements, community events, targeted outreach, and collaboration with CBOs, agencies, and the Washoe Tribal community. In 2024, Liberty added the option to apply for the MBL Allowance Program online.

Energy Saving Assistance ("ESA") Program

Liberty offers the ESA Program to eligible income-qualified customers. This program provides energy-efficient home improvements and energy education. Liberty performs program outreach through bill inserts, radio, social media, digital advertisements, community events, targeted outreach, and collaboration with CBOs, agencies, and the Washoe Tribal community.

California Alternate Rates for Energy ("CARE")

Liberty offers a 20 percent CARE discount to qualified low-income primary residential customers who receive energy directly from Liberty or through a sub-meter, such as in a mobile home park or an apartment complex. Liberty performs program outreach through bill inserts, radio, social media, digital advertisements, community events, targeted outreach, and collaboration with CBOs through the CARE

Community Organization Outreach Program, agencies, and the Washoe Tribal community.

PSPS Offering Additions

Liberty stocks emergency gift cards to offer support to CARE or MBL customers in the event of an active PSPS through CRC locations, and is also prepared to support alternative lodging for critical MBL customers as needs are communicated by community partners or MBL customers.

2.1.5 Emergency Operations Centers

Emergency Operations Centers are in both the South Lake Tahoe and North Lake Tahoe offices. Liberty has the ability to manage these events partially or fully via virtual Incident Command with paperless Incident Command System ("ICS") forms, job descriptions, event documentation, and electronic meeting venues. Staff members are trained to perform their roles in both formats.

Preparation Exercises

In preparation for wildfire season, Liberty will conduct a Public Safety Partner Workshop, a tabletop PSPS exercise, and a full-scale PSPS exercise. Dates are to be determined at this time. The full-scale exercise and the planning meetings leading up to the exercise will include Cal OES, CPUC, CAL FIRE, and Office of Energy Infrastructure Safety ("OEIS"), along with other public safety partners, including government, critical facilities, and AFN Community advocates.

Training

Liberty employees receive annual Emergency Management Plan training. The instruction includes specific training on the roles and responsibilities of each functional area in support of the ICS. Emergency response exercises are executed annually, so employees practice using the plan, as well as test the plan for effectiveness. Liberty also participates in regional exercises to train employees and exercise the Emergency Management Plan and will participate in emergency exercises and training with state and regional OES and county emergency offices.

Additional PSPS CRC Staff training was developed in 2022 for CRC representative and CRC lead positions. This training program provides a thorough overview of PSPS criteria, activation, and execution expectations for involved roles. Disability sensitivity content was integrated into the training program to support AFN individuals during a PSPS event. This training was last administered in September 2025. In November 2025, Liberty experienced one PSPS event that required on-the-job training of additional CRC leads. CRC-related lessons learned from this event will be included in future training. Liberty's third-party contractor, Fire Dawg, also provided significant support during this PSPS event by preparing and staffing CRC locations ahead of de-energization.

2.1.6 PSPS Preparedness Outreach and Community Engagement

CBO Outreach

Liberty seeks opportunities to provide PSPS preparedness information through established CBOs

throughout the year. Liberty sent links directing to PSPS preparedness information, customer assistance program information including AFN-self ID, and web resource information to CBO contacts via email on August 8, 2025. This effort was also used as an opportunity to update contact information for CBOs for notification during PSPS events.

Refer to the following attachment for an example of the PSPS and self-identification information provided to CBOs as part of this effort:

"Attachment_01-Liberty-CBO_Outreach"

Liberty also continues to grow and expand CBO networks throughout its service territory where possible by providing materials and resource information for CBOs to share with the communities they serve. A targeted webinar presentation focused on PSPS awareness and information was provided again in 2025 to CBOs and local agencies. Invitations were sent to contacts throughout the service territory.

Liberty has held and participated in multiple outreach events to access AFN communities with Spanish-speaking support on-site through collaboration with local CBOs and partners. Liberty will maintain CBO relationships throughout 2026 by continuing to share outreach opportunities for dissemination to clients and pursuing collaborative opportunities to reach AFN audiences. Liberty shares available resources and materials with organizations through in-person and virtual meetings.

Liberty also participates in community collaborative groups in both South and North Lake Tahoe with the goal of being an involved partner in community conversations, establish new connections, and provide applicable information on available assistance programs and PSPS preparedness information to local networks.

Liberty's Strategic Growth & Community Affairs Manager, working primarily with AFN matters, served as a member of the Community Action Council of El Dorado County in 2025. This council is comprised of a tripartite board and includes three categories: public official sector, low-income sector, and community sector. The Council provides advice and recommendations to the Board of Supervisors, aids in educating the community on human services and available resources in El Dorado County and participates in developing collaborative solutions to meet ongoing community needs, while working together to meet the basic needs and to improve the quality of life for residents of El Dorado County.

AFN Customer Outreach

Liberty conducts customer outreach to share information about customer programs (CARE, ESA, MBL) and PSPS awareness through a variety of methods, including community events, website resources, social media, bill inserts, targeted outreach, radio ads (multicultural media), digital ads, print ads, and through call center staff. AFN identification and available resource communication will continue to be a focus in 2026. Utilizing CBO networks and targeted customer program outreach, including community events and direct mailings, remains a core method of AFN identification and increased customer awareness of available resources. Liberty continued outreach efforts in 2025, completing 24 outreach events.

2025 outreach events included:

- Tahoe Family Resource Center Bilingual Presentation, South Lake Tahoe, CA, January 22, 2025

- El Dorado County LIHEAP Collaboration, South Lake Tahoe, CA, February 11, 2025
- Customer Service Open House, Kings Beach, CA, February 26, 2025
- Customer Service Open House, South Lake Tahoe, CA, March 28, 2025
- South Lake Tahoe Business Expo, South Lake Tahoe, CA, April 3, 2025
- South Lake Tahoe Earth Day, South Lake Tahoe, CA, April 19, 2025
- Palisades Earth Day, Truckee, CA, April 26, 2025
- Customer Service Open House, Loyalton, CA, April 30, 2025
- Customer Service Open House, Portola, CA, April 30, 2025
- Senior Center Presentation, South Lake Tahoe, CA, May 7, 2025
- Washoe Tribe Alpine County Create the Good Lunch, Markleeville, CA, May 9, 2025
- Wildfire Safety Expo, South Lake Tahoe, CA, May 24, 2025
- Placer County Fire Prevention Town Hall, Kings Beach, June 17, 2025
- Sierra County Health and Wellness Fair, Loyalton, CA, August 2, 2025
- Tahoe Valley Townhomes Open House, South Lake Tahoe, CA, August 4, 2025
- Sierra Community House Back to School Vaccine Clinic, Kings Beach, CA, August 20, 2025
- Sierra Valley Senior Apartments, Loyalton, CA, September 10, 2025
- Fire Fest, South Lake Tahoe, CA, September 27, 2025
- Coleville Community Open House, Coleville, CA, October 2, 2025
- Barton Health Fair, South Lake Tahoe, CA, October 16, 2025
- Coleville Community Open House, November 6, 2025
- Alpine County LIHEAP Collaboration Create the Good Lunch, November 7, 2025
- Coleville Community Open House, December 4, 2025
- IMACA Food Distribution Event, Coleville, CA, December 23, 2025

Wildfire Messaging Customer Awareness Surveys

In 2025, Liberty again utilized MDC Research to conduct wildfire messaging awareness surveys that gauge customer awareness of information related to wildfire preparedness and safety. Survey questions were designed to measure awareness of Liberty messages related to wildfire preparedness, PSPS, notifications, customer information recall, and more.

Liberty's most recent survey round, took place between November 13 and November 30, 2025, included 413 completed phone and web surveys. Compared to Liberty's June 2025 survey round, the November survey results showed increases in awareness of wildfire safety communications and recall of the phrase "Public Safety Power Shutoff" or "PSPS." This is a significant improvement in communication awareness compared to the steady decline between June 2023 and June 2024.

- 76% of respondents from the November 2025 survey were aware of wildfire survey communications, up significantly since June 2025 (65%).
- 68% of respondents from the November 2025 survey recalled the acronym "PSPS," a significant increase from 55% in June 2025.
- Among those recalling the acronym "PSPS", 96% are aware of its possible implementation to prevent wildfire, similar to results in June 2025 (97%).
    - 79% understood that PSPS is a mitigation of last resort, and that the likelihood of implementation can be reduced when Liberty takes steps to harden its infrastructure (86%), marking a slight increase from 2024 results.

MDC points out that these results indicate improvement beyond seasonal fluctuations when compared to November 2024 results. Additionally, in November 2025, Liberty experienced one PSPS event in its service territory, following three PSPS events and one NV Energy PSOM event in 2024. Prior to November 2024, Liberty had not experienced a PSPS event in the history of its program. As MDC points out in its evaluation, 34% of customers surveyed in November experienced a PSPS, which likely had an influence on increased awareness.

The November 2025 survey round also provided an opportunity to assess metrics tied to Liberty's KPIs discussed in Section 1.8:

1. 47% of surveyed respondents with AFN were aware of what support and resources were available to them during a PSPS. This metric increased slightly from a result of 42% in December 2024.

2. 27% of respondents said they were able to use necessary medical equipment during a PSPS that affected them and 46% stated that they were unable to do so. 27% of survey respondents that identified as electricity dependent said they had no need to utilize medical equipment during the PSPS that affected them.

3. MDC's methodology surveys Liberty's customers at random. Of the 413 surveys completed in November, 34% stated that they experienced a PSPS. 71% reported receiving adequate notification and information to prepare, and 47% surveyed reported awareness of CRCs. Four respondents reported visiting a CRC location. Of these 4 respondents, 50% reported that the CRC met their needs.

For additional survey findings, MDC's recommendations, and other detailed metrics from Liberty's 2025 survey results, refer to the following attachments:

"Attachment 02-Liberty-Survey_Results_June2025"
"Attachment 03-Liberty-Survey_Results_November2025"

Tribal Engagement

Liberty maintains a working relationship with the Washoe tribe, the only tribal community in its service territory. As mentioned above, Liberty experienced one PSPS event in November 2025. The Washoe Tribe provides support to customers with AFN and was included as an essential Public Safety partner throughout each of these events. Liberty maintained communication with the Washoe tribe's Emergency Manager and the Hung-A-Lel-Ti Community Chairman at each stage of PSPS. Liberty has a Memorandum of Understanding with the Washoe tribe and has established a CRC location in Markleeville, CA within close proximity to the local AFN community. This CRC location was activated from 8:00 AM to 10:00 PM during the PSPS event.

Liberty acknowledges the unique needs of tribal residents and will continue to develop a supportive relationship in 2026, including continued collaboration with the Washoe Tribe regarding ongoing grant opportunities. Liberty held meetings with the Washoe Tribe's Emergency Manager during 2025,

including discussion related to the importance of electricity dependent customer awareness of the MBL Program and benefits of enrollment. Liberty continues to discuss the importance of the medical baseline program and encourage tribal resident enrollment based on communicated need.

Marketing and Communications

Liberty has developed the following communications outreach plan to notify AFN customers of pertinent PSPS status updates, including ongoing proactive education.

Liberty will continue to engage AFN customers throughout 2026 to educate them about the PSPS of notification process and how they can prepare for prolonged de-energization through the following channels:

- Community meetings: Liberty will continue to share information through community meetings to educate customers about the PSPS notification process and preparing for PSPS events. When applicable, Liberty will co-host meetings with public safety partners and AFN advocacy groups.

- Toolkits: Liberty will distribute PSPS educational pamphlets, flyers, and checklists in accessible formats. Toolkit information is available in English, Spanish, French, German, Chinese, Vietnamese, and Tagalog.

- Website: Liberty will publish and maintain PSPS web copy outlining Liberty's notification process and detailing ways for customers to prepare for PSPS events, including information specific to AFN populations.

- Social media: Liberty will post content to Facebook and X informing customers of Liberty's PSPS notification process.

- Customer email: Liberty will distribute an email informing customers of Liberty's PSPS notification process.

- Bill insert/mail: Liberty will distribute a bill insert/mailer informing customers of Liberty's PSPS notification process.

Throughout 2025, Liberty shared AFN self-identification information through email, direct mail, and shared paper versions of the AFN self-identification web forms for increased accessibility. Throughout 2025, Liberty shared AFN self-identification information through email, direct mail, and shared paper versions of the AFN self-identification web forms for increased accessibility. AFN self-ID information is included in shelf-stable meal emergency preparedness boxes to target elderly customers receiving senior nutrition assistance. AFN identified households received targeted communication via direct mail in 2025 focused on PSPS awareness and preparedness information. Direct mail communications were revised with accessibility and simplified language as a focus to both AFN and MBL audiences in 2025, and a direct mail master meter property communication was sent with a focus on property manager PSPS preparedness and tenant assistance program awareness. Accessible doorhangers were left at MBL households during a territory-wide field audit sharing information about PSPS preparedness, and similar to direct mail communications, were provided in both English and Spanish. Additionally, a call campaign

was executed to reach MBL customers to communicate the importance of up to date contact information and PSPS awareness.

Liberty intends to continue accessible and targeted communication efforts with AFN customers in 2026.

Translations

Liberty call centers provide customers access to bilingual (Spanish and English) customer service representatives. Additionally, Liberty offers Spanish language translation on its website and Spanish language PSPS preparedness videos.

2.1.7 Community Resource Centers

Liberty has established an internal working group comprised of representatives from a variety of departments, including emergency management and wildfire mitigation, to focus on CRC planning. This group meets regularly to further develop plans, determine priorities, and execute required actions for CRC preparedness. After a PSPS event where one or more CRCs are activated, Liberty performs a post-event hotwash to gather CRC lessons learned.

Liberty contracts a third party, Fire Dawg, Inc., for support services including CRC staffing and setup. Liberty provides snacks, water, device charging ability, Wi-Fi, ADA-accessible restrooms, resource information, third-party customer service staff (including bilingual representation when possible), and blankets at CRC locations. CRC locations present a unique opportunity for program enrollment, PSPS preparedness information sharing, and AFN identification. Liberty plans to provide information on CARE, ESA, and MBL programs at each CRC. PSPS toolkit information will be shared in English and Spanish at CRC locations.

Unique community needs have been considered in CRC planning, including a water truck for agricultural areas when required. Refrigeration needs for medication are also considered in CRC planning based on feedback gathered from local CBOs. Ice delivery has also been included in the planning process, and is provided by Fire Dawg, Inc. After receiving feedback from local partners, TVs have been utilized to share informational videos to educate the public on PSPS and wildfire mitigation. Liberty will continue to build relationships and solicit feedback and suggestions regarding community PSPS support from local organizations and customers.

2.2 PSPS Activation (During –Emergency Operation Center activated)

MBL Customer Communication

To identify and reach MBL customers in a PSPS event, Liberty identifies accounts marked as MBL within the potentially impacted area and executes its notification sequence according to protocol. The MBL notification sequence is as follows:

1. Onsolve notification (providing text, email, and voice push notifications, with receipt verification capability).
2. If no positive contact, phone call to customer from customer service representative.
3. If still no positive contact, physical site visit to the residence.
4. If still no positive contact, door hanger notification left at the residence.

PSPS Notifications

Liberty will continue to notify AFN customers before, during, and after a PSPS through the following channels (posted and updated as needed):

- Onsolve alerts: Liberty will distribute an alert through the Onsolve system notifying customers of the status of the PSPS. The Onsolve system consists of a three-part alert: first a text is sent, then an email, and lastly a call.

- CBOs: Liberty will notify CBOs that serve AFN populations of the status of the PSPS and request that they distribute the alert to their contact list.

- Critical facilities and infrastructure: Liberty will notify critical facilities and infrastructure

of the status of the PSPS and request that they distribute the alert to their own AFN contact lists. Critical facilities and infrastructure include:

- Police stations
- Fire stations
- Emergency operations centers
- Schools
- Jails and prisons
- Public health departments
- Medical facilities, including hospitals, skilled nursing facilities, nursing homes, blood banks, health care facilities, dialysis centers, and hospice facilities
- Facilities associated with automobile, rail, and aviation transportation for civilian and military purposes
- Telecommunication companies

- Website: Liberty will publish an alert to its customer-facing website notifying customers of the status of the PSPS. Microsites are made available in both English and Spanish during a PSPS event.

- Social media: Liberty will post content to Facebook and X notifying customers of the status of the PSPS.

- Customer email: Liberty will distribute an email to AFN customers notifying them of the status of the PSPS. An enhancement added in 2021 includes Spanish language messaging within PSPS customer emails.

- News release and public service announcements: Liberty will distribute a news release and/or a public service announcement to local media outlets alerting customers of the status of the PSPS. In 2021, Liberty added multicultural media outlets to lists of media contacts utilized for PSPS notification.

- Customer service representatives (CSR): Liberty will provide CSRs with information and resources for AFN customers during a PSPS.

- Content intended for customers will be translated and disseminated in English and Spanish when possible.

2.3 Recovery (After - Power has been restored)

Customer Support / Notification

Liberty will continue to maintain partnerships with local organizations where possible to remain aware of customer needs before, during, and after PSPS events. Liberty will notify AFN customers after a PSPS through the same channels utilized during a PSPS event described in Section 2.2. These channels include Onsolve alerts, communications to CBOs and critical facilities, updates to the Liberty website, posts on social media, customer emails, and news releases. Content intended for customers will be translated and disseminated in English and Spanish when possible.

After-Action Reviews and Reports

After-action reviews ("AARs") with company leadership and the Incident Management Team are conducted after an exercise and/or event. Exercise and event AARs are documented in Homeland Security Exercise and Evaluation Program ("HSEEP") format. AARs include an improvement plan that assigns actions and tracks items needing improvement. Following implemented PSPS events, Liberty will conduct CRC-specific hotwashes, as applicable, to gather lessons learned.

Liberty's AAR of its November 5, 2025 PSPS Event included three lessons learned and resolutions related to CRCs:

- Regarding CRC staffing, Liberty will reassess its list of CRC leads to address recent staffing changes;
- Regarding CRC signage, Liberty will put up signs outside CRC locations during future PSPS events; and
- Regarding CRC supplies, Liberty will determine if there is a reasonable solution to better prepare customers using well water who requested larger-sized bottles of water for toilet flushing.

Customer Surveys

Liberty will continue its pre-season and post-season wildfire outreach survey efforts in 2026 to gather information about wildfire awareness and inform communications plans. Liberty intends to use the results of its next survey round in 2026 to capture additional customer feedback regarding its 2025 PSPS event.

CONCLUSION

In 2026, Liberty will continue to seek opportunities to enhance outreach effectiveness and expand CBO networks across the service territory, such as informing partners of program changes, sharing accessibility improvements as applicable, and acting as a participative member of community outreach events. Liberty will continue to prioritize identifying and engaging with AFN populations in its service area and will continue working with local governments, public safety organizations, tribal communities, representatives of AFN communities, and CBOs to help communicate with support AFN customers in compliance with guidelines in R.18-12-005.

Respectfully submitted,

/s/ Jordan Parrillo

Jordan Parrillo
Manager of Regulatory Affairs
Liberty Utilities (CalPeco Electric) LLC
701 National Ave,
Tahoe Vista, CA 96148
Telephone: 530-721-7818
Dated: January 31, 2025
jordan.parrillo@libertyutilities.com

Attachment 1
Liberty's Community Based Organization Outreach

Access and Functional Needs Customers



What is Access and Functional Needs (AFN)?

The CPUC defines the Access and Functional Needs (AFN) population as individuals who have developmental or intellectual disabilities, physical disabilities, chronic conditions, injuries, limited English proficiency or who are non-English speaking, a household with older adults and/or children, people living in institutionalized settings, or those who are low income, homeless, or transportation disadvantaged, including, but not limited to, those who are dependent on public transit or those who are pregnant.

Benefits of Self-Identification

Liberty is working to identify the unique needs of the communities we serve. When you self-identify as an AFN customer, Liberty will attempt to provide more information about Public Safety Power Shutoffs, low income programs, and other resources using the contact information on file or submitted through this form.

Privacy Statement

Algonquin Power & Utilities Corp. and its affiliates and subsidiaries, which include those entities forming part of the Liberty Utilities Group and the Liberty Power Group (collectively referred to as "Algonquin," "we," "us," or "our") are concerned with your privacy and want you to be familiar with how we collect, use and disclose personal information. This Privacy Policy describes Algonquin's practices with respect to personal information collected through our websites (collectively referred to as "websites") as well as offline, such as when you ("user", "you" or "your") apply for or use our services, or otherwise interact with us. This Privacy Policy does not apply to personal information relating to our employees.

By accessing or using our websites or services or providing us with personal information, you agree and consent to the provisions of this Privacy Policy. Learn more about our Privacy Policy at libertyenergyandwater.com.

Submit Your Self-Identification Form

Please mail this paper form to:

Attn: Cindy Ramos
Liberty
933 Eloise Ave.
South Lake Tahoe, CA 96150

OR submit a self-identification form online at https://libertyutilities.com/afn/english/ or by scanning this QR code:

Liberty Self-Identification Form: Access and Functional Needs

1. Customer First Name _____

2. Customer Last Name _____

3. Account Number
Enter full 12-digit Liberty account number (ex. 200000xxxxxxx), found at the top of your billing statement.

_____

4. Service Address - Street
Please enter the address linked to your Liberty account.

_____

5. Service Address - City
Please enter the address linked to your Liberty account.

_____

6. Service Address - Zip Code
Please enter the address linked to your Liberty account.

_____

7. I agree to willingly self-identify as an AFN customer.*
**Liberty wants to understand the needs of the communities we serve. If you let us know you're an AFN customer, we will provide information about power shutoffs, programs for low-income customers, and other resources using the contact details we already have on file. To update contact information on your account, please call 1-800-782-2506.*

☐ I agree

8. AFN Category
Please choose the AFN category below that best fits you. If you are enrolled in the Medical Baseline Allowance or CARE program, you are already identified as AFN. If you want to apply for these financial assistance programs, please check the program applications on our Electric Financial Help webpage.

☐ Physical or developmental or intellectual disabilities

☐ Chronic conditions or injuries

☐ Limited English proficiency

☐ Households with older adults

☐ Homeless and/or transportation disadvantaged

☐ Other: _____

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Clientes de Acceso y Necesidades Funcionales



¿Qué es AFN?

La CPUC define la población con Necesidades Funcionales y de Acceso (AFN por sus siglas en inglés) como personas que tienen discapacidades del desarrollo o intelectuales, discapacidades físicas, afecciones crónicas, lesiones, dominio limitado del inglés o que no hablan inglés, un hogar con adultos mayores y/o niños, personas que viven en entornos institucionalizados, o aquellos que tienen bajos ingresos, personas sin hogar o en desventaja de transporte, incluidos, entre otros, los que dependen del transporte público o las que están embarazadas.

Beneficios de la Autoidentificación

En Liberty, nos esforzamos por identificar las necesidades específicas de las comunidades a las que servimos. Al identificarse como cliente de AFN, Liberty intentará proporcionarle más información sobre cortes de suministro eléctrico por motivos de seguridad pública, programas para personas de bajos ingresos y otros recursos, utilizando la información de contacto que tenemos registrada o que puede enviar a través de este formulario.

Declaracion de Privacidad

Algonquin Power & Utilities Corp. y sus filiales y subsidiarias, que incluyen las entidades que forman parte de Liberty Utilities Group y Liberty Power Group (en conjunto, "Algonquin", "nosotros", "nos" o "nuestro"), se preocupan por su privacidad y desean que esté familiarizado con la forma en que recopilamos, utilizamos y divulgamos su información personal. Esta Política de Privacidad describe las prácticas de Algonquin con respecto a la información personal recopilada a través de nuestros sitios web (colectivamente denominados, "sitios web"), así como fuera de línea, como cuando usted ("usuario", "usted" o "su") solicita o utiliza nuestros servicios, o interactúa con nosotros de cualquier otra forma. Esta Política de Privacidad no se aplica a la información personal de nuestros empleados.

Al acceder o utilizar nuestros sitios web o servicios, o al proporcionarnos información personal, usted acepta y consiente las disposiciones de esta Política de Privacidad. Obtenga más información sobre nuestra Política de Privacidad en libertyenergyandwater.com. Obtenga más información sobre nuestra Política de Privacidad en libertyenergyandwater.com.

Envíe Su Formulario de Autoidentificación

Favor de enviar este formulario en papel por correo a:

Attn: Cindy Ramos
Liberty
933 Eloise Ave.
South Lake Tahoe, CA 96150

O envíe un formulario de autoidentificación en línea en https://libertyutilities.com/afn/spanish/ o escaneando este código QR:

Formulario de Autoidentificación de Liberty: Acceso y Necesidades Funcionales

1. Primer Nombre del Cliente _____

2. Apellido del Cliente _____

3. Número de cuenta
Ingrese el número de cuenta completo de Liberty de 12 dígitos (p. ej.: 200000xxxxxx), que se encuentra en la parte superior de su estado de cuenta.

_____

4. Dirección de Servicio - Calle
Ingrese la dirección vinculada a su cuenta Liberty

_____

5. Dirección de Servicio - Ciudad
Ingrese la dirección vinculada a su cuenta Liberty.

_____

6. Dirección de Servicio - Código postal
Ingrese la dirección vinculada a su cuenta Liberty.

_____

7. Acepto identificarme voluntariamente como cliente de AFN.*
**En Liberty, queremos comprender las necesidades de las comunidades a las que servimos. Si nos informa que es cliente de AFN, le proporcionaremos información sobre cortes de suministro eléctrico, programas para clientes de bajos ingresos y otros recursos utilizando los datos de contacto que ya tenemos registrados. Para actualizar la información de contacto de su cuenta, llame al 1-800-782-2506.*

☐ Estoy de Acuerdo

8. Categoría de AFN
Seleccione la categoría de AFN que mejor se adapte a sus necesidades. Si está inscrito en el programa de Subsidio Médico Base o CARE, ya está identificado como AFN. Si desea solicitar estos programas de asistencia financiera, consulte las solicitudes en nuestra página web de Ayuda Financiera Eléctrica.

☐ Discapacidades físicas, intelectuales o del desarrollo
☐ Condiciones o lesiones crónicas
☐ Dominio limitado del Ingles
☐ Hogares con adultos mayores
☐ Sin hogar y/o con desventajas de transporte
☐ Otro: _____

Liberty®

www.libertyenergyandwater.com

Attachment 2
Liberty's Survey Results, June 2024

Wildfire Messaging Awareness

Prepared by

MDC Research

Jakob Lahmers - Jakob.Lahmers@mdcresearch.com

Objectives & Methodology

The **overall objective** of this research was to measure the public's awareness of messaging related to wildfire preparedness and safety. Specific research objectives include:

- Measure awareness of Liberty Utilities (Liberty) messages related to wildfire preparedness
- Identify recall of specific message topics
- Identify recall of message channels
- Measure recall and understanding of Public Safety Power Shutoff or PSPS
- Evaluate sources customers are most likely to turn to for information about PSPS
- Explore actions taken by customers to prepare for wildfire season
- Measure awareness of Liberty's efforts to reduce the risk of wildfires
- Evaluate PSPS notifications perception

Target Audience

- Liberty residential and business customers in California
- Liberty critical customers

Methodology

- Customers were surveyed at random from Liberty customer records, targeted for either phone or web administration
- Surveys available to customers in English and Spanish
- A total of 260 surveys were completed between June 8 and June 18
  - Phone: 180 completed surveys from 12,748 records
  - Web: 80 completed surveys from 18,916 records

Key Findings

Communications

- **65% are aware of wildfire safety communications**, consistent with December 2024 (62%).
- **Liberty** remains the primary source for wildfire preparedness information despite a significant decrease from December 2024 (25% vs 40%). **Vegetation management** and **personal preparedness** are the most common messages recalled.
- **Email** remains the most cited channel for wildfire preparedness communication, though it saw a significant decrease from December 2024 (33% vs 49%); bill inserts, social media, and TV news make up the next most common tier.
- **Community meetings, the Liberty website, and direct mail are considered the clearest; community meetings, word of mouth, and local organizations or community centers are seen as the most useful resources** for information about wildfire preparedness.
- **55%** recall seeing, hearing or reading the phrase **"Public Safety Power Shutoff or PSPS,"** down significantly from last wave (73%). **Email (31%), TV news (19%), and social media (15%)** remain the most common sources of PSPS communication, though all three saw significant decreases.
- Among those recalling the phrase "PSPS" from the past year, **97% are aware of its possible implementation to prevent wildfire**, consistent with last wave (99%); just under three quarters **understand PSPS is a last resort (74%)** and the likelihood of **implementation becomes reduced when Liberty takes steps to harden its infrastructure (83%)**.
- **42%** say they would first turn to the **Liberty website** for information about a PSPS event, consistent with last wave (45%).
- Notifications via text and email are considered most effective forms of communication from Liberty. Audio recordings of written text is seen as the most helpful communication element that could be incorporated.

Actions Taken

- **67% have taken some form of action to prevent wildfires or to prepare their home or business** for the event of a PSPS. Having a **generator** and **trimming vegetation around properties** are the most common actions taken.
- **51% are aware of Liberty's efforts to prune vegetation** around power lines in higher-risk areas, consistent with last wave (56%). **Non-Recallers** are significantly more likely than Recallers to say they are unaware of Liberty's efforts (**35%** vs 21%). **63%** are aware they can **update their contact information with Liberty**, consistent with December 2024 (62%); 66% of those aware have done so, down significantly from last wave (66% vs 76%).

AFN and Critical Customers

- **16% of customers can be considered AFN**.
- Of the resources available to the public, customers are most likely to be aware of **LIHEAP, special payment arrangements, and CARE California Alternate Rates for Energy**; 24% have not investigated any of the resources and 32% report no need.
- Only 5% of AFN customers have heard of AFN Self-Identification.
- Among those reporting that they rely on electricity for medical needs, 35% are aware of additional notices from Liberty, 29% are currently enrolled in the Medical Baseline Allowance program.
- 97% of respondents indicated it would not be helpful to receive communications in a language other than English; only 1% indicate Spanish as their preferred language.

PSPS Experience

- 33% of customers report experiencing a PSPS this year, down significantly from what was reported last wave (42%); of those, 67% said they received adequate notification and information to prepare, though 20% say the number one improvement to be made is more frequent/faster notifications. 36% say no PSPS notification improvements are necessary.

Recommendations

Consider year-round outreach efforts in an attempt to educate the public on wildfire safety and knowledge of PSPS.

- Though just under two thirds (65%) of Liberty's customers claim to have seen or heard communications about wildfire safety in the past year, the number of customers who mention Liberty as the source of communication saw a significant decrease when compared with December 2024.
    - Mentions of email, direct mail, word of mouth, the Liberty website, local agencies, and other websites all saw significant decreases when compared with December 2024.
    - Among the communications messages recalled by customers, vegetation management tops the list, remaining consistent with results from the past five reporting periods, though recall of nearly all other messages saw significant decreases when compared with December 2024.
- Just over half (55%) say they recall seeing, hearing or reading the phrase "Public Safety Power Shutoff or PSPS," down significantly from December 2024.
    - Mentions of email, TV news, and social media as sources of PSPS communication all saw significant decreases when compared with results from December 2024, though the number of people who would turn to the Liberty website to find more information remains consistent with last wave.

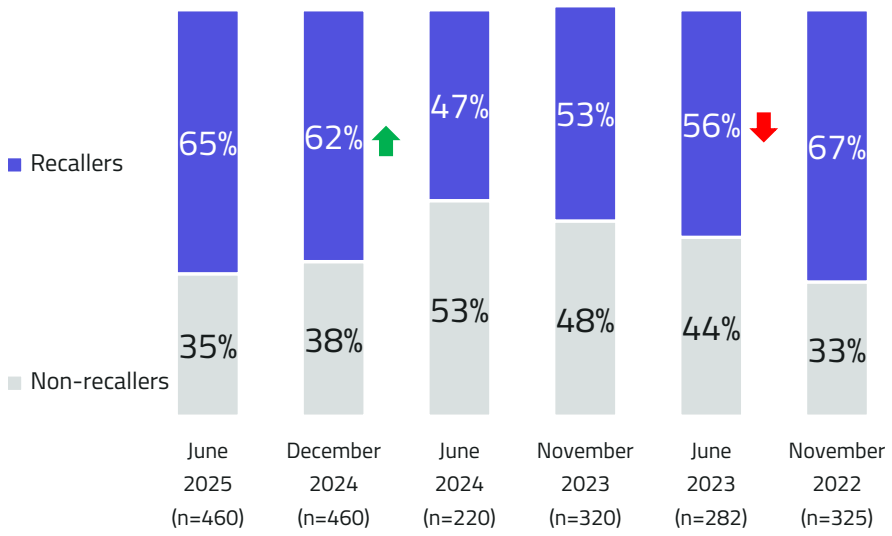
Increase efforts to drive customers to the Liberty website.

- The liberty website remains the number one source mentioned by customers seeking information about a Public Safety Power Shutoff by a considerable margin.
- Despite being ranked second in terms of clarity of information, the website is ranked seventh in terms of usefulness, highlighting the possibility of needed improvements.
- With notifications via text viewed as the most effective means of communication, followed by email and notifications via phone, there remains the possibility of driving customers to the website through these initial means of contact.
- Just over six in ten customers are aware they can update their contact information with Liberty and two-thirds of those aware have actually done so, significantly lower than in December 2024
- Only 7% of customers are aware of Access and Functional Needs (AFN) Self-Identification and, among those aware, only 5% have used this resource. Just one in four AFN customers are aware Liberty provides targeted communication and early PSPS notifications.

Wildfire Safety Communications Awareness

- Just under two thirds (65%) have seen or heard communications about wildfire safety in the past year, consistent with December 2024 (62%)

Communication Awareness

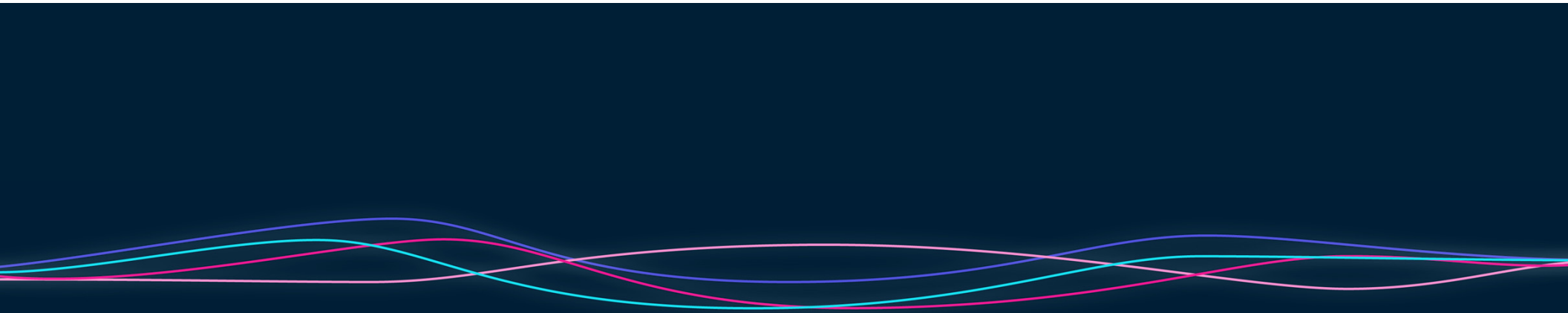


	Recallers (n=169)	**Non-Recallers** (n=65)
Gender	Male – 54% Female – 41%	Male – 65% Female – 31%
Age	18-54 – 22% 55-64 – 24% 65+ – 47%	18-54 – 22% 55-64 – 32% 65+ – 38%
Median Income	$117K	$100K
Home Ownership	Own – 84% Rent – 9%	Own – 77% Rent –17%
Primary Language is not English	11%	22%
Responded they Rely on Electricity for Medical Needs	12%	12%

Q2 Have you seen or heard any communications about wildfire safety in the past year? (n=260; Total)

Arrows signify statistical difference at the 95% confidence level compared to the previous wave

Bold denotes statistically significant difference between Recallers and Non-Recallers



Communication Recall

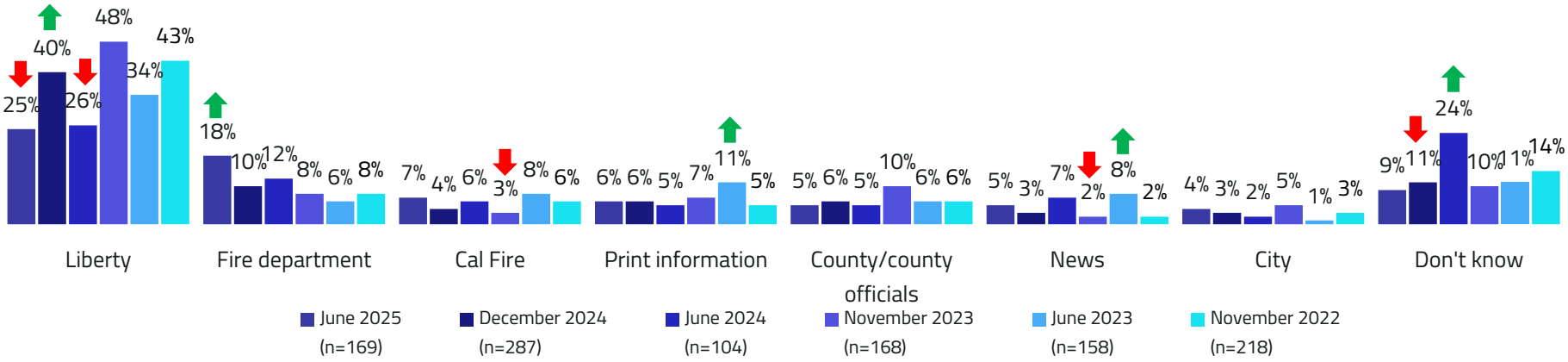
(among those aware of communications)

Sources of Wildfire Preparedness Communications

- Of those aware of communications, one in four (25%) mention Liberty as the source of wildfire preparedness communication, down significantly from December 2024 (40%); just under one in five (18%) mention fire departments, up significantly from December 2024 (10%)
- Just under one in ten (9%) are not aware of the source of communication, consistent with December 2024 (11%)

Wildfire Preparedness Communications Sources

(among those who recall communication)



Q5 Who was the information about wildfire preparedness from? (n=169; Aware of Communication)

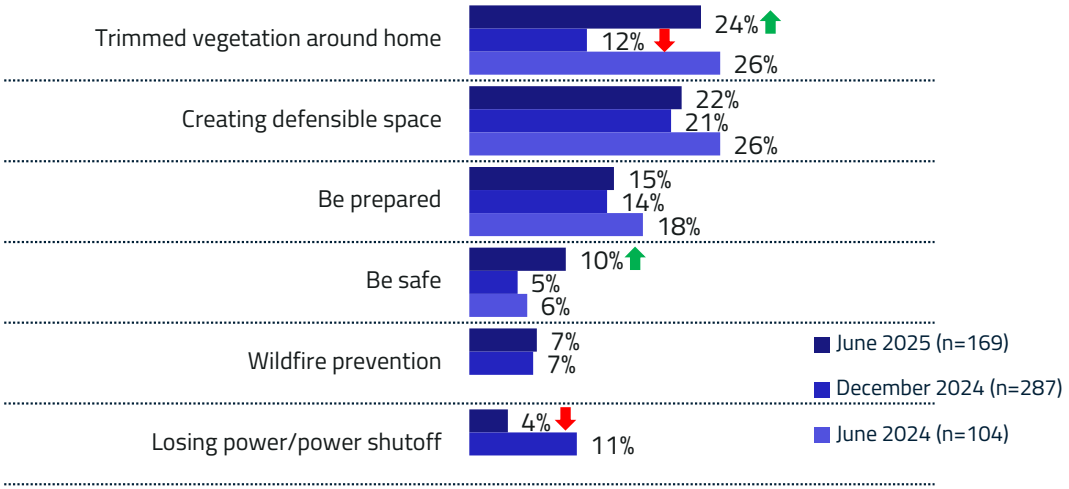
Arrows signify statistical difference at the 95% confidence level compared to the previous wave

Unaided Message Recall

- Of those who recall communications, just under one in four cited trimming vegetation around home or property (24%) as the main takeaway from communications about wildfire safety over the past year, up significantly from December 2024 (12%)
- One in twenty-five (4%) recall the message of losing power, down significantly from December 2024 (11%)

Communications Main Takeaway

(among those who recall communication)

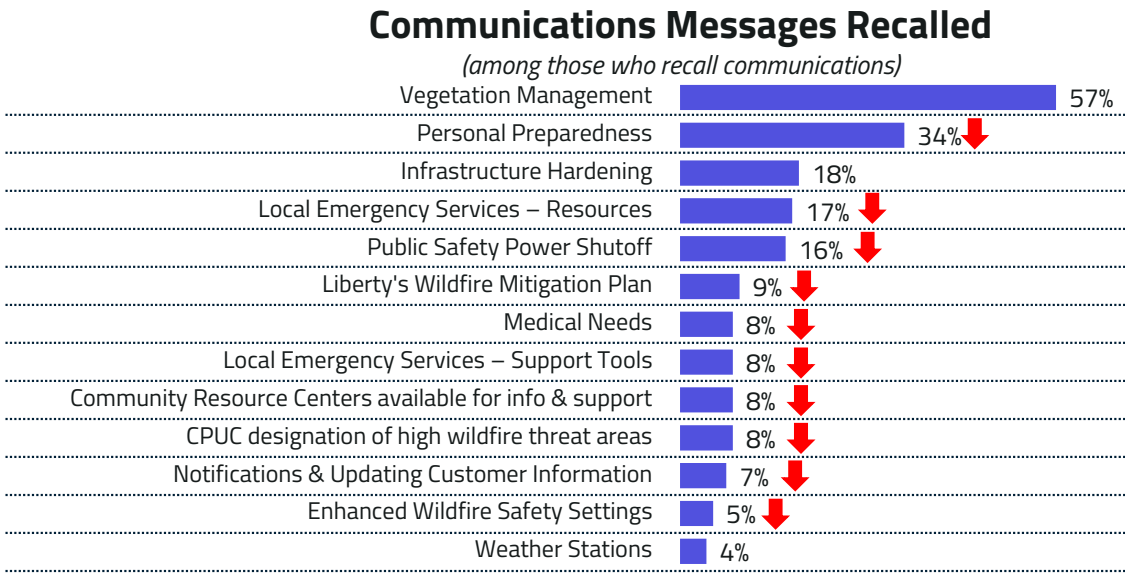


QB1 What was your main takeaway from the communications? (n=169; Aware of Communication)

Arrows signify statistical difference at the 95% confidence level compared to the previous wave

Wildfire Preparedness Communications Messages

- Of those who recall communications, just under six in ten recall messages about vegetation management (57%), followed by personal preparedness (34%) and infrastructure hardening (18%)
- Compared to the previous wave, mentions of all but three messages decreased significantly



Communications Messages Recalled *(among those who recall communications)*	Dec 2024 (n=287)	June 2024 (n=104)	Nov 2023 (n=168)	June 2023 (n=158)	Nov 2022 (n=218)
Vegetation Management	57%	56%	57%	58%	56%	59%
Personal Preparedness	34% ↓	56%	43%	55%	61%	56%
Infrastructure Hardening	18%	27%	21%	18% ↑	9% ↓	20%
Local Emergency Services – Resources	17% ↓	26% ↑	13% ↓	26%	20%	24%
Public Safety Power Shutoff	16% ↓	57% ↑	19% ↓	32%	27% ↓	41%
Liberty's Wildfire Mitigation Plan	9% ↓	28%	29%	38%	31%	40%
Medical Needs	8% ↓	20% ↑	12%	22%	20%	17%
Local Emergency Services – Support Tools	8% ↓	19%	13%	20%	15%	21%
Community Resource Centers available for info & support	8% ↓	18% ↑	8%	14%	15%	19%
CPUC designation of high wildfire threat areas	8% ↓	17%	12%	20%	15%	21%
Notifications & Updating Customer Information	7% ↓	28% ↑	10% ↓	23%	23%	28%
Enhanced Wildfire Safety Settings	5% ↓	18% ↑	10%	16%	12%	17%
Weather Stations	4%	7%	5%	7%	9%	9%

Q3 What were the messages of the information you saw or heard about wildfire preparedness from Liberty? (n=169; Aware of Communication)

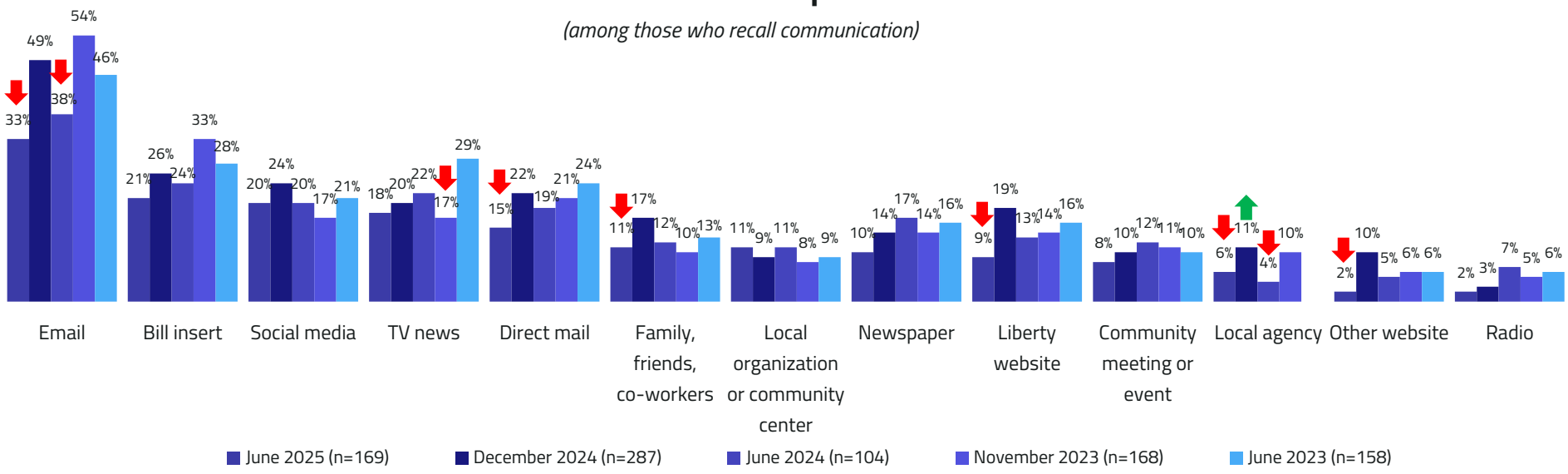
↑ ↓ Arrows signify statistical difference at the 95% confidence level compared to the previous wave

Information Channels for Wildfire Communications

- Email remains the most common channel for wildfire preparedness communication with one third (33%) mentioning it, followed by bill inserts (21%), social media (20%), and TV news (18%)
- Mentions of email, direct mail, family, friends, co-workers, the Liberty website, local agency, and other websites all saw significant decreases from December 2024

Information Channels for Wildfire Preparedness Communications

(among those who recall communication)

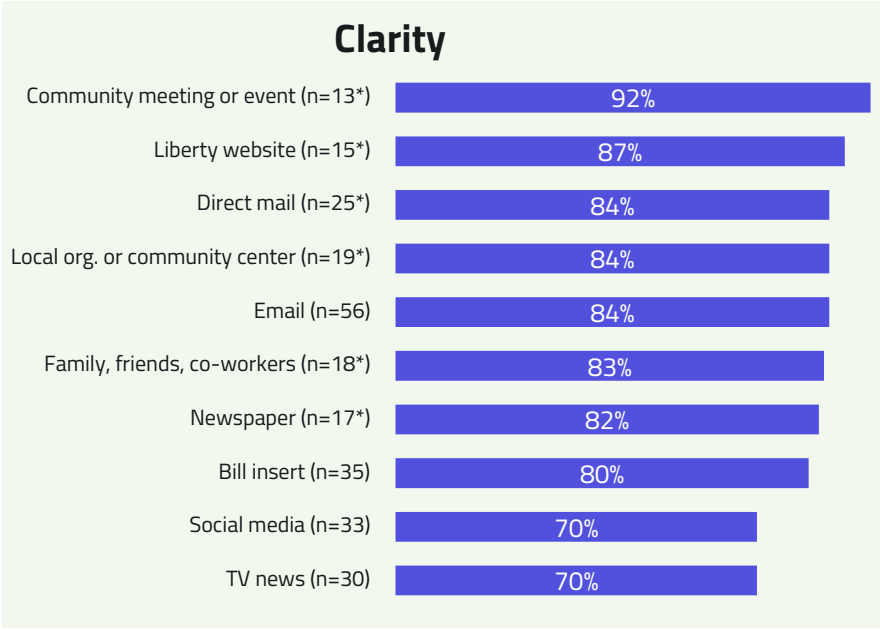


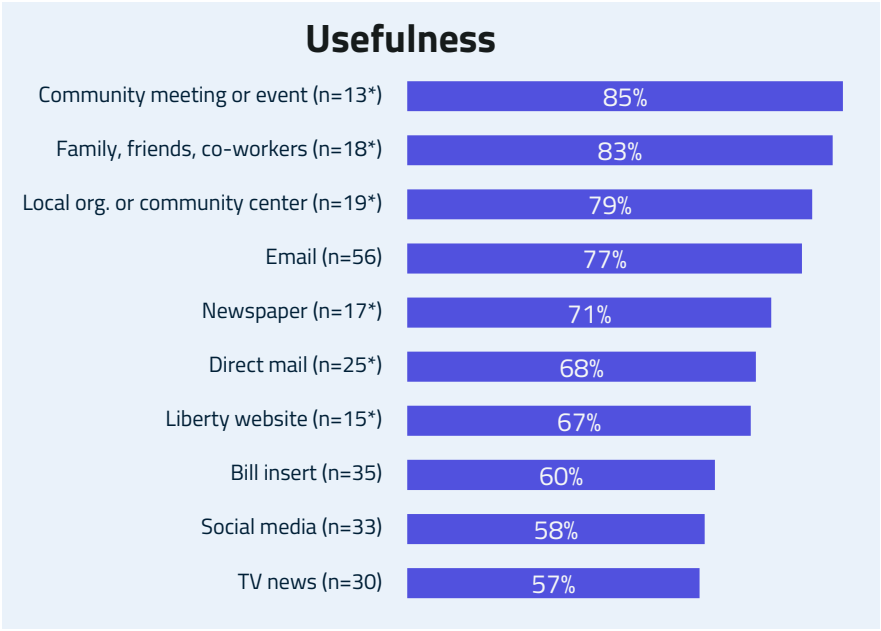
Q4 Where did you see or hear the communications about wildfire preparedness? (n=169; Aware of Communication)

Arrows signify statistical difference at the 95% confidence level compared to the previous wave

Information Usefulness and Clarity

- In terms of clarity, community meetings or events (92%) and the Liberty website (87%) are rated the highest, along with direct mail (84%), local organizations or community centers (84%), and email (84%)
- In terms of usefulness, community meetings or events (85%) and Family, friends, co-workers (83%) are rated highest



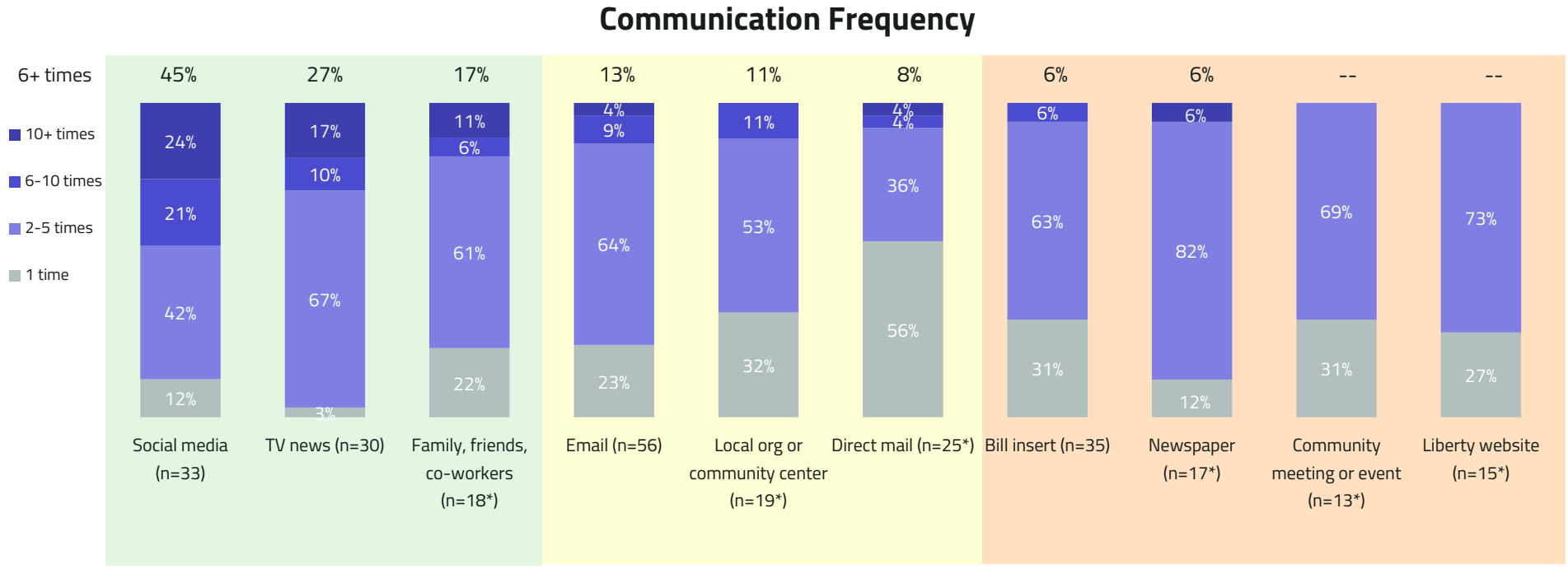


Q4A How useful was the information about wildfire preparedness from each of these sources? (n=169; Aware of Communication)
Q4B How would you rate the clarity of the information about wildfire preparedness from each of these sources? (n=169; Aware of Communication)

*Small sample size (n<30)

Communication Frequency

- Just under half say they have seen at least six messages about wildfire preparedness on social media (45%), followed by TV news (27%), and family, friends, co-workers (17%)



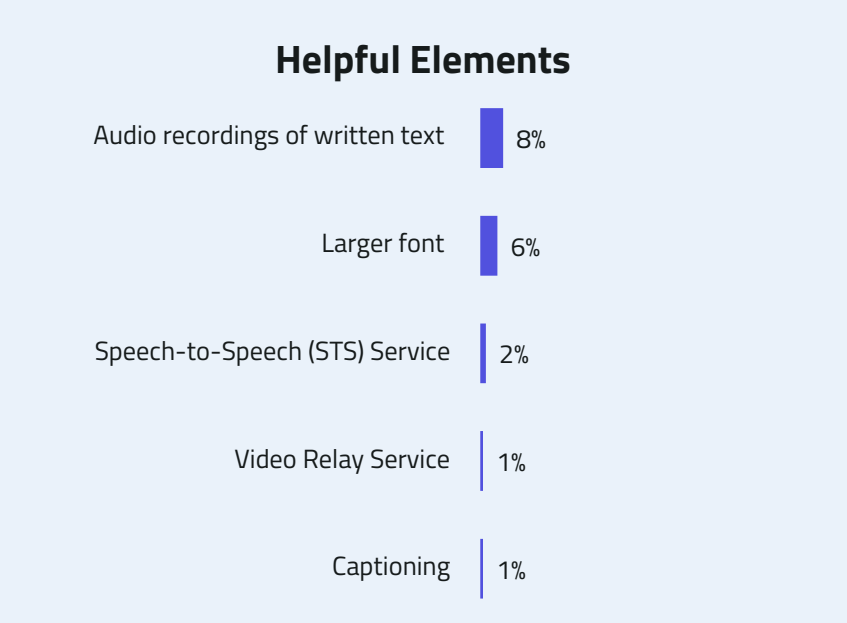
Q5A In the past 6 months, how often do you recall seeing, hearing or seeking messages about wildfire preparedness? (n=169; Aware of Communication)

*Small sample size (n<30)

Effective and Helpful Communication

- Notifications via text remain the most effective form of communication from Liberty (56%) followed by email (21%); audio recordings of written text is the most helpful (8%) element that could be incorporated, followed by larger font (6%)





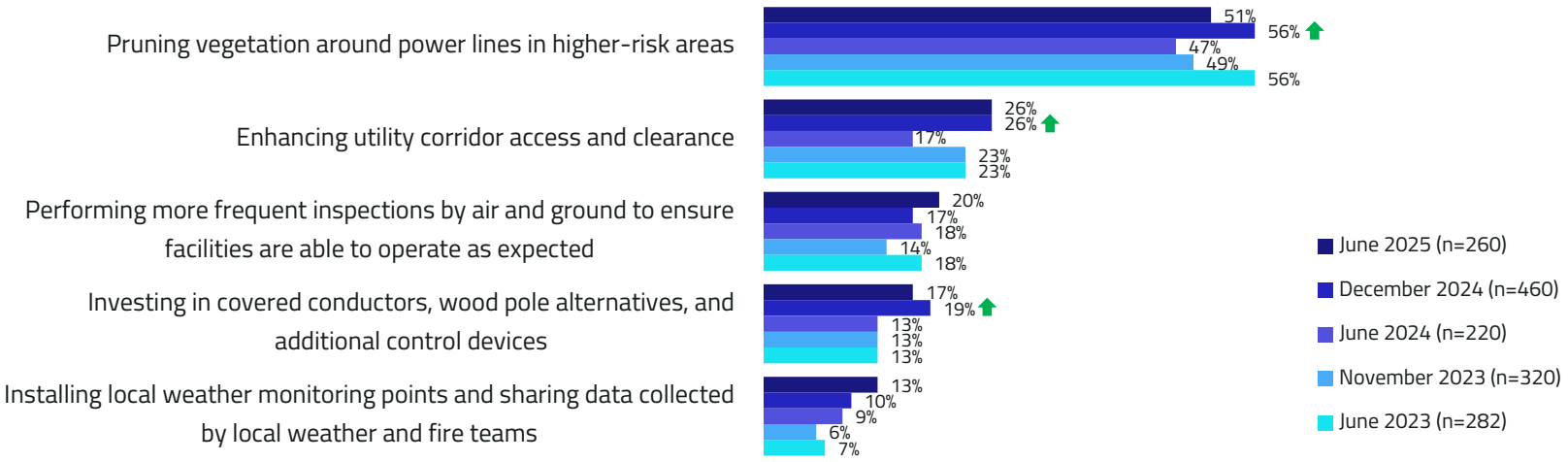
A6 What method of communication from Liberty do you find most effective? (n=260; Total)
A12 Regardless of how communications from Liberty are received, which, if any, of the following would be helpful for you? (n=260; Total)

Wildfire Preparedness Actions Taken

Awareness of Liberty's Efforts

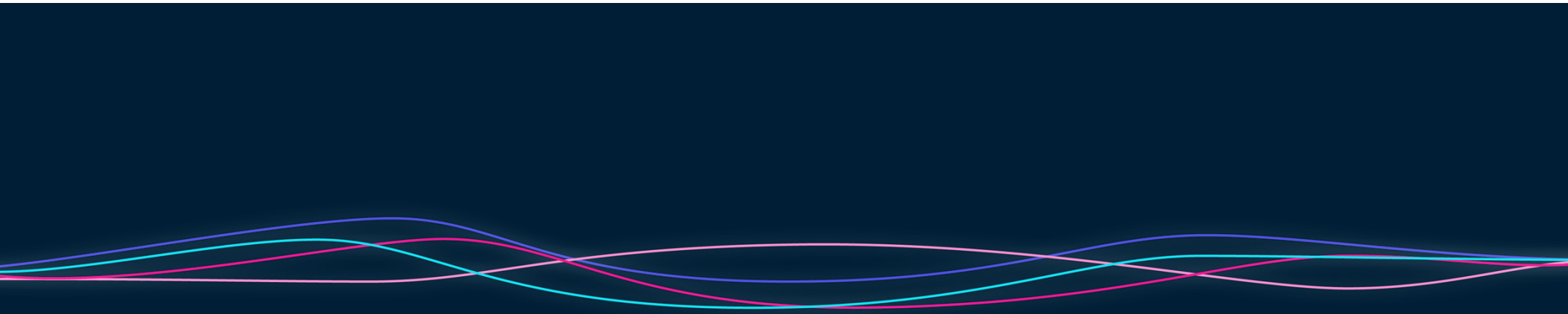
- Consistent with previous results, pruning vegetation around power lines in higher-risk areas remains at the top of the list of efforts by Liberty to reduce the risk of wildfire (51%), consistent with December 2024 (56%), followed by enhancing utility corridor access and clearance (26%)
- Non-Recallers are significantly more likely than Recallers to say they are not aware of any efforts by Liberty (**35%** vs 21%)

Awareness of Liberty's Efforts to Reduce Wildfire Risk



Q7 What efforts by Liberty are you aware of to reduce the risk of wildfire? (n=260; Total)

Arrows signify statistical difference at the 95% confidence level compared to the previous wave

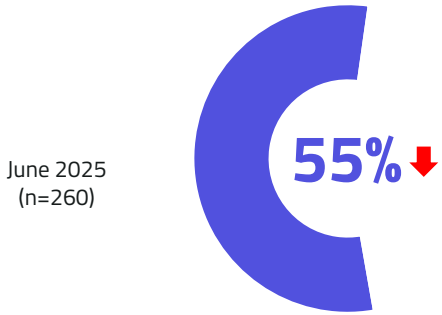


Awareness of Public Safety Power Shutoff

PSPS Awareness

- Just over half (55%) say they recall seeing, hearing or reading the phrase "Public Safety Power Shutoff or PSPS," down significantly from December 2024 (73%); **Recallers** remain significantly more likely than Non-Recallers to be aware of PSPS (**66%** vs 37%)
- Email is the leading source of PSPS communications (31%), followed by TV news (19%) and social media (15%), all three of which saw significant decreases from December 2024

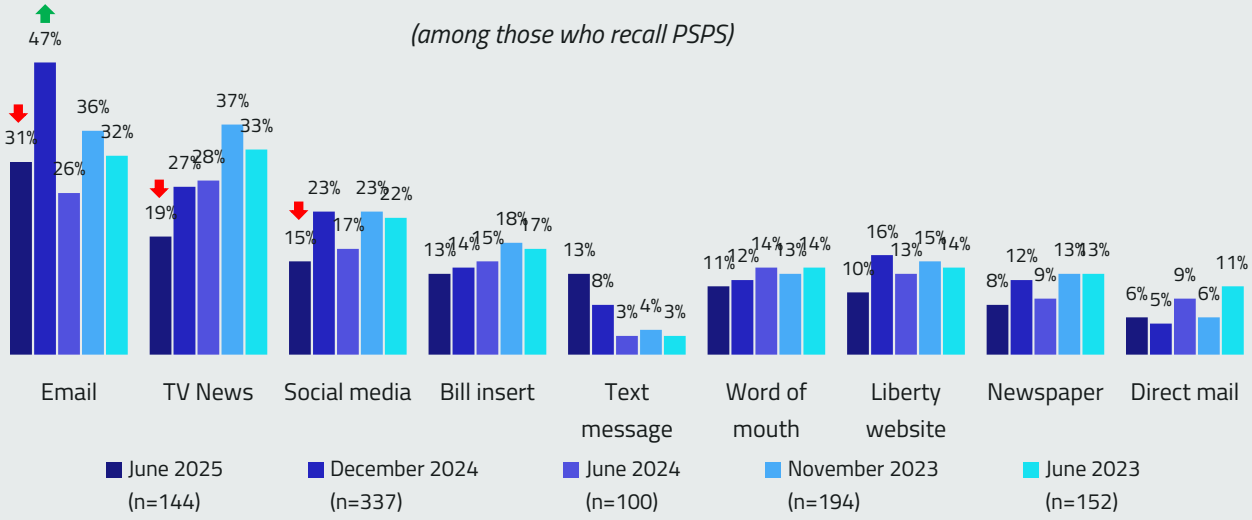
PSPS Recall



December 2024 (n=460)	73% ↑
June 2024 (n=220)	45% ↓
November 2023 (n=320)	61%
June 2023 (n=282)	54% ↓
November 2022 (n=325)	67%

Sources of PSPS Communications

(among those who recall PSPS)



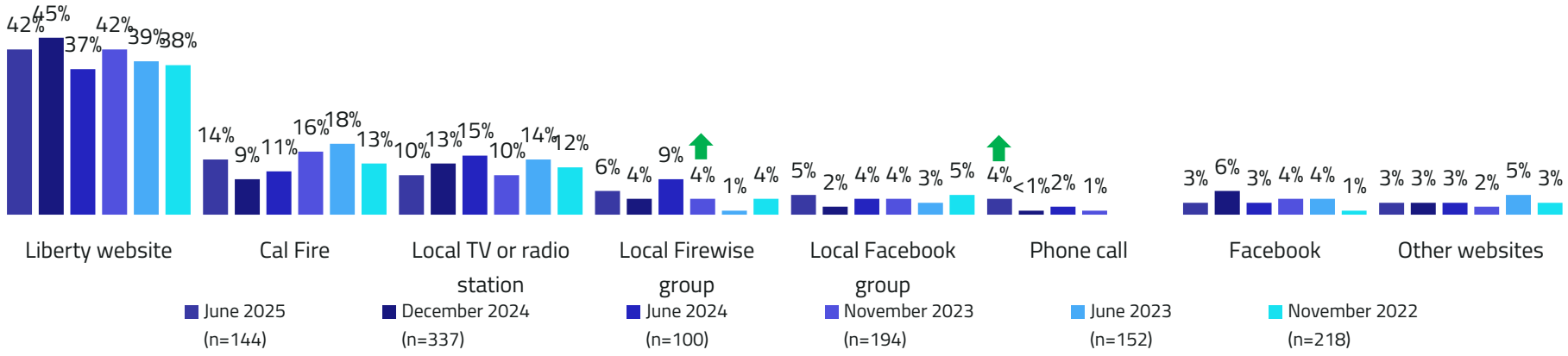
Q8 In the past year, do you recall seeing, hearing or reading the phrase 'Public Safety Power Shutoff or PSPS?' (n=260; Total)
Q8A Where do you recall seeing or hearing about Public Safety Power Shutoff information related to wildfire conditions? (n=144; Recall PSPS Communications)

↑ ↓ Arrows signify statistical difference at the 95% confidence level compared to the previous wave

PSPS Information

- The Liberty website remains the most mentioned source for information about PSPS (42%), followed by Cal Fire (14%) and local TV or radio stations (10%)

Top Sources of PSPS Information



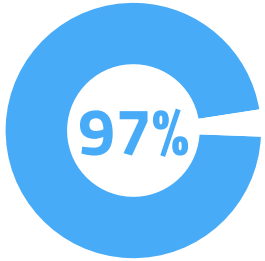
Q9 Which one of the following would you most likely turn to first for information about Public Safety Power Shutoff? (n=144; Recall PSPS)

Arrows signify statistical difference at the 95% confidence level compared to the previous wave

Understanding PSPS

- Almost all (97%) of those who recall the term PSPS are aware Liberty could proactively shut off power to prevent the ignition of a catastrophic wildfire, consistent with last wave
- Just over seven in ten understand PSPS is a last resort (74%) and just over eight in ten understand that the likelihood of PSPS is reduced when Liberty takes steps to harden its infrastructure (83%)

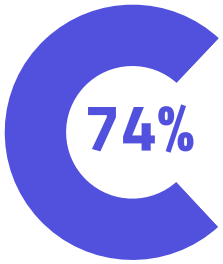
Awareness of Potential Proactive Shutoff



June 2024 (n=144)

December 2024 (n=337)	99% ↑
June 2024 (n=100)	94%

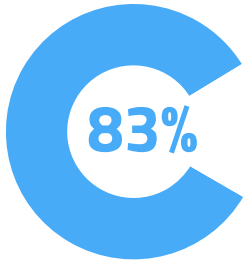
Awareness PSPS is Measure of Last Resort



June 2024 (n=144)

December 2024 (n=337)	72%
June 2024 (n=100)	73%

Awareness PSPS Risk Reduced by Infrastructure Hardening



June 2024 (n=144)

December 2024 (n=337)	83%
June 2024 (n=100)	77%

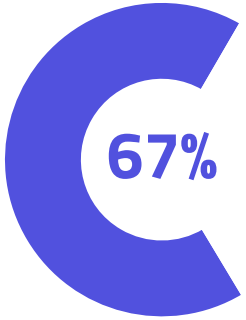
QP10A Are you aware that the utility could proactively shut off power to prevent the ignition of a catastrophic wildfire? (n=144; Recall PSPS)
QP10B Are you aware that a proactive PSPS is a measure of last resort? (n=144; Recall PSPS)
QP10C Are you aware that the likelihood of a PSPS is reduced when the utility takes steps to harden its infrastructure? (n=144; Recall PSPS)

↑ ↓ Arrows signify statistical difference at the 95% confidence level compared to the previous wave

PSPS Preparedness

- Just over two thirds (67%) have taken actions to prevent or prepare their home or business in the event of a PSPS
- Generator purchases remain the most common action taken, mentioned by 35% of respondents who have taken action; trimming vegetation is the second most common action taken, mentioned by 29% of respondents

Took Actions to Prevent or Prepare for a PSPS



June 2024 (n=144)

December 2024 (n=337)	69%
June 2024 (n=100)	60%

Actions Taken *(among those taking action)*	**June 2025 (n=97)**	**December 2024 (n=232)**	**June 2024 (n=60)**
Generator (prep/purchase)	35%	35%	43%
Trimmed vegetation	29%	24%	18%
Prepared lanterns/flashlights	12%	17%	--
Backup battery	12%	11%	--
Switched to alternative energy source	8%	7%	--
Created defensible space	6%	6%	12%
Food & water storage	5%	5%	3%
Candles	4%	3%	--
Prepared an emergency kit	3%	3%	7%
Planned ahead for fuel and cash needs	3%	2%	--
Prepared an emergency readiness plan and contact information	--	1%	2%

QP6. In the past year, have you taken any actions to prevent or prepare your home or business in the event of a Public Safety Power Shutoff? (n=144; Recall PSPS)
QP6A. What actions have you taken in your home or business to prevent or prepare in the event of a Public Safety Power Shutoff? (n=97; Took actions)

Arrows signify statistical difference at the 95% confidence level compared to the previous wave

Contact Information for PSPS

- Just over six in ten (63%) are aware they can update their contact information with Liberty, consistent with December 2024 (62%); awareness among **Recallers** remains significantly higher than among Non-Recallers (**73%** vs 45%)
- Two thirds (66%) of those aware they can update their information have done so, down significantly from last wave (76%)

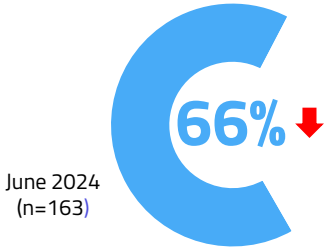
Awareness of Ability to Update Contact Information for PSPS



December 2024 (n=460)	62% ↑
June 2024 (n=220)	51%
November 2023 (n=320)	59%
June 2023 (n=282)	57%
November 2022 (n=325)	60%

Have Updated Contact Information

(among those aware they can update contact info)



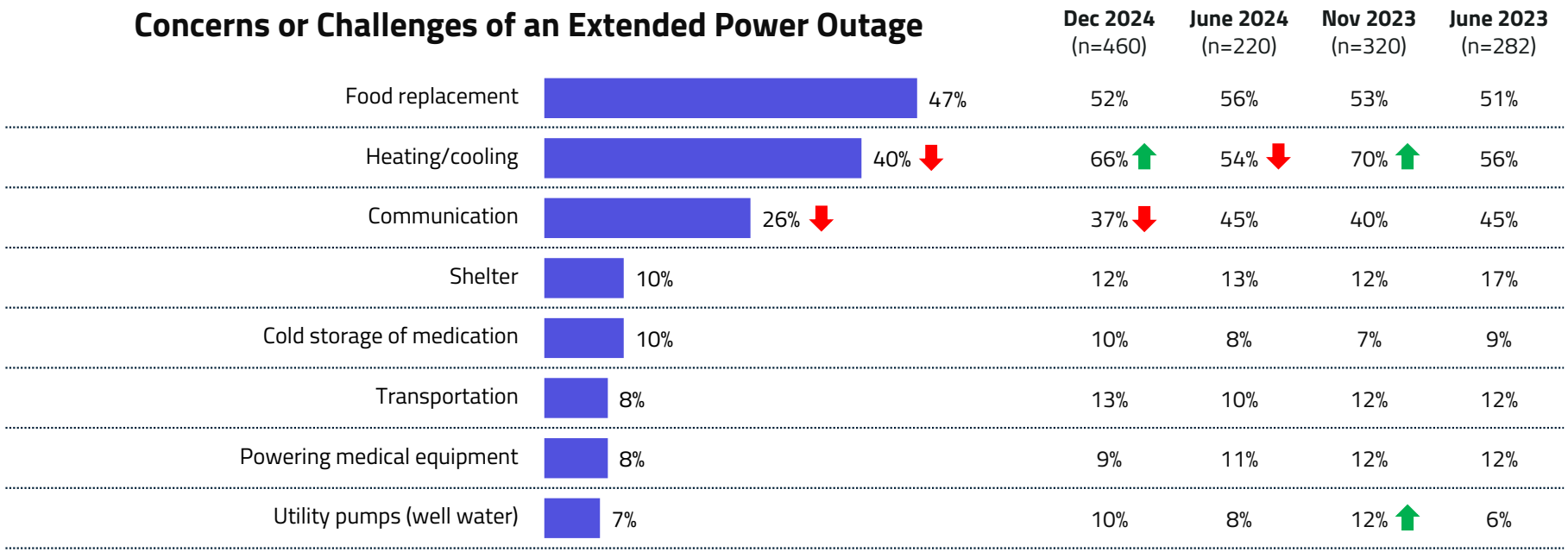
December 2024 (n=285)	76%
June 2024 (n=112)	69%
November 2023 (n=189)	77%
June 2023 (n=162)	73%
November 2022 (n=194)	75%

Q11 Are you aware you can update your contact information with Liberty to receive proactive notification prior to a Public Safety Power Shutoff? (n=260; Total)
Q11A Have you updated your contact information with Liberty to receive notifications prior to a Public Safety Power Shutoff? (n=163; Aware of Information Update)

↑ ↓ Arrows signify statistical difference at the 95% confidence level compared to the previous wave

Concerns about Extended Outage

- The largest concerns and perceived challenges in the event of an extended power outage include food replacement (47%), heating/cooling (40%), and communication (26%)
- Mentions of heating/cooling decreased significantly from last wave (40% vs 66%), as did mentions of communication (26% vs 37%)



A5 *In the event of an extended power outage, what are your most significant concerns or challenges? (n=260; Total)*

Arrows signify statistical difference at the 95% confidence level compared to the previous wave

Medical Needs and Language Preferences

Roughly one in eight (12%) responded that they rely on electricity for medical needs

Just over one third (35%) of those relying on electricity for medical needs are aware Liberty provides additional notices prior to a PSPS event

One in eight (13%), indicate that another language other than English is primarily spoken; English remains preferred for communications for nearly all respondents (98%)

- One percent mentioned Spanish as their preferred language

The majority of respondents (97%) stated it would not be helpful for them or somebody in their household to receive communications in another language

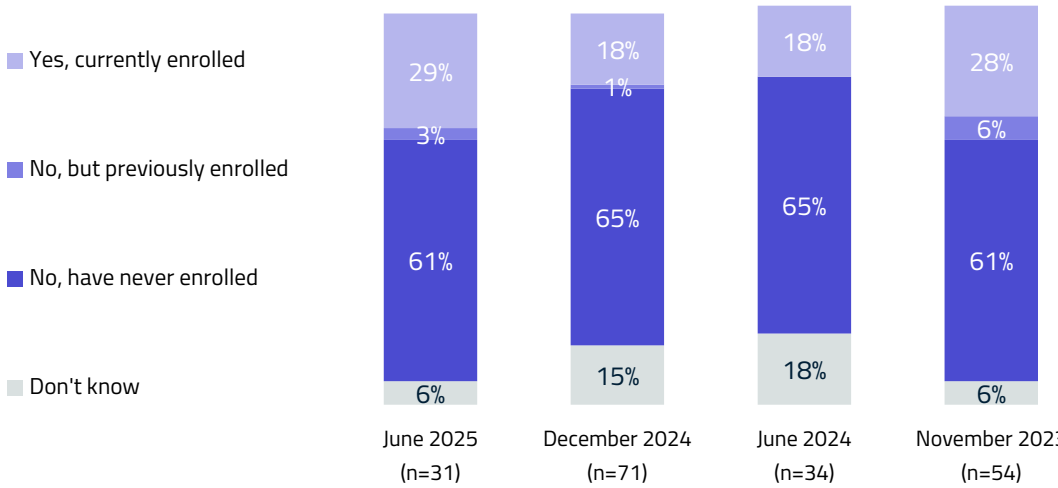
Q14 Does anyone in your home or business rely on electricity for medical needs/equipment? (n=260; Total)
Q14A Are you aware that Liberty provides additional notices prior to a Public Safety Power Shutoff to households that have medical needs/equipment? (n=34; Rely on electricity for medical needs)
Q15 Is your primary language other than English? (n=260; Total)
Q16 Would it be helpful for you or anyone else in your household to receive communications in another language? (n=260; Total)
Q16B What is your preferred language to receive communications? (n=260; Total)

Medical Baseline Enrollment

- Just under three in ten (29%) are currently enrolled in Liberty's Medical Baseline Allowance Program, consistent with the previous wave

Enrolled in Medical Baseline Allowance Program

(among those with medical needs)



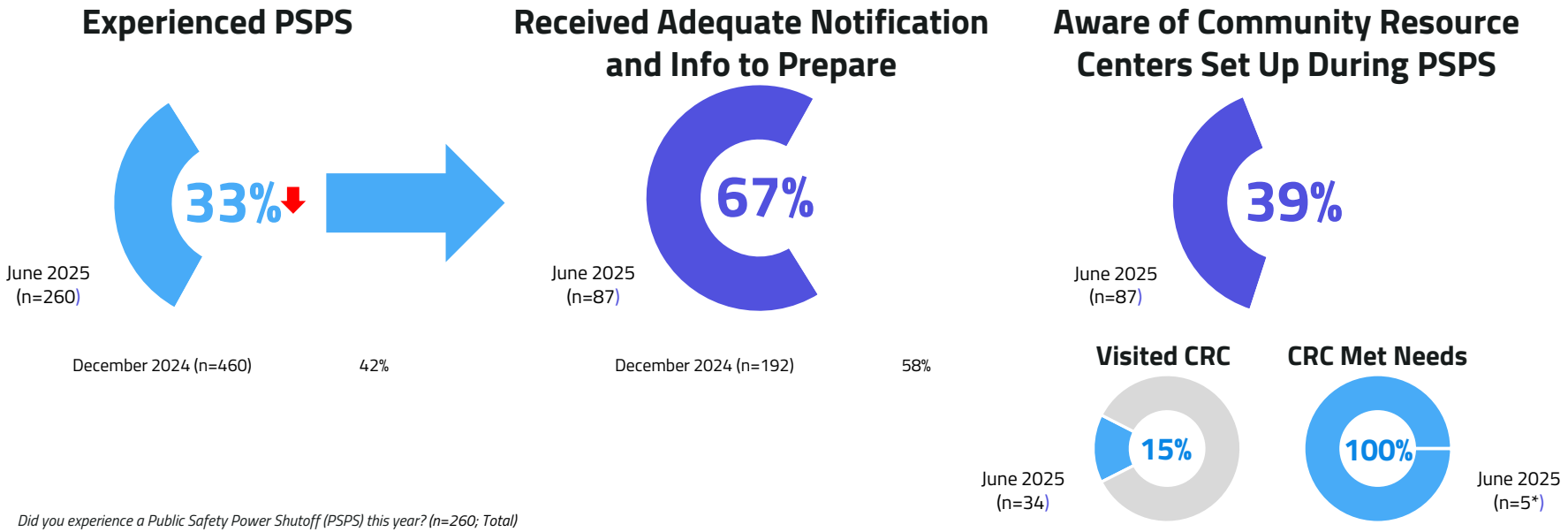
Q14E *Are you enrolled in Liberty's Medical Baseline Allowance Program? (n=34; Rely on electricity for medical needs*

Arrows signify statistical difference at the 95% confidence level compared to the previous wave

PSPS Experience

Experiencing PSPS

- One third (33%) reported experiencing a Public Safety Power Shutoff in June 2025, down significantly from December 2024 (42%)
- Among those who experienced a PSPS, just over two thirds (67%) said they received adequate notification and information to prepare and just under four in ten (39%) said they were aware of community resource centers set up during the PSPS



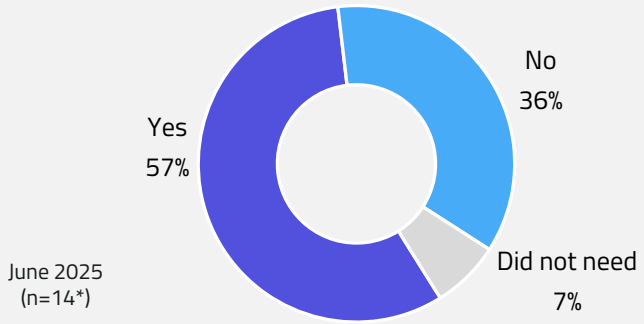
QPS1 *Did you experience a Public Safety Power Shutoff (PSPS) this year? (n=260; Total)*
QPS1A *Did you receive adequate notification and information to prepare for the Public Safety Power Shutoff? (n=87; Experienced PSPS)*
QPS1C *Are you aware of Community Resource Centers set up during the Public Safety Power Shutoff? (n=87; Experienced PSPS)*
QPS1D *Did you visit a Community Resource Center? (n=87; Aware of Community Resource Centers)*
QPS1E *Did the Community Resource Center meet your needs with sufficient capacity and other functional requirements? (n=5; Visited a Community Resource Center)*

Arrows signify statistical difference at the 95% confidence level compared to the previous wave
*Small sample size (n<30)

Medical Equipment Use And CBO Engagement

Among those **experiencing PSPS, just under six in ten (57%) said they were able to use the necessary medical equipment during the outage**, while just over one third (36%) indicated they were not able. One in fourteen (7%) said they did not need to use any medical equipment during the outage

Used Medical Equipment During PSPS



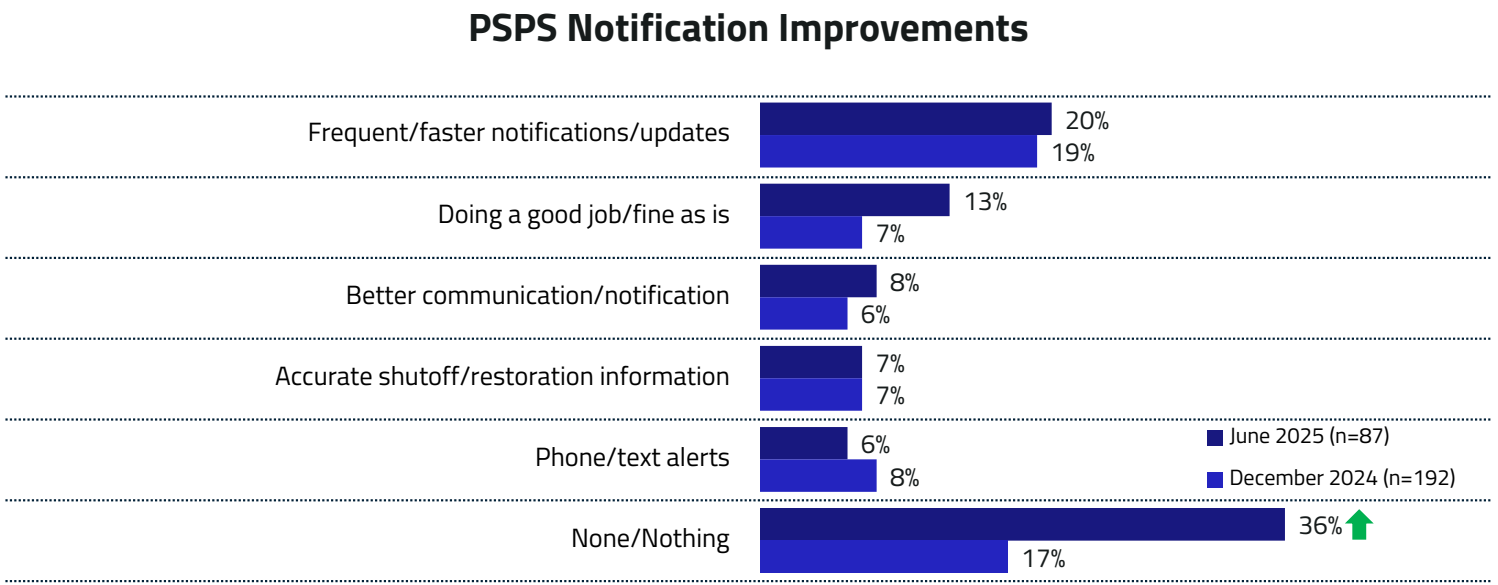
Almost all (99%) who experienced a PSPS said they did not engage with any community-based organizations or resource networks to address food replacement, transportation, translation services, etc. One person surveyed (1%) indicated they did engage with CBOs, citing their "local housing office" by phone within the first day

*Small sample size (n<30)

QA13 Were you able to use necessary medical equipment during the PSPS outage? (n=14; Experienced PSPS & Rely on electricity for medical needs)
QA1 During the power outage, did you engage with any community-based organizations (CBOs) or resource networks to assist in meeting your needs with food replacement, transportation, translation services, etc.? (n=87; Experienced PSPS)
QA2 What local Community Based Organizations (CBOs) or resource networks did you engage with? (n=1; Engaged with CBO)
QA3 How did you engage with the CBO or resource networks you mentioned? (n=1; Engaged with CBO)
QA4 At what point during the outage did you engage the CBOs or resource networks? (n=1; Engaged with CBO)

PSPS Notification Improvements

- One in five (20%) of those who experienced a PSPS say the number one notification improvement is frequent/faster notifications and updates
- Just over one third (36%) have no recommendations for improvement, up significantly from December 2024 (17%)



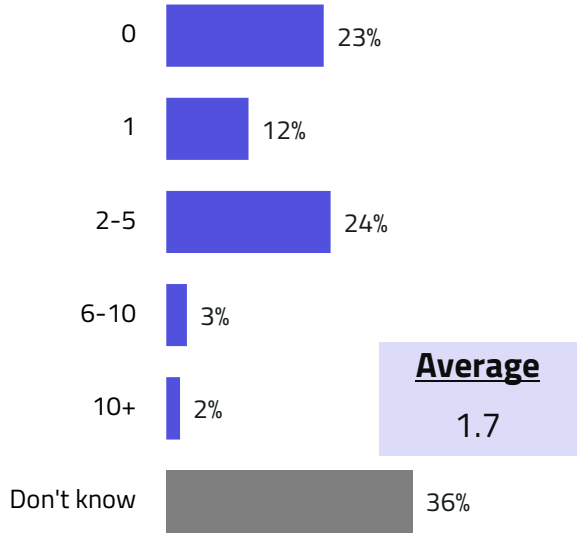
QPS1B *What about the Public Safety Power Shutoff (PSPS) notification and information could have been improved? (n=87; Experienced PSPS)*

Arrows signify statistical difference at the 95% confidence level compared to the previous wave

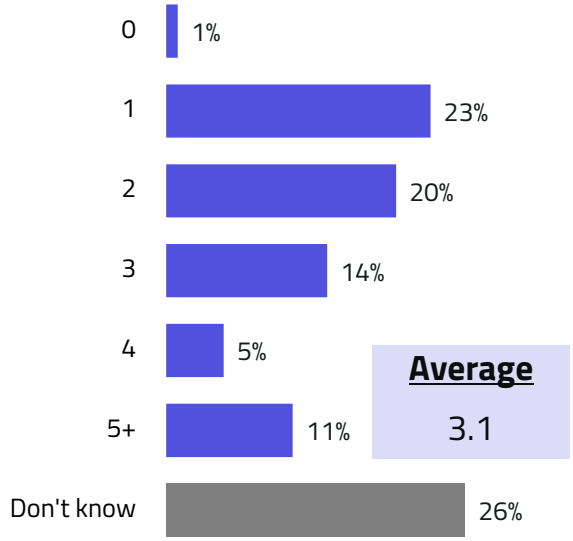
PSPS Notifications

- Just over four in ten (41%) customers said they received at least one PSPS notification; among customers who said they experienced a PSPS event, an average of 3.1 events were reported

Number of PSPS Notifications Received in Past Year



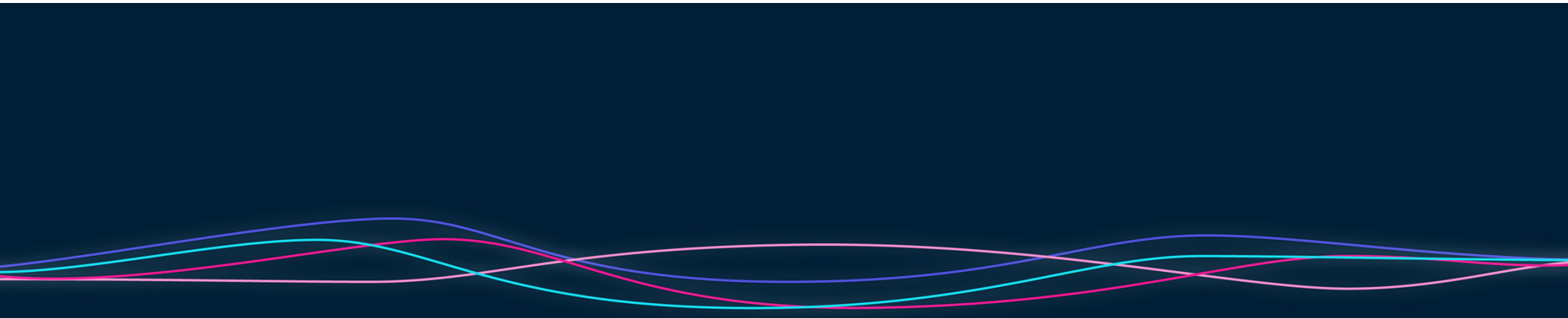
Number of PSPS Events Experienced in Past Year



Impact of PSPS "False Alarm"

Nuisance	3%
Anxiety	2%
Other	18%
Don't know	3%
No effect	73%

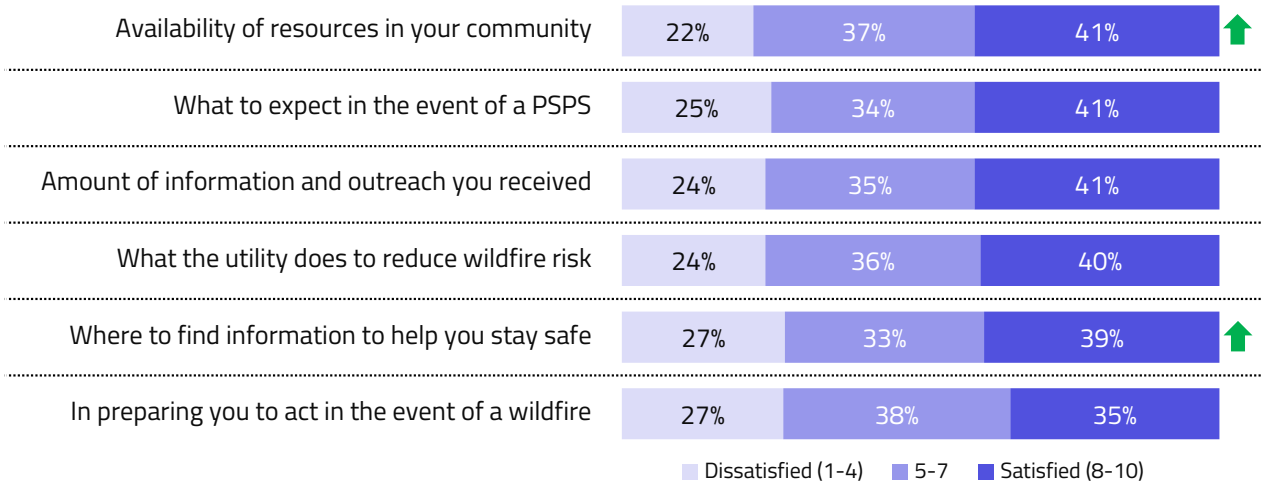
QOSAT2 How many Public Safety Power Shutoff (PSPS) notifications have you received in the past year? (n=260; Total)
QOSAT3 How many Public Safety Power Shutoffs have you experienced in the past year? (n=87; Experienced PSPS in past year)
QOSAT5 In what ways did 'false alarm' Public Safety Power Shutoff (PSPS) notifications, where you received a notification but did not have a PSPS, affect you, personally? (n=62; Received more notifications than PSPS events experienced)



Post-PSPS

Outreach and Engagement Satisfaction

- Customers remain generally satisfied with most of the outreach and engagement they receive
- Satisfaction with what the availability of resources in your community and where to find information to help you stay safe saw significant increases compared to December 2024 (41% vs 33% and 39% vs 31%, respectively)



	Top-3-Box				
	Dec 2024 (n=460)	June 2024 (n=220)	Nov 2023 (n=320)	June 2023 (n=282)	Nov 2022 (n=325)
Availability of resources in your community	33%	30%	33%	40%	43%
What to expect in the event of a PSPS	37%	30%	32%	37%	41%
Amount of information and outreach you received	35% ↑	27%	32% ↓	42%	43%
What the utility does to reduce wildfire risk	36% ↑	27%	32%	38%	41%
Where to find information to help you stay safe	31%	28%	34%	39%	43%
In preparing you to act in the event of a wildfire	31%	29%	29% ↓	38%	42%

QSAT1 On a scale of 1 to 10, with 1 being not at all satisfied and 10 being very satisfied, how satisfied are you with the outreach and engagement you receive? (n=260; Total)

↑ ↓ Arrows signify statistical difference at the 95% confidence level compared to the previous wave

PSPS Notifications

- Just under four in ten (38%) say that notifications should be sent if there is any possibility of a PSPS; another 45% feel that notifications should only be sent if there is a high likelihood of a PSPS

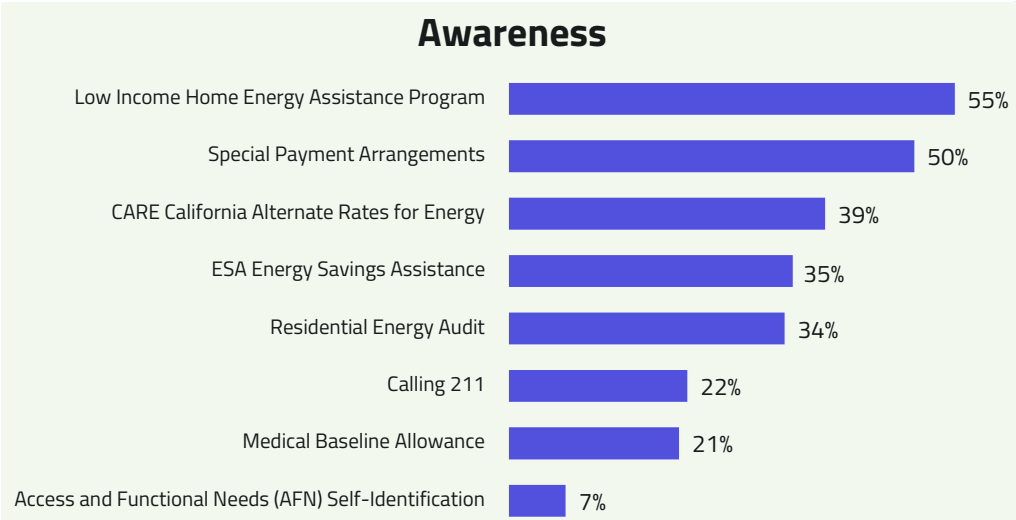
PSPS Notifications Perception	June 2025 (n=260)	Dec 2024 (n=460)	June 2024 (n=220)	Nov 2023 (n=320)	June 2023 (n=282)	Nov 2022 (n=325)
Notifications should be sent if there is any possibility of a PSPS	38%	45%	47%	48%	51%	44%
Notifications should only be sent if there is a high likelihood of a PSPS	45%	41%	42%	42%	37% ↓	45%
Notifications should only be sent if a PSPS is certain to occur	16%	14%	11%	11%	12%	11%

QOSAT4. Which of the following statements best describes how you feel about Public Safety Power Shutoff (PSPS) notifications? (n=260; Total)

↑ ↓ Arrows signify statistical difference at the 95% confidence level compared to the previous wave

Awareness and Familiarity of Resources

- Of the resources available to the public, just over half (55%) indicated they were aware of the Low-Income Home Energy Assistance Program, followed by Special Payment Arrangements (50%), and California Alternate Rates for Energy (39%)
- Just under one third (32%) report they have no need of the resources and just under one in four (24%) say they have not investigated any of the resources

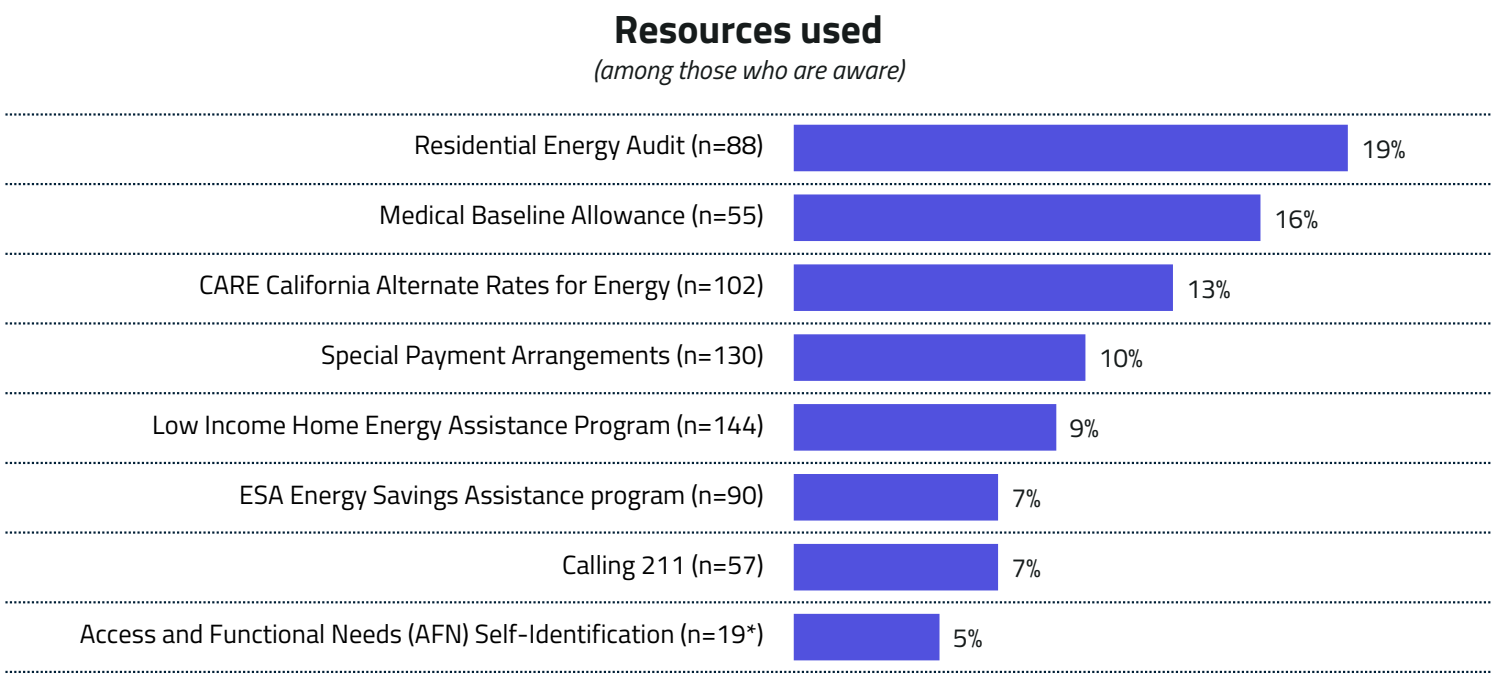




A7 *Liberty supports a number of resources that are available to the public. Before today, which of the following resources have you heard of? (n=260; Total)*
A8 *What statement best describes your familiarity with the resources you just reviewed? (n=260; Total)*

Resources Used

- Of those who are aware of the resources available, Residential Energy Audit, Medical Baseline Allowance, and CARE California Alternate Rates for Energy are the most frequently used

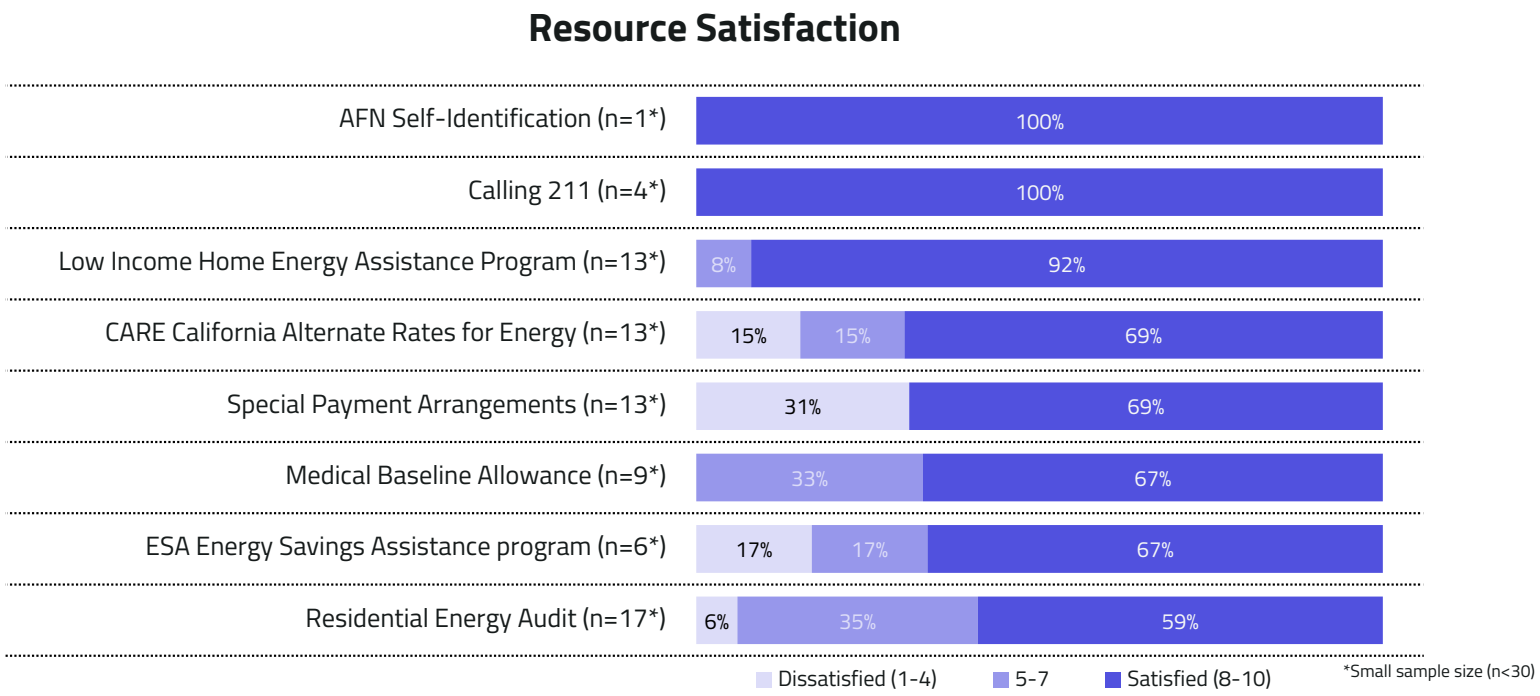


A9 Which, if any, of these resources have you used in the past? (n varies; Aware of Resource)

*Small sample size (n<30)

Satisfaction with Resources Used

- Among the small numbers of customers who have used any of the available resources in the past, satisfaction is relatively high

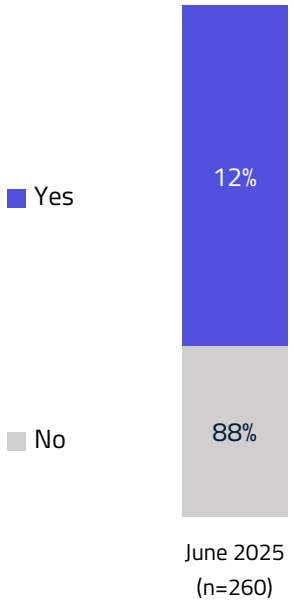


A10 On a scale of 1 to 10, with 1 being not at all satisfied and 10 being very satisfied, how satisfied are you with the resources you've used in the past?

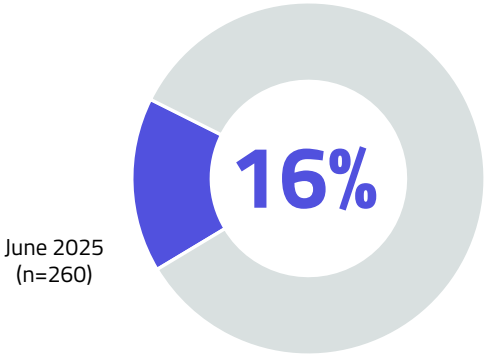
Self-Identified AFN Status

- Just under one in eight (12%) say someone in their household is at increased risk of harm to health, safety, or independence during a power outage

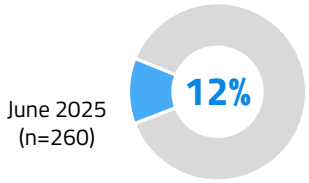
Households With Increased Risk of Harm to Health, Safety, and Independence During Power Outage



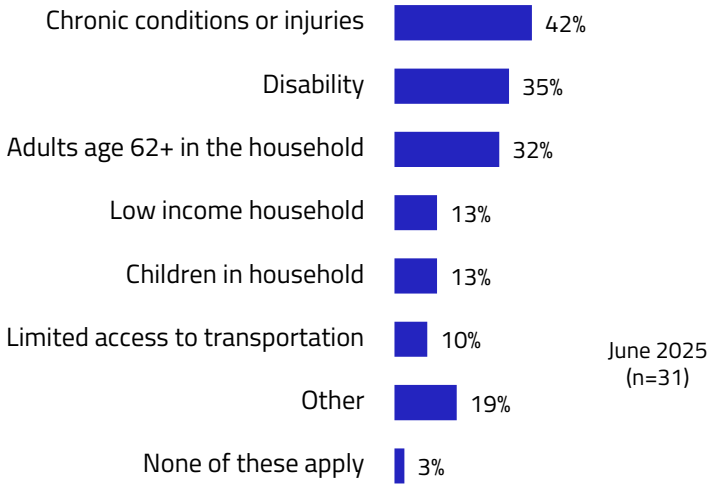
Access and Functional Needs



Relies on Electricity for Medical Needs



Reasons For Increased Risk of Harm During Power Outage



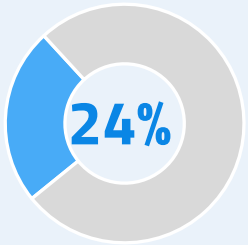
QA14. Are you, or anyone else in your household, at increased risk of harm to health, safety, and independence during a power outage? (n=260; Total)
QA15. For what reasons are you, or anyone else in your household, at increased risk of harm to health, safety, and independence during a power outage? (n=31; A14=Yes)
Q14. Does anyone in your home or business rely on electricity for medical needs/equipment? (n=260; Total)

Access and Functional Needs Resources

- Among the 16% of customers who indicated they have access and functional needs, 24% are aware that Liberty looks to identify households with AFN needs to provide targeted communication and earlier notification of PSPS
- 30% of Critical or AFN customers have received communication from Liberty about programs available and 9% indicate they engage with Community Based Organizations outside of a PSPS context

Aware Liberty Identifies AFN Households for Targeted Communication & Early PSPS Notification

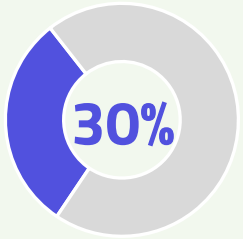
(among AFN customers)



June 2025 (n=42)

Received Direct Communication on Liberty Programs or Preparedness

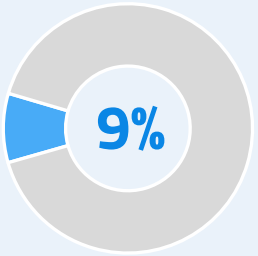
(among AFN/Critical customers)



June 2025 (n=54)

Engage with Community Based Organizations Outside of PSPS Events

(among AFN/Critical customers)



June 2025 (n=54)

QL2 Are you aware that Liberty looks to identify households with access and functional needs to provide targeted communication and earlier notification of PSPS? (n=42; AFN=Yes)
QL3 Do you recall receiving direct communication regarding available Liberty customer programs and/or preparedness? (n=54; AFN=Yes / Used CARE / Critical Customer / Rely on electricity for medical needs)
QL4 Do you or members of your household engage with Community Based Organizations or local Health and Human Services agencies within your community outside of the "during PSPS" context covered earlier in the survey? (n=54; AFN=Yes / Used CARE / Critical Customer / Rely on electricity for medical needs)

AFN Summary

Key Metrics: AFN vs. Non-AFN

	AFN Customer (n=42)	Non-AFN Customer (n=218)
Aware of Wildfire Safety Communications	57%	67%
Aware of Communications from Liberty (among those aware)	13%	28%
Recall PSPS	62%	54%
Would Turn to Liberty Website for PSPS Info	23%	**46%**
Aware of Ability to Update Contact Info for PSPS	57%	64%
Satisfied with Availability of Resources in Community for Wildfire Safety Info	33%	43%
Aware of Additional PSPS Notices for Those with Medical Need (among those with medical need)	35%	--
Aware of AFN Self-Identification	5%	8%

Bold denotes statistically significant difference between AFN and non-AFN Customers

Demographic Profiles: AFN vs. Non-AFN

	AFN Customer (n=42)	Non-AFN Customer (n=218)
Gender	Male – 45% Female – 48%	Male – 59% Female – 38%
Age	18-54 – 26% 55-64 – 12% 65+ – 52%	18-54 – 22% **55-64 – 28%** 65+ – 44%
Median Income	$63K	**$132K**
Home Ownership	Own – 74% Rent – 17%	Own – 84% Rent – 10%
Reside in Liberty Service Territory	**Year round – 69%** 6 to 11 months – 10% Under 6 months – 21%	Year round – 53% 6 to 11 months – 11% **Under 6 months – 36%**
Primary Language is not English	17%	12%
Responded they Rely on Electricity for Medical Needs	74%	--

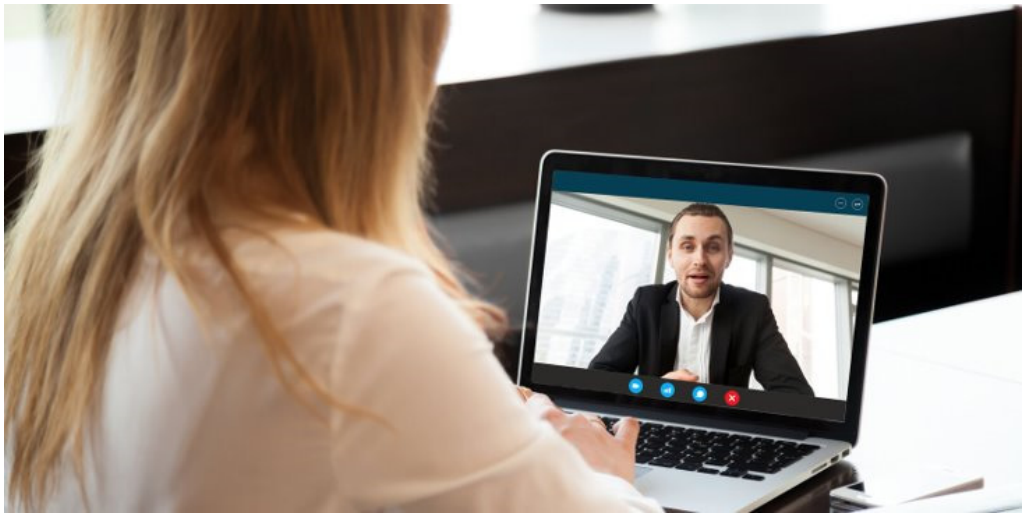
Bold denotes statistically significant difference between AFN and non-AFN Customers

CBO Interviews

CBO Interviews

Four in-depth interviews were conducted with community-based organizations (CBOs) in the Liberty territory in June 2025.

- Interviews lasted 30 minutes and were conducted using Microsoft Teams
- Participants were offered $100 as a “thank you” for their time and feedback
- All interviews were recorded
- Interviews were scheduled using a “warm handoff” from Liberty



CBO Interviews

PSPS Awareness and Messaging

- Participants are aware of PSPS and recall messages from Liberty, but the experience varies by organization
  - Some report general communications being sent to the agency that are seen as "customer-facing" rather than specific to CBOs or agencies
  - Others recall specific communications from Liberty to their agency, and mention workshops or virtual training events
- Most of the communications recalled about PSPS were via email, and provided general information about when power might go out; in some cases, the recall of the messaging was vague enough that it could have been for any weather-related outage
- CBOs all have some degree of interaction with the public related to PSPS, but none of those interviewed this wave are directly providing information about public preparation
  - Interactions typically revolve around letting their clients know what services will not be available during a PSPS event
  - Some centers are positioned to function as a CRC in the event of a PSPS, but have not personally been involved
- Community-facing education from Liberty about PSPS is important, including an explanation of PSPS, why events are called, how to prepare, and what Liberty is doing to mitigate the potential for PSPS
  - Social media, flyers/handouts, email communications, community events, are recommended, and late spring/early summer is the ideal time
  - English and Spanish are the primary languages required

PSPS Awareness and Messaging (cont.)

- Special care is required to reach those most vulnerable
  - Seniors are less likely to be active on social media, and are more dependent on word of mouth during emergency situations; it is important to encourage the community to help spread the word, as well as partnering with senior centers, CBOs, and county agencies to post flyers, etc.
  - Renters and those in group home settings may not personally be Liberty customers and may not receive direct communications
  - As much advanced notice as possible is appreciate for those who are most vulnerable during a PSPS
- Several resources are mentioned that would help the community
  - Information about how to prepare for an outage or fire (having food/water, gas in car, go bags, shelter information, etc.)
  - Support with generators or backup power or supporting facilities such as senior centers, hospitals, CRCs, etc.
- Participants would welcome Liberty's participation in public-facing meetings and encourage Liberty to make it easier to attend PSPS informational events
  - Liberty is encouraged to visit sites or attend community events where they can interact directly with the public
  - Hosting PSPS meetings online and making recordings available for those who cannot attend would help reach those farther away or who are unable to attend during the live event
- As much advanced notice as possible for PSPS events is important, particularly for those more vulnerable to power outages

CBO Interviews

CRC Awareness and Messaging

- Participants are aware of CRCs, but the level of familiarity is limited
  - A couple of CBOs have served as CRCs in the past, and think they might still be in partnership but are not personally involved and do not know the details about coordination
  - They acknowledge the importance of providing a place where people can go, especially for seniors or those with medical equipment that requires electricity
- All agree that it is important to make the public aware of CRCs, including where they are located, when they will be operational, and what resources will be provided
  - Similar messaging to PSPS is recommended, including direct mail and email from Liberty, social media outreach, distributed flyers or mailers, text messaging, and spreading the word in-person at events or at CBO sites
  - This is especially important for the elderly population, AFN, and those with medical needs
- Liberty could support CRCs with resources, such as generators, transportation, and supplies is an area where participants feel Liberty could contribute
  - In addition to providing electricity for medical equipment, cooling is highly important to those who are elderly or medically fragile
  - CBOs, senior centers, aid agencies (e.g., Red Cross) are mentioned as natural partners for running CRC operations

AFN Awareness and Messaging

- Participants who support seniors are familiar with AFN and actively support this community, but those focused more on children are not familiar
  - Those who work with seniors have lists of AFN community members, but do not actively provide alerts or notifications related to PSPS
  - There is little knowledge of Liberty's AFN program, and CBO's outreach efforts are based on providing their core services; they receive referrals from county government, senior centers, meal delivery programs, and word of mouth and are open to providing information about Liberty's resources
- CBOs interviewed are unsure about the ability to share AFN data with Liberty (and vice versa), due to privacy requirements and regulations; the general perception is that AFN status is covered by HIPPA and special arrangements and care would be required to ensure privacy
- Educating the public and CBOs focused on seniors about the additional notifications and resources available to customers enrolled in AFN self-identification is important, as there appears to be knowledge gap among those interviewed this wave
- It is important to include those who are supported by case managers or live in master leased apartments by CBOs, as they are unlikely to be direct Liberty customers and may not receive notifications or have access to the resources available to those enrolled in AFN directly through Liberty

CBO Interviews

Additional Resources

- Participants this wave have limited knowledge of support resources provided by Liberty
  - CARE and other income support programs are most commonly recalled; those working with low-income families or seniors do point their clients to resources available from Liberty
  - Awareness of Medical Baseline is more limited, with one participant being aware of PG&E's program and that Liberty also offers something similar
  - Only one participant was aware of 211 Resources and has told clients about the program
- Due to the general lack of awareness of Liberty's programs, participants are not aware of the efforts taken by Liberty to educate customers
  - Sending mailings or emails, posting flyers, and attendance at events or CBO sites are considered ways Liberty could educate customers about resources available for the community
  - Direct communication with CBOs, or meetings (virtual or in-person) would be helpful in educating them so they can pass on information to clients

Demographic Profiles

Respondent Profiles

Gender	Total (n=260)	Recallers (n=169)	Non-Recallers (n=65)
Male	57%	54%	65%
Female	39%	41%	31%
Age			
18 to 24	--	--	--
25 to 34	3%	2%	5%
35 to 44	8%	8%	6%
45 to 54	13%	12%	11%
55 to 64	25%	24%	32%
65 or over	45%	47%	38%
Prefer not to say	7%	7%	8%

Renter/Homeowner	Total (n=260)	Recallers (n=169)	Non-Recallers (n=65)
Own	82%	84%	77%
Rent	11%	9%	17%
Prefer not to say	6%	7%	5%
Reside in Liberty Service Territory			
Year round	55%	58%	57%
6 to 11 months	11%	9%	12%
Under 6 months	34%	33%	31%
Household Income			
Less than $20,000	2%	2%	3%
$20,000 to $39,999	7%	6%	12%
$40,000 to $59,999	7%	8%	6%
$60,000 to $89,999	11%	11%	12%
$90,000 to $129,999	9%	11%	6%
$130,000 to $199,999	10%	11%	8%
$200,000 or more	22%	20%	23%
Prefer not to say	31%	31%	29%

Q17 What is your gender? (n=260; Total)
Q18 What is your age category? (n=260; Total)
Q19 Do you own or rent your home? (n=260; Total)
Q20 Which of the following best describes your annual household income? (n=260; Total)

Bold denotes statistically significant difference between Recallers and Non-Recallers

Respondent Profiles – AFN Criteria

	Total (n=260)	**Recallers** (n=169)	**Non-Recallers** (n=65)
AFN (NET)	16%	14%	20%
Age 65+	45%	47%	38%
<$40K income	10%	8%	15%
Chronic conditions or injuries	42%	47%	33%
Limited access to transportation	10%	7%	17%
Physical, developmental, or intellectual disability	35%	27%	42%
Non-English language needs	13%	11%	22%
Medical need	12%	12%	12%

Bold denotes statistically significant difference between Recallers and Non-Recallers

Attachment 3
Liberty's Survey Results, December 2024

Wildfire Messaging Awareness

Prepared by

MDC Research

Jakob Lahmers - Jakob.Lahmers@mdcresearch.com

Objectives & Methodology

The **overall objective** of this research was to measure the public's awareness of messaging related to wildfire preparedness and safety. Specific research objectives include:

- Measure awareness of Liberty Utilities (Liberty) messages related to wildfire preparedness
- Identify recall of specific message topics
- Identify recall of message channels
- Measure recall and understanding of Public Safety Power Shutoff or PSPS
- Evaluate sources customers are most likely to turn to for information about PSPS
- Explore actions taken by customers to prepare for wildfire season
- Measure awareness of Liberty's efforts to reduce the risk of wildfires
- Evaluate PSPS notifications perception

Target Audience

- Liberty residential and business customers in California
- Liberty critical customers

Methodology

- Customers were surveyed at random from Liberty customer records, targeted for either phone or web administration
- Surveys available to customers in English and Spanish
- A total of 413 surveys were completed between November 13 and November 30
  - Phone: 80 completed surveys from 12,412 records
  - Web: 333 completed surveys from 20,046 records

Key Findings

Communications

- **76% are aware of wildfire safety communications**, up significantly from June 2025 (65%).
- **Liberty** remains the primary source for wildfire preparedness information and saw a significant increase from June 2025 (36% vs 25%). **Vegetation management** and **personal preparedness** are the most common messages recalled.
- **Email** remains the most cited channel for wildfire preparedness communication and saw a significant increase from June 2025 (46% vs 33%); bill inserts, direct mail, and social media make up the next most common tier.
- **Local agencies, community meetings, and email are considered the clearest; community meetings, newspaper, and local agencies are seen as the most useful resources** for information about wildfire preparedness.
- **68%** recall seeing, hearing or reading the phrase **"Public Safety Power Shutoff or PSPS,"** up significantly from last wave (55%). **Email (53%), TV news (26%), and social media (21%)** remain the most common sources of PSPS communication.
- Among those recalling the phrase "PSPS" from the past year, **96% are aware of its possible implementation to prevent wildfire**, consistent with last wave (97%); just under eight in ten **understand PSPS is a last resort (79%)** and the likelihood of **implementation becomes reduced when Liberty takes steps to harden its infrastructure (86%)**.
- **46%** say they would first turn to the **Liberty website** for information about a PSPS event, consistent with last wave (42%).
- Notifications via text (57%) and email (28%) are considered the two most effective forms of communication from Liberty. Larger font (8%) and audio recordings of written text (6%) are seen as the most helpful communication elements that could be incorporated.

Actions Taken

- **65% have taken some form of action to prevent wildfires or to prepare their home or business** for the event of a PSPS. Having a **generator** and **trimming vegetation around properties** are the most common actions taken.
- **58% are aware of Liberty's efforts to prune vegetation** around power lines in higher-risk areas, consistent with last wave (51%). **Non-Recallers** are significantly more likely than Recallers to say they are unaware of Liberty's efforts (**51%** vs 14%). **66%** are aware they can **update their contact information with Liberty**, consistent with June 2025 (63%); 69% of those aware have done so, also consistent with last wave (69% vs 66%).

AFN and Critical Customers

- **24% of customers can be considered AFN**.
- Of the resources available to the public, customers are most likely to be aware of **LIHEAP (58%), special payment arrangements (49%), and Residential Energy Audit (39%)**; 34% have not investigated any of the resources and 27% report no need.
- Only 4% of AFN customers have heard of AFN Self-Identification.
- Among those reporting that they rely on electricity for medical needs, 44% are aware of additional notices from Liberty, 26% are currently enrolled in the Medical Baseline Allowance program.
- 98% of respondents indicated it would not be helpful to receive communications in a language other than English; less than 1% indicate Spanish and Russian as their preferred language.

PSPS Experience

- 34% of customers report experiencing a PSPS this year, consistent with last wave (33%); of those, 71% said they received adequate notification and information to prepare, though 13% say the number one improvement to be made is more frequent/faster notifications. 23% say no PSPS notification improvements are necessary.

Recommendations

Consider more targeted outreach efforts to engage the public on wildfire safety and knowledge of PSPS.

- While overall communication awareness saw a significant increase in November 2025 when compared with June 2025 (76% vs 65%), Liberty customers under the age of 65, as well as those indicating a reliance upon electricity for medical needs and those identified as AFN, are significantly less likely than their counterparts to say they've seen or heard communications about wildfire safety in the past year.

Continue efforts to increase AFN self-enrollment, and awareness that enrolling will provide targeted early notifications about PSPS. Also consider promotion of CBOs that provide support to AFN customers during and outside of PSPS events.

- Only 3% of AFN customers are aware of AFN self-enrollment, and two thirds of AFN customers are not aware that Liberty provides targeted communications and early notice about PSPS.
- Only one in five AFN customers have engaged with CBOs outside of PSPS events.

Evaluate communication efforts during the off season.

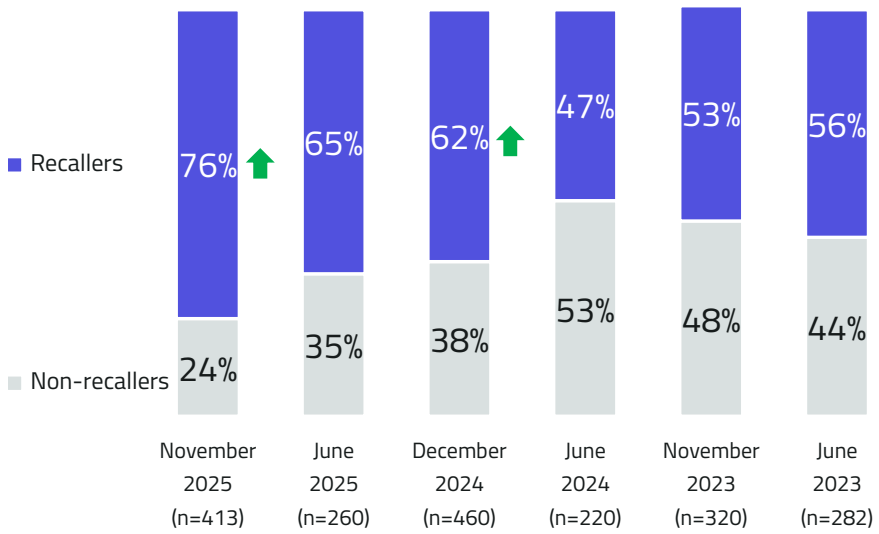
- In November 2025, information recall about wildfire preparedness from Liberty saw significant improvements across all evaluated messages when compared with June 2025 results. A similar pattern was observed between December 2024 and June 2024, hinting at the cyclical nature of messaging in addition to the general relevance of this type of communication throughout the summer. There is opportunity during the winter months to spread the word around taking actions to prevent or prepare homes and business in the event of a PSPS, particularly around preparing emergency readiness plans & contact information, preparing emergency kits, and food and water storage, all of which have been consistently among the fewest actions taken by customers.
- Less than half (39% to 45%) are highly satisfied, while roughly one quarter (23% to 28%) are dissatisfied with Liberty's outreach and engagement around the amount of information received, where to find information to help stay safe, what to expect in the event of a PSPS, availability of resources in the community, what Liberty does to reduce wildfire risk, and in preparing you to act in the event of a wildfire.
- With the Liberty website consistently remaining the number one source customers indicate they would turn to first for information about PSPS, consider ways to increase traffic to the website for additional information, particularly the resources made available by Liberty, such as updating contact information and other special programs.
    - Despite relatively high satisfaction with resources, less than half of customers indicate awareness, and even fewer have used resources like Special Payments Arrangements, Residential Energy Audits, California Alternate Rates for Energy, ESA Energy Savings Assistance, Medical Baseline Allowance, calling 211, and AFN Self-Identification.

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Wildfire Safety Communications Awareness

- Just over three in four (76%) have seen or heard communications about wildfire safety in the past year, significantly higher than in June 2025 (65%)

Communication Awareness

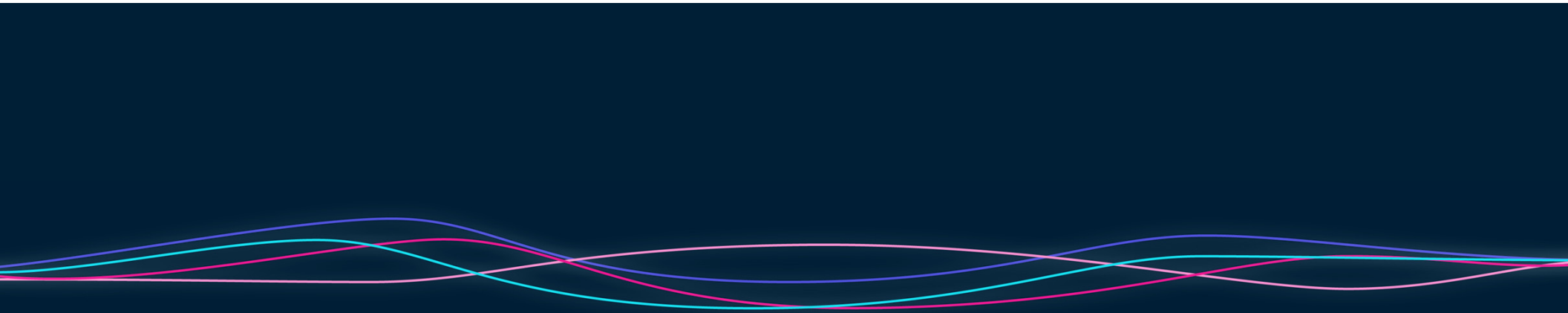


Q2 Have you seen or heard any communications about wildfire safety in the past year? (n=413; Total)

	Recallers (n=313)	**Non-Recallers** (n=100)
Gender	Male – 50% Female – 43%	Male – 46% Female – 42%
Age	18-54 – 17% 55-64 – 19% **65+ – 58%**	**18-54 – 28%** 55-64 – 16% 65+ – 46%
Median Income	$115K	$86K
Home Ownership	Own – 84% Rent – 10%	Own – 75% Rent –16%
Primary Language is not English	12%	17%
Responded they Rely on Electricity for Medical Needs	15%	**26%**

Arrows signify statistical difference at the 95% confidence level compared to the previous wave

Bold denotes statistically significant difference between Recallers and Non-Recallers



Communication Recall

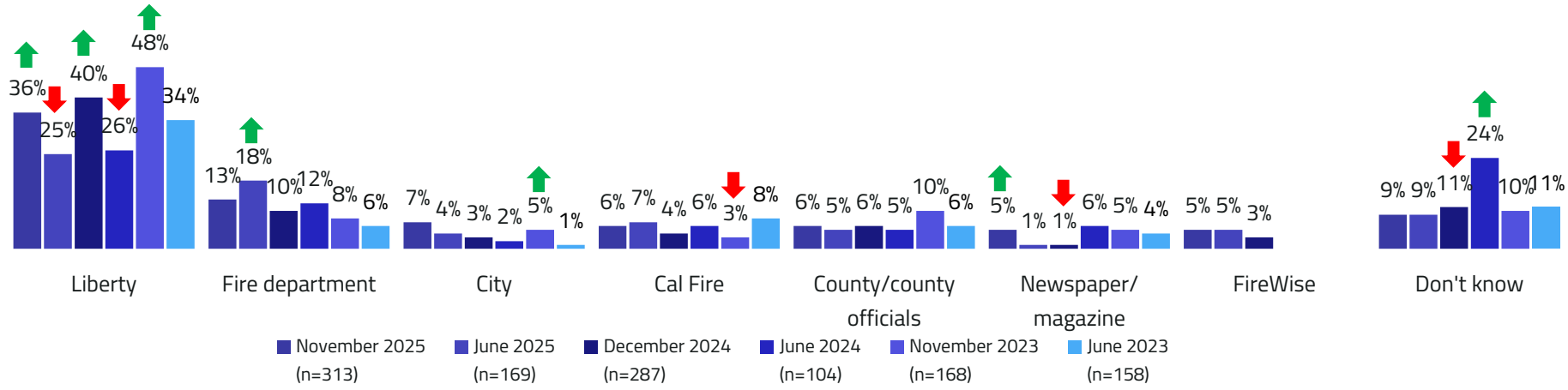
(among those aware of communications)

Sources of Wildfire Preparedness Communications

- Of those aware of communications, just over one third (36%) mention Liberty as the source of wildfire preparedness communication, up significantly from June 2025 (25%); roughly one in eight (13%) mention fire departments, consistent with June 2025 (18%)
- Just under one in ten (9%) are not aware of the source of communication, consistent with June 2025 (9%)

Wildfire Preparedness Communications Sources

(among those who recall communication)



Q5 Who was the information about wildfire preparedness from? (n=313; Aware of Communication)

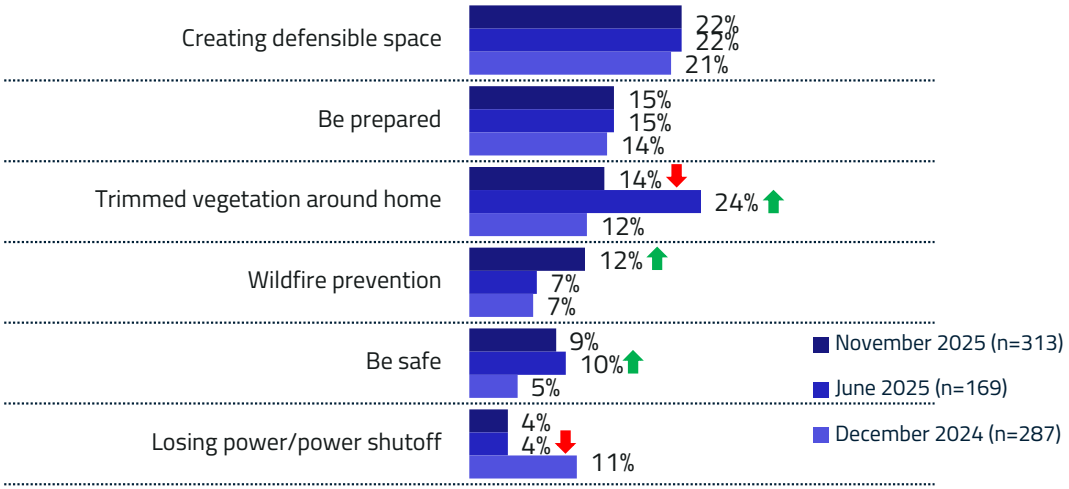
Arrows signify statistical difference at the 95% confidence level compared to the previous wave

Unaided Message Recall

- Of those who recall communications, just over one in five cited creating a defensible space (22%) as the main takeaway from communications about wildfire safety over the past year, consistent with June 2025 (22%)
- One in seven (14%) recall the message of trimming vegetation, down significantly from June 2025 (24%)

Communications Main Takeaway

(among those who recall communication)

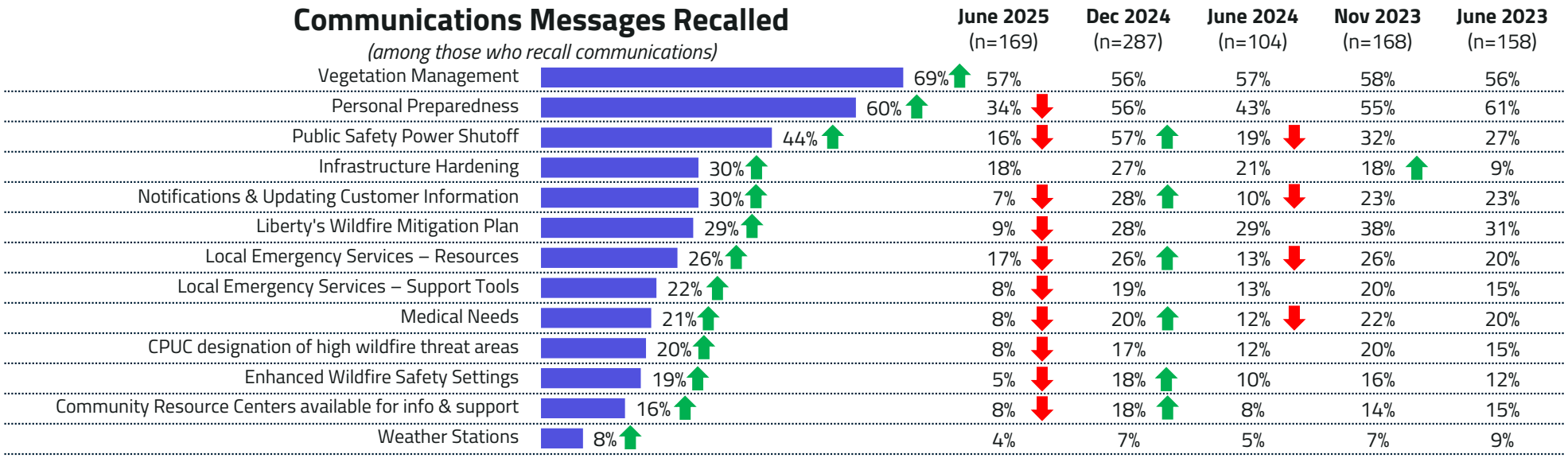


QB1 What was your main takeaway from the communications? (n=313; Aware of Communication)

Arrows signify statistical difference at the 95% confidence level compared to the previous wave

Wildfire Preparedness Communications Messages

- Of those who recall communications, just under seven in ten recall messages about vegetation management (69%), followed by personal preparedness (60%) and PSPS (44%)
- Compared to the previous wave, mentions of all messages increased significantly



Q3 What were the messages of the information you saw or heard about wildfire preparedness from Liberty? (n=313; Aware of Communication)

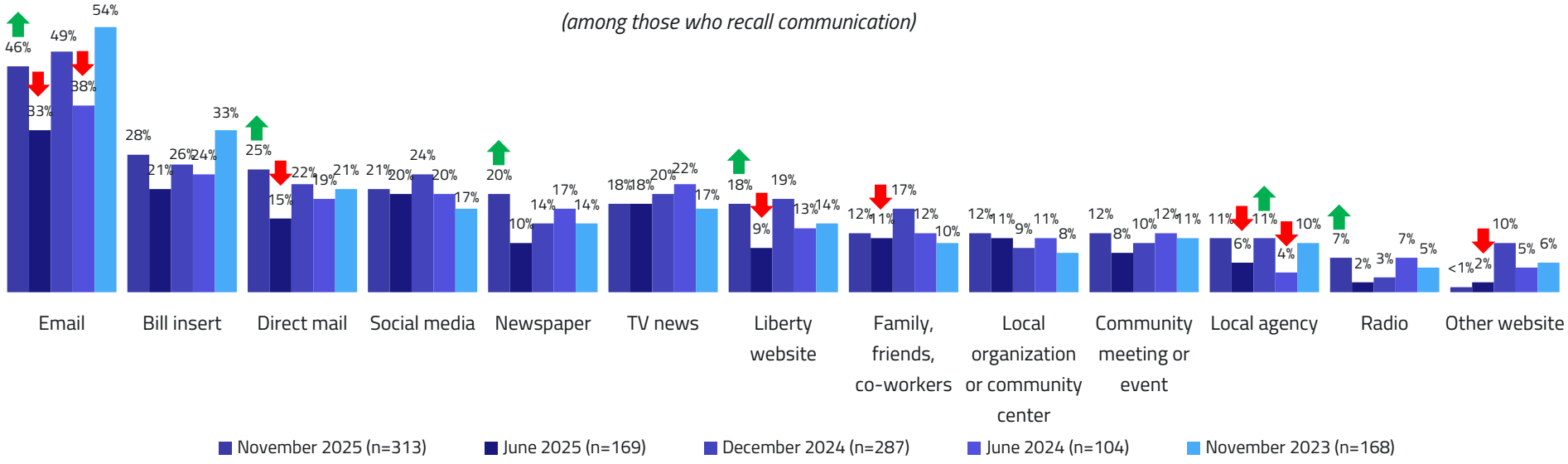
Arrows signify statistical difference at the 95% confidence level compared to the previous wave

Information Channels for Wildfire Communications

- Email remains the most common channel for wildfire preparedness communication with just under half (46%) mentioning it, followed by bill inserts (28%), direct mail (25%), social media (21%), and newspaper (20%)
- Mentions of email, direct mail, newspaper, the Liberty website, and radio all saw significant increases from June 2025

Information Channels for Wildfire Preparedness Communications

(among those who recall communication)

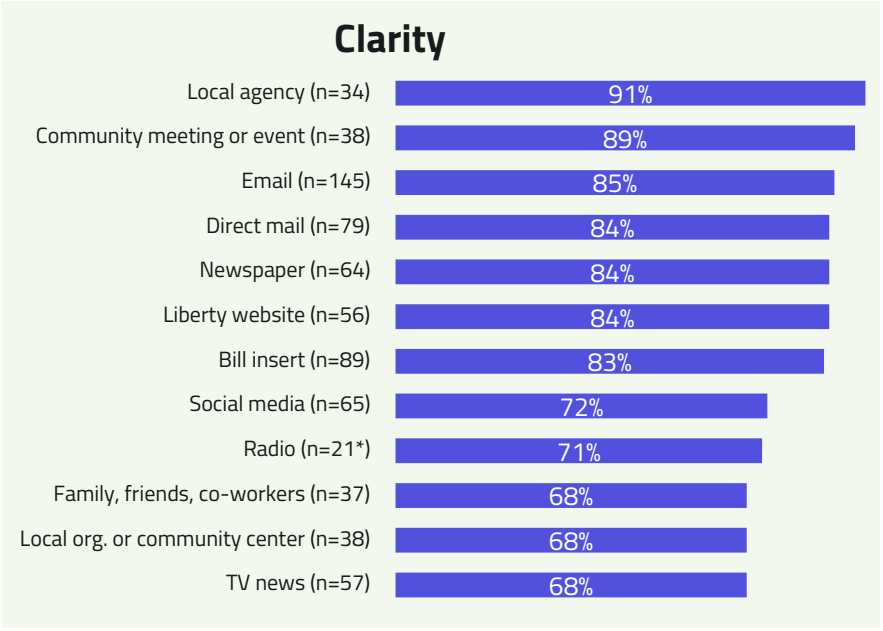


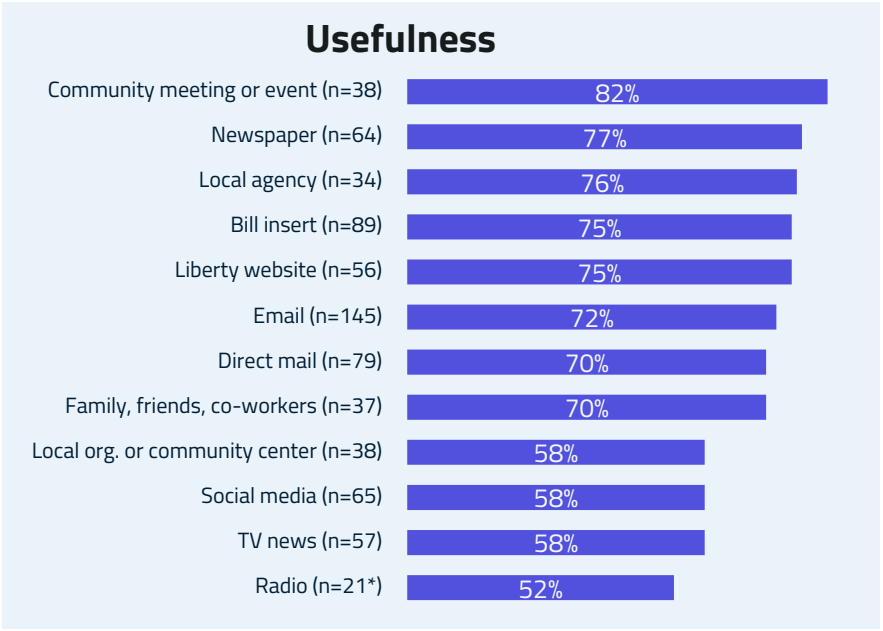
Q4 Where did you see or hear the communications about wildfire preparedness? (n=313; Aware of Communication)

Arrows signify statistical difference at the 95% confidence level compared to the previous wave

Information Usefulness and Clarity

- In terms of clarity, local agency (91%), community meetings or events (89%) and email (85%) are rated the highest, along with direct mail (84%), newspaper (84%), and the Liberty website (84%)
- In terms of usefulness, community meetings or events (82%), newspaper (77%), and local agency (76%) are rated highest



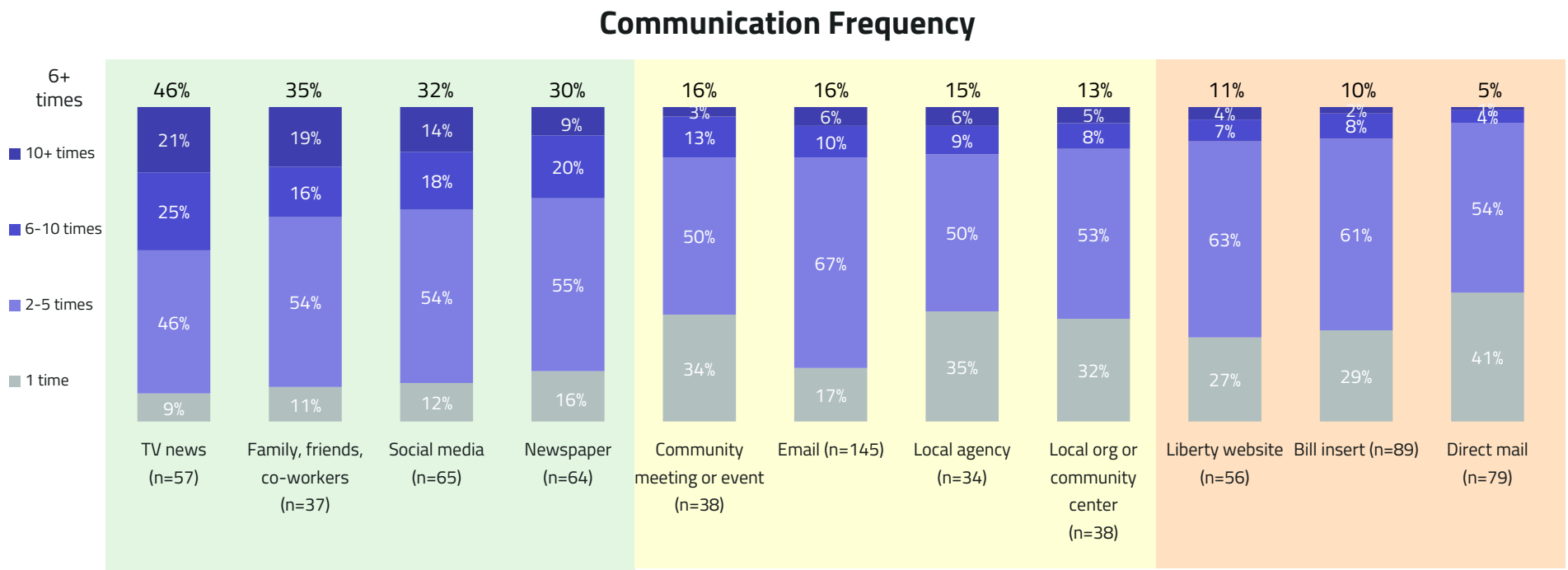


Q4A How useful was the information about wildfire preparedness from each of these sources? (n=313; Aware of Communication)
Q4B How would you rate the clarity of the information about wildfire preparedness from each of these sources? (n=313; Aware of Communication)

*Small sample size (n<30)

Communication Frequency

- Just under half say they have seen at least six messages about wildfire preparedness on TV news (46%), followed by family, friends, co-workers (35%), social media (32%), and newspaper (30%)

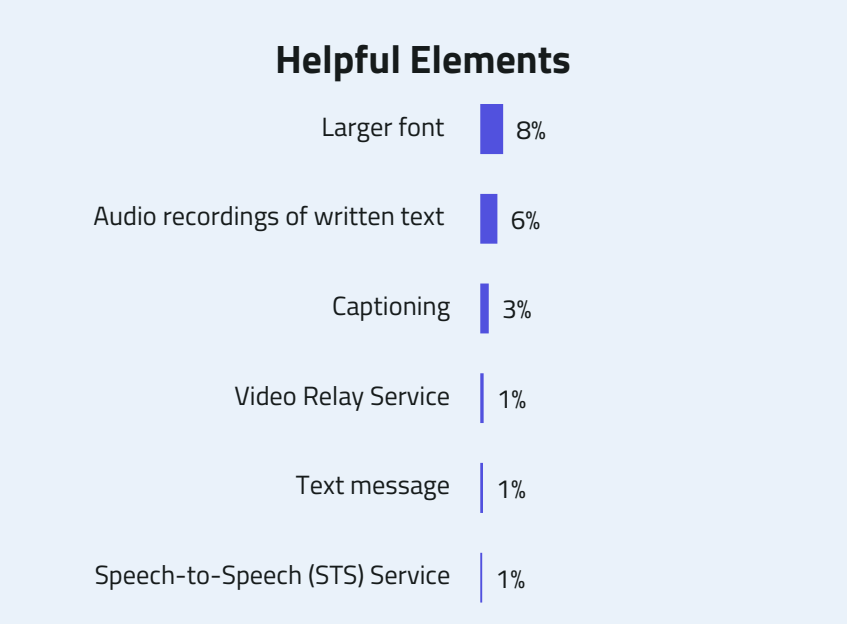


Q5A In the past 6 months, how often do you recall seeing, hearing or seeking messages about wildfire preparedness? (n=313; Aware of Communication)

Effective and Helpful Communication

- Notifications via text remain the most effective form of communication from Liberty (57%) followed by email (28%); larger font is the most helpful (8%) element that could be incorporated, followed by audio recordings of written text (6%)





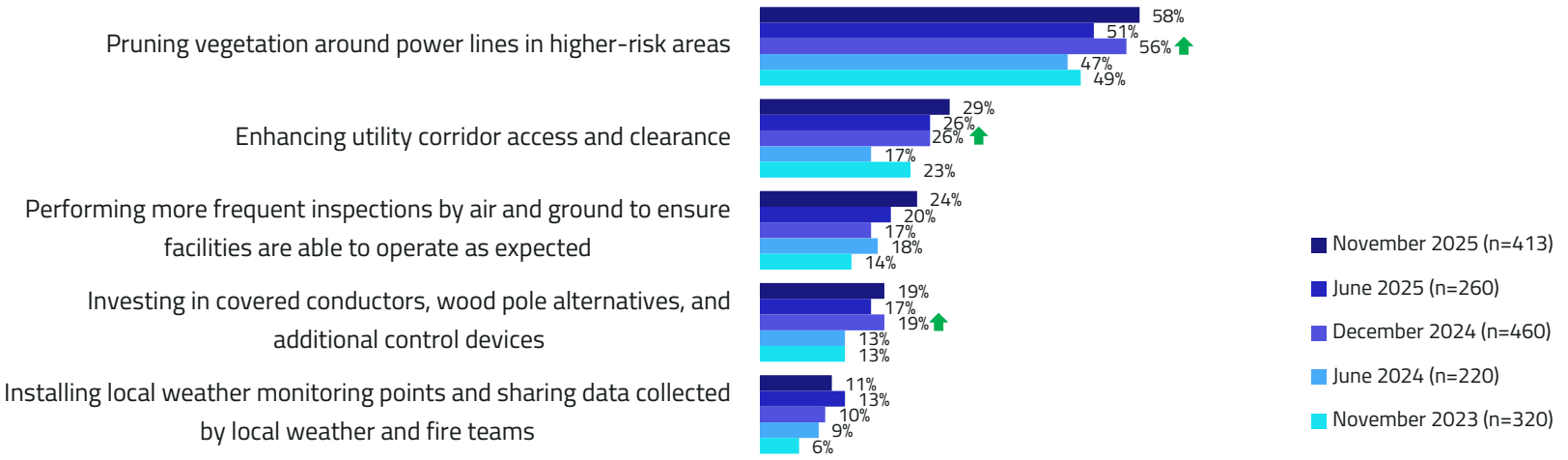
A6 What method of communication from Liberty do you find most effective? (n=413; Total)
A12 Regardless of how communications from Liberty are received, which, if any, of the following would be helpful for you? (n=413; Total)

Wildfire Preparedness Actions Taken

Awareness of Liberty's Efforts

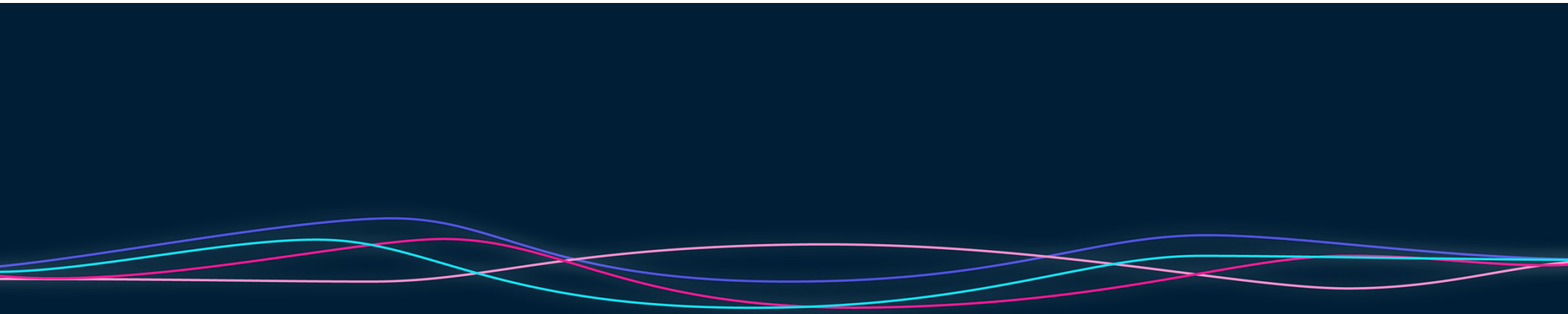
- Consistent with previous results, pruning vegetation around power lines in higher-risk areas remains at the top of the list of efforts by Liberty to reduce the risk of wildfire (58%), remaining in line with June 2025 (51%), followed by enhancing utility corridor access and clearance (29%)
- Non-Recallers are significantly more likely than Recallers to say they are not aware of any efforts by Liberty (**51%** vs 14%)

Awareness of Liberty's Efforts to Reduce Wildfire Risk



Q7 What efforts by Liberty are you aware of to reduce the risk of wildfire? (n=413; Total)

Arrows signify statistical difference at the 95% confidence level compared to the previous wave

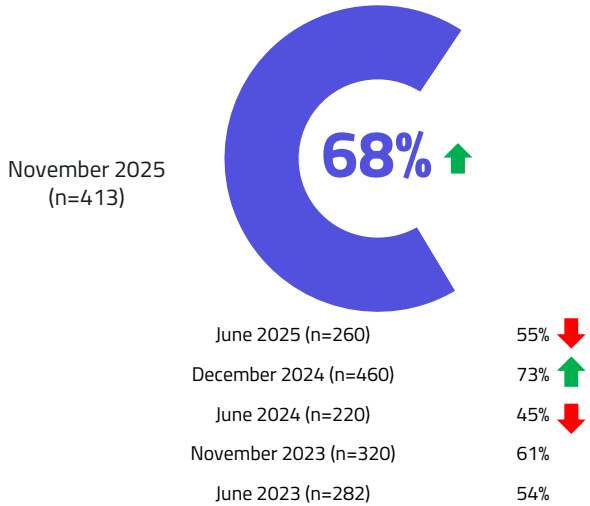


Awareness of Public Safety Power Shutoff

PSPS Awareness

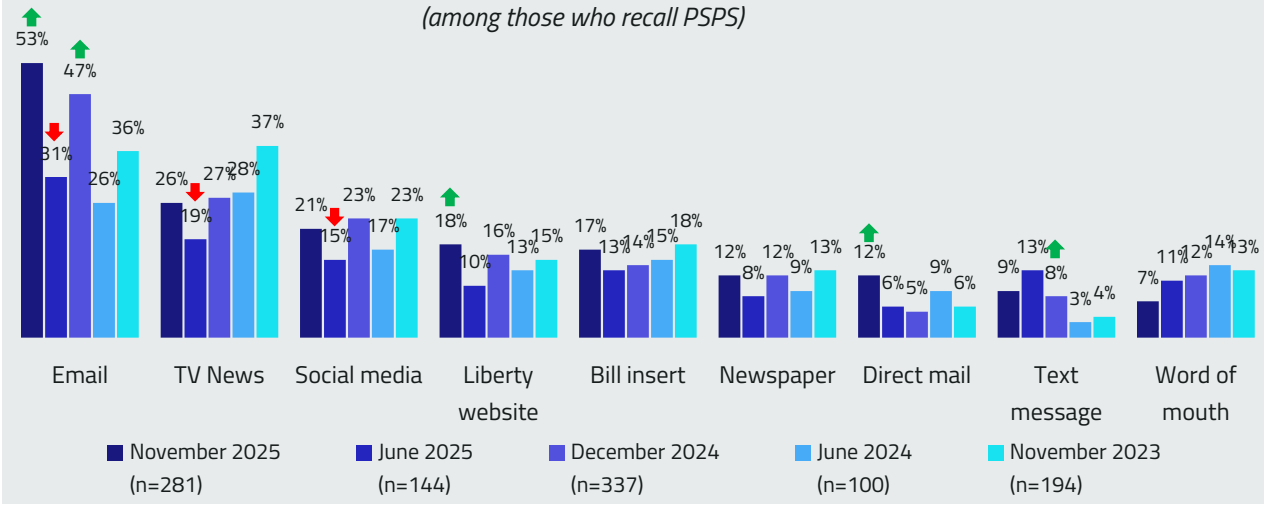
- Just over two thirds (68%) say they recall seeing, hearing or reading the phrase "Public Safety Power Shutoff or PSPS," up significantly from June 2025 (55%); **Recallers** remain significantly more likely than Non-Recallers to be aware of PSPS (**75%** vs 45%)
- Email is the leading source of PSPS communications (53%), followed by TV news (26%) and social media (21%); email, the Liberty website, and direct mail all saw significant increases from June 2025

PSPS Recall



Sources of PSPS Communications

(among those who recall PSPS)



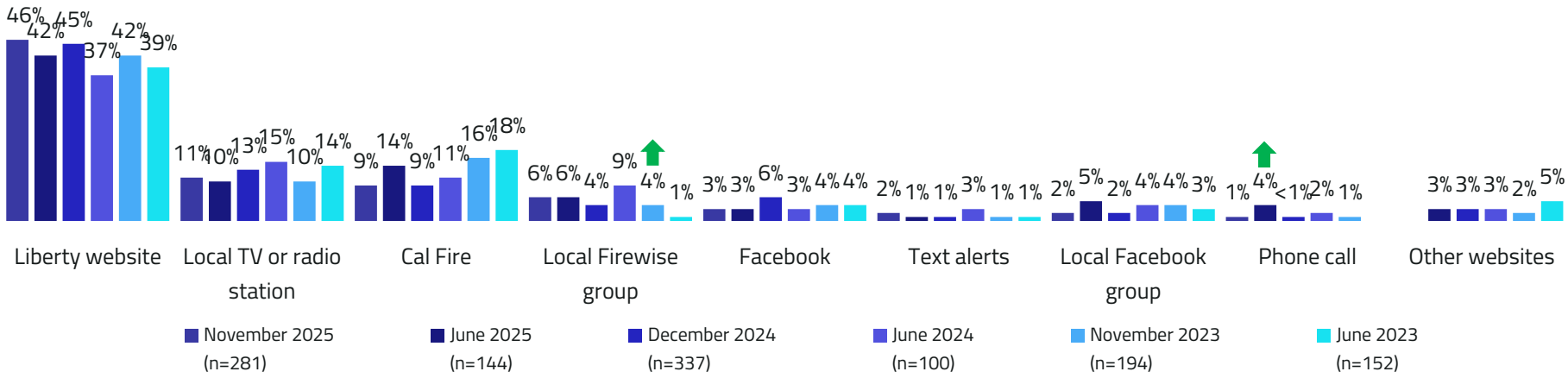
Q8 In the past year, do you recall seeing, hearing or reading the phrase 'Public Safety Power Shutoff or PSPS?' (n=413; Total)
Q8A Where do you recall seeing or hearing about Public Safety Power Shutoff information related to wildfire conditions? (n=281; Recall PSPS Communications)

Arrows signify statistical difference at the 95% confidence level compared to the previous wave

PSPS Information

- The Liberty website remains the most mentioned source for information about PSPS (46%), followed by local TV or radio stations (11%) and Cal Fire (9%)

Top Sources of PSPS Information



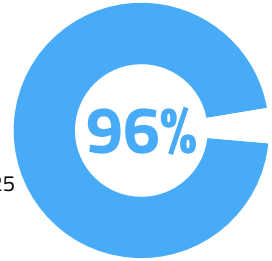
Q9 Which one of the following would you most likely turn to first for information about Public Safety Power Shutoff? (n=281; Recall PSPS)

Arrows signify statistical difference at the 95% confidence level compared to the previous wave

Understanding PSPS

- Almost all (96%) of those who recall the term PSPS are aware Liberty could proactively shut off power to prevent the ignition of a catastrophic wildfire, consistent with last wave
- Just under eight in ten understand PSPS is a last resort (79%) and just under nine in ten understand that the likelihood of PSPS is reduced when Liberty takes steps to harden its infrastructure (86%)

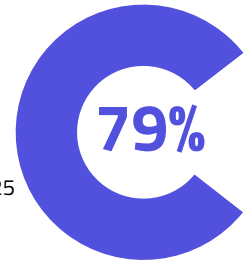
Awareness of Potential Proactive Shutoff



November 2025 (n=281)

June 2025 (n=144)	97%
December 2024 (n=337)	99% ↑
June 2024 (n=100)	94%

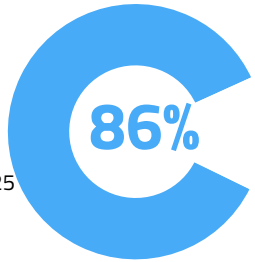
Awareness PSPS is Measure of Last Resort



November 2025 (n=281)

June 2025 (n=144)	74%
December 2024 (n=337)	72%
June 2024 (n=100)	73%

Awareness PSPS Risk Reduced by Infrastructure Hardening



November 2025 (n=281)

June 2025 (n=144)	83%
December 2024 (n=337)	83%
June 2024 (n=100)	77%

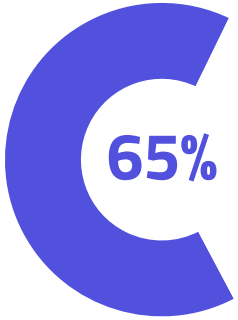
QP10A Are you aware that the utility could proactively shut off power to prevent the ignition of a catastrophic wildfire? (n=281; Recall PSPS)
QP10B Are you aware that a proactive PSPS is a measure of last resort? (n=281; Recall PSPS)
QP10C Are you aware that the likelihood of a PSPS is reduced when the utility takes steps to harden its infrastructure? (n=281; Recall PSPS)

↑ ↓ Arrows signify statistical difference at the 95% confidence level compared to the previous wave

PSPS Preparedness

- Just under two thirds (65%) have taken actions to prevent or prepare their home or business in the event of a PSPS, consistent with previous results
- Generator preparation and purchases remain the most common action taken, mentioned by 31% of those who have taken action; trimming vegetation is the second most common action taken, mentioned by 21% of respondents

Took Actions to Prevent or Prepare for a PSPS



November 2025 (n=281)

June 2025 (n=144)	67%
December 2024 (n=337)	69%
June 2024 (n=100)	60%

Actions Taken *(among those taking action)*	**November 2025 (n=183)**	**June 2025 (n=97)**	**December 2024 (n=232)**
Generator (prep/purchase)	31%	35%	35%
Trimmed vegetation	21%	29%	24%
Backup battery	15%	12%	11%
Created defensible space	15% ↑	6%	6%
Prepared lanterns/flashlights	13%	12%	17%
Switched to alternative energy source	9%	8%	7%
Food & water storage	8%	5%	5%
Prepared an emergency kit	5%	3%	3%
Candles	3%	4%	3%
Planned ahead for fuel and cash needs	2%	3%	2%
Prepared an emergency readiness plan and contact information	1%	--	1%

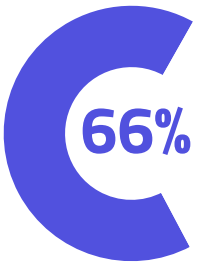
QP6. In the past year, have you taken any actions to prevent or prepare your home or business in the event of a Public Safety Power Shutoff? (n=281; Recall PSPS)
QP6A. What actions have you taken in your home or business to prevent or prepare in the event of a Public Safety Power Shutoff? (n=183; Took actions)

↑ ↓ Arrows signify statistical difference at the 95% confidence level compared to the previous wave

Contact Information for PSPS

- Two thirds (66%) are aware they can update their contact information with Liberty, consistent with June 2025 (63%); awareness among **Recallers** remains significantly higher than among Non-Recallers (**70%** vs 54%)
- Just under seven in ten (69%) of those aware they can update their information have done so, consistent with last wave (66%)

Awareness of Ability to Update Contact Information for PSPS

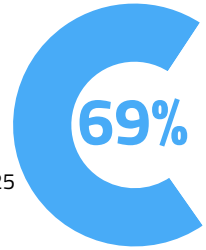


November 2025 (n=413)

June 2025 (n=260)	63%
December 2024 (n=460)	62% ↑
June 2024 (n=220)	51%
November 2023 (n=320)	59%
June 2023 (n=282)	57%

Have Updated Contact Information

(among those aware they can update contact info)



November 2025 (n=274)

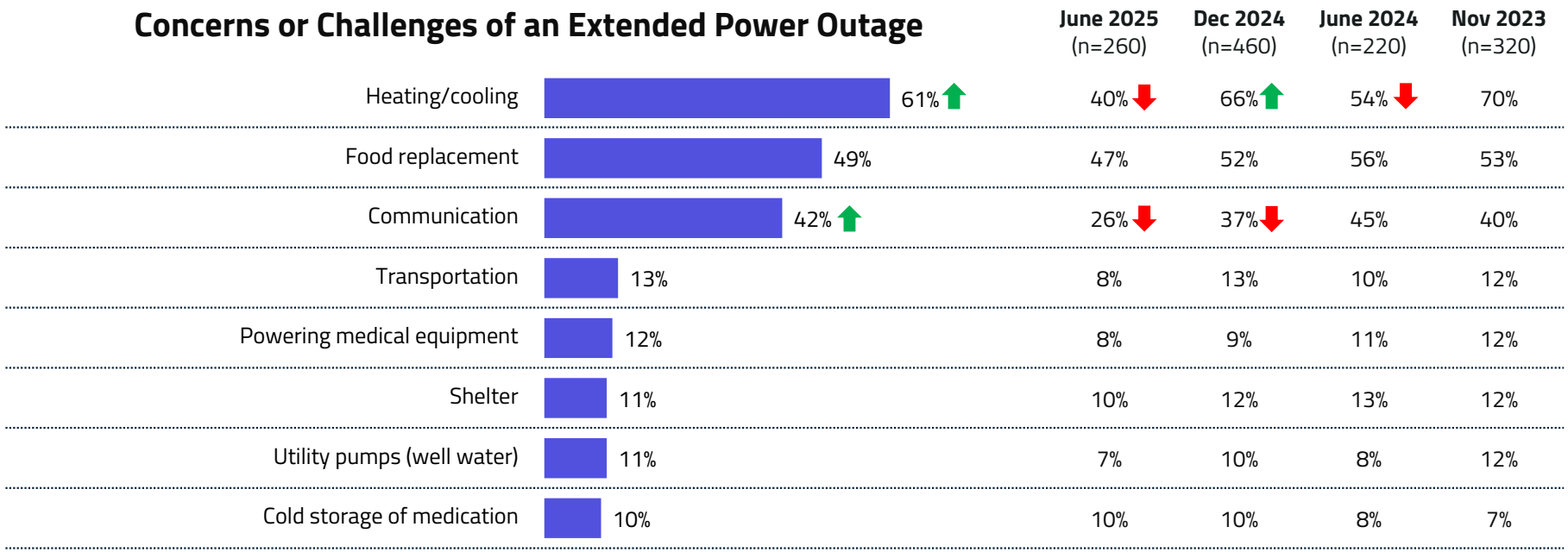
June 2025 (n=163)	66% ↓
December 2024 (n=285)	76%
June 2024 (n=112)	69%
November 2023 (n=189)	77%
June 2023 (n=162)	73%

Q11 Are you aware you can update your contact information with Liberty to receive proactive notification prior to a Public Safety Power Shutoff? (n=413; Total)
Q11A Have you updated your contact information with Liberty to receive notifications prior to a Public Safety Power Shutoff? (n=274; Aware of Information Update)

↑ ↓ Arrows signify statistical difference at the 95% confidence level compared to the previous wave

Concerns about Extended Outage

- The largest concerns and perceived challenges in the event of an extended power outage include heating/cooling (61%), food replacement (49%), and communication (42%)
- Mentions of heating/cooling increased significantly from last wave (61% vs 40%), as did mentions of communication (42% vs 26%)



A5 In the event of an extended power outage, what are your most significant concerns or challenges? (n=413; Total)

Arrows signify statistical difference at the 95% confidence level compared to the previous wave

Medical Needs and Language Preferences

Roughly one in eight (17%) responded that they rely on electricity for medical needs

Just over four in ten (44%) of those relying on electricity for medical needs are aware Liberty provides additional notices prior to a PSPS event

One in seven (14%), indicate that another language other than English is primarily spoken; English remains preferred for communications for nearly all respondents (99%)

- One person mentioned Spanish as their preferred language and one person mentioned Russian

The majority of respondents (98%) stated it would not be helpful for them or somebody in their household to receive communications in another language

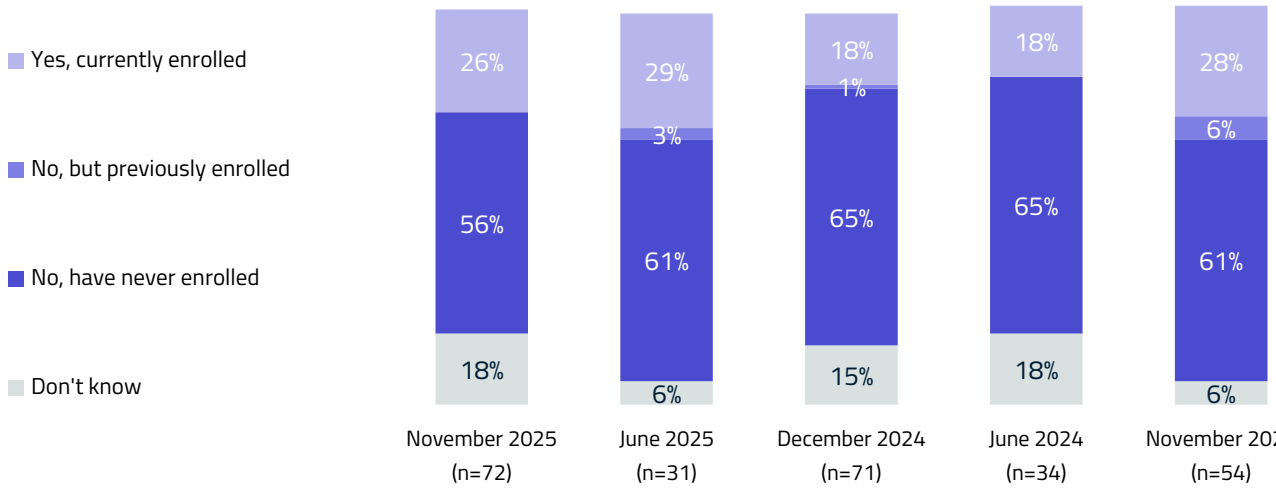
Q14 Does anyone in your home or business rely on electricity for medical needs/equipment? (n=413; Total)
Q14A Are you aware that Liberty provides additional notices prior to a Public Safety Power Shutoff to households that have medical needs/equipment? (n=72; Rely on electricity for medical needs)
Q15 Is your primary language other than English? (n=413; Total)
Q16 Would it be helpful for you or anyone else in your household to receive communications in another language? (n=413; Total)
Q16B What is your preferred language to receive communications? (n=413; Total)

Medical Baseline Enrollment

- Just over one in four (26%) are currently enrolled in Liberty's Medical Baseline Allowance Program, consistent with the previous wave
- **Recallers** are significantly more likely than Non-Recallers to be enrolled (**35%** vs 12%)

Enrolled in Medical Baseline Allowance Program

(among those with medical needs)



Q14E Are you enrolled in Liberty's Medical Baseline Allowance Program? (n=34; Rely on electricity for medical needs

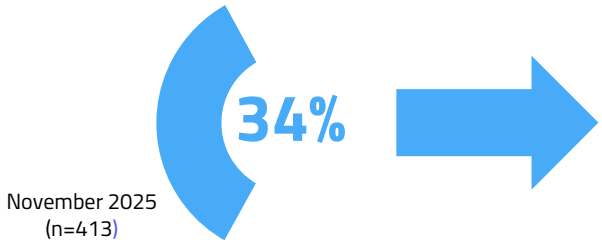
Arrows signify statistical difference at the 95% confidence level compared to the previous wave

PSPS Experience

Experiencing PSPS

- Just over one third (34%) reported experiencing a Public Safety Power Shutoff in November 2025, consistent with June 2025 (33%)
- Among those who experienced a PSPS, just over seven in ten (71%) said they received adequate notification and information to prepare and just under half (47%) said they were aware of community resource centers set up during the PSPS

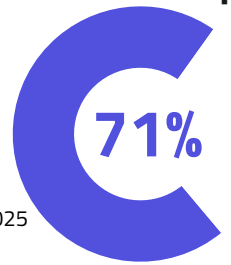
Experienced PSPS



November 2025 (n=413)

June 2025 (n=260)	33% ↓
December 2024 (n=460)	42%

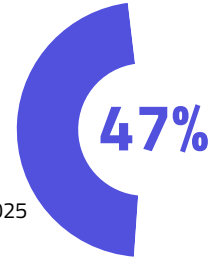
Received Adequate Notification and Info to Prepare



November 2025 (n=141)

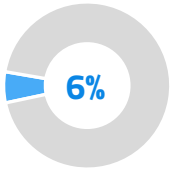
June 2025 (n=87)	67%
December 2024 (n=192)	58%

Aware of Community Resource Centers Set Up During PSPS



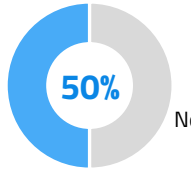
November 2025 (n=141)

Visited CRC



November 2025 (n=66)

CRC Met Needs



November 2025 (n=4*)

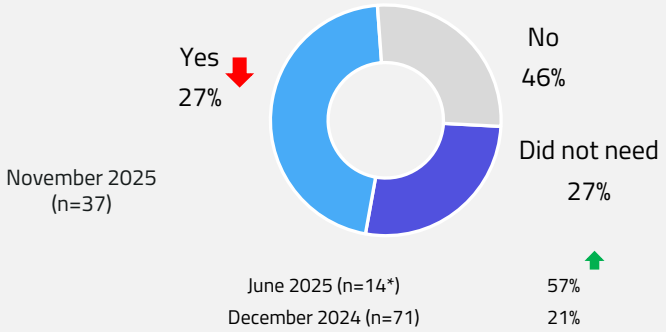
QPS1 Did you experience a Public Safety Power Shutoff (PSPS) this year? (n=413; Total)
QPS1A Did you receive adequate notification and information to prepare for the Public Safety Power Shutoff? (n=141; Experienced PSPS)
QPS1C Are you aware of Community Resource Centers set up during the Public Safety Power Shutoff? (n=141; Experienced PSPS)
QPS1D Did you visit a Community Resource Center? (n=66; Aware of Community Resource Centers)
QPS1E Did the Community Resource Center meet your needs with sufficient capacity and other functional requirements? (n=4; Visited a Community Resource Center)

↑ ↓ Arrows signify statistical difference at the 95% confidence level compared to the previous wave
*Small sample size (n<30)

Medical Equipment Use And CBO Engagement

Among those experiencing PSPS who rely on medical equipment, **just over one in four (27%) said they were able to use the necessary medical equipment during the outage**, while just under half (46%) indicated they were not able; just over one in four (27%) said they did not need to use any medical equipment during the outage

Used Medical Equipment During PSPS



Almost all (97%) who experienced a PSPS said they did not engage with any community-based organizations or resource networks to address food replacement, transportation, translation services, etc.

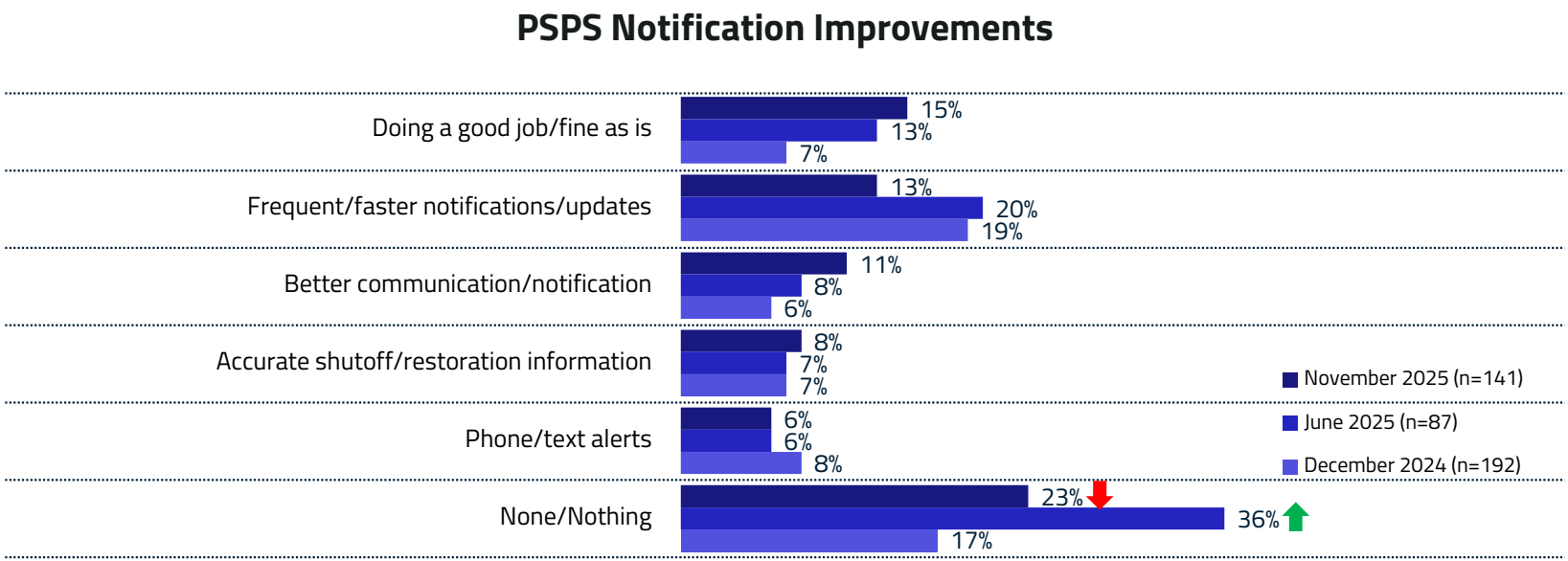
4 people indicated they contacted county offices, local food banks, and the fire department by phone, in person, and email in the following days

QA13 Were you able to use necessary medical equipment during the PSPS outage? (n=37; Experienced PSPS & Rely on electricity for medical needs)
QA1 During the power outage, did you engage with any community-based organizations (CBOs) or resource networks to assist in meeting your needs with food replacement, transportation, translation services, etc.? (n=141; Experienced PSPS)
QA2 What local Community Based Organizations (CBOs) or resource networks did you engage with? (n=4; Engaged with CBO)
QA3 How did you engage with the CBO or resource networks you mentioned? (n=4; Engaged with CBO)
QA4 At what point during the outage did you engage the CBOs or resource networks? (n=4; Engaged with CBO)

Arrows signify statistical difference at the 95% confidence level compared to the previous wave
*Small sample size (n<30)

PSPS Notification Improvements

- One in eight (13%) of those who experienced a PSPS say the speed of notifications and updates could be improved
- Just under one in four (23%) have no recommendations for improvement, down significantly from June 2025 (36%)



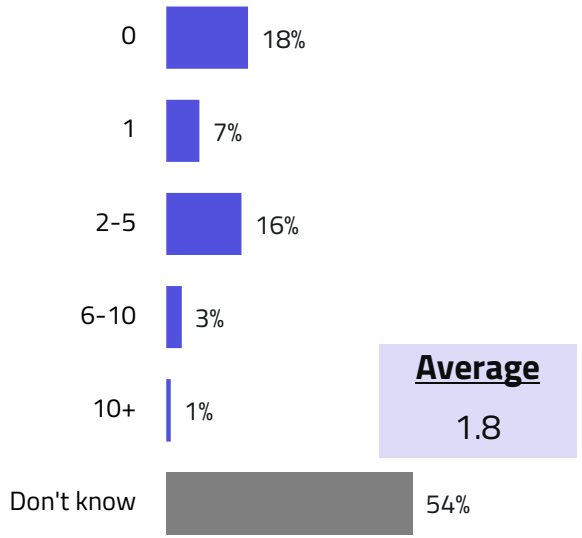
QPS1B *What about the Public Safety Power Shutoff (PSPS) notification and information could have been improved? (n=141; Experienced PSPS)*

Arrows signify statistical difference at the 95% confidence level compared to the previous wave

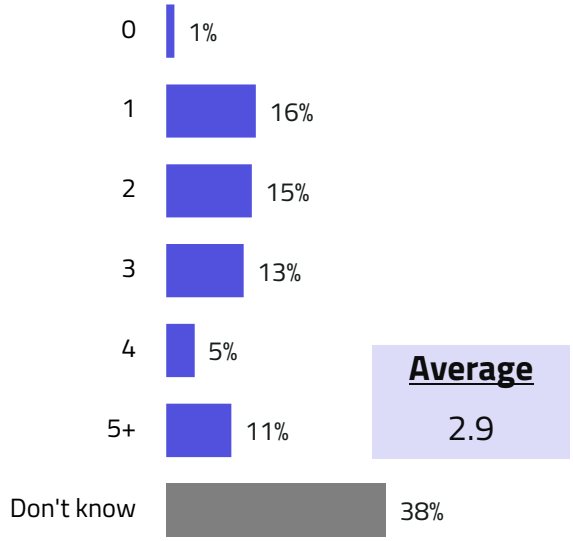
PSPS Notifications

- Just under half (46%) of customers said they received at least one PSPS notification; among customers who said they experienced a PSPS event, an average of 2.9 events were reported

Number of PSPS Notifications Received in Past Year



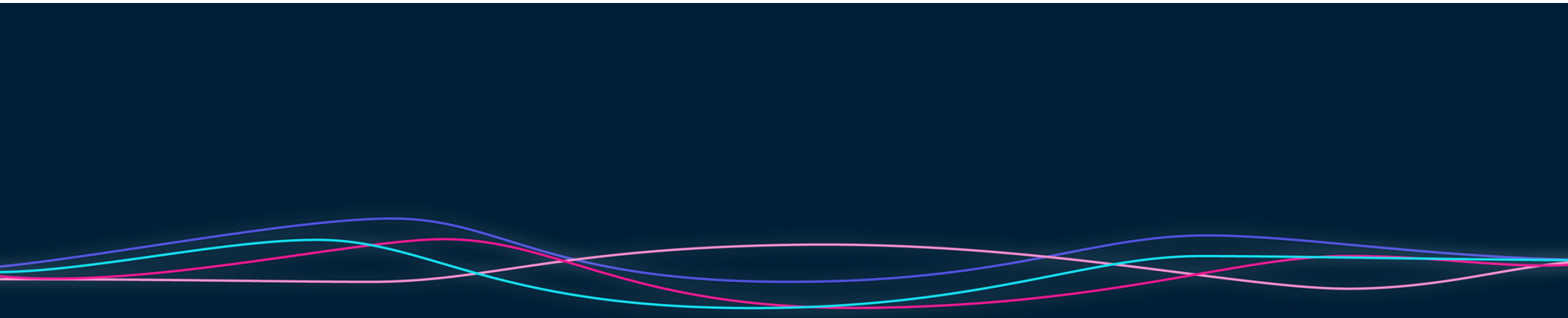
Number of PSPS Events Experienced in Past Year



Impact of PSPS "False Alarm"

Allowed for preparation	14%
Outside my area	6%
Nuisance	2%
Anxiety	2%
Other	16%
Don't know	2%
No effect	64%

QOSAT2 How many Public Safety Power Shutoff (PSPS) notifications have you received in the past year? (n=413; Total)
QOSAT3 How many Public Safety Power Shutoffs have you experienced in the past year? (n=141; Experienced PSPS in past year)
QOSAT5 In what ways did 'false alarm' Public Safety Power Shutoff (PSPS) notifications, where you received a notification but did not have a PSPS, affect you, personally? (n=50; Received more notifications than PSPS events experienced)



Post-PSPS

Outreach and Engagement Satisfaction

- Customers remain generally satisfied with most of the outreach and engagement they receive
- Satisfaction with all six outreach and engagement statements remained consistent with June 2025

Outreach and Engagement Satisfaction



	Dissatisfied (1-4)	5-7	Satisfied (8-10)	Top-3-Box June 2025 (n=260)	Dec 2024 (n=460)	June 2024 (n=220)	Nov 2023 (n=320)	June 2023 (n=282)
Amount of information and outreach you received	24%	31%	45%	41%	35% ↑	27%	32% ↓	42%
Where to find information to help you stay safe	26%	30%	45%	39% ↑	31%	28%	34%	39%
What to expect in the event of a PSPS	25%	31%	44%	41%	37%	30%	32%	37%
Availability of resources in your community	23%	35%	43%	41% ↑	33%	30%	33%	40%
What the utility does to reduce wildfire risk	28%	31%	41%	40%	36% ↑	27%	32%	38%
In preparing you to act in the event of a wildfire	27%	33%	39%	35%	31%	29%	29% ↓	38%

QSAT1 On a scale of 1 to 10, with 1 being not at all satisfied and 10 being very satisfied, how satisfied are you with the outreach and engagement you receive? (n=413; Total)

↑ ↓ Arrows signify statistical difference at the 95% confidence level compared to the previous wave

PSPS Notifications

- Just under half (45%) say that notifications should be sent if there is any possibility of a PSPS; another 40% feel that notifications should only be sent if there is a high likelihood of a PSPS, consistent with previous results

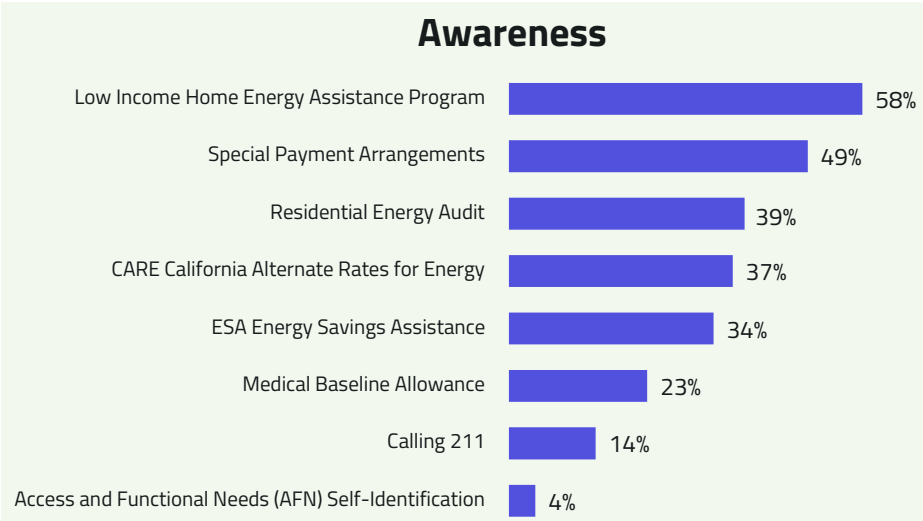
PSPS Notifications Perception	Nov 2025 (n=413)	June 2025 (n=260)	Dec 2024 (n=460)	June 2024 (n=220)	Nov 2023 (n=320)	June 2023 (n=282)
Notifications should be sent if there is any possibility of a PSPS	45%	38%	45%	47%	48%	51%
Notifications should only be sent if there is a high likelihood of a PSPS	40%	45%	41%	42%	42%	37%
Notifications should only be sent if a PSPS is certain to occur	15%	16%	14%	11%	11%	12%

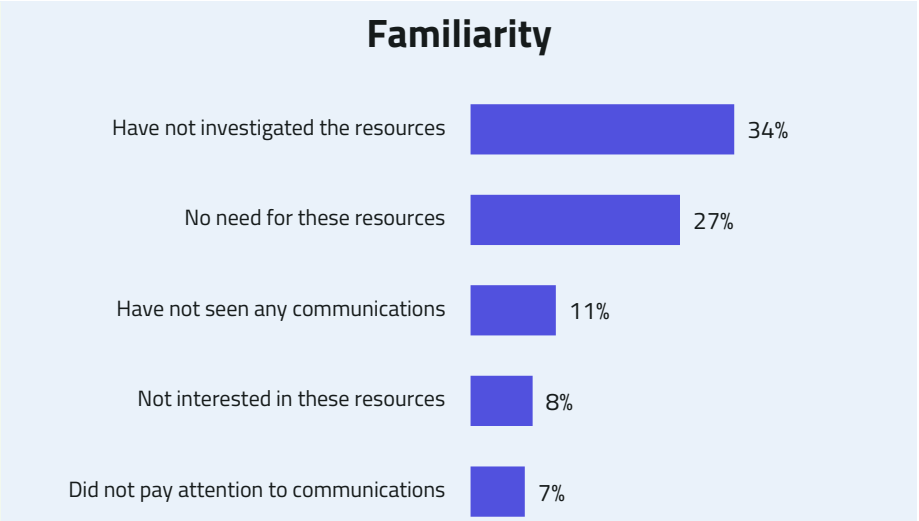
QOSAT4. Which of the following statements best describes how you feel about Public Safety Power Shutoff (PSPS) notifications? (n=413; Total)

Arrows signify statistical difference at the 95% confidence level compared to the previous wave

Awareness and Familiarity of Resources

- Of the resources available to the public, just under six in ten (58%) indicated they were aware of the Low-Income Home Energy Assistance Program, followed by Special Payment Arrangements (49%), and Residential Energy Audit (39%)
- Just over one third (34%) report they have not investigated any of the resources and just over one in four (27%) say they have no need for the resources

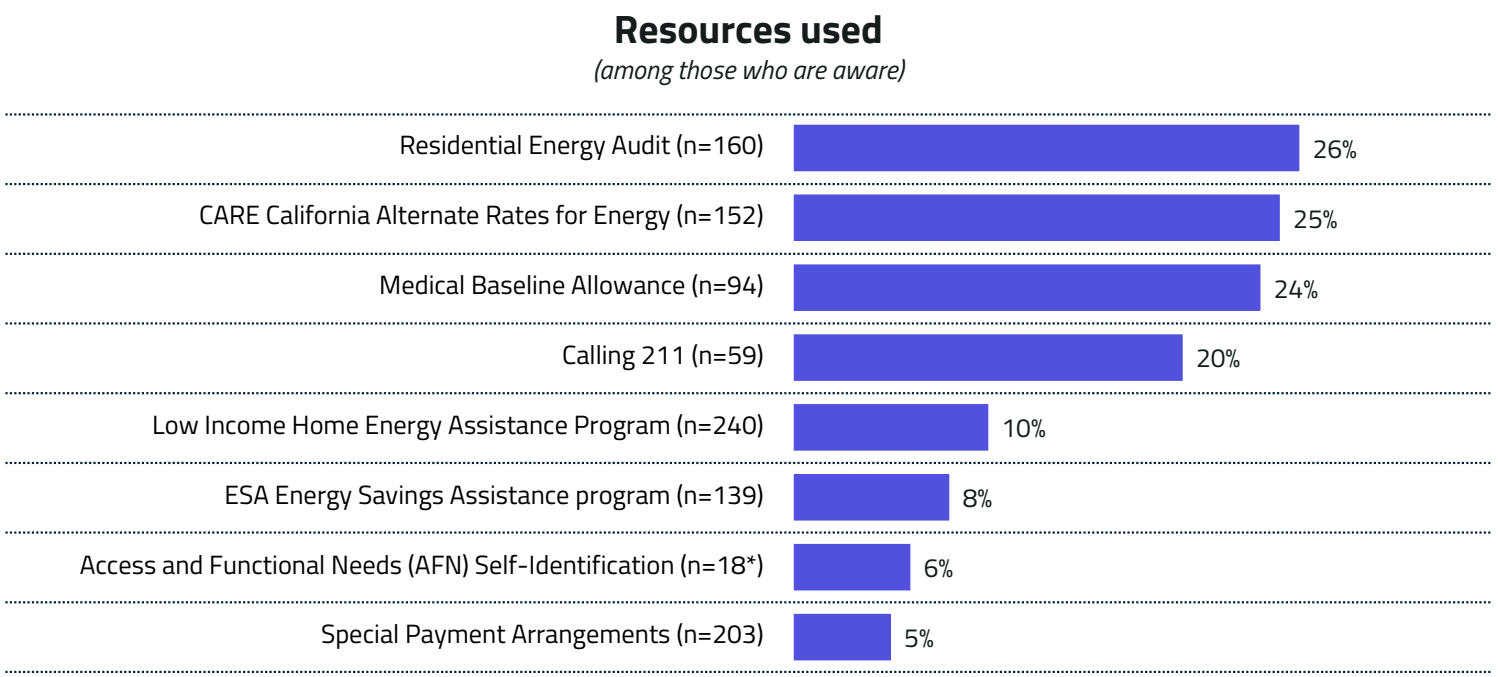




A7 *Liberty supports a number of resources that are available to the public. Before today, which of the following resources have you heard of? (n=413; Total)*
A8 *What statement best describes your familiarity with the resources you just reviewed? (n=413; Total)*

Resources Used

- Of those who are aware of the resources available, Residential Energy Audit, CARE California Alternate Rates for Energy, and Medical Baseline Allowance are the most frequently used

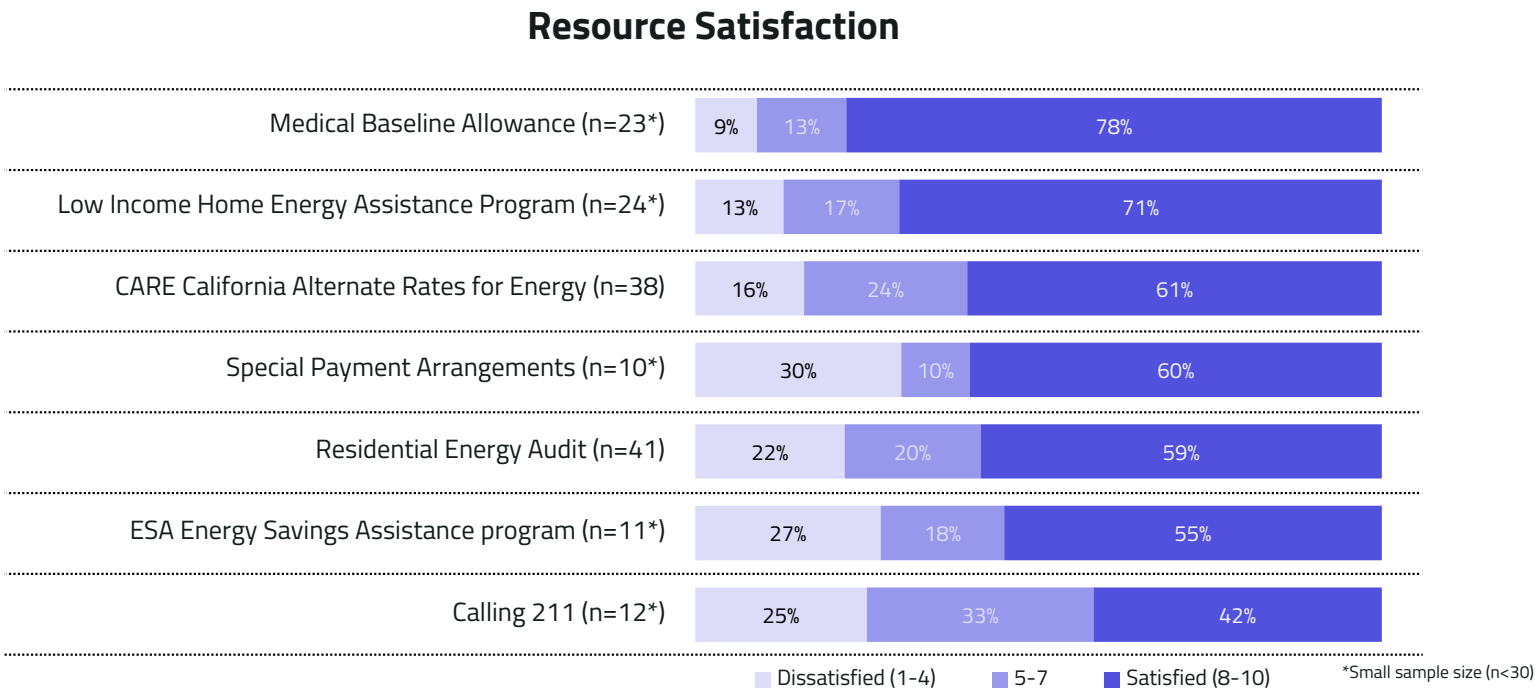


A9 Which, if any, of these resources have you used in the past? (n varies; Aware of Resource)

*Small sample size (n<30)

Satisfaction with Resources Used

- Among the small numbers of customers who have used any of the available resources in the past, satisfaction is highest with Medical Baseline Allowance and the Low Income Home Energy Assistance Program

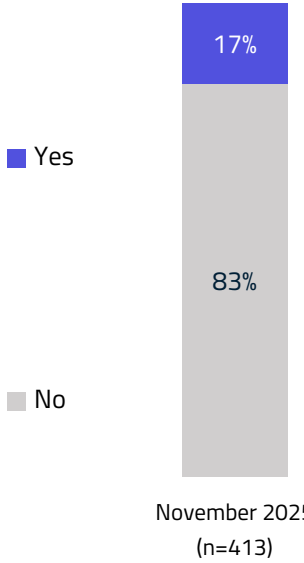


A10 On a scale of 1 to 10, with 1 being not at all satisfied and 10 being very satisfied, how satisfied are you with the resources you've used in the past?

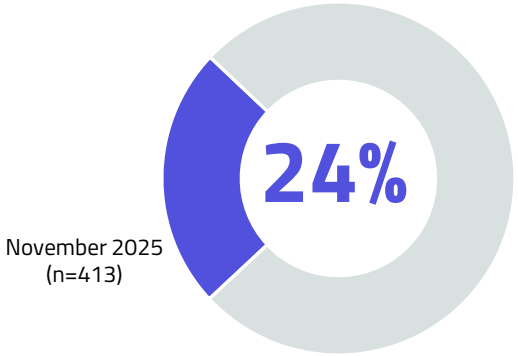
Self-Identified AFN Status

- Just under one in four (24%) customers are identified as having Access and Functional Needs

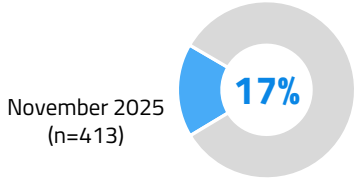
Households With Increased Risk of Harm to Health, Safety, and Independence During Power Outage



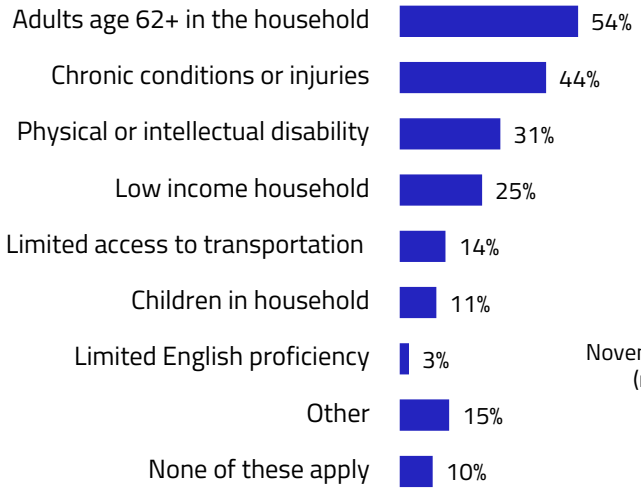
Access and Functional Needs



Relies on Electricity for Medical Needs



Reasons For Increased Risk of Harm During Power Outage



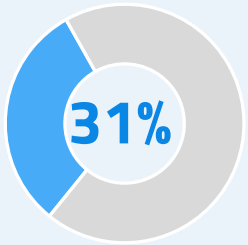
QA14. Are you, or anyone else in your household, at increased risk of harm to health, safety, and independence during a power outage? (n=413; Total)
QA15. For what reasons are you, or anyone else in your household, at increased risk of harm to health, safety, and independence during a power outage? (n=72; A14=Yes)
Q14. Does anyone in your home or business rely on electricity for medical needs/equipment? (n=413; Total)

Access and Functional Needs Resources

- Among the 24% of customers who indicated they have access and functional needs, 31% are aware that Liberty looks to identify households with AFN needs to provide targeted communication and earlier notification of PSPS
- 39% of Critical or AFN customers have received communication from Liberty about programs available and 19% indicate they engage with Community Based Organizations outside of a PSPS context

Aware Liberty Identifies AFN Households for Targeted Communication & Early PSPS Notification

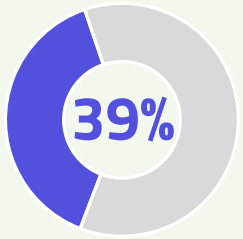
(among AFN customers)



November 2025
(n=98)

Received Direct Communication on Liberty Programs or Preparedness

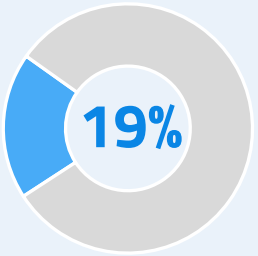
(among AFN/Critical customers)



November 2025
(n=122)

Engage with Community Based Organizations Outside of PSPS Events

(among AFN/Critical customers)



November 2025
(n=122)

QL2 Are you aware that Liberty looks to identify households with access and functional needs to provide targeted communication and earlier notification of PSPS? (n=98; AFN=Yes)
QL3 Do you recall receiving direct communication regarding available Liberty customer programs and/or preparedness? (n=122; AFN=Yes / Used CARE / Critical Customer / Rely on electricity for medical needs)
QL4 Do you or members of your household engage with Community Based Organizations or local Health and Human Services agencies within your community outside of the "during PSPS" context covered earlier in the survey? (n=122; AFN=Yes / Used CARE / Critical Customer / Rely on electricity for medical needs)

AFN Summary

Key Metrics: AFN vs. Non-AFN

	AFN Customer (n=98)	Non-AFN Customer (n=315)
Aware of Wildfire Safety Communications	66%	**79%**
Aware of Communications from Liberty (among those aware)	38%	36%
Recall PSPS	63%	70%
Would Turn to Liberty Website for PSPS Info	47%	46%
Aware of Ability to Update Contact Info for PSPS	66%	66%
Satisfied with Availability of Resources in Community for Wildfire Safety Info	27%	**48%**
Aware of Additional PSPS Notices for Those with Medical Need (among those with medical need)	44%	--
Aware of AFN Self-Identification	3%	5%

Bold denotes statistically significant difference between AFN and non-AFN Customers

Demographic Profiles: AFN vs. Non-AFN

	AFN Customer (n=98)	Non-AFN Customer (n=315)
Gender	Male – 40% Female – 48%	**Male – 52%** Female – 41%
Age	18-54 – 22% 55-64 – 10% 65+ – 55%	18-54 – 19% **55-64 – 21%** 65+ – 55%
Median Income	$50K	**$127K**
Home Ownership	Own – 69% Rent – 17%	**Own – 86%** Rent – 10%
Reside in Liberty Service Territory	**Year round – 72%** 6 to 11 months – 14% Under 6 months – 13%	Year round – 50% 6 to 11 months – 12% **Under 6 months – 37%**
Primary Language is not English	14%	13%
Responded they Rely on Electricity for Medical Needs	73%	--

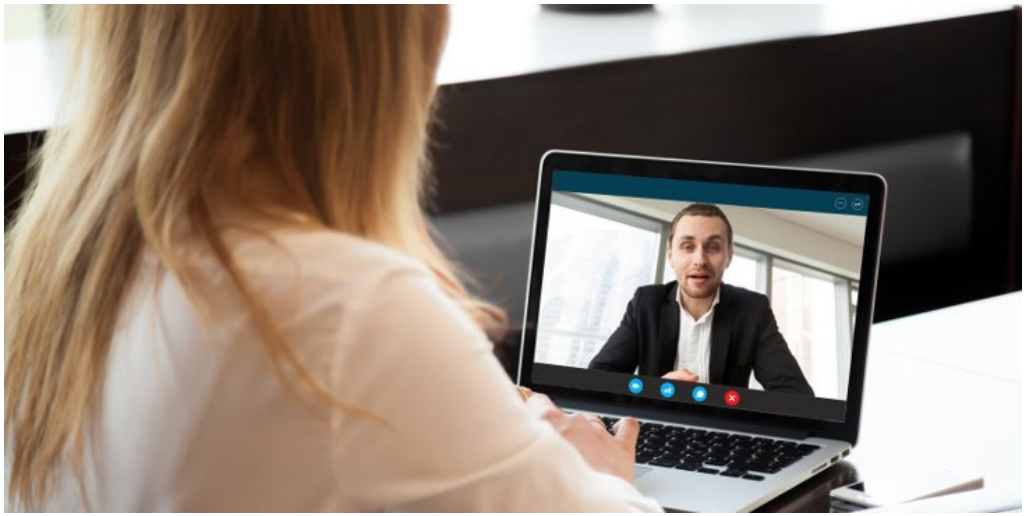
Bold denotes statistically significant difference between AFN and non-AFN Customers

CBO Interviews

CBO Interviews

Four in-depth interviews were conducted with community-based organizations (CBOs) and local agencies in the Liberty territory in November 2025.

- Interviews lasted 30 minutes and were conducted using Microsoft Teams
- Participants were offered $100 as a “thank you” for their time and feedback
- All interviews were recorded
- Interviews were scheduled using a “warm handoff” from Liberty



CBO Interviews

PSPS Awareness and Messaging

- Participants are well aware of PSPS, and recall communications and messaging from Liberty
  - School districts and county agencies have close relationships and close communications with Liberty, with detailed planning for PSPS events
  - The CBO that works with seniors has received materials to hand out regarding PSPS and the potential impacts on individuals and the community
- Most of the communications recalled about PSPS were a combination of emails and personal discussions, although the CBO received printed materials for distribution to seniors and has not had direct interactions
- All participants work directly with the public, and do share information about PSPS when appropriate
  - School districts typically focus on whether there will be school, which is dependent on having power or backup power to run classrooms and provide meals, etc.
  - The senior-facing CBO is focused on ensuring those who are medically fragile have the necessary resources, and provide information about what to do in the event of a PSPS
- Community-facing information is important, including an explanation of PSPS, why events are called, how to prepare, and mitigation efforts
  - Email, flyers/handouts, community events, and social media are recommended, and late spring/early summer is the ideal time
  - English and Spanish are the languages required

PSPS Awareness and Messaging (cont.)

- All have experience with vulnerable populations that require special support and notifications
  - School districts mention low-income families and those where English is not their primary language; these families are dependent on schools for childcare (so they can work) and often for meals, so school closures for PSPS can be significant hardships
  - Seniors and the AFN population are also cited as being at increased risk due to needing power for medical devices, etc.
  - The senior/AFN audience is more difficult to reach as they are less likely to be active on social media or online; participants recommend tabling at public events and partnering with senior centers, local organizations, and CBOs to reach people directly or indirectly through word of mouth
  - As much advanced notice as possible is important for those who are most vulnerable during a PSPS
- General information on how to cope with a power outage (keeping fridge closed, having food/water, etc.) as well as information about backup power options or support providing backup power solutions would be helpful for the community
- Liberty would be welcome to participate in public-facing meetings or local events, and that would be considered helpful to reach seniors and AFN community members
- Increased information sharing and transparency about weather reports, PSPS criteria/planning, and specific areas and times of impact would be most helpful for schools and county agencies

CBO Interviews

CRC Awareness and Messaging

- Most are aware of the CRC concept, but with limited familiarity
  - Local organizations running centers, such as non-profits, libraries, and county/municipal buildings, and schools are the locations mentioned
  - One participant specifically recalled Liberty providing generators for a CRC at the school, and said the support was very helpful
  - All acknowledge the importance of providing a place where people can go and access electricity, especially for seniors and AFN community members
- Promoting public awareness of CRCs is important, including the location, when they will be operational, and resources provided
  - Direct mailings, bill inserts, and emails directly from Liberty, participation and local events or community meetings, social media outreach, and flyers are recommended to educate the public about CRCs
  - Partnership with senior centers CBOs supporting seniors, and public health or other county agencies is important to reach vulnerable seniors
- Providing support with generators and timely information/updates is an important way Liberty can support CRCs during PSPS
  - Powering medical equipment, providing cooling, and a place to charge devices are cited as highly important for those attending CRCs
  - Schools, libraries, county/municipal buildings, senior centers, and CBOs are mentioned as ideal partners for running CRC operations
  - In more isolated parts of Liberty's service territory, there is concern about whether people could easily get to a CRC; it will be important to communicate the necessity to plan for transportation in the event of a PSPS, especially among the senior and AFN populations

AFN Awareness and Messaging

- County agencies and CBOs that support seniors are well aware of AFN, but school districts are not familiar with the terminology
  - The county does maintain a list of AFN community members, and those supporting seniors know which of their clients they would consider vulnerable and AFN
  - The county's AFN list is opt-in, and outreach is made to encourage enrollment at community events, through organizations supporting seniors, and through participation in other services (behavioral health or Cal Fresh)
  - Participants are generally not familiar with Liberty's efforts to maintain an AFN customer database, and only the senior-facing CBO has provided information to clients about enrolling with Liberty
- Participants are either unsure about the ability to share AFN data with Liberty or say it is not possible due to privacy requirements; for those who think it could be a possibility, discussions between their legal departments and Liberty would be required
- General communications through email and bill inserts, partnership with CBOs that cater to AFN clients, and attendance at local events and community meetings are methods to increase public awareness of AFN and Liberty's AFN program
- To encourage enrollment in Liberty's AFN program, it is important to educate the public about the specific resources available, as well as the early notifications that AFN customers receive in the event of a PSPS outage

CBO Interviews

Additional Resources

- Participants from school districts and county agencies this wave have little knowledge of support resources provided by Liberty; the CBO focused on supporting seniors is aware and familiar with programs
  - Among those who cannot name any programs, they are vaguely aware that income-based programs exist to support low-income households
  - Medical Baseline and 211 Resources were only familiar to the CBO supporting seniors
  - The CBO supporting seniors is listed on 211 Resources, and is regularly helping clients connect to the services
- Participants are not aware of the efforts taken by Liberty to educate customers
  - Even the CBO focused on seniors is not aware of information provided by Liberty directly to the public
  - Mailings, emails, attendance at community meetings or events, and partnering with CBOs is considered the best way to educate the public about resources

Demographic Profiles

Respondent Profiles

Gender	Total (n=413)	Recallers (n=313)	Non-Recallers (n=100)
Male	49%	50%	46%
Female	43%	43%	42%
Age			
18 to 24	<1%	1%	--
25 to 34	2%	1%	4%
35 to 44	8%	7%	12%
45 to 54	9%	9%	12%
55 to 64	18%	19%	16%
65 or over	55%	**58%**	46%
Prefer not to say	8%	7%	10%

Renter/Homeowner	Total (n=413)	Recallers (n=313)	Non-Recallers (n=100)
Own	82%	84%	75%
Rent	11%	10%	16%
Prefer not to say	6%	5%	8%
Reside in Liberty Service Territory			
Year round	56%	52%	**66%**
6 to 11 months	13%	13%	10%
Under 6 months	32%	**34%**	24%
Household Income			
Less than $20,000	4%	4%	5%
$20,000 to $39,999	7%	7%	8%
$40,000 to $59,999	8%	7%	12%
$60,000 to $89,999	9%	9%	10%
$90,000 to $129,999	11%	**12%**	5%
$130,000 to $199,999	11%	11%	10%
$200,000 or more	18%	18%	17%
Prefer not to say	33%	33%	33%

Q17 What is your gender? (n=413; Total)
Q18 What is your age category? (n=413; Total)
Q19 Do you own or rent your home? (n=413; Total)
Q20 Which of the following best describes your annual household income? (n=413; Total)

Bold denotes statistically significant difference between Recallers and Non-Recallers

Respondent Profiles – AFN Criteria

	Total (n=413)	Recallers (n=313)	Non-Recallers (n=100)
AFN (NET)	24%	21%	**33%**
Age 65+	55%	**58%**	46%
<$40K income	11%	10%	13%
Chronic conditions or injuries	44%	46%	41%
Limited access to transportation	14%	12%	18%
Physical, developmental, or intellectual disability	31%	34%	23%
Non-English language needs	14%	12%	17%
Rely on electricity for medical needs	17%	15%	**26%**

Bold denotes statistically significant difference between Recallers and Non-Recallers