Liberty Utilities (CalPeco Electric) LLC (U 933-E)

2020 Wildfire Mitigation Plan

Plan Overview

Liberty CalPeco's 2020 WMP is a comprehensive plan that incorporates lessons learned from Liberty CalPeco's 2019 efforts, the plans of the other California electric utilities, and guidance from the Commission. As shown in the table below, Liberty CalPeco's WMP includes approximately $40 million in capital investments covering all aspects of the WMP, including inspection plans, system hardening, operational practices, and situational awareness.

Liberty CalPeco WMP Capital Forecast
$(000)

Program/Project	Category	2020	2021	2022	Total
System Survey/Inventory	Asset Management & Inspections	$ 6,000	$ -	$ -	$ 6,000
Tree Attachment Removal Program	Grid Design & System Hardening	600	600	600	1,800
LIDAR Technology	Asset Management & Inspections	250	300	300	850
Covered Conductor Program	Grid Design & System Hardening	3,198	8,337	9,734	21,269
Fuse Replacement Program	Grid Design & System Hardening	1,544	1,544	1,544	4,632
Wire Upgrade Program (Open-Wire & Gray Wire)	Grid Design & System Hardening	150	250	350	750
Sagehen Microgrid	Grid Design & System Hardening	616	-	-	616
Automatic Reclosers and Fast-Curve Setting	Grid Operations & Protocols	360	540	360	1,260
Transportation & Equipment	Asset Management & Inspections	254	98	-	352
Weather Station Installations	Situational Awareness & Forecasting	300	300	15	615
Fire Potential Index	Situational Awareness & Forecasting	70	10	10	90
Distribution Fault Anticipation	Situational Awareness & Forecasting	-	706	162	868
Emerging Programs	Situational Awareness and Forecating	200	200	200	600
Total		$ 13,542	$ 12,885	$ 13,275	$ 39,702

Key projects and programs include a system survey and inventory project, the Sagehen microgrid, and various system hardening programs. Liberty CalPeco plans to undertake a complete system survey in 2020 that will create an asset inventory database documenting the location and condition of every overhead distribution asset in Liberty CalPeco's service territory. This database will provide a complete look at the system and enable Liberty CalPeco to identify and mitigate hazards at a programmatic level on a system-wide basis.

The Sagehen project will install a microgrid pilot project at Sagehen near Truckee, CA. The microgrid will include solar panels and battery storage to serve UC Berkeley's Sagehen research facility that is currently served by a three mile line that runs through a high-fire area. The cost of the Sagehen project is significantly less than the cost to harden the distribution line currently serving this single customer. The microgrid will allow Liberty CalPeco to de-energize the line during the fire season.

Liberty CalPeco's WMP also includes a ramping up of the system hardening projects included in its 2019 WMP, including covered conductors, fuse replacements, and tree attachment removals. The 2020 WMP also includes various programs to improve situational awareness, including installing additional weather stations and distribution fault anticipation monitoring sensors.

1. Persons responsible for executing the WMP

Provide an accounting of the responsibilities of the responsible person(s) executing the plan, including:

1. Executive level with overall responsibility
2. Program owners specific to each component of the plan

Ensure that the plan components described in (2) include an accounting for each of the WMP sections and subsections.

Description	Title
1. Executive level with overall responsibility	President, California
2. Program owners specific to each component of the plan	
1 Persons responsible for executing the WMP	Sr. Manager, Wildfire Prevention
1.1 Verification	President, California
2 Metrics and underlying data	Sr. Manager, Wildfire Prevention
2.1 Lessons learned: how tracking metrics on the 2019 plan has informed the 2020 plan	Sr. Manager, Wildfire Prevention
2.2 Recent performance on progress metrics, last 5 years	Sr. Manager, Wildfire Prevention
2.3 Recent performance on outcome metrics, annual and normalized for weather, last 5 years	Sr. Manager, Wildfire Prevention
2.4 Description of additional metrics	Sr. Manager, Wildfire Prevention
2.5 Description of program targets	Sr. Manager, Wildfire Prevention
2.6 Detailed information supporting outcome metrics	Sr. Manager, Wildfire Prevention
2.7 Mapping recent, modelled, and baseline conditions	Manager, Operations Compliance
3 Baseline ignition probability and wildfire risk exposure	Sr. Manager, Wildfire Prevention
3.1 Recent weather patterns, last 5 years	Sr. Manager, Wildfire Prevention
3.2 Recent drivers of ignition probability, last 5 years	Engineer IV
3.3 Recent use of PSPS, last 5 years	Sr. Manager, Wildfire Prevention
3.4 Baseline state of equipment and wildfire and PSPS event risk reduction plans	Manager, Operations Compliance
3.4.1 Current baseline state of service territory and utility equipment	Manager, Operations Compliance
3.4.2 Planned additions, removal, and upgrade of utility equipment by end of 3-year plan term	Manager, Operations Compliance
3.4.3 Status quo ignition probability drivers by service territory	Sr. Manager, Wildfire Prevention
4 Inputs to the plan and directional vision for wildfire risk exposure	Sr. Manager, Wildfire Prevention
4.1 The objectives of the plan	Sr. Manager, Wildfire Prevention
4.2 Understanding major trends impacting ignition probability and wildfire consequence	Sr. Manager, Wildfire Prevention
4.2.1 Service territory fire threat evaluation and ignition risk trends	Sr. Manager, Wildfire Prevention
4.3 Change in ignition probability drivers	Sr. Manager, Wildfire Prevention
4.4 Directional vision for necessity of PSPS	Sr. Manager, Wildfire Prevention
5 Wildfire mitigation strategy and programs for 2019 and for each year of the 3-year WMP term	Sr. Manager, Wildfire Prevention
5.1 Wildfire mitigation strategy	Sr. Manager, Wildfire Prevention
5.2 Wildfire Mitigation Plan implementation	Sr. Manager, Wildfire Prevention
5.3 Detailed wildfire mitigation programs	Sr. Manager, Wildfire Prevention
5.3.1 Risk assessment and mapping	Sr. Analyst, Rates and Regulatory Affairs
5.3.2 Situational awareness and forecasting	Sr. Manager, Wildfire Prevention
5.3.3 Grid design and system hardening	Manager, Substations
5.3.4 Asset management and inspections	Manager, Substations
5.3.5 Vegetation management and inspections	Sr. Manager, Wildfire Prevention
5.3.6 Grid operations and protocols	Manager, Substations
5.3.7 Data governance	Sr. Manager, Wildfire Prevention
5.3.8 Resource allocation methodology	Sr. Analyst, Rates and Regulatory Affairs
5.3.9 Emergency planning and preparedness	Sr. Manager, Wildfire Prevention
5.3.10 Stakeholder cooperation and community engagement	Program Manager, Communications and Media Relations
5.3.11 Definitions of initiative activities by category	Sr. Manager, Wildfire Prevention
5.4 Methodology for enterprise-wide safety risk and wildfire-related risk assessment	Sr. Analyst, Rates and Regulatory Affairs
5.5 Planning for workforce and other limited resources	Sr. Manager, Wildfire Prevention
5.6 Expected outcomes of 3-year plan	Sr. Manager, Wildfire Prevention
5.6.1 Planned utility infrastructure construction and upgrades	Sr. Manager, Wildfire Prevention
5.6.2 Protocols on Public Safety Power Shut-off	Sr. Manager, Wildfire Prevention
6 Utility GIS attachments	Sr. Manager, Wildfire Prevention
6.1 Recent weather patterns	Manager, Operations Compliance
6.2 Recent drivers of ignition probability	Manager, Operations Compliance
6.3 Recent use of PSPS	Manager, Operations Compliance
6.4 Current baseline state of service territory and utility equipment	Manager, Operations Compliance
6.5 Location of planned utility equipment additions or removal	Manager, Operations Compliance
6.6 Planned 2020 WMP initiative activity by end-2022	Manager, Operations Compliance

1.1 Verification

I am an officer of the applicant limited liability company herein and am authorized to make this verification on its behalf. The statements in the foregoing document are true of my own knowledge, except as to matters which are therein stated on information or belief, and as to those matters I believe them to be true.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on February 7, 2020 at Downey, California.

Chris Alario
President, California

2. Metrics and Underlying Data

2.1. Lessons Learned from 2019 WMP

Major themes of lessons learned from Liberty CalPeco's 2019 WMP include resource constraints limiting the implementation of the plan, external constraints related to construction planning and proper execution, lack of established data metrics, and the need to develop and coordinate plans with public safety partners.

Other Lessons Learned since filing the 2019 WMP are listed below:

- A system-wide asset inventory is necessary to facilitate data tracking on maintenance, inspections, and replacements at the location/circuit level. Inspection and ignition driver data is currently tracked in paper forms and the data needs to be consolidated and analyzed for consistency and data integrity.
- Due to resource constraints in 2019, Liberty CalPeco only implemented a few WMP programs with attainable and measurable targets. The 2020 plan incorporates long-term plans with established accounting and tracking capabilities to identify at-risk assets of the electric system. Data records associated with this software can be easily reviewed and compiled for subsequent evaluation, giving more direct access to all of the electrical assets and hazardous surrounding vegetation. Constraints in 2019 included workforce and material shortages and siting issues.
- Liberty CalPeco did not rely heavily on performance against metrics implemented in the 2019 WMP to inform its 2020 WMP initiatives. This 2020 WMP primarily consists of a complete and comprehensive evaluation of resource capabilities and system-wide assets to reduce overall wildfire risks based on mitigating programs outlined in section 5.3 that relied on lessons learned from last year, review of other California utilities WMPs and guidance from the Commission.
- Going forward, Liberty CalPeco plans to front-load the design, permitting, and material orders for its programs to optimally prepare for work each year.
- As discussed later in this plan, Liberty CalPeco needs to increase staffing in key areas to execute the programs contained in the 2020 WMP. Liberty CalPeco is currently staffing a new Wildfire Mitigation group to manage its WMP. Liberty CalPeco is also focused on enhancing emergency management with new personnel and engaging with public safety partners on communication and coordination plans for PSPS events and wildfire threats. Plans for 2020 also include revamping the utility's data collection practices to better align with the ongoing information required by the Wildfire Safety Division ("WSD") and other parties.
- Liberty CalPeco has also reviewed its successful project targets for the 2019 year. Deploying the iRestore Responder application for inspections and future response needs has been a successful initiative to prepare for emergency events and identify at-risk elements of the electric system. Data records associated with this software can be easily reviewed and compiled for subsequent evaluation, giving more direct visibility to all of the electrical assets and hazardous surrounding vegetation. Liberty CalPeco also received authorization from the United States Department of Agriculture Forest Service to begin activities related to its Forest Resiliency Corridor initiative, which aims to reduce the risk of wildland fires caused by vegetation contact with electrical equipment leading to

landscape resilience and critical infrastructure safety. This joint effort for fuels management and treatment conveys Liberty CalPeco's prioritized strategy to develop collaborative initiatives with key fire and public safety partners.

2.2. Recent Performance on Progress Metrics

Table 1 – Recent Performance Metrics, Last 5 Years

#	Progress metric name	Annual performance					Unit(s)	Comments
		2015	2016	2017	2018	2019		
1	Grid condition findings from inspection	Level 1 = 0 Level 2 = 0 Level 3 = every .39 miles	Level 1 = 0 Level 2 = every 1.5 miles Level 3 = every .45 miles	Level 1 = every 90.34 miles Level 2 = every 29.61 miles Level 3 = every .42 miles	Level 1 = 0 Level 2 = every 21.19 miles Level 3 = every .42 miles	Level 1 = 0 Level 2 = every 4.72 miles Level 3 = every .26 miles	Number of Level 1, 2, and 3 findings per mile of circuit in HFTD, and per total miles of circuit for each of the following inspection types: 1. Patrol inspections 2. Detailed inspections 3. Other inspection types	Liberty CalPeco's inspection data is still in paper format so location by HFTD is difficult to compile. The overwhleming majority of Liberty Calpeco's facilities are classified as HFTD with only small sections being Non-HFTD (7.7% of facilities can be classifed as such). For the purpose of this exercise it is assumed all detailed inspections occurred in HFTD areas. Liberty CalPeco is only able to provide unit data for Detailed Inspections at this time but is putting mechanisms in place to better capture Patrol and Other Inspection types.
2	Vegetation clearance findings from inspection	7.07 Trees/Mile	8.61 Trees/Mile	10.12 Trees/Mile	7.71 Trees/Mile	8.17 Trees/Mile	Percentage of right-of-way with noncompliant clearance based on applicable rules and regulations at the time of inspection, as a percentage of all right-of-way inspected	Liberty CalPeco tracks the number of line miles inspected and the number of trees identified with non compliant clearance which can be used to calculate the number of non compliant trees per circuit mile. This is a sound progress metric as defined by WSD in attachment 4. It is unclear how to calculate percentage of non compliant trees as a percentage of all ROW inspected. Owner: Eliot Jones Dataset: Attachment 1 Table 1 Q2 - Veg Non Compliance Data
3	Extent of grid modularization					1. HFTD: Sec devices / mi = (1946 devices/1922 mi) = 1.01 devices per mile; Automated control equipment: 28 auto line reclosers, 2 motor operated switches = 30 auto devices all in HFTD; 2. Non-HFTD = 28 devices/134 mi = .21 devices per mile;	Number of sectionalizing devices per circuit mile plus number of automated grid control equipment in: 1. HFTD 2. Non-HFTD	Air switches and reclosers. 2019 data only. Doesn't specify just primary/secondary or u/g vs. o/h, so included all for line miles and devices. - Blaine Ladd
4	Data collection and reporting	N/A	N/A	N/A	N/A	____% (Assuming this question was intended to indicate the completeness of the 2020 WMP submission)	Percent of data requested in SDR and WMP collected in initial submission	Eliot Jones

2.3. Recent Performance on Outcome Metrics, Annual and Normalized for Weather, Last 5 Years

Table 2: Recent Performance on Outcomes Metrics, Last 5 Years

Metric type	#	Outcome metric name	Annual performance					Unit(s)	Comments
			2015	2016	2017	2018	2019		
1. Near misses	1.a.	Number of all events (such as unplanned outages, faults, conventional blown fuses, etc.) that could result in ignition, by type according to utility-provided list (total)	99	111	137	115	278	Number per year	Included all overhead outages. Underground outages related to terminators and vehicle contact with padmounted equipment were included.
	1.b.	Number of all events (such as unplanned outages, faults, conventional blown fuses, etc.) that could result in ignition, by type according to utility-provided list (normalized)	0.038	0.262	0.124	0.039	0.342	Number per RFW circuit mile day per year	
	1.c.	Number of wires down (total)	5	10	3	4	5	Number of wires down per year	Wire down events unrelated to vegetation contact.
	1.d.	Number of wires down (normalized)	0.002	0.024	0.003	0.001	0.006	Number per RFW circuit mile day per year	
2. Utility inspection findings	2.a.	Number of Level 1 findings that could increase the probability of ignition discovered per circuit mile inspected	-	-	3	-	-	Average number of Level 1 findings that could increase the probability of ignition discovered by all inspections per circuit mile per year	These are the most severe violations and consist of broken crossarms, leaning/broken poles, broken insulators, etc. Liberty CalPeco believes all of these conditions are likely to increase the probability of ignition and provided a total instead of an average as requested.
	2.b.	Number of Level 2 findings that could increase the probability of ignition discovered per circuit mile inspected	-	98	14	8	43	Average number of Level 2 findings that could increase the probability of ignition discovered by all inspections per circuit mile per year	These are the moderate violations and consist of damaged crossarms, damaged poles, cracked insulators, etc. Liberty CalPeco believes all of these conditions are likely to increase the probability of ignition and provided a total instead of an average as requested.
	2.c.	Number of Level 3 findings that could increase the probability of ignition discovered per circuit mile inspected	-	-	-	-	-	Average number of Level 3 findings that could increase the probability of ignition discovered by all inspections per circuit mile per year	These are low level violations such as missing high voltage signs, guy guards, ground molding, etc., and are very unlikely to increase the probability of ignition.

Table 2: Recent Performance on Outcomes Metrics, Last 5 Years (Continued)

Metric type	#	Outcome metric name	Annual performance					Unit(s)	Comments
			2015	2016	2017	2018	2019		
3. Customer hours of PSPS and other outages	3.a.	Customer hours of planned outages including PSPS (total)	Unknown	5,124	7,025	31,470	113,282	Total customer hours of planned outages per year	Planned outages were not tracked with this level of detail prior to 2016.
	3.b.	Customer hours of planned outages including PSPS (normalized)	Unknown	12.08	6.36	10.74	139.3	Total customer hours of planned outages per RFW circuit mile day per year	
	3.c.	Customer hours of unplanned outages, not including PSPS (total)	112,599	111,988	133,267	75,720	246,866	Total customer hours of unplanned outages per year	
	3.d.	Customer hours of unplanned outages, not including PSPS (normalized)	43.28	264.01	120.67	25.85	303.57	Total customer hours of unplanned outages per RFW circuit mile day per year	
	3.e.	Increase in System Average Interruption Duration Index (SAIDI)	-137.98	-18.16	26.22	-66.33	216.16	Change in minutes compared to the previous year	
4. Utility ignited wildfire fatalities	4.a.	Fatalities due to utility-ignited wildfire (total)	-	-	-	-	-	Number of fatalities per year	
	4.b.	Fatalities due to utility-ignited wildfire (normalized)	-	-	-	-	-	Number of fatalities per RFW circuit mile day per year	
5. Accidental deaths resulting from utility wildfire mitigation initiatives	5.a.	Deaths due to utility wildfire mitigation activities (total)	-	-	-	-	-	Number of fatalities per year	
6. OSHA-reportable injuries from utility wildfire mitigation initiatives	6.a.	OSHA-reportable injuries due to utility wildfire mitigation activities (total)	-	-	-	-	-	Number of OSHA-reportable injuries per year	
	6.b.	OSHA-reportable injuries due to utility wildfire mitigation activities (normalized)	-	-	-	-	-	Number of OSHA-reportable injuries per year per 1000 line miles of grid	
7. Value of assets destroyed by utility- ignited wildfire, listed by asset type	7.a.	Value of assets destroyed by utility-ignited wildfire (total)	-	$315,649.02	-	-	$9,855.29	Dollars of damage or destruction per year	Total cost of rebuild. For 2016, see attached doc 8800-0216-0148 Job Assets. For 2019 see attached doc 8800-0219-0433 Job Assets.
	7.b.	Value of assets destroyed by utility-ignited wildfire (normalized)	-	$744.14	-	-	$12.12	Dollars of damage or destruction per RFW circuit mile day per year	Need the RFW circuit mile day per year.

Table 2: Recent Performance on Outcomes Metrics, Last 5 Years (Continued)

Metric type	#	Outcome metric name	Annual performance					Unit(s)	Comments
			2015	2016	2017	2018	2019		
8. Structures damaged or destroyed by utility- ignited wildfire	8.a.	Number of structures destroyed by utility-ignited wildfire (total)	-	18 poles	-	-	-	Number of structures destroyed per year	Number of utility poles only. No homes damaged.
	8.b.	Number of structures destroyed by utility-ignited wildfire (normalized)	-	0.042	-	-	-	Number of structures destroyed per RFW circuit mile day per year	
9. Acreage burned by utility-ignited wildfire	9.a.	Acreage burned by utility-ignited wildfire (total)	10.25	196	-	-	0.5	Acres burned per year	
	9.b.	Acreage burned by utility-ignited wildfire (normalized)	0.0039402	0.46206799	-	-	0.0006148	Acres burned per RFW circuit mile day per year	
10. Number of utility wildfire ignitions	10.a.	Number of ignitions (total) according to existing ignition data reporting requirement	2	1	-	-	1	Number per year	
	10.b.	Number of ignitions (normalized)	0.001	0.002	-	-	0.001	Number per RFW circuit mile day per year	
	10.c.	Number of ignitions in HFTD (subtotal)	2	1	-	-	1	Number in HFTD per year	
	10.c.i.	Number of ignitions in HFTD Zone 1	-	-	-	-	-	Number in HFTD Zone 1 per year	
	10.c.ii.	Number of ignitions in HFTD Tier 2	2	1	-	-	1	Number in HFTD Tier 2 per year	
	10.c.iii.	Number of ignitions in HFTD Tier 3	-	-	-	-	-	Number in HFTD Tier 3 per year	
	10.d.	Number of ignitions in HFTD (subtotal, normalized)	0.001	0.002	-	-	0.001	Number in HFTD per RFW circuit mile day per year	
	10.d.i.	Number of ignitions in HFTD Zone 1 (normalized)	-	-	-	-	-	Number in HFTD Zone 1 per RFW circuit mile day per year	
	10.d.ii.	Number of ignitions in HFTD Tier 2 (normalized)	0.0007688	0.00235749	-	-	0.0012297	Number in HFTD Tier 2 per RFW circuit mile day per year	
	10.d.iii.	Number of ignitions in HFTD Tier 3 (normalized)	-	-	-	-	-	Number in HFTD Tier 3 per RFW circuit mile day per year	
	10.e.	Number of ignitions in non-HFTD (subtotal)	-	-	-	-	-	Number in non-HFTD per year	
	10.f.	Number of ignitions in non-HFTD(normalized)	-	-	-	-	-	Number in non-HFTD per RFW circuit mile day per year	
11. Critical infrastructure impacted	11.a.	Critical infrastructure impacted by PSPS	-	-	-	-	-	Number of critical infrastructure (in accordance with D.19-05-042) locations impacted per hour multiplied by hours offline per year	single PSPS event in 2018 did not impact any critical infrastructure
	11.b.	Critical infrastructure impacted by PSPS (normalized)	-	-	-	-	-	Number of critical infrastructure (in accordance with D.19-05-042) locations impacted per hour multiplied by hours offline per year hour multiplied by hours offline per RFW circuit mile day per year	single PSPS event in 2018 did not impact any critical infrastructure

Near miss data includes outages that could have resulted in an ignition. Liberty CalPeco excluded outages that occurred in January and February of 2017 due to the historic snowfall and known weather conditions, which included several extreme atmospheric rivers. No other exclusions were made because snow accumulation in the other years did not warrant the elimination of possible ignition events.

2.4. Description of Additional Metrics

Liberty CalPeco has not identified additional metrics beyond the performance metrics provided in Tables 1 and 2.

2.5. Description of Program Targets

Table 4: 2019 WMP Program Targets

Program target	2019 performance	Units	Underlying assumptions	Third-party validation
High-Speed Clearing (Automatic Reclosers and Fast-Curve Sensitive Relay Settings). Program target was to install 6 automatic reclosers with "fire season" settings in 2019.	Installed six new or upgraded vacuum reclosers with SCADA controls with "fire season" settings. Continued installation of new relays that allow for remote setting changes to reduce spark potential during fire season.	Number of reclosers installed	Remote monitoring of system assets promotes faster outage response. Supervisory controls will provide the settings necessary to reduce electrical igniton, while also helping to mitigate power outages.	Purchase orders and receipts for relay and recloser equipment, work orders, job design, field verification of installation.
Improve situational awareness and determination of local conditions.	Contracted Reax Engineering to develop fire weather forecasting and monitoring webtool. The system allows for advanced notification of elevated fire risk conditions as well as monitoring and visualization of regional weather conditions.		Improved situational awareness results in inproved PSPS decision making.	Quote, purchase order, access to fire monitoring website, fire weather notification emails and text messages.
Fuse replacement program. Replace 60 fuses per month starting at approval date of 2019 WMP.	Replaced 250 expulsion fuses in HFTD Tier 3 areas with current limiting, non-expulsion fuses.	Number of fuses installed	Energy and spark potential at faulted locations is mitigated by non-expulsion fuses.	Quote for material, purchase order, fuse installation tracking spreadhseet, field verification of installation.
Installation of 2.7 miles of covered conductor in HFTD Tier 2 areas.	Deisgned and permitted 2.7 miles of covered conductor in HFTD Tier 2 areas. Construction not yet complete.	Miles of covered conductor installed	Mitigate contact of igniton source by covering the wire.	Quote for material, purchase order, job designs.
Install of 13 weather stations in 2019-2020 to support weather forecasting and monitoring efforts.	10 weather stations installed.	Weather stations installed	Improved situational awareness results in inproved PSPS decision making.	Quote for material, purchase order, field verification of installation.
Routine Vegetation Maintenance - Increase vegetation management budget from $2.5 million to $4 million to allow for additional contractor staffing to support additional tree inspections, trimming, and removal.	Increased number of trees worked from 2018 to 2019 by 39% and number of trees inspected by 12%.	Percent increase in number of trees worked and inspected	Increase in number of trees inspected will result in decrease in non-compliant trees, tree related outages, and potential ignitions.	Work orders, work tracking spreadsheets, verification of identification and trimmed trees.
Elevated Weather Events Operations.	Activation of "fire mode" settings during fire season.	Number of devices with fire season settings activated. Including substation breakers and reclosers	Elimination of reclosing operations reduces potential ignition events.	Physical fire season tags, SCADA records of "fire mode" activation.
Perform On-Ground Routine Inspections and Equipment Asset Inspections.	GO 165 inspections completed.	Number of devices and locations inspected.	Completed inspections result in detection of non-compliant items and decrease in potential ignition events.	GO165 inspection records stored.

Table 4: 2019 WMP Program Targets (Continued)

Program target	2019 performance	Units	Underlying assumptions	Third-party validation
Perform Vegetation Risk Inspections.	Increased number of trees inspected by 12%	% increase in # of trees inspected	Increase in number of trees inspected will result in decrease in non-compliant trees, tree related outages, and potential ignitions.	Tree inspection records, vegetation contractor invoices.
Perform pole loading calculations and replacement on new conductor or pole replacement projects.	Performed pole loading calculations on all replaced poles or poles where attachments / new equipment was added.	Number of pole loading calculations completed	Determine if structural integrity of the pole is within calculated threshold.	Pole loading calculation files (O-Calc) stored with each project folder.
Substation Design Hardening.	Awaiting approval of Brockway substation removal in 2019 GRC. Replacement of OCB's under substation equipment replacement program. Continuing to evaluate substation design hardening opportunites.		Hardened design of substation leads to less equipment failure and decrease in potential ignitions.	Design drawings for Brockway removal and replacement of OCB's. Meeting notes. Field verification of replaced breakers.
Tree Attachment Removal.	35 poles were set to remove at least 35 tree attachments.	Number of tree attachments removed per year.	Decrease in number of tree attachements results in decrease in potential ignitions.	Tree attachment removal job folders.
Tree Mortality Removal Project.	Removed 1539 dying trees.	Number of Trees removed	Removal of dying trees in or adjacent to right of way decreases potential ignitions.	Work orders, work tracking spreadsheets, invoices.
Forest Resiliency Corridor Development.	Grant application denied, no FRC projects were implemented, obtained categorical exclusion from USFS to streamline program implementation for future FRC projects.	Number of acres treated	Expanded vegetation management and fuel reduction in the forest reduces ignition source and minimizes fire propagation .	Work orders.
PSPS events.	No events in 2019.	Number of PSPS events	De-energization of power lines under elevated fire risk conditions results in decreased potential ignitions.	PSPS event reports.
Post-incident recovery, restoration, and remediation.	Did not need to enact procedures related to de-energization or emergency disaster relief proceedings.	Number of events	Post-incident recovery, restoration and remediation allows for expedited recovery and power restoration following emergencies.	Documentation of training, program elements, comprehensive emergency plans, exercises, debriefing, corrective action and evaluations for due diligence, training, and regulatory compliance.

2.6. Detailed Information Supporting Outcome Metrics

Tables 5: Accidental deaths due to wildfire mitigation initiatives, last 5 years

Activity	Victim															Total
	Full-time employee					Contractor					Member of public					
Year	2015	2016	2017	2018	2019	2015	2016	2017	2018	2019	2015	2016	2017	2018	2019	
Inspection	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vegetation management	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Utility fuel management	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Grid hardening	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

Table 6: OSHA-reportable injuries due to utility wildfire mitigation initiatives, last 5 years

Activity	Victim															Total
	Full-time employee					Contractor					Member of public					
Year	2015	2016	2017	2018	2019	2015	2016	2017	2018	2019	2015	2016	2017	2018	2019	
Inspection	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vegetation management	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Utility fuel management	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Grid hardening	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

As shown in Table 7, Liberty CalPeco monitors various data points to evaluate the probability of an ignition event in its service territory. As found in Liberty CalPeco's Fire Prevention Plan ("FPP"), data that the company monitors includes Red Flag Warning ("RFW") notifications, notifications from its predictive software tool Reax, wind gust information from the National Weather Service ("NWS") and information from the company's weather stations. Liberty CalPeco is developing a Fire Potential Index ("FPI") methodology to comprehensively assess fire risk that utilizes several data points to guide decisions on what type of operation and maintenance field work is appropriate at a given time. The FPI forecasting application is anticipated to capture data from situational awareness tools and seven-day projections and to calculate a fire ranking that aligns with a "Normal," "Elevated," or "Extreme" fire potential.

Liberty CalPeco is developing a comprehensive risk-based decision-making ("RBDM") framework that will include modeled predictive drivers and consequences for utility-caused fire ignitions. Using its incident reporting tool, the outage management system ("OMS") Responder, Liberty CalPeco will be able to identify reported incidents, which are the foundation of identifying potential ignition-causing events. By carefully evaluating its reported ignition-risk event logs and near misses, Liberty CalPeco will be able to identify drivers that caused the event. Supplementing its own data, Liberty CalPeco will utilize peer utility and nationally available data as it relates to predictive drivers and impacts of consequences of a utility-caused wildfire. Integration of weather data from Reax, NWS, FPI, and weather station data are examples of inputs that will be modeled in the RBDM framework.

Liberty CalPeco will follow the methodology utilized by the larger California IOUs in the Risk Assessment and Mitigation Phase ("RAMP")/Safety Model Assessment Proceeding ("S-MAP") proceedings and guidance for Small and Multi-Jurisdictional Utilities ("SMJU") Voluntary Agreement in D.19-04-020 to develop its RBDM framework. Liberty CalPeco's RBDM framework will provide Liberty CalPeco with a more quantitative, probabilistic modeling approach to evaluate wildfire risks in the future.

Table 7: Methodology for Potential Impact of Ignitions

List of all data inputs used in impact simulation	Sources of data inputs	Data selection and treatment	Assumptions, including SME input	Equation(s), functions, or other algorithms used to	Output type(s), e.g., wind speed model	Comments
Vegetation characteristics	https://landfire.gov		LANDFIRE provides best available landscape-level fuels information including disturbances through 2016.			
Topography	https://landfire.gov					
Structure density / building footprints	2010 US Census data and Microsoft building footprints dataset https://github.com/microsoft/USBuildingFootprints		Census-based metrics provide structure density at the census-block level but highly granular building footprints provide more accurate strucutre location/density data			
Fire weather (historical)	Historical surface Wx observations and archived weather forecast/reanalysis dataincluding CPUC Fire Map 1 10-year climatology					
Fire history	https://frap.fire.ca.gov/mapping/gis-data/		Past fire history of a region influences the state of vegetation and provides insight into local fire risk from ignitions from nearby locations.			
Tree mortality	"https://www.arcgis.com/apps/MapJournal/index.html?appid=0098db792f5d48bbbc82515c3e0e7abf"		Tree mortality, which may change year to year, can increase surface fuel loads and ingition probability due to hazard trees contacting overhead electrical utilities.			
Live fuel moisture	Field sampling					
Fire weather (forecast)	"High Resolution Rapid Refresh (HRRR) North American Mesoscale Forecast System (NAM) Global Forecast System (GFS)"					

2.7. Mapping Recent, Modelled, and Baseline Conditions

Table 8: Map file requirements for recent and modelled conditions, last 5 years

Layer name	Measurements	Units	Attachment location
Recent weather patterns	Average annual number of Red Flag Warning days per square mile across service territory	Area, days, square mile resolution	6.1
	Average 95th and 99th percentile wind speed and prevailing direction (actual)	Area, miles per hour, at a square mile resolution or better, noting where measurements are actual or interpolated	
Recent drivers of ignition probability	Date of recent ignitions categorized by ignition probability driver	Point, GPS coordinate, days, square mile resolution	6.2
Recent use of PSPS	Duration of PSPS events and area of the grid affected in customer hours per year	Area, customer hours, square mile resolution	6.3

Table 9: Map file requirements for baseline condition for 2020

Layer name	Measurements / variables	Units	Appendix location
Current baseline state of service territory and utility equipment	Non-HFTD vs HFTD (Zone 1, Tier 2, Tier 3) regions of utility service territory	Area, square mile resolution per type	6.4
	Urban vs. rural vs. highly rural regions of utility service territory	Area, square mile resolution per type	
	WUI regions of utility service territory	Area, square mile resolution	
	Number and location of critical facilities	Point, GPS coordinate	
	Number and location of customers	Area, number of people, square mile resolution	
	Number and location of customers belonging to access and functional needs populations	Area, number of people, square mile resolution	
	Overhead transmission lines	Line, quarter mile resolution	
	Overhead distribution lines	Line, quarter mile resolution	
	Location of substations	Point, GPS coordinate	
	Location of weather stations	Point, GPS coordinate	
	All utility assets by asset type, model, age, specifications, and condition	Point, GPS coordinate	
Location of planned utility equipment additions or removal	Non-HFTD vs HFTD (Zone 1, Tier 2, Tier 3) regions of utility service territory	Line, quarter mile resolution	6.5
	Urban vs. rural vs. highly rural regions of utility service territory	Line, quarter mile resolution	
	WUI regions of utility service territory	Line, quarter mile resolution	
	Circuit miles of overhead transmission lines	Line, quarter mile resolution	
	Circuit miles of overhead distribution lines	Line, quarter mile resolution	
	Location of substations	Point, GPS coordinate	
Planned 2020 WMP initiative activity per year	Location of 2020 WMP initiative activity for each activity as planned to be completed by the end of each year of the plan term	Line, quarter mile resolution	6.6

3. Baseline Ignition Probability and WF Risk Exposure

3.1. Recent Weather Patterns

Table 10: Recent Weather patterns, last 5 years

Weather measurement	Circuit	2015	2016	2017	2018	2019	5-year historical average	Unit(s)
Red Flag Warning days	608 LINE	22.08	3.08	8.92	24.4	6.23	12.942	RFW circuit mile days per year
Red Flag Warning days	BROCKWAY 4201	16.24	2.27	6.53	18.19	4.58	9.562	RFW circuit mile days per year
Red Flag Warning days	BROCKWAY 4202	88	12.32	35.36	98.52	24.8	51.8	RFW circuit mile days per year
Red Flag Warning days	BROCKWAY 5100	5.47	0.77	2.2	6.12	1.54	3.22	RFW circuit mile days per year
Red Flag Warning days	BROCKWAY 5200	167.55	23.45	67.32	187.59	47.22	98.626	RFW circuit mile days per year
Red Flag Warning days	BUC-STL 634	0.85	0.12	0.34	0.95	0.24	0.5	RFW circuit mile days per year
Red Flag Warning days	CALIFORNIA 204	3.76	0.49	2.17	4.04	1.15	2.322	RFW circuit mile days per year
Red Flag Warning days	CEMETERY 41	9.61	1.07	5.47	10.33	2.93	5.882	RFW circuit mile days per year
Red Flag Warning days	CEMETERY 42	14	1.56	7.97	15.05	4.27	8.57	RFW circuit mile days per year
Red Flag Warning days	GLENSHIRE 7400	89.37	12.51	35.91	100.06	25.19	52.608	RFW circuit mile days per year
Red Flag Warning days	GLENSHIRE 7600	3.5	0.47	1.52	3.91	1	2.08	RFW circuit mile days per year
Red Flag Warning days	HOBART MILLS 7700	4.33	0.48	2.46	4.65	1.32	2.648	RFW circuit mile days per year
Red Flag Warning days	KBH-TAH 625	58.52	8.19	23.51	65.52	16.49	34.446	RFW circuit mile days per year
Red Flag Warning days	MEY-BUC 111	19.16	2.68	7.7	23.83	6.35	11.944	RFW circuit mile days per year
Red Flag Warning days	MEYERS 3100	115.21	16.12	46.29	128.99	32.47	67.816	RFW circuit mile days per year
Red Flag Warning days	MEYERS 3200	141.28	19.77	56.77	158.18	39.81	83.162	RFW circuit mile days per year
Red Flag Warning days	MEYERS 3300	297.53	41.64	119.54	333.12	83.85	175.136	RFW circuit mile days per year
Red Flag Warning days	MEYERS 3400	214.25	29.98	86.08	239.87	60.38	126.112	RFW circuit mile days per year
Red Flag Warning days	MEYERS 3500	211.34	29.58	84.91	236.61	59.56	124.4	RFW circuit mile days per year
Red Flag Warning days	MULLER 1296	34.88	31.15	35.72	46.43	43.15	38.266	RFW circuit mile days per year
Red Flag Warning days	NORTHSTAR 8600	0.1	0.01	0.04	0.11	0.03	0.058	RFW circuit mile days per year
Red Flag Warning days	NST-KBH 669	21.35	2.99	8.58	23.91	6.02	12.57	RFW circuit mile days per year
Red Flag Warning days	PORTOLA 31	0	0	0	0	0	0	RFW circuit mile days per year
Red Flag Warning days	PORTOLA 32	0	0	0	0	0	0	RFW circuit mile days per year
Red Flag Warning days	RDH-STL 160	1.24	0.17	0.5	1.39	0.35	0.73	RFW circuit mile days per year
Red Flag Warning days	RUSSELL VALLEY 7900	2.54	0.28	1.44	2.73	0.77	1.552	RFW circuit mile days per year
Red Flag Warning days	SIERRA BROOKS 51	14.27	1.59	8.12	15.34	4.35	8.734	RFW circuit mile days per year

Table 10: Recent Weather patterns, last 5 years (Continued)

Weather measurement	Circuit	2015	2016	2017	2018	2019	5-year historical average	Unit(s)
Red Flag Warning days	SILVER LAKE 257	0.15	0.02	0.08	0.16	0.05	0.092	RFW circuit mile days per year
Red Flag Warning days	SQUAW VALLEY 7201	35.47	4.96	14.25	39.71	10	20.878	RFW circuit mile days per year
Red Flag Warning days	SQUAW VALLEY 8200	32.88	4.6	13.21	36.81	9.27	19.354	RFW circuit mile days per year
Red Flag Warning days	SQUAW VALLEY 8300	2.39	0.33	0.96	2.68	0.67	1.406	RFW circuit mile days per year
Red Flag Warning days	SQV-TAH 629 TRK-SQV 609	16.96	2.37	6.82	18.99	4.78	9.984	RFW circuit mile days per year
Red Flag Warning days	STAMPEDE 8700	0.27	0.03	0.15	0.29	0.08	0.164	RFW circuit mile days per year
Red Flag Warning days	STATELINE 2200	0.26	0.04	0.11	0.29	0.07	0.154	RFW circuit mile days per year
Red Flag Warning days	STATELINE 2300	23.48	3.29	9.43	26.29	6.62	13.822	RFW circuit mile days per year
Red Flag Warning days	STATELINE 3101	95.7	13.39	38.45	107.14	26.97	56.33	RFW circuit mile days per year
Red Flag Warning days	STATELINE 3501	114.13	15.97	45.86	127.78	32.16	67.18	RFW circuit mile days per year
Red Flag Warning days	STL-MEY 640	26.4	3.69	10.61	29.55	7.44	15.538	RFW circuit mile days per year
Red Flag Warning days	TAHOE CITY 5201	131.75	18.44	52.94	147.51	37.13	77.554	RFW circuit mile days per year
Red Flag Warning days	TAHOE CITY 7100	74.64	10.45	29.99	83.56	21.03	43.934	RFW circuit mile days per year
Red Flag Warning days	TAHOE CITY 7200	8.51	1.19	3.42	9.53	2.4	5.01	RFW circuit mile days per year
Red Flag Warning days	TAHOE CITY 7300	347.87	48.68	139.77	389.47	98.03	204.764	RFW circuit mile days per year
Red Flag Warning days	TOPAZ 1261	46.71	41.72	47.84	62.39	57.87	51.306	RFW circuit mile days per year
Red Flag Warning days	TRK-NST 650	21.32	2.98	8.57	23.87	6.01	12.55	RFW circuit mile days per year
Red Flag Warning days	TRK-SQV 609	36.35	5.09	14.61	40.7	10.24	21.398	RFW circuit mile days per year
Red Flag Warning days	TRUCKEE 7202	17.49	2.45	7.03	19.58	4.93	10.296	RFW circuit mile days per year
Red Flag Warning days	TRUCKEE 7203	5.57	0.78	2.24	6.23	1.57	3.278	RFW circuit mile days per year
Red Flag Warning days	TRUCKEE 7204	2.16	0.3	0.87	2.42	0.61	1.272	RFW circuit mile days per year
Red Flag Warning days	WASHOE 201	4.5	0.62	1.85	4.91	1.24	2.624	RFW circuit mile days per year

Table 10: Recent Weather patterns, last 5 years (Continued)

Weather measurement	Circuit	2015	2016	2017	2018	2019	5-year historical average	Unit(s)
Days rated at the top 30% of proprietary fire potential index or similar fire risk index measure	608 LINE	82.31	127.84	133.97	179.5	202.85	145.294	Circuit mile days where proprietary measure rated above top 30% threshold[1] per year
Days rated at the top 30% of proprietary fire potential index or similar fire risk index measure	BROCKWAY 4201	14.88	29.76	29.76	44.64	49.6	33.728	Circuit mile days where proprietary measure rated above top 30% threshold[1] per year
Days rated at the top 30% of proprietary fire potential index or similar fire risk index measure	BROCKWAY 4202	80.61	161.22	161.22	241.83	268.7	182.716	Circuit mile days where proprietary measure rated above top 30% threshold[1] per year
Days rated at the top 30% of proprietary fire potential index or similar fire risk index measure	BROCKWAY 5100	5.01	10.02	10.02	15.03	16.7	11.356	Circuit mile days where proprietary measure rated above top 30% threshold[1] per year
Days rated at the top 30% of proprietary fire potential index or similar fire risk index measure	BROCKWAY 5200	153.48	306.96	306.96	460.44	511.6	347.888	Circuit mile days where proprietary measure rated above top 30% threshold[1] per year
Days rated at the top 30% of proprietary fire potential index or similar fire risk index measure	BUC-STL 634	0.78	1.56	1.56	2.34	2.6	1.768	Circuit mile days where proprietary measure rated above top 30% threshold[1] per year
Days rated at the top 30% of proprietary fire potential index or similar fire risk index measure	CALIFORNIA 204	10.08	12.6	13.86	16.38	18.9	14.364	Circuit mile days where proprietary measure rated above top 30% threshold[1] per year
Days rated at the top 30% of proprietary fire potential index or similar fire risk index measure	CEMETERY 41	29.92	37.4	41.14	48.62	56.1	42.636	Circuit mile days where proprietary measure rated above top 30% threshold[1] per year
Days rated at the top 30% of proprietary fire potential index or similar fire risk index measure	CEMETERY 42	38.96	48.7	53.57	63.31	73.05	55.518	Circuit mile days where proprietary measure rated above top 30% threshold[1] per year
Days rated at the top 30% of proprietary fire potential index or similar fire risk index measure	GLENSHIRE 7400	82.56	165.12	165.12	247.68	275.2	187.136	Circuit mile days where proprietary measure rated above top 30% threshold[1] per year
Days rated at the top 30% of proprietary fire potential index or similar fire risk index measure	GLENSHIRE 7600	4.42	7.46	7.69	10.73	12.05	8.47	Circuit mile days where proprietary measure rated above top 30% threshold[1] per year
Days rated at the top 30% of proprietary fire potential index or similar fire risk index measure	HOBART MILLS 7700	11.6	14.5	15.95	18.85	21.75	16.53	Circuit mile days where proprietary measure rated above top 30% threshold[1] per year

Table 10: Recent Weather patterns, last 5 years (Continued)

Weather measurement	Circuit	2015	2016	2017	2018	2019	5-year historical average	Unit(s)
Days rated at the top 30% of proprietary fire potential index or similar fire risk index measure	KBH-TAH 625	53.61	107.22	107.22	160.83	178.7	121.516	Circuit mile days where proprietary measure rated above top 30% threshold[1] per year
Days rated at the top 30% of proprietary fire potential index or similar fire risk index measure	MEY-BUC 111	32.4	71.4	85.92	120.52	139.9	90.028	Circuit mile days where proprietary measure rated above top 30% threshold[1] per year
Days rated at the top 30% of proprietary fire potential index or similar fire risk index measure	MEYERS 3100	105.54	211.08	211.08	316.62	351.8	239.224	Circuit mile days where proprietary measure rated above top 30% threshold[1] per year
Days rated at the top 30% of proprietary fire potential index or similar fire risk index measure	MEYERS 3200	129.42	258.84	258.84	388.26	431.4	293.352	Circuit mile days where proprietary measure rated above top 30% threshold[1] per year
Days rated at the top 30% of proprietary fire potential index or similar fire risk index measure	MEYERS 3300	291.84	583.68	583.68	875.52	972.8	661.504	Circuit mile days where proprietary measure rated above top 30% threshold[1] per year
Days rated at the top 30% of proprietary fire potential index or similar fire risk index measure	MEYERS 3400	196.26	392.52	392.52	588.78	654.2	444.856	Circuit mile days where proprietary measure rated above top 30% threshold[1] per year
Days rated at the top 30% of proprietary fire potential index or similar fire risk index measure	MEYERS 3500	193.59	387.18	387.18	580.77	645.3	438.804	Circuit mile days where proprietary measure rated above top 30% threshold[1] per year
Days rated at the top 30% of proprietary fire potential index or similar fire risk index measure	MULLER 1296	841.05	2082.6	2963.7	3938.25	4739.25	2912.97	Circuit mile days where proprietary measure rated above top 30% threshold[1] per year
Days rated at the top 30% of proprietary fire potential index or similar fire risk index measure	NORTHSTAR 8600	0.09	0.18	0.18	0.27	0.3	0.204	Circuit mile days where proprietary measure rated above top 30% threshold[1] per year
Days rated at the top 30% of proprietary fire potential index or similar fire risk index measure	NST-KBH 669	19.56	39.12	39.12	58.68	65.2	44.336	Circuit mile days where proprietary measure rated above top 30% threshold[1] per year
Days rated at the top 30% of proprietary fire potential index or similar fire risk index measure	PORTOLA 31	99.68	124.6	137.06	161.98	186.9	142.044	Circuit mile days where proprietary measure rated above top 30% threshold[1] per year
Days rated at the top 30% of proprietary fire potential index or similar fire risk index measure	PORTOLA 32	212.24	265.3	291.83	344.89	397.95	302.442	Circuit mile days where proprietary measure rated above top 30% threshold[1] per year
Days rated at the top 30% of proprietary fire potential index or similar fire risk index measure	RDH-STL 160	1.14	2.28	2.28	3.42	3.8	2.584	Circuit mile days where proprietary measure rated above top 30% threshold[1] per year

Table 10: Recent Weather patterns, last 5 years (Continued)

Weather measurement	Circuit	2015	2016	2017	2018	2019	5-year historical average	Unit(s)
Days rated at the top 30% of proprietary fire potential index or similar fire risk index measure	RUSSELL VALLEY 7900	6.8	8.5	9.35	11.05	12.75	9.69	Circuit mile days where proprietary measure rated above top 30% threshold[1] per year
Days rated at the top 30% of proprietary fire potential index or similar fire risk index measure	SIERRA BROOKS 51	38.24	47.8	52.58	62.14	71.7	54.492	Circuit mile days where proprietary measure rated above top 30% threshold[1] per year
Days rated at the top 30% of proprietary fire potential index or similar fire risk index measure	SILVER LAKE 257	0.4	0.5	0.55	0.65	0.75	0.57	Circuit mile days where proprietary measure rated above top 30% threshold[1] per year
Days rated at the top 30% of proprietary fire potential index or similar fire risk index measure	SQUAW VALLEY 7201	32.49	64.98	64.98	97.47	108.3	73.644	Circuit mile days where proprietary measure rated above top 30% threshold[1] per year
Days rated at the top 30% of proprietary fire potential index or similar fire risk index measure	SQUAW VALLEY 8200	30.12	60.24	60.24	90.36	100.4	68.272	Circuit mile days where proprietary measure rated above top 30% threshold[1] per year
Days rated at the top 30% of proprietary fire potential index or similar fire risk index measure	SQUAW VALLEY 8300	2.19	4.38	4.38	6.57	7.3	4.964	Circuit mile days where proprietary measure rated above top 30% threshold[1] per year
Days rated at the top 30% of proprietary fire potential index or similar fire risk index measure	SQV-TAH 629 TRK-SQV 609	15.54	31.08	31.08	46.62	51.8	35.224	Circuit mile days where proprietary measure rated above top 30% threshold[1] per year
Days rated at the top 30% of proprietary fire potential index or similar fire risk index measure	STAMPEDE 8700	0.72	0.9	0.99	1.17	1.35	1.026	Circuit mile days where proprietary measure rated above top 30% threshold[1] per year
Days rated at the top 30% of proprietary fire potential index or similar fire risk index measure	STATELINE 2200	0.42	0.84	0.84	1.26	1.4	0.952	Circuit mile days where proprietary measure rated above top 30% threshold[1] per year
Days rated at the top 30% of proprietary fire potential index or similar fire risk index measure	STATELINE 2300	21.51	43.02	43.02	64.53	71.7	48.756	Circuit mile days where proprietary measure rated above top 30% threshold[1] per year
Days rated at the top 30% of proprietary fire potential index or similar fire risk index measure	STATELINE 3101	87.66	175.32	175.32	262.98	292.2	198.696	Circuit mile days where proprietary measure rated above top 30% threshold[1] per year
Days rated at the top 30% of proprietary fire potential index or similar fire risk index measure	STATELINE 3501	104.55	209.1	209.1	313.65	348.5	236.98	Circuit mile days where proprietary measure rated above top 30% threshold[1] per year
Days rated at the top 30% of proprietary fire potential index or similar fire risk index measure	STL-MEY 640	24.18	48.36	48.36	72.54	80.6	54.808	Circuit mile days where proprietary measure rated above top 30% threshold[1] per year

Table 10: Recent Weather patterns, last 5 years (Continued)

Weather measurement	Circuit	2015	2016	2017	2018	2019	5-year historical average	Unit(s)
Days rated at the top 30% of proprietary fire potential index or similar fire risk index measure	TAHOE CITY 5201	120.69	241.38	241.38	362.07	402.3	273.564	Circuit mile days where proprietary measure rated above top 30% threshold[1] per year
Days rated at the top 30% of proprietary fire potential index or similar fire risk index measure	TAHOE CITY 7100	68.37	136.74	136.74	205.11	227.9	154.972	Circuit mile days where proprietary measure rated above top 30% threshold[1] per year
Days rated at the top 30% of proprietary fire potential index or similar fire risk index measure	TAHOE CITY 7200	7.8	15.6	15.6	23.4	26	17.68	Circuit mile days where proprietary measure rated above top 30% threshold[1] per year
Days rated at the top 30% of proprietary fire potential index or similar fire risk index measure	TAHOE CITY 7300	318.66	637.32	637.32	955.98	1062.2	722.296	Circuit mile days where proprietary measure rated above top 30% threshold[1] per year
Days rated at the top 30% of proprietary fire potential index or similar fire risk index measure	TOPAZ 1261	1130.22	2798.64	3982.68	5292.3	6368.7	3914.508	Circuit mile days where proprietary measure rated above top 30% threshold[1] per year
Days rated at the top 30% of proprietary fire potential index or similar fire risk index measure	TRK-GLS 608	0	0	0	0	0	0	Circuit mile days where proprietary measure rated above top 30% threshold[1] per year
Days rated at the top 30% of proprietary fire potential index or similar fire risk index measure	TRK-NST 650	23.07	46.14	46.14	69.21	76.9	52.292	Circuit mile days where proprietary measure rated above top 30% threshold[1] per year
Days rated at the top 30% of proprietary fire potential index or similar fire risk index measure	TRK-SQV 609	38.84	76.18	76.43	113.77	126.55	86.354	Circuit mile days where proprietary measure rated above top 30% threshold[1] per year
Days rated at the top 30% of proprietary fire potential index or similar fire risk index measure	TRUCKEE 7202	16.08	32.16	32.16	48.24	53.6	36.448	Circuit mile days where proprietary measure rated above top 30% threshold[1] per year
Days rated at the top 30% of proprietary fire potential index or similar fire risk index measure	TRUCKEE 7203	6.33	12.66	12.66	18.99	21.1	14.348	Circuit mile days where proprietary measure rated above top 30% threshold[1] per year
Days rated at the top 30% of proprietary fire potential index or similar fire risk index measure	TRUCKEE 7204	2.07	4.14	4.14	6.21	6.9	4.692	Circuit mile days where proprietary measure rated above top 30% threshold[1] per year
Days rated at the top 30% of proprietary fire potential index or similar fire risk index measure	WASHOE 201	4.45	8.42	8.5	12.47	13.9	9.548	Circuit mile days where proprietary measure rated above top 30% threshold[1] per year

Table 10: Recent Weather patterns, last 5 years (Continued)

Weather measurement	Circuit	2015	2016	2017	2018	2019	5-year historical average	Unit(s)
95th percentile wind conditions	608 LINE	334.76	936.57	1321.82	1647.83	1976.46	1243.49	Circuit mile days with wind gusts over 95th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
95th percentile wind conditions	BROCKWAY 4201	114.08	317.44	451.36	550.56	664.64	419.62	Circuit mile days with wind gusts over 95th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
95th percentile wind conditions	BROCKWAY 4202	618.01	1719.68	2445.17	2982.57	3600.58	2273.20	Circuit mile days with wind gusts over 95th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
95th percentile wind conditions	BROCKWAY 5100	38.41	106.88	151.97	185.37	223.78	141.28	Circuit mile days with wind gusts over 95th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
95th percentile wind conditions	BROCKWAY 5200	1176.68	3274.24	4655.56	5678.76	6855.44	4328.14	Circuit mile days with wind gusts over 95th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
95th percentile wind conditions	BUC-STL 634	5.98	16.64	23.66	28.86	34.84	22.00	Circuit mile days with wind gusts over 95th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
95th percentile wind conditions	CALIFORNIA 204	16.38	46.62	64.26	85.68	100.8	62.75	Circuit mile days with wind gusts over 95th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
95th percentile wind conditions	CEMETERY 41	48.62	138.38	190.74	254.32	299.2	186.25	Circuit mile days with wind gusts over 95th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
95th percentile wind conditions	CEMETERY 42	63.31	180.19	248.37	331.16	389.6	242.53	Circuit mile days with wind gusts over 95th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
95th percentile wind conditions	GLENSHIRE 7400	632.96	1761.28	2504.32	3054.72	3687.68	2328.19	Circuit mile days with wind gusts over 95th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
95th percentile wind conditions	GLENSHIRE 7600	22.77	63.55	89.99	111.1	133.64	84.21	Circuit mile days with wind gusts over 95th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
95th percentile wind conditions	HOBART MILLS 7700	18.85	53.65	73.95	98.6	116	72.21	Circuit mile days with wind gusts over 95th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year

Table 10: Recent Weather patterns, last 5 years (Continued)

Weather measurement	Circuit	2015	2016	2017	2018	2019	5-year historical average	Unit(s)
95th percentile wind conditions	KBH-TAH 625	411.01	1143.68	1626.17	1983.57	2394.58	1511.80	Circuit mile days with wind gusts over 95th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
95th percentile wind conditions	MEY-BUC 111	152.26	420.38	598.9	733.72	887.52	558.56	Circuit mile days with wind gusts over 95th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
95th percentile wind conditions	MEYERS 3100	809.14	2251.52	3201.38	3904.98	4714.12	2976.23	Circuit mile days with wind gusts over 95th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
95th percentile wind conditions	MEYERS 3200	992.22	2760.96	3925.74	4788.54	5780.76	3649.64	Circuit mile days with wind gusts over 95th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
95th percentile wind conditions	MEYERS 3300	2237.44	6225.92	8852.48	10798.08	13035.52	8229.89	Circuit mile days with wind gusts over 95th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
95th percentile wind conditions	MEYERS 3400	1504.66	4186.88	5953.22	7261.62	8766.28	5534.53	Circuit mile days with wind gusts over 95th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
95th percentile wind conditions	MEYERS 3500	1484.19	4129.92	5872.23	7162.83	8647.02	5459.24	Circuit mile days with wind gusts over 95th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
95th percentile wind conditions	MULLER 1296	614.1	1508.55	2216.1	2896.95	3604.5	2168.04	Circuit mile days with wind gusts over 95th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
95th percentile wind conditions	NORTHSTAR 8600	0.69	1.92	2.73	3.33	4.02	2.54	Circuit mile days with wind gusts over 95th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
95th percentile wind conditions	NST-KBH 669	149.96	417.28	593.32	723.72	873.68	551.59	Circuit mile days with wind gusts over 95th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
95th percentile wind conditions	PORTOLA 31	161.98	461.02	635.46	847.28	996.8	620.51	Circuit mile days with wind gusts over 95th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
95th percentile wind conditions	PORTOLA 32	344.89	981.61	1353.03	1804.04	2122.4	1321.19	Circuit mile days with wind gusts over 95th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
95th percentile wind conditions	RDH-STL 160	8.74	24.32	34.58	42.18	50.92	32.15	Circuit mile days with wind gusts over 95th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year

Table 10: Recent Weather patterns, last 5 years (Continued)

Weather measurement	Circuit	2015	2016	2017	2018	2019	5-year historical average	Unit(s)
95th percentile wind conditions	RUSSELL VALLEY 7900	11.05	31.45	43.35	57.8	68	42.33	Circuit mile days with wind gusts over 95th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
95th percentile wind conditions	SIERRA BROOKS 51	62.14	176.86	243.78	325.04	382.4	238.04	Circuit mile days with wind gusts over 95th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
95th percentile wind conditions	SILVER LAKE 257	0.65	1.85	2.55	3.4	4	2.49	Circuit mile days with wind gusts over 95th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
95th percentile wind conditions	SQUAW VALLEY 7201	249.09	693.12	985.53	1202.13	1451.22	916.22	Circuit mile days with wind gusts over 95th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
95th percentile wind conditions	SQUAW VALLEY 8200	230.92	642.56	913.64	1114.44	1345.36	849.38	Circuit mile days with wind gusts over 95th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
95th percentile wind conditions	SQUAW VALLEY 8300	16.79	46.72	66.43	81.03	97.82	61.76	Circuit mile days with wind gusts over 95th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
95th percentile wind conditions	SQV-TAH 629 TRK-SQV 609	119.14	331.52	471.38	574.98	694.12	438.23	Circuit mile days with wind gusts over 95th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
95th percentile wind conditions	STAMPEDE 8700	1.17	3.33	4.59	6.12	7.2	4.48	Circuit mile days with wind gusts over 95th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
95th percentile wind conditions	STATELINE 2200	3.22	8.96	12.74	15.54	18.76	11.84	Circuit mile days with wind gusts over 95th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
95th percentile wind conditions	STATELINE 2300	164.91	458.88	652.47	795.87	960.78	606.58	Circuit mile days with wind gusts over 95th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
95th percentile wind conditions	STATELINE 3101	672.06	1870.08	2659.02	3243.42	3915.48	2472.01	Circuit mile days with wind gusts over 95th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
95th percentile wind conditions	STATELINE 3501	801.55	2230.4	3171.35	3868.35	4669.9	2948.31	Circuit mile days with wind gusts over 95th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year

Table 10: Recent Weather patterns, last 5 years (Continued)

Weather measurement	Circuit	2015	2016	2017	2018	2019	5-year historical average	Unit(s)
95th percentile wind conditions	STL-MEY 640	185.38	515.84	733.46	894.66	1080.04	681.88	Circuit mile days with wind gusts over 95th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
95th percentile wind conditions	TAHOE CITY 5201	925.29	2574.72	3660.93	4465.53	5390.82	3403.46	Circuit mile days with wind gusts over 95th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
95th percentile wind conditions	TAHOE CITY 7100	524.17	1458.56	2073.89	2529.69	3053.86	1928.03	Circuit mile days with wind gusts over 95th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
95th percentile wind conditions	TAHOE CITY 7200	59.8	166.4	236.6	288.6	348.4	219.96	Circuit mile days with wind gusts over 95th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
95th percentile wind conditions	TAHOE CITY 7300	2443.06	6798.08	9666.02	11790.42	14233.48	8986.21	Circuit mile days with wind gusts over 95th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
95th percentile wind conditions	TOPAZ 1261	825.24	2027.22	2978.04	3892.98	4843.8	2913.46	Circuit mile days with wind gusts over 95th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
95th percentile wind conditions	TRK-GLS 608	0	0	0	0	0	0.00	Circuit mile days with wind gusts over 95th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
95th percentile wind conditions	TRK-NST 650	176.87	492.16	699.79	853.59	1030.46	650.57	Circuit mile days with wind gusts over 95th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
95th percentile wind conditions	TRK-SQV 609	285.69	795.17	1130.23	1380.08	1665.52	1051.34	Circuit mile days with wind gusts over 95th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
95th percentile wind conditions	TRUCKEE 7202	123.28	343.04	487.76	594.96	718.24	453.46	Circuit mile days with wind gusts over 95th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
95th percentile wind conditions	TRUCKEE 7203	48.53	135.04	192.01	234.21	282.74	178.51	Circuit mile days with wind gusts over 95th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
95th percentile wind conditions	TRUCKEE 7204	15.87	44.16	62.79	76.59	92.46	58.37	Circuit mile days with wind gusts over 95th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
95th percentile wind conditions	WASHOE 201	30.25	84.24	119.65	146.41	176.58	111.43	Circuit mile days with wind gusts over 95th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year

Table 10: Recent Weather patterns, last 5 years (Continued)

Weather measurement	Circuit	2015	2016	2017	2018	2019	5-year historical average	Unit(s)
99th percentile wind conditions	608 LINE	56.62	229.1	307.9	370.65	433.4	279.53	Circuit mile days with wind gusts over 99th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
99th percentile wind conditions	BROCKWAY 4201	19.84	94.24	124	143.84	163.68	109.12	Circuit mile days with wind gusts over 99th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
99th percentile wind conditions	BROCKWAY 4202	107.48	510.53	671.75	779.23	886.71	591.14	Circuit mile days with wind gusts over 99th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
99th percentile wind conditions	BROCKWAY 5100	6.68	31.73	41.75	48.43	55.11	36.74	Circuit mile days with wind gusts over 99th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
99th percentile wind conditions	BROCKWAY 5200	204.64	972.04	1279	1483.64	1688.28	1125.52	Circuit mile days with wind gusts over 99th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
99th percentile wind conditions	BUC-STL 634	1.04	4.94	6.5	7.54	8.58	5.72	Circuit mile days with wind gusts over 99th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
99th percentile wind conditions	CALIFORNIA 204	2.52	3.78	6.3	10.08	13.86	7.31	Circuit mile days with wind gusts over 99th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
99th percentile wind conditions	CEMETERY 41	7.48	11.22	18.7	29.92	41.14	21.69	Circuit mile days with wind gusts over 99th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
99th percentile wind conditions	CEMETERY 42	9.74	14.61	24.35	38.96	53.57	28.25	Circuit mile days with wind gusts over 99th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
99th percentile wind conditions	GLENSHIRE 7400	110.08	522.88	688	798.08	908.16	605.44	Circuit mile days with wind gusts over 99th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
99th percentile wind conditions	GLENSHIRE 7600	3.9	17.03	22.65	26.78	30.91	20.25	Circuit mile days with wind gusts over 99th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
99th percentile wind conditions	HOBART MILLS 7700	2.9	4.35	7.25	11.6	15.95	8.41	Circuit mile days with wind gusts over 99th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year

Table 10: Recent Weather patterns, last 5 years (Continued)

Weather measurement	Circuit	2015	2016	2017	2018	2019	5-year historical average	Unit(s)
99th percentile wind conditions	KBH-TAH 625	71.48	339.53	446.75	518.23	589.71	393.14	Circuit mile days with wind gusts over 99th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
99th percentile wind conditions	MEY-BUC 111	27.14	123.14	162.64	190.88	218.46	144.45	Circuit mile days with wind gusts over 99th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
99th percentile wind conditions	MEYERS 3100	140.72	668.42	879.5	1020.22	1160.94	773.96	Circuit mile days with wind gusts over 99th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
99th percentile wind conditions	MEYERS 3200	172.56	819.66	1078.5	1251.06	1423.62	949.08	Circuit mile days with wind gusts over 99th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
99th percentile wind conditions	MEYERS 3300	389.12	1848.32	2432	2821.12	3210.24	2140.16	Circuit mile days with wind gusts over 99th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
99th percentile wind conditions	MEYERS 3400	261.68	1242.98	1635.5	1897.18	2158.86	1439.24	Circuit mile days with wind gusts over 99th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
99th percentile wind conditions	MEYERS 3500	258.12	1226.07	1613.25	1871.37	2129.49	1419.66	Circuit mile days with wind gusts over 99th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
99th percentile wind conditions	MULLER 1296	146.85	347.1	493.95	707.55	881.1	515.31	Circuit mile days with wind gusts over 99th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
99th percentile wind conditions	NORTHSTAR 8600	0.12	0.57	0.75	0.87	0.99	0.66	Circuit mile days with wind gusts over 99th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
99th percentile wind conditions	NST-KBH 669	26.08	123.88	163	189.08	215.16	143.44	Circuit mile days with wind gusts over 99th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
99th percentile wind conditions	PORTOLA 31	24.92	37.38	62.3	99.68	137.06	72.27	Circuit mile days with wind gusts over 99th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
99th percentile wind conditions	PORTOLA 32	53.06	79.59	132.65	212.24	291.83	153.87	Circuit mile days with wind gusts over 99th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
99th percentile wind conditions	RDH-STL 160	1.52	7.22	9.5	11.02	12.54	8.36	Circuit mile days with wind gusts over 99th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year

Table 10: Recent Weather patterns, last 5 years (Continued)

Weather measurement	Circuit	2015	2016	2017	2018	2019	5-year historical average	Unit(s)
99th percentile wind conditions	RUSSELL VALLEY 7900	1.7	2.55	4.25	6.8	9.35	4.93	Circuit mile days with wind gusts over 99th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
99th percentile wind conditions	SIERRA BROOKS 51	9.56	14.34	23.9	38.24	52.58	27.72	Circuit mile days with wind gusts over 99th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
99th percentile wind conditions	SILVER LAKE 257	0.1	0.15	0.25	0.4	0.55	0.29	Circuit mile days with wind gusts over 99th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
99th percentile wind conditions	SQUAW VALLEY 7201	43.32	205.77	270.75	314.07	357.39	238.26	Circuit mile days with wind gusts over 99th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
99th percentile wind conditions	SQUAW VALLEY 8200	40.16	190.76	251	291.16	331.32	220.88	Circuit mile days with wind gusts over 99th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
99th percentile wind conditions	SQUAW VALLEY 8300	2.92	13.87	18.25	21.17	24.09	16.06	Circuit mile days with wind gusts over 99th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
99th percentile wind conditions	SQV-TAH 629 TRK-SQV 609	20.72	98.42	129.5	150.22	170.94	113.96	Circuit mile days with wind gusts over 99th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
99th percentile wind conditions	STAMPEDE 8700	0.18	0.27	0.45	0.72	0.99	0.52	Circuit mile days with wind gusts over 99th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
99th percentile wind conditions	STATELINE 2200	0.56	2.66	3.5	4.06	4.62	3.08	Circuit mile days with wind gusts over 99th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
99th percentile wind conditions	STATELINE 2300	28.68	136.23	179.25	207.93	236.61	157.74	Circuit mile days with wind gusts over 99th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
99th percentile wind conditions	STATELINE 3101	116.88	555.18	730.5	847.38	964.26	642.84	Circuit mile days with wind gusts over 99th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
99th percentile wind conditions	STATELINE 3501	139.4	662.15	871.25	1010.65	1150.05	766.70	Circuit mile days with wind gusts over 99th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year

Table 10: Recent Weather patterns, last 5 years (Continued)

Weather measurement	Circuit	2015	2016	2017	2018	2019	5-year historical average	Unit(s)
99th percentile wind conditions	STL-MEY 640	32.24	153.14	201.5	233.74	265.98	177.32	Circuit mile days with wind gusts over 99th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
99th percentile wind conditions	TAHOE CITY 5201	160.92	764.37	1005.75	1166.67	1327.59	885.06	Circuit mile days with wind gusts over 99th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
99th percentile wind conditions	TAHOE CITY 7100	91.16	433.01	569.75	660.91	752.07	501.38	Circuit mile days with wind gusts over 99th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
99th percentile wind conditions	TAHOE CITY 7200	10.4	49.4	65	75.4	85.8	57.20	Circuit mile days with wind gusts over 99th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
99th percentile wind conditions	TAHOE CITY 7300	424.88	2018.18	2655.5	3080.38	3505.26	2336.84	Circuit mile days with wind gusts over 99th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
99th percentile wind conditions	TOPAZ 1261	197.34	466.44	663.78	950.82	1184.04	692.48	Circuit mile days with wind gusts over 99th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
99th percentile wind conditions	TRK-GLS 608	0	0	0	0	0	0.00	Circuit mile days with wind gusts over 99th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
99th percentile wind conditions	TRK-NST 650	30.76	146.11	192.25	223.01	253.77	169.18	Circuit mile days with wind gusts over 99th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
99th percentile wind conditions	TRK-SQV 609	49.62	234.07	308.25	358.12	407.99	271.61	Circuit mile days with wind gusts over 99th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
99th percentile wind conditions	TRUCKEE 7202	21.44	101.84	134	155.44	176.88	117.92	Circuit mile days with wind gusts over 99th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
99th percentile wind conditions	TRUCKEE 7203	8.44	40.09	52.75	61.19	69.63	46.42	Circuit mile days with wind gusts over 99th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
99th percentile wind conditions	TRUCKEE 7204	2.76	13.11	17.25	20.01	22.77	15.18	Circuit mile days with wind gusts over 99th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year
99th percentile wind conditions	WASHOE 201	5.24	24.37	32.15	37.47	42.79	28.40	Circuit mile days with wind gusts over 99th percentile historical (meaning the prior 10 years, 2005-2014) conditions per year

3.2. Recent Drivers of Ignition Probability

Table 11: Key recent drivers of ignition probability, last 5 years

Incident type by ignition probability driver		Near misses tracked (y/n)?	Number of incidents per year						Average percentage probability of ignition per incident						Number of ignitions per year from this driver					
			2015	2016	2017	2018	2019	Average	2015	2016	2017	2018	2019	Average	2015	2016	2017	2018	2019	Average
Contact from object	All types of object contact	N	37	27	34	19	60	35	2.7%	3.7%	0.0%	0.0%	0.0%	1.1%	1.0	1.0	-	-	-	0.4
	Animal contact	Y	13	3	9	2	20	9	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-	-	-	-	-	-
	Balloon contact	N	-	-	-	-	-	-	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-	-	-	-	-	-
	Veg. contact	Y	21	17	15	14	35	20	0.0%	5.9%	0.0%	0.0%	0.0%	1.0%	-	1.0	-	-	-	0.2
	Vehicle contact	Y	3	7	10	3	5	6	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-	-	-	-	-	-
All types of equipment / facility failure	All types	N	43	38	51	44	79	51	2.3%	0.0%	0.0%	0.0%	1.3%	0.8%	1.0	-	-	-	1.0	0.4
	Capacitor bank failure	N	-	-	-	-	-	-	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-	-	-	-	-	-
	Conductor failure—all	N	2	10	4	4	8	6	0.0%	0.0%	0.0%	0.0%	12.5%	3.6%	-	-	-	-	1.0	0.2
	Conductor failure— wires down	Y	2	10	3	4	5	5	0.0%	0.0%	0.0%	0.0%	20.0%	4.2%	-	-	-	-	1.0	0.2
	Fuse failure—all	Y	33	21	34	30	50	34	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-	-	-	-	-	-
	Fuse failure—convention al blown fuse	Y	33	21	34	30	50	34	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-	-	-	-	-	-
	Lightning arrestor failure	Y	3	1	4	1	5	3	33.3%	0.0%	0.0%	0.0%	0.0%	6.7%	1.0	-	-	-	-	0.2
	Switch failure	N	-	-	-	-	-	-	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-	-	-	-	-	-
	Transformer failure	Y	5	6	9	9	16	9	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-	-	-	-	-	-
Wire-to-wire contact / contamination		Y	11	24	4	6	45	18	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-	-	-	-	-	-
Other		Y	29	21	6	36	85	35	3.4%	0.0%	0.0%	0.0%	0.0%	0.6%	1.0	-	-	-	-	0.2

3.3. Recent Use of PSPS

Table 12: Recent use of PSP, last 5 years

PSPS characteristic	2015	2016	2017	2018	2019	Unit(s)
Frequency of PSPS events (total)	-	-	-	1.0000	-	Number of instances where utility operating protocol requires de-energization of a circuit or portion thereof to reduce ignition probability, per year
Frequency of PSPS events (normalized)	-	-	-	0.0003	-	Number of instances where utility operating protocol requires de-energization of a circuit or portion thereof in order to reduce ignition probability, per RFW circuit mile day per year
Scope of PSPS events (total)	-	-	-	1.0000	-	Circuit-events, measured in number of events multiplied by number of circuits de-energized per year. Less than one full circuit de-energized during PSPS, rounding up to 1
Scope of PSPS events (normalized)	-	-	-	0.0003	-	Circuit-events, measured in number of events multiplied by number of circuits targeted for de- energization per RFW circuit mile day per year
Duration of PSPS events (total)	-	-	-	90.0000	-	Customer hours per year
Duration of PSPS events (normalized)	-	-	-	0.0310	-	Customer hours per RFW circuit mile day per year
Other						

3.4. Baseline State of Equipment and Wildfire and PSPS Event Risk Reduction Plans

3.4.1. Current Baseline State of Service Territory and Utility Equipment

Table 13: Current Baseline State of service territory and equipment

Land use	Characteristic tracked	In non- HFTD	In HFTD Tier 2	In HFTD Tier 3
In urban areas	Circuit miles	91.94	743.61	73.21
	Circuit miles in WUI	104.89	1,415.30	116.18
	Number of critical facilities	-	-	-
	Number of critical facilities in WUI	-	-	-
	Number of customers	3,147	26,052	1,857
	Number of customers in WUI	3,406	40,012	2,817
	Number of customers belonging to access and functional needs populations	41	142	14
	Number of customers belonging to access and functional needs populations in WUI	44	185	20
	Circuit miles of overhead transmission lines	0.54	0.51	-
	Circuit miles of overhead transmission lines in WUI	0.68	3.82	0.03
	Circuit miles of overhead distribution lines	62.64	572.21	68.86
	Circuit miles of overhead distribution lines in WUI	72.45	1,001.10	107.54
	Number of substations	-	1	-
	Number of substations in WUI	1	6	-

Table 13: Current Baseline State of service territory and equipment (Continued)

Land use	Characteristic tracked	In non- HFTD	In HFTD Tier 2	In HFTD Tier 3
In rural areas	Circuit miles	12.95	671.68	42.97
	Circuit miles in WUI	104.89	1,415.30	116.18
	Number of critical facilities	-	-	-
	Number of critical facilities in WUI	-	-	-
	Number of customers	259	13,960	960
	Number of customers in WUI	3,406	40,012	2,817
	Number of customers belonging to access and functional needs populations	3	43	6
	Number of customers belonging to access and functional needs populations in WUI	44	185	20
	Circuit miles of overhead transmission lines	0.14	3.32	0.03
	Circuit miles of overhead transmission lines in WUI	0.68	3.82	0.03
	Circuit miles of overhead distribution lines	9.81	428.89	38.68
	Circuit miles of overhead distribution lines in WUI	72.45	1,001.10	107.54
	Number of substations	1	5	-
	Number of substations in WUI	1	6	-
In highly rural areas	Circuit miles	28.86	370.52	19.40
	Circuit miles in WUI	104.89	1,415.30	116.18
	Number of critical facilities	-	-	-
	Number of critical facilities in WUI	-	-	-
	Number of customers	308	2,237	145
	Number of customers in WUI	3,406	40,012	2,817
	Number of customers belonging to access and functional needs populations	2	3	4
	Number of customers belonging to access and functional needs populations in WUI	44	185	20
	Circuit miles of overhead transmission lines	0.23	12.28	2.32
	Circuit miles of overhead transmission lines in WUI	0.68	3.82	0.03
	Circuit miles of overhead distribution lines	23.90	264.31	15.61
	Circuit miles of overhead distribution lines in WUI	72.45	1,001.10	107.54
	Number of substations	1	4	1
	Number of substations in WUI	1	6	-

Table 14: Summary data on weather stations

Weather station count type	Current count	Unit(s)
Number of weather stations (total)	10	Total number located in service territory and operated by utility
Number of weather stations (normalized)	0.005	Total number located in service territory and operated by utility, divided by total number of circuit miles in utility service territory (2,055 circuit miles)
Number of weather stations in non- HFTD (total)	1	Total number located in non-HFTD service territory and operated by utility
Number of weather stations in non-HFTD (normalized)	0.007	Total number located in non-HFTD service territory and operated by utility, divided by total number of circuit miles in non-HFTD service territory (134 circuit miles)
Number of weather stations in HFTD Zone 1 (total)	-	Total number located in HFTD Zone 1 service territory and operated by utility
Number of weather stations in HFTD Zone 1 (normalized)	-	Total number located in HFTD Zone 1 service territory and operated by utility, divided by total number of circuit miles in HFTD Zone 1 service territory
Number of weather stations in HFTD Tier 2 (total)	8	Total number located in HFTD Tier 2 service territory and operated by utility
Number of weather stations in HFTD Tier 2 (normalized)	0.004	Total number located in HFTD Tier 2 service territory and operated by utility, divided by total number of circuit miles in HFTD Tier 2 service territory (1,786 circuit miles)
Number of weather stations in HFTD Tier 3 (total)	1	Total number located in HFTD Tier 3 service territory and operated by utility
Number of weather stations in HFTD Tier 3 (normalized)	0.007	Total number located in HFTD Tier 3 service territory and operated by utility, divided by total number of circuit miles in HFTD Tier 3 service territory (136 circuit miles)

Table 15: Summary data on fault indicators

Fault indicator count type	Current count	Unit(s)
Number of fault indicators (total)	239	Total number located in service territory and operated by utility
Number of fault indicators (normalized)	0.116	Total number located in service territory and operated by utility, divided by total number of circuit miles in utility service territory (2,055 circuit miles)
Number of fault indicators in non-HFTD (total)	6	Total number located in non-HFTD service territory and operated by utility
Number of fault indicators in non-HFTD (normalized)	0.003	Total number located in non-HFTD service territory and operated by utility, divided by total number of circuit miles in non-HFTD service territory (134 circuit miles)
Number of fault indicators in HFTD Zone 1 (total)	-	Total number located in HFTD Zone 1 service territory and operated by utility
Number of fault indicators in HFTD Zone 1 (normalized)	-	Total number located in HFTD Zone 1 service territory and operated by utility, divided by total number of circuit miles in HFTD Zone 1 service territory
Number of fault indicators in HFTD Tier 2 (total)	228	Total number located in HFTD Tier 2 service territory and operated by utility
Number of fault indicators in HFTD Tier 2 (normalized)	0.128	Total number located in HFTD Tier 2 service territory and operated by utility, divided by total number of circuit miles in HFTD Tier 2 service territory (1,786 cicuit miles)
Number of fault indicators in HFTD Tier 3 (total)	5	Total number located in HFTD Tier 3 service territory and operated by utility
Number of fault indicators in HFTD Tier 3 (normalized)	0.037	Total number located in HFTD Tier 3 service territory and operated by utility, divided by total number of circuit miles in HFTD Tier 3 service territory (136 circuit miles)

3.4.2. Planned Adds, Removals, and Equip Upgrade (3-yr term)

Table 16: Location of planned utility equipment additions or removal by end of 3-year plan term

Land use	Characteristic tracked	Changes by end-2022			
		In non-HFTD	In HFTD Zone 1	In HFTD Tier 2	In HFTD Tier 3
In urban areas	Circuit miles of overhead transmission lines	-	-	-	-
	Circuit miles of overhead distribution lines	-	-	2.564	0.127
	Circuit miles of overhead transmission lines in WUI	-	-	-	-
	Circuit miles of overhead distribution lines in WUI	0.004	-	9.569	0.668
	Number of substations	-	-	1.000	-
	Number of substations in WUI	-	-	1.000	-
	Number of weather stations	-	-	-	-
	Number of weather stations in WUI	-	-	-	-
In rural areas	Circuit miles of overhead transmission lines	-	-	-	-
	Circuit miles of overhead distribution lines	0.004	-	7.005	0.541
	Circuit miles of overhead transmission lines in WUI	-	-	-	-
	Circuit miles of overhead distribution lines in WUI	0.004	-	9.569	0.668
	Number of substations	-	-	2.000	-
	Number of substations in WUI	-	-	2.000	-
	Number of weather stations	-	-	-	-
	Number of weather stations in WUI	-	-	-	-
In highly rural areas	Circuit miles of overhead transmission lines	-	-	-	-
	Circuit miles of overhead distribution lines	0.031	-	12.648	5.366
	Circuit miles of overhead transmission lines in WUI	-	-	-	-
	Circuit miles of overhead distribution lines in WUI	0.004	-	9.569	0.668
	Number of substations	-	-	1.000	-
	Number of substations in WUI	-	-	1.000	-
	Number of weather stations	-	-	-	-
	Number of weather stations in WUI	-	-	-	-

Table 17: Location of planned utility infrastructure upgrades

Land use	Characteristic tracked	In non-HFTD			In HFTD Zone 1			In HFTD Tier 2			In HFTD Tier 3		
		2020	2021	2022	2020	2021	2022	2020	2021	2022	2020	2021	2022
Total circuit miles planned for hardening each year, all types and locations		-	-	0.036	-	-	-	5.857	10.697	5.663	-	-	6.034
Total number of substations planned for hardening each year, all locations		-	-	-	-	-	-	4.000	2.000	1.000	-	-	-
In urban areas	Circuit miles planned for grid hardening of overhead transmission lines	-	-	-	-	-	-	-	-	-	-	-	-
	Circuit miles of overhead transmission lines in WUI to harden	-	-	-	-	-	-	-	-	-	-	-	-
	Circuit miles of overhead distribution lines to harden	-	-	-	-	-	-	0.738	0.787	1.039	-	-	0.127
	Circuit miles of overhead distribution lines in WUI to harden	-	-	0.004	-	-	-	2.733	5.030	1.806	-	-	0.668
	Circuit miles of overhead transmission lines in WUI to harden	-	-	-	-	-	-	-	-	-	-	-	-
	Number of substations to harden	-	-	-	-	-	-	1.000	-	-	-	-	-
	Number of substations in WUI to harden	-	-	-	-	-	-	1.000	-	-	-	-	-
In rural areas	Circuit miles of overhead transmission lines to harden	-	-	-	-	-	-	-	-	-	-	-	-
	Circuit miles of overhead transmission lines in WUI to harden	-	-	-	-	-	-	-	-	-	-	-	-
	Circuit miles of overhead distribution lines to harden	-	-	0.004	-	-	-	1.995	4.243	0.768	-	-	0.541
	Circuit miles of overhead distribution lines in WUI to harden	-	-	0.004	-	-	-	2.733	5.030	1.806	-	-	0.668
	Circuit miles of overhead transmission lines in WUI to harden	-	-	-	-	-	-	-	-	-	-	-	-
	Number of substations to harden	-	-	-	-	-	-	-	2.000	-	-	-	-
	Number of substations in WUI to harden	-	-	-	-	-	-	-	2.000	-	-	-	-
In highly rural areas	Circuit miles of overhead transmission lines to harden	-	-	-	-	-	-	-	-	-	-	-	-
	Circuit miles of overhead transmission lines in WUI to harden	-	-	-	-	-	-	-	-	-	-	-	-
	Circuit miles of overhead distribution lines to harden	-	-	0.031	-	-	-	3.124	5.667	3.857	-	-	5.366
	Circuit miles of overhead distribution lines in WUI to harden	-	-	0.004	-	-	-	2.733	5.030	1.806	-	-	0.668
	Circuit miles of overhead transmission lines in WUI to harden	-	-	-	-	-	-	-	-	-	-	-	-
	Number of substations to harden	-	-	-	-	-	-	-	-	1.000	-	-	-
	Number of substations in WUI to harden	-	-	-	-	-	-	-	-	1.000	-	-	-

3.4.3. Status Quo Ignition Probability Drivers

Table 18: Key Drivers of Ignition Probability

Ignition probability drivers		Number of incidents per year (according to 5-year historical average)	Average likelihood of ignition per	Ignitions from this driver (according to 5-year historical average)				
				Total	In non-HFTD	In HFTD Zone 1	In HFTD Tier 2	In HFTD Tier 3
Contact from object	All types of object contact	35	1.1%	0.4	-	-	0.4	-
	Animal contact	9	0.0%	-	-	-	-	-
	Balloon contact	-	-	-	-	-	-	-
	Vegetation contact	20	1.0%	0.2	-	-	0.2	-
	Vehicle contact	6	0.0%	-	-	-	-	-
All types of equipment / facility failure	All types	51	0.8%	0.4	-	-	0.4	-
	Capacitor bank failure	-	-	-	-	-	-	-
	Conductor failure— all	6	3.6%	0.2	-	-	0.2	-
	Conductor failure—wires down	5	4.2%	0.2	-	-	0.2	-
	Fuse failure—all	34	0.0%	-	-	-	-	-
	Fuse	34	0.0%	-	-	-	-	-
	Lightning arrestor failure	3	6.7%	0.2	-	-	0.2	-
	Switch failure	-	-	-	-	-	-	-
	Transformer failure	9	0.0%	-	-	-	-	-
Wire-to-wire contact / contamination		18	0.0%	-	-	-	-	-
Other *		35	0.6%	0.2	-	-	-	-

4. Inputs to the Plan and Directional Vision for Wildfire Risk Exposure

Liberty CalPeco's WMP incorporates both short-term and long-term strategies to mitigate wildfire risks. The short-term plan includes development of resiliency corridors during PSPS events, operational awareness, and conservative work practices during high fire threat weather. The long-term plan includes extensive system hardening, increased operational awareness, and conservative, clearly defined work practices.

4.1. The Objectives of the Plan

Liberty CalPeco plans to execute the following initiatives:

4.1.1. Before the upcoming wildfire season

- Asset Survey – Liberty CalPeco plans to issue an RFP for a complete system-wide assessment and asset inventory. Liberty CalPeco will partner with iRestore to create an asset inventory database that houses results from the system-wide survey along with detailed inspections documenting the condition of each overhead distribution asset in its service territory. The asset inventory will provide a complete look at the system and enable Liberty CalPeco to understand, identify, and remove hazards at a programmatic level on a system-wide basis.
- WF Risk Analysis and Assessment – Liberty CalPeco will expand and refine its current wildfire risk analysis and initial assessments to prioritize WMP initiatives expected for the remainder of 2020 and will reevaluate annually for budget planning. Because of the age of the system, Liberty CalPeco does not currently have a complete inventory of system components. Once the asset survey is complete, Liberty CalPeco will utilize this data in future WMPs.

4.1.2. Before the next annual update

- Update dataset using iRestore mobile application to get real-time asset data, responder data, GIS, asset inventory in one centralized location. Use this to track asset life cycle using maintenance/replacement work in HFTDs.
- Implement new operational procedures discussed in section 5.3 and train employees/contract crews of new work requirements during RFW days or high fire risk conditions.
- Continue to implement system hardening initiatives detailed in section 5.3 and incorporate possible new programs that arise following the system survey.
- Continue development of resiliency corridors to prepare for a PSPS event.
- Hire additional staff required to implement the 2020 WMP.

4.1.3. Within the next 3 years

- Continue multi-year system hardening initiatives (overhead line replacements and substation upgrades), improve situational awareness with additional weather station installations, fire potential index, distribution fault anticipation, and emerging technology pilot programs.

4.1.4. Within the next 10 years

- Achieve significant progress on system hardening and situational awareness programs, minimizing the need for PSPS events.
- Complete resiliency corridors, enabling critical infrastructure to remain in power during a PSPS event in most regions of the service territory.
- Address critical issues identified in the system survey and asset inventory.
- Deploy emerging technology programs.

4.2. Understanding Major Trends Impacting Ignition Probability and Wildfire Consequence

In order to objectively compare and evaluate wildfire risk mitigation strategies, Liberty CalPeco utilizes its current ERM methodology to identify inherent risk, residual risk, existing controls, and future mitigation efforts after determining the likelihood and impact of wildfire risk in the Liberty CalPeco service territory. Currently, Liberty CalPeco is diligently working toward a RBDM framework that incorporates elements of the Commission's S-MAP/RAMP proceedings, as well as adopting the Commission's recommendations toward a probabilistic modeling methodology with MARS/MAVF scoring. Liberty CalPeco will also adhere to the RBDM requirements from D.19-04-020.

Liberty CalPeco utilizes REAX Engineering to help monitor fuel moisture content. Field sampling of wildland fuels will be conducted in key areas identified through a joint review

from REAX and Liberty CalPeco. The fuel moisture condition data will provide insight into potential fire behavior and facilitate calculations of the National Fire Danger Rating System fuel indices (specifically the Energy Release Component of reported information). Energy Release Component ("ERC") is a key index calculated from Remote Automated Weather Station ("RAWS") observations as part of the US National Fire Danger Rating System ("NFDRS"). The physical meaning of an ERC value is 4% of the energy per unit area that would be released during a fire in units of BTU/square foot. In other words, multiplying an ERC value by 25 gives the number of BTUs per square foot that would be released in a fire, e.g., an ERC of 10 corresponds to 250 BTU per square foot. ERC depends on live and dead fuel loading by size class (as characterized by an NFDRS fuel model) as well as fuel moisture content of live and dead fuels. In forested areas, ERC values are usually calculated for NFDRS fuel model G which includes a heavy loading of 1,000-hour fuels (dead fuels between 3 and 8 inches in diameter). Consequently, ERC for fuel model G (or ERC(G) for short) is therefore quite sensitive to 1,000-hour fuel moisture values.[1]

In addition to depending on fuel loading/fuel model, ERC varies daily due to changes in moisture content of both live and dead fuels, which are in turn dependent on antecedent precipitation, relative humidity, and temperature. ERC is a "build up" index that, in the western United States, typically peaks during summer months and drops off after rains return and temperatures drop. Figure 1, below, shows an example seasonal variation of ERC. Since ERC depends on fuel loading/fuel model at each RAWS station, absolute ERC values are commonly converted to percentiles to facilitate comparison of seasonal ERC trends between RAWS stations with different fuel models. Conversion of an absolute ERC value to a percentile ERC value is accomplished by analyzing historical weather station observations using software developed by the USDA Forest Service known as Fire Family Plus. This will be based upon actual field observations and disseminated through the Wildland Fire Assessment System (WFAS) to report field conditions.

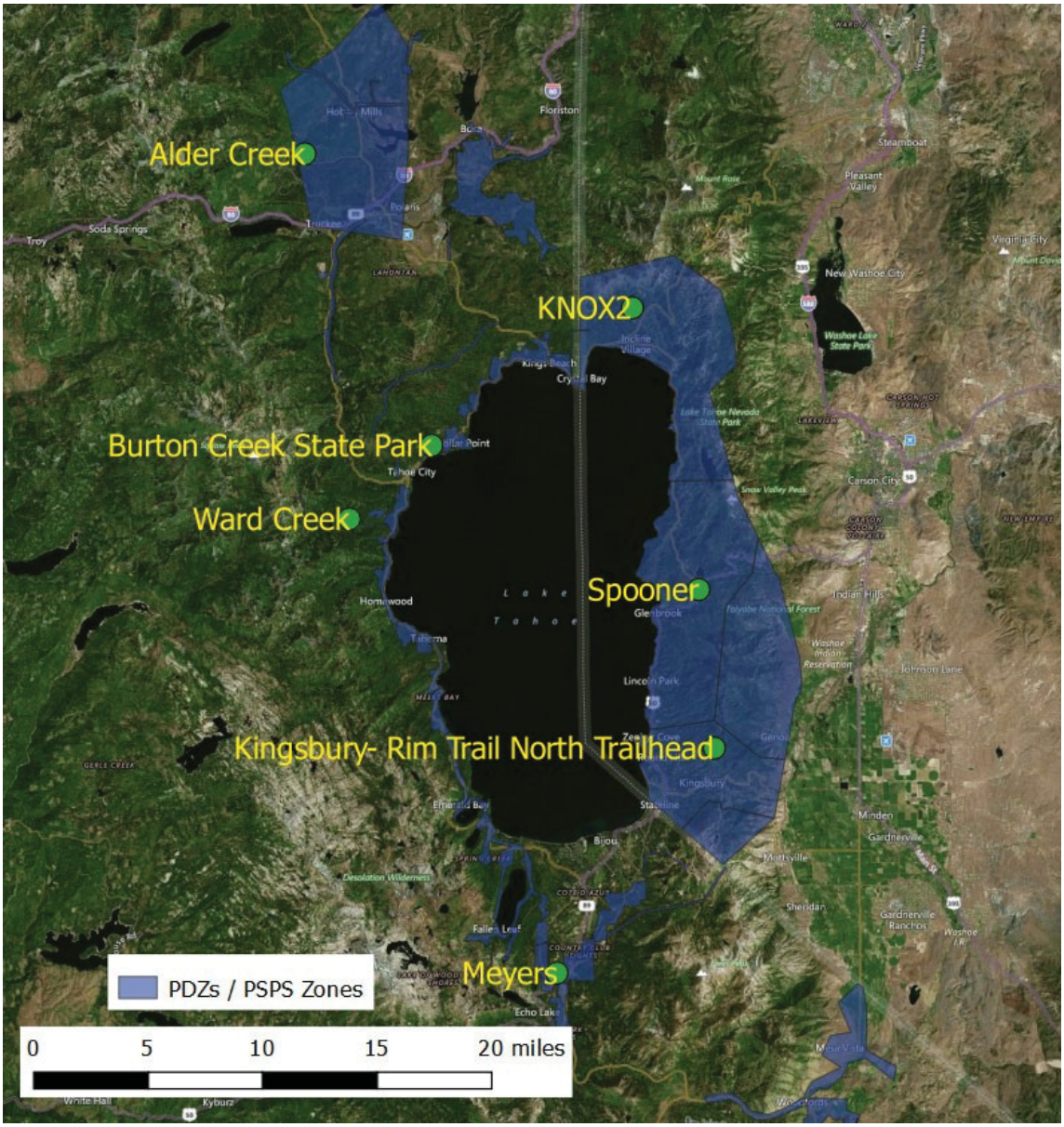
During the 2019 fire season, field sampling was conducted by REAX Engineering and Spatial Informatics Group. Typically, fuel moistures are sampled on a bi-weekly basis (an interval of 10-14 days). Sampling also occurred after heavy rain events. For this and ongoing efforts, Greenleaf Manzanita and Snowbrush Ceanothus will be prioritized for observations with Sagebrush targeted when neither Manzanita nor Snowbrush are present.

Sampling occurred at the following locations:

1. Alder Creek (NV Energy Truckee PDZ)
2. Knox 2 RAWS (NV Energy Incline PDZ)
3. Spooner Summit (NV Energy Glenbrook PDZ)
4. Kingsbury / Tahoe Rim Trail North (NV Energy Roundhill PDZ)
5. Meyers / Baron RAWS (Liberty Utilities south shore PSPS zones)
6. Ward Creek (Liberty Utilities west and north shore PSPS zones)
7. Burton Creek State Park (Liberty Utilities west and north shore PSPS zones)

[1] REAX Engineering. Liberty CalPeco De-Energization Thresholds. August 20, 2019.

Figure 1: Fuel Moisture Sampling Locations in Greater Lake Tahoe Area



Source: REAX Engineering, 2019

Sampling protocol

To the extent possible, sampling follows recommendations in the U.S. Forest Service fuel moisture collection and equipment guide.[2]

[2] Zahn, S. and Henson, C., "A Synthesis of Fuel Moisture Collection Methods and Equipment – A Desk Guide," US Department of Agriculture Forest Service, National Technology & Development Program, May 2011.

Drying, reporting, and calculations
Samples will be weighed in the field, dried in a lab oven at 100 °C for 24 hours, and then weighed again to calculate moisture content. The resulting moisture content values will then be used to calculate ERC using Fuel Model G. Since this calculation gives values with units of BTU/square foot, a Fire Family Plus climatology analysis of the nearest NFDRS weather station will be used to convert ERC values in BTU/square foot to percentiles.

The three FPI Risk conditions are defined as:

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 operations and maintenance (O&M) activities have stipulations and significant fire mitigation activities are required. The Extreme Fire Risk status is indicated as "red."
Elevated 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 required. The Elevated Fire Risk status is indicated as "yellow."
Normal Fire Risk –Normal Fire Risk is defined as periods where 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 Normal Fire Risk status is the default operational state and the FPI is indicated as "green."
As presented in Liberty CalPeco's Fire Prevention Plan, filed on October 30, 2019 in its annual General Order 166 filing, methodologies for forecasting and monitoring fire weather conditions as well as triggered operational practice modes are outlined below:

ASSESSMENT METHODOLOGY

Liberty/Reax Fire Forecast – Reax is a predictive tool that captures three main methods of fire weather condition measurement: Energy Release Component (ERC), wind gusts, and the Fosberg Fire Weather Index (FFWI). CalPeco will issue proactive patrols and inspection procedures during applicable work if a triggered scenario is revealed through the predictive software tool. When the Reax tool predicts potential fire weather conditions, the Manager-in-Charge or designee will refer to the tiered risk categories in this Plan and initiate operational protocols based on the determined rating.

2) Red Flag Warnings - Fire Weather Zone Boundaries were compared to CalPeco's service territory and it was identified that the territory spans portions of three different Zones. The applicable Zones include Zone 271, Zone 272 and Zone 273, which CalPeco will monitor. Historical data for the past ten years' RFWs within each of these zones was collected for each occurrence so that wind data could be collected an evaluated for each identified RFW. During Red Flag Events, CalPeco will monitor wind gusts at the peak elevation located at Bliss State Park using the link below or other available data. CalPeco has identified 46 Public Safety Power Shut-off (PSPS) zones that are based on isolation points within certain circuits or areas. After receiving a forecast from each of the zones through Reax, and if the ERC, wind, and FFWI are forecasted to come within 80%, 90%, or 100% of the thresholds for de-energization, a PSPS will be enacted upon reaching, or just before,

100%. During a PSPS event, noncritical operational work will be suspended to focus efforts on current conditions and proactive patrols after de-energizing and when restoring power. CalPeco leans on the guidelines provided by the CPUC through R. 18-12-005, which is an open proceeding to examine utilities' PSPS processes among other issues. CalPeco will provide updated protocols for internal PSPS practices in the 2020 version of its Wildfire Mitigation Plan.

3) CalPeco Design Standards - The CalPeco facilities design standards were reviewed by an engineer to evaluate the minimum standard for wind loading design. The design standard utilizes the criteria specified in GO 95 Section IV. However, it is known that this is a minimum design standard and that facilities are often oversized for a variety of reasons. CalPeco will review applicable wind loading design standards, monitor regulatory changes to standard design requirements, and update standards for minimum wind loading design criteria as deemed prudent.

4) Wind Data - NWS Remote Automatic Weather Stations were mapped for the area within 25 miles of the CalPeco service territory. For each RFW, wind gust data from the NWS site is monitored. The station automatically records the maximum instantaneous gust over the past hour and wind speed averages are taken by the stations over a ten-minute period. Because it is not possible to discern if gusts lasted three-seconds or more, it is assumed that all maximum gusts met the three-second criteria to guard against underestimating the fire threat.

   In addition to fire weather and fuels data from the NWS and United States Department of Agriculture National Fire Danger Rating System, CalPeco tracks instantaneous meteorological conditions received from the ten weather stations in the service territory. CalPeco also proposes to install 20 additional weather stations during 2020. The server data capturing meteorological conditions will serve as a principle variable underlying the development of the FPI. Until the FPI developed and adopted by CalPeco, operational designations for fire ratings will be derived from the meteorological data expressed above.

5) Mapping - Tiers 2 and 3 of the HFTD are overlaid on the CalPeco service territory map. All CalPeco facilities are mapped without underground facilities which are not subject to the Plan requirements. Operational work within Tier 2 and 3 of the HFTD or as a response to issued RFWs are subject to more stringent fire safety requirements, as described in this Plan. The attached map complies with GO 95 Rule 21.2-D.

6) Fire Potential Index (FPI) – The FPI is used as means to develop guidelines for Utility and Contractor operations and maintenance crews to follow under CalPeco defined categories of wildfire risk. The Wildfire Prevention Department is responsible for determining and communicating the FPI on a daily basis. The Wildfire Prevention Department will assure that the current status of the FPI is posted on the Company Intranet and will communicate the status to the Manager in charge. The FPI rating framework is currently in development.

B. Describe how the utility monitors and accounts for fuel conditions to ignition probability

Fuel moisture conditions during fire season in 2019 were monitored by in-situ fuel moisture content sampling conducted at four sites within Liberty's service territory. The focus of sampling was live and 1000-hr fuels because fuel moisture models are less accurate for those fuel types than for 1-hr, 10-hr, and 100-hr fuels. Live and 1000-hr fuels were sampled approximately weekly from mid-July through mid-November. Live samples were predominantly manzanita or sagebrush. For live fuels, fuel moisture contents of approximately 60% is considered critical for sagebrush, and ~80% for manzanita. 1000-hr fuels were minimum 3" diameter samples from dead-and-downed branches or trunks of various species. Sampling is anticipated to begin in late May / early June and end in late Fall for the upcoming 2020 year, with the understanding the start and end dates are dependent on numerous climatological factors.

Moisture content results were reported in percentages and used to calculate Energy Release Component (ERC) for NFDRS Fuel Model G which has a high correlation with wildland fire occurrence and size. ERC values (in units of BTU/square foot) were converted to percentile based on long-term historical ERC values and climatology. ERC percentiles are used to quantify intermediate to long-term drying.

4.2.1 – Service territory fire-threat evaluation and ignition risk trends

Liberty CalPeco has not performed any cursory or comprehensive study in 2019 to determine whether expansion of the HFTD tiers are necessary. Since Liberty CalPeco's territory comprises of mainly Tier 2 and some Tier 3 of the HFTD, enhanced operational practices that include fire-threat conditions/stipulations are considered as part of general business practice due to the unique mountainous terrain. The decision to redesign the tiers to modify the boundaries of where Tier 2 and 3 intersect is not considered to be appropriate at this time. Liberty CalPeco likewise did not meet trigger thresholds to initiate a PSPS event during the 2019 fire season, leading to the understanding that the Commission has suitably mapped the fire threat profile for the service territory at this time.

Upon implementing the full system asset survey project, Liberty CalPeco will consider evaluating terrain conditions as it relates to the underlying risk drivers of the HFTD tiers. The utility will also consider re-evaluating this determination in future WMP filings.

Table 19: Macro trends impacting ignition probability and/or wildfire consequence

Rank	Macro trends impacting utility ignited ignition probability and estimated wildfire consequence by year 10	Comments
1	Change in ignition probability and estimated wildfire consequence due to climate change	Reduction in live and dead fuel moisture values relative to the historical baseline correlate with increased fire severity. Tree mortality induced by climate change may increase ignitions associated with trees contacting powerlines. Hotter summers, with drought conditions and more extremenity in the winter.
5	Change in ignition probability and estimated wildfire consequence due to relevant invasive species, such as bark beetles	Tree mortality induced by disturbances such as bark beetles may increase ignitions associated with trees contacting powerlines. The relationship between tree mortality and fire behavior is not clear and remains an active research area. Vegetation such as cheatgrass has taken over native grasslands and is highly flammible.
2	Change in ignition probability and estimated wildfire consequence due to other drivers of change in fuel density and moisture	100+ years of fire suppression and exclusion have contributed to higher fuel loading. This results in a shift from frequent, low intensity fires that benefit the landscape to periodic, intense fires that have negative effects.
7	Population changes (including Access and Functional Needs population) that could be impacted by utility ignition	This macro trend was interpreted to refer to aging population and individuals with limited mobility and/or cognitive impairments and how they could be impacted by utility-caused ignitions. Due to relatively scarce urban populations, this is not viewed as a major driver of fire consequence in Liberty's service territory.
8	Population changes in HFTD that could be impacted by utility ignition	Future demographic trends are unknown, thus this is not considered a major driver of fire consequence in Liberty's service territory.
6	Population changes in WUI that could be impacted by utility ignition	Structures in Wildland Urban Interface or Intermix are more vulnerable to fire losses than those in urbanized areas. As more structures are built in WUI/Intermix areas fire losses from all causes, not just utility ignitions, may increase.
3	Utility infrastructure location in HFTD vs non-HFTD	As additional utility infrastructure is added to HFTD areas to serve new development, ignition probability may increase due to the presence of utilities in areas that previously had no utility infrastructure. This increase in ignition probabilty may be partially offset by improved real-time monitoring of circuits and fire prevention measures such as proactive de-energization.
4	Utility infrastructure location in urban vs rural vs highly rural areas	As more structures are built in rural and highly rural areas that are connected to the grid, increased presence of utilities in areas that previously contained no utilities may increase ignition probability. This increase in ignition probability may be partially offset by improved real-time monitoring of circuits and other fire prevention measures such as proactive de-energization.

4.3. Change in Ignition Probability Drivers

Liberty CalPeco experienced over 7,000 events over the past five years, none of which caused significant fires.[3] The number of incidents reported in the Liberty CalPeco service territory remained constant from 2015-2018 at about 110. In 2019, the company experienced 269 reported incidents, as shown in Table 11 above. The trend was driven mostly by sharp increases in vegetation contact, animal contact, fuse failures, wire-to-wire contact, and other reported incidents.

In order to address the challenges faced in 2020, Liberty CalPeco plans to front-load the design and permitting of seasonally constrained upgrades to prepare for the working months to the greatest extent possible. As a result, the number of reported incidents is anticipated to decrease as system upgrades increase.

While 94% of Liberty CalPeco's overhead lines are in a HFTD, the spread of fire is often suppressed by the cold weather and snow, which is prevalent in Liberty CalPeco's service territory. Additionally, as system hardening measures continue to be implemented, Liberty CalPeco expects the probability of ignition from events to decrease.

4.4. Directional Vision for Necessity of PSPS

Liberty CalPeco's PSPS program will be influenced in the future by PSPS events and lessons learned through its responses to those events. Much of the regulatory framework in place today was not in place during Liberty CalPeco's 2018 event. In 2019, Liberty CalPeco did not initiate a PSPS, but it did initiate the processes and ultimately determined a PSPS event was unnecessary. The PSPS framework has helped Liberty CalPeco develop better decision-making processes and communication plans. Liberty CalPeco does not currently analyze future quantitative impacts of the number of customers and circuits affected by PSPS events. The protocols and thresholds used to determine if power will be shutoff are detailed in the Fire Prevention Plan submitted in Liberty CalPeco's annual GO 166 compliance report. Additionally, since the WUI designation is new in this 2020 WMP, Liberty CalPeco does not have a set process as it relates to the PSPS program and serving customers in urban, rural, and highly rural areas. Moving forward, Liberty CalPeco will study possible differences in approaches to the PSPS protocol across the customer classes in the WUI designation.

[3] The referenced events include outage and non-outage events.

2019 Public Safety Power Shutoff ("PSPS") Near Miss Lessons Learned	
Steering Committee	Bright red line threshold is clear, but as we approach, is there room to define cusp thresholds and potential action items?
Operations	More patrols if there is a forecast threshold exceeds.
Dispatch and Control	New Hampshire Dispatch and Control – indications staffing could be a challenge.
Communications	One agency notification was missed Disjointed systems (Responder, Everbridge, GIS, etc.)
Administration	Logistics, admin requirements are significant and difficult for team lead and other core members to manage in addition to executing the PSPS. Overlap in roles between emergency management and PSPS requirements
Documentation & Records Management	Explore establishing a role dedicated to documentation and records management

Table 20 – Anticipated characteristics of PSPS use over next 10 years

At this time, Liberty CalPeco has insufficient recent experience with PSPS events in its own service territory to feel confident ranking the characteristic of PSPS events anticipated to change the most and have the greatest impact on reliability over the next ten years.

5. Wildfire Mitigation Strategy and 2020 Programs (3-years)

5.1 Wildfire Mitigation Strategy

5.1.A

The threat of a wildfire in the Liberty CalPeco service territory is a risk the company and its parent companies take very seriously. Providing its customers safe and reliable service is paramount. The devastating consequences of wildfires include loss of service, property, and even life. The wildfire risk mitigation programs discussed in the Liberty CalPeco WMP are explicitly designed to keep its customers and surrounding populations safe.

In order to objectively compare and evaluate wildfire risk mitigation strategies, the company utilizes its current Enterprise Risk Management ("ERM") methodology to identify inherent risk, residual risk, existing controls, and future mitigation efforts after determining the likelihood and impact of wildfire risk in the Liberty CalPeco service territory. The company is developing a Risk-Based Decision Making ("RBDM") framework that incorporates elements of the IOU S-MAP/RAMP proceedings, as well as adopting the Commission's recommendations toward a probabilistic modeling methodology with MARS/MAVF scoring.

Furthermore, to evaluate the risk associated with wildfire events, Liberty CalPeco will isolate the risk of wildfire separate from other safety and reliability risk events. Preventing the loss of any life due to wildfire is of the utmost importance. Specific measures must be implemented to mitigate the driving forces behind ignitions in the Liberty CalPeco service territory. Therefore, when comparing wildfire risk to other safety/reliability risks, wildfires should be evaluated and modeled as a standalone risk.

1) **Before upcoming wildfire season –** The Company is working to complete a draft of the RBDM framework to bolster its ability to evaluate, model, and mitigate ignition events in its service territory. At this stage, the end of the evaluation phase of the RBDM should be taking place.
2) **Before the next annual update –** Liberty CalPeco expects its RBDM framework to be complete and useful before the next annual update.
3) **Within the next 3 years –** Within the next three years, Liberty CalPeco expects to enhance its RBDM framework through the addition of more resources, technological upgrades, richer data sets for modeling purposes, and generally more experience to refine its risk models as they relate to wildfires.
4) **Within the next 10 years –** Liberty CalPeco expects to continuously build upon its developed risk models to evaluate wildfire risk and expects to take advantage of all possible technologies available.

5.1.B

5.1.C

Liberty CalPeco is concerned about limited resources over the next three to five years. The company is already short-staffed in field personnel. Liberty CalPeco has historically had retention issues with the high cost of living in the Lake Tahoe region and the long commutes to affordable housing in the area.

Liberty CalPeco plans to supplement its staff with qualified contractors as much as possible, but even this has been difficult recently because, with the surplus of fire hardening work throughout California, many contractors "follow the money." Nevertheless, to the extent possible, Liberty CalPeco will aggressively pursue its Wildfire Mitigation Plan using resources, both internal and external, to their maximum potential.

In addition to labor resource constraints, Liberty CalPeco expects the high demand for wildfire hardened materials (*e.g.*, covered conductor, non-expulsion fuses, exempt hardware, etc.) will result in long material lead times.

Liberty CalPeco does not anticipate that these resource challenges will change over the next three years.

5.1.D

Liberty CalPeco has included several new technologies and innovations in its three-year WMP. This will impact resources, but Liberty CalPeco plans to use outside resources for help in many of these areas:

- Substation rebuilds – Liberty CalPeco plans to decommission or rebuild 3 substations (Brockway, Stateline, and Squaw Valley) over the next three years (2020-2022). This includes fire hardening and new technologies implemented. Old, aging wooden bus structure and oil filled equipment will be replaced with steel bus, gas or vacuum breakers, and FR3 oil filled equipment (such as transformers and voltage regulators).
- Microgrid pilot project – Liberty CalPeco plans to implement a microgrid pilot project at Sagehen near Truckee, CA in 2020-2021. The technology will be solar with battery storage to feed a single customer (Cal Berkley's Sagehen research facility). Initially, the customer will stay "plugged in" to the grid but would eventually be planned to disconnect from the grid entirely and three miles of overhead line is planned for removal
- Non-expulsion fuses and electronic fuse replacements – Liberty CalPeco has already begun replacing many of its expulsion fuses as included in its approved 2019 WMP at a rate of approximately 60 fuses per month over nine years. Liberty CalPeco has also implemented a pilot program to install electronic dropout reclosers at various locations where non-expulsion fusing is difficult to coordinate.
- Distribution Fault Anticipation (DFA) – Liberty CalPeco plans to embark on a collaborative research project with Texas A&M to evaluate this emerging technology (as directed by the CPUC in D.19-05-040). Initial program will be to implement DFA on 10 feeders in 2020-2021.
- Auto-reclosers – Liberty CalPeco plans to continue replacing older line reclosers and installing new reclosers at ideal locations throughout its territory. Many of these will roll into use as part of Liberty CalPeco's distribution automation program.
- Emerging technologies (high impedance fault detection, rapid earth fault current limiting) – Liberty CalPeco will consider implementing these technologies based upon further research and cost effectiveness.

5.2 Wildfire Mitigation Plan Implementation

5.2.A

Liberty CalPeco plans to identify and track costs associated with each major WMP initiative. Unique identifiers will be assigned to each specific WMP initiative for tracking purposes. When job orders are created for capital projects or programs, an operations analyst will track costs and develop methods for tracking all metrics and data related to wildfire mitigation. The reports created will be used by management to plan for WMP work activities, to measure performance of the WMP over time, and to make informed WMP risk-based decision making. After conducting the system-wide asset survey, Liberty CalPeco will have an updated GIS containing a database that houses all the asset data by geographic coordinates. Going forward, Liberty CalPeco can utilize this information to develop risk mapping and to prioritize WMP work initiatives based on wildfire risk.

5.2.B

Achieving a robust, all-encompassing approach to mitigate wildfire risk from the utility is the primary objective of aggregating respective plans, protocols, and strategies into the WMP. Staff responsible for assigned mitigation areas have the role of vetting current procedures and recommending changes or enhancements to build upon initiatives that result in unfavorable risk spend efficiency. If regulatory changes, emerging technologies, external constraints, resource adequacy limitations, or other unforeseen circumstances yield deficiencies within the WMP, Liberty CalPeco will report in subsequent filings identified remediation solutions. The VP of Operations, or his designee, will be responsible for spearheading discussions about correcting deficiencies when updating the WMP in each comprehensive filing.

5.2.C

Liberty CalPeco inspects and repairs facilities in accordance with G.O. 165. Any issues found impacting safety and reliability are addressed as outlined in G.O. 165. Liberty CalPeco constantly evaluates its facilities while performing other activities, such as outage patrols, new business planning, engineering studies, pole replacements, and related field work. Monitoring the effectiveness of inspection practices will occur through ongoing tracking and annually review of findings resulting from internal process. As part of the full system asset survey, the conditions of each piece of equipment or hardware will be visually inspected and accounted for more efficient grid hardening efforts in the future. Because this activity will be performed in part by contracted support, Liberty CalPeco will provide escort personnel to assist in appropriately identifying assets and to provide expert knowledge of Liberty CalPeco's system.

The VP of Operations, or his designee, will review concerns found during routine field work and equipment and line inspections. Additionally, the Wildfire Prevention personnel will record equipment and line corrections or deficiencies for WMP effectiveness evaluation, as these responsibilities were formally established during the 2019 wildfire season. Liberty CalPeco will use this information to assess inspection procedure effectiveness. Annually, Liberty CalPeco will review inspection records, identify deficiencies, and determine corrective actions. An internal report will be provided to the utility's leadership in deliberation of future strategies to strengthen the utility's wildfire prevention priorities in 2020. Related strategies that mitigate wildfire risk will be identified and proposed in the next iteration of the WMP.

Aggregating this data will guide future decision-making regarding wildfire mitigation strategy with the goal of reducing incidents and system-wide hazards.

5.2.D

To manage data collection requests, the utility will direct and train staff to track and regularly verify recorded data and to update respective metrics for future WMP filings and data requests.

Liberty CalPeco uses several software applications to normalize different data sets to present a uniform scaled unit that can be measured across another variable data point. Generally, this activity occurs through statistical and forecast models through spreadsheets, as well as ArcGIS mapping computations. The mapping platform allows for this process to occur through visualized data points, lines, rasters, and polygons built upon multiple layers involving unique calculations. These activities are performed on a project-need basis or routinely in an effort to

draw comparisons of varying datasets. Liberty CalPeco relies on its recordkeeping practices to influence its risk-based decision-making activities related to utility capital investments.

The two tables below describe areas crucial to wildfire mitigation data collection, where that information is stored, the value of its assessment in wildfire risk reduction, and the metadata and data dictionary to explain each article/attribute collected. Pursuant to R. 18-10-007, Liberty CalPeco filed its Data Collection for WMPs Report to the CPUC on July 30, 2019.[4] This report identifies the mechanisms and types of data that are regularly tracked by the utility at the time of reporting.

Data and Map Product Catalogue

Data Collection Area	Data/Map Products	Software/File Type & Storage	Access / Responsible Group	Description	Assessment Value
Vegetation Management	Vegetation Management System Tree Inventory	Software Database	Internal system access / Vegetation Management Department	Captures and records results of vegetation inspections, work status, and completed tree crew work.	Capturing the results of vegetation inspections can lead to a better understanding of the trends that are developing on Liberty CalPeco's system. By capturing the type of work needed, Liberty CalPeco can determine timelines for frequency of inspections and tree work needed. The tree work completed allows Liberty CalPeco to determine the effectiveness of the work type and allows for integration with the GIS system to geospatially view inspections and

[4] *"Data Collection for WMPs Report"*

					tree work activities.
Outage Tracking	Outage Log	Report from Outage Management System	Internal OMS / System Operations Group	Collects incidents detailing the duration, weather conditions, cause, and impacted facilities associated with each outage event.	Fire Incident Data collection is annually updated by the CPUC Safety Enforcement Division (SED) and is an approved reporting method. This supports the underlying data.
Infrastructure/ Operations	Substation Inspections	Record-keeping Application	Internal paper and electronic records / Engineering & Operations Group	Records substation inspections.	Regular, detailed inspections will help identify repairs and reduce the risk of substation equipment failures.
Infrastructure/ Operations	Mobile Mapping	GIS Application	Smart phone device for vendor database application / Field Crew & Operations Personnel	Provides field personnel with a view to the GIS system.	Mobile mapping will provide field personnel with maps of the system and equipment in fire threat areas.
Infrastructure/ Operations	Pole Test and Treat	Excel Workbook	Physical and electronic forms and / Field Operations	Inspects and tests poles on an annual basis.	Identification of damaged or failing infrastructure that is then scheduled for replacement or repair will help structural integrity of facilities, which reduces fire risk.
Infrastructure/ Operations	Covered Wire Pilot Program	GIS Database	Physical and electronic forms translated into map products / Field	Tracks covered conductor as it is installed in the field in the GIS.	This program will allow for tracking of covered conductor installations. Covered conductor is shown to reduce potential

			Operations & GIS Specialists		ignitions and arc events.
Infrastructure/ Operations	GO 165 Inspection Program	Excel Workbook	Physical and electronic forms and / Field Operations & Engineering	Inspects distribution and transmission lines per CPUC requirement.	Regular, detailed inspections of facilities will identify required repairs, which should reduce the risk of equipment failures and potential ignition events.
Infrastructure/ Operations	Expulsion Limiting Fuse Locations	GIS Database	Physical and electronic forms translated into map products / Field Operations & GIS Specialists	Tracks conventional fuse replacements in GIS system	Installation of new fuses throughout the system designed will minimize ignition events. As replacements are done, they can be compared to other areas that do not have the same type of fuses to measure effectiveness.
Situational Awareness/ Weather Conditions	Weather Station Database	Database, Web Map	Internal weather data feed / GIS Specialists & Operations	Displays current conditions at each location.	The information is utilized when making PSPS events as well as provides operations current weather conditions at a given location.
Situational Awareness/ Weather Conditions	Weather Station Locations	GIS Database	GIS map application / GIS Specialists	Provides GIS locations for each weather station and the associated facilities.	This gives operations exact locations of weather stations and current weather details.

Data Dictionary

Data Product	Field ID/Metadata	Description
Outage Log	Incident ID	Associated incident ID for tracking
	Substation	Substation from which the circuit is sourced
	FeederID	ID of circuit
	Address	Location of incident
	Customer count	Number of customers impacted
		Cause of incident

	Cause	Type of equipment and relevant notes
	Equipment	Time outage was logged
	Outage time	Time outage was restored
	Restoration time	
Substation Inspections	Substation	Name of substation inspected
	Date	Time and date stamp of inspection
	Equipment ID	Type of equipment and relevant notes
	Pass/Fail	Whether equipment passes or fails inspection
Mobile Mapping	Metadata	A base map that contains service territory, locations of lines and facilities, HFTD tiers
Pole Test and Treat	Inspect_Date	Date of inspection
	POLENUMBER	Facility ID of pole
	Species	Type of wood pole
	VISUAL	Whether a visual inspection occurred
	SOUNDBORE	Whether a sound and bore test occurred
	Height	Height of pole
	ORIGGLCIRC	Original circumference of pole
Covered Wire Pilot Program	Install date	Date installed
	Conductor type	Information about conductor type and materials
	Voltage	Voltage of wire
GO 165 Inspection Program	Metadata	Dataset that contains tracking and information around the GO 165 inspections and relevant maintenance programs
Expulsion Limiting Fuse Locations	Pole number	Associated pole
	Fuse type	Type of fuse
	Voltage	Voltage of equipment
	Manufacturer	Name of equipment manufacturer
Weather Station Database	Metadata	Database that stores meteorological measurements, such as temperature, wind chill, heat index, dew point, altitude, humidity, wind speed, wind gusts, barometer pressure
Weather Station Locations	Metadata	Locations of weather stations and associated equipment
Vegetation Management System Tree Inventory	Tree number	Unique identifier for a single tree or group of trees with similar location /characteristics
	Circuit	Circuit where the tree is located

	Ownership type	Owner of the tree
	Pole ID	Pole number/span the tree
	Tree species	Common name of the tree species
	Tree hazard(s)	Tree condition/reason for work needed
	Trim type	Type of work needed
	INSP date	Date the tree was inspected
	Clearance	The distance the vegetation is prescribed to be removed from the nearest conductor
	Status	Status of the tree work order (e.g., pending, permissioned, completed, etc.)
	Crew type	Type of equipment and personnel needed to complete the work
	Date completed	Date the work was completed
Pole Clearing Data	DateInsAndCleared	Date the pole was inspected and cleared
	CircuitNameNumber	Circuit associated with the pole
	Pole ID	Pole number
	Subject hardware	Type of hardware on the pole that requires the pole to be cleared
	Comments	Comments related to the work

5.3 DETAILED Wildfire Mitigation Programs

5.3.1 Risk Assessment and Mapping

Liberty CalPeco plans to implement a risk mapping tool using Hexagon Smart M.Apps, which will provide the utility with the ability to do dynamic analysis on its incident reporting overlaying various maps of the utility's service territory. The software allows for filtering by many informational characters, including, but not limited to, outage cause, date, number of customers affected, location, and circuit. Liberty CalPeco intends to incorporate the analytical capabilities of Smart M.Apps into the WMP and RBDM framework programs. The software will also be able to show ignition probability by circuit.

5.3.1.1 - Risk Mapping Model

The inclusion of climate/weather driven risk mapping, initiative mapping, and PSPS risk-reduction impact are all initiatives the company will implement by the next wildfire season and in its next GRC as part of the company's RBDM framework. Monte Carlo simulation analysis will also be included as part of the quantitative modeling phase. Before the next annual update, Liberty CalPeco expects that the data modeling and evaluation methods will build upon what was in place at the time of the 2020 wildfire season. In the next three years, the company will utilize the best technology available to mitigate wildfire risk.

Project Timeline:

- Before the upcoming wildfire season – status quo.
- Before the next annual update – develop risk map.
- Within the next three years – evaluate risk map, make changes, review data.
- Within the next 10 years – evaluate risk map, make changes, review data.

5.3.2 Situational Awareness and Forecasting

Liberty CalPeco sees the need to enhance its situational awareness and forecasting tools to enable the company to better predict the potential for a wildfire impacting our service territory and surrounding areas by monitoring, assessing, and predicting various weather conditions. The Fire Potential Index, described below, is a key predictive operating and assessment tool, that once implemented will allow Liberty CalPeco to forecast fire threat up to 7 days in advance. Installing weather stations with fuel moisture and precipitation sensors allows for more accurate fuel moisture and ERC calculations. In addition, installing Distribution Fault Anticipation (DFA) monitoring sensors at key system locations to identify potential line failure events that could ignite wildfires is crucial for Liberty CalPeco to continue to explore these new and emerging technologies to better detect wildfires and reduce overall wildfire risk. Partnering (retaining services) with Reax Engineering to develop a weather monitoring tool to monitor elevated fire risk has allowed Liberty CalPeco to plan for, and potentially execute, PSPS events.

5.3.2.1 Advanced Weather Monitoring and Weather Stations

Liberty CalPeco deployed 10 weather stations in 2019 and plans to deploy 40 additional stations through 2021. All stations will be installed with fuel moisture and precipitation sensors. The new sensors will allow for automated Energy Release Component (ERC) calculations to be compared with existing fuel moisture sampling. Weather stations help to evaluate and forecast the need for PSPS events during elevated fire risk conditions. Additionally, in 2019, Liberty CalPeco contracted Reax Engineering to develop a weather monitoring and notification tool to warn of potential elevated fire risk.

Figure 2. below, shows locations of existing and proposed weather stations.

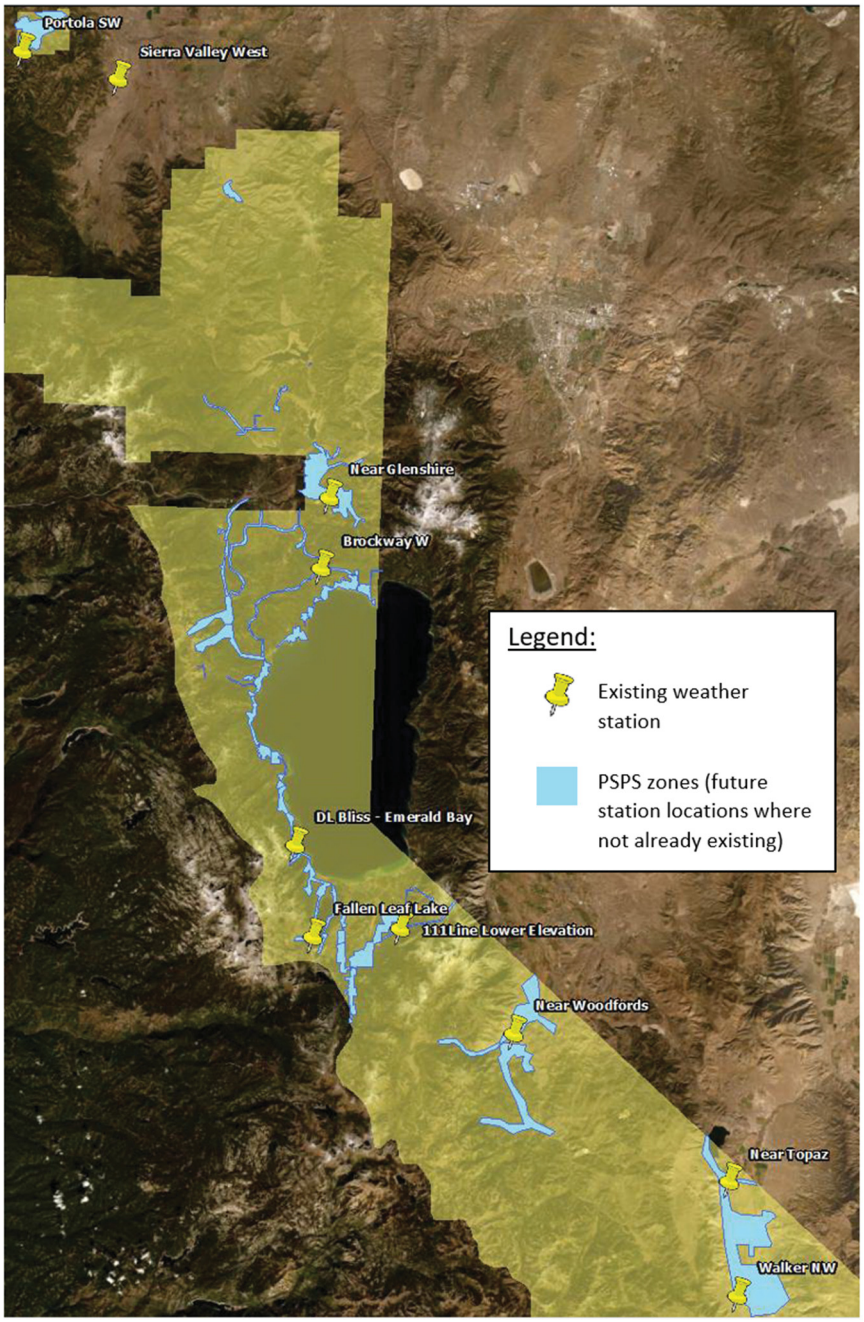
Program Timeline:

- **Before the upcoming wildfire season** – Order material and prepare for installation of weather stations as soon as conditions permit.
- **Before the next annual update** – Install 20 weather stations.
- **Within the next 3 years** – Install 40 weather stations.
- **Within the next 10 years** – Continue to maintain weather network.

Table 22: Advanced Weather Monitoring and Weather Stations

Initiative activity	Year	Total per-initiative spend	Line miles to be treated	Spend/ treated line mile	Ignition probability drivers targeted	Risk reduction	Risk-spend efficiency	Other risk drivers addressed	Existing/ new	Existing: What proceeding has reviewed program	If new: Memorandum account	In / exceeding compliance with regulations	Cite associated rule	Comments
Advanced weather monitoring and weather stations	2019 plan	148,720	2,055	72	All types of contact, all types of equipment failure	Unknown	Unknown	Unknown	Existing	2019 WMP	WMP memorandum account	Exceeding	N/A	2019 Plan included installation of 13 weather stations. Considers all line miles as treated since entire service territory is in scope. Line miles provided by GIS dept.
	2019 actual	199,297	2,055	97	All types of contact, all types of equipment failure	Unknown	Unknown	Unknown	Existing	2019 WMP	WMP memorandum account	Exceeding	N/A	Installation of 10 weather stations and development of advanced weather monitoring tool by Reax Engineering. Considers all line miles as treated since entire service territory is in scope. Line miles provided by GIS dept.
	2020	300,000	2,055	146	All types of contact, all types of equipment failure	Unknown	Unknown	Unknown	Existing		WMP memorandum account	Exceeding	N/A	Installation of 20 new weather stations. Considers all line miles as treated since entire service territory is in scope. Line miles provided by GIS dept.
	2021	300,000	2,055	146	All types of contact, all types of equipment failure	Unknown	Unknown	Unknown	Existing		WMP memorandum account	Exceeding	N/A	Installation of 20 new weather stations. Considers all line miles as treated since entire service territory is in scope. Line miles provided by GIS dept.
	2022	15,000	2,055	7	All types of contact, all types of equipment failure	Unknown	Unknown	Unknown	Existing		WMP memorandum account	Exceeding	N/A	Installation or upkeep of stations. Considers all line miles as treated since entire service territory is in scope. Line miles provided by GIS dept.
	2020-2022 plan total	615,000												

Figure 2: Locations of Existing and Proposed Weather Stations



5.3.2.2a Continuous Monitoring Sensors – Distribution Fault Anticipation

Liberty CalPeco is considering a collaborative research initiative with Texas A&M University called Distribution Fault Anticipation ("DFA"). This technology uses real-time electric waveforms to detect anomalies on the system that have a high potential of ignition (*e.g.,* arcing connections). The DFA technology was recently presented at the Wildfire Technology Innovation Summit. Liberty CalPeco intends to pilot DFA technology on 10 distribution feeders in HFTD Tier 2 and Tier 3 areas. The expectation is that DFA technology will be able to continuously identify incipient line failure events that may be undetectable by traditional inspection methods.

Program Timeline:

- **Before the upcoming wildfire season –** Continue to investigate DFA, define contractual obligations and pricing.
- **Before the next annual update –** Make provisions for deployment of DFA.
- **Within the next 3 years –** Deploy DFA on 10 feeders.
- **Within the next 10 years –** Continue to monitor viability of DFA and potentially expand to include more feeders.

Table 22a: Continuous Monitoring Sensors

Initiative activity	Year	Total per-initiative spend	Line miles to be treated	Spend/ treated line mile	Ignition probability drivers targeted	Risk reduction	Risk-spend efficiency	Other risk drivers addressed	Existing/ new	Existing: What proceeding has reviewed program	If new: Memorandum account	In / exceeding compliance with regulations	Cite associated rule	Comments
Continuous monitoring sensors	2019 plan													
	2019 actual													
	2020													
	2021	706,000	313	2,256	All types of contact, all types of equipment failure	Unknown	Unknown	Unknown	New	N/A	WMP memorandum account	Exceeding	N/A	Distribution fault anticipation (DFA) at Stateline, Northstar, Tahoe City. All OH miles out of those 3 subs.
	2022	162,000	313	518	All types of contact, all types of equipment failure	Unknown	Unknown	Unknown	New	N/A	WMP memorandum account	Exceeding	N/A	Distribution fault anticipation (DFA) at Stateline, Northstar, Tahoe City. All OH miles out of those 3 subs.
	2020-2022 plan total	868,000												

5.3.2.2b Continuous Monitoring Sensors – ALERTWildfire Cameras

Liberty CalPeco is proposing to work with ALERTWildfire to support the local ALERTTahoe wildfire camera network. ALERTWildfire deploys pan-tilt-zoom (PTZ) cameras monitoring high fire risk areas to allow for discovery of ignition events and support fire resources throughout a wildfire event. ALERTWidlfire's first project, ALERTTahoe provided camera coverage for the majority of Liberty CalPeco's service territory. Liberty CalPeco plans to partner with ALERTWildfire to update and maintain the cameras in the Lake Tahoe area to provide camera control to Liberty CalPeco. See alertwildfire.org/about for more information.

Program Timeline:

- **Before the upcoming wildfire season** – Partner with ALERTWildfire to maintain ALERTTahoe camera network.
- **Before the next annual update** – Evaluate replacement of cameras with higher resolution models.
- **Within the next 3 – 10 years** – Continue to support ALERTTahoe camera network through maintenance or addition of cameras.

Table 22b: Continuous Monitoring Sensors – ALERTWildfire Cameras

Initiative activity	Year	Total per-initiative spend	Line miles to be treated	Spend/ treated line mile	Ignition probability drivers targeted	Risk reduction	Risk-spend efficiency	Other risk drivers addressed	Existing/ new	Existing: What proceeding has reviewed program	If new: Memorandum account	In / exceeding compliance with regulations	Cite associated rule	Comments
Continuous monitoring sensors	2019 plan													
	2019 actual													
	2020	80,000	2,055	39	All types of contact, all types of equipment failure	Unknown	Unknown	Unknown	New	N/A	WMP memorandum account	Exceeding	N/A	Liberty CalPeco to maintain 8 cameras that are part of the ALERTTahoe camera network.
	2021	80,000	2,055	39	All types of contact, all types of equipment failure	Unknown	Unknown	Unknown	New	N/A	WMP memorandum account	Exceeding	N/A	
	2022	80,000	2,055	39	All types of contact, all types of equipment failure	Unknown	Unknown	Unknown	New	N/A	WMP memorandum account	Exceeding	N/A	
	2020-2022 plan total	240,000												

5.3.2.3 Fault Indicators

Liberty CalPeco uses fault indicators to detect and shorten outages. There is currently no plan to expand the use of fault indicators as a wildfire mitigation initiative. Liberty CalPeco will continue to look into line monitoring technologies and their potential ability to mitigate wildfire risk.

Program Timeline:

- **Before the upcoming wildfire season** – No current program plans.
- **Before the next annual update** – Research new line monitoring technologies and their potential ability to mitigate wildfire risk.
- **Within the next 3 – 10 years** – Implement new line monitoring technologies if applicable.

5.3.2.4 Forecast of a Fire Index, Fire Potential Risk

The Fire Potential Index (FPI) is a comprehensive assessment tool developed by San Diego Gas and Electric (SDG&E) for operational decision making to reduce fire threats and risks. The tool converts environmental, statistical, and scientific data into an easily understood forecast of short-term fire threat for the utility's service territory. The FPI forecasts up to seven days of fire threat potential.

Threshold values for each ranking were determined through evaluation of historical fire incidents and typical seasonal values. Using FPI allows for more precise predictions of fire risk for a specific geographic area and may provide hourly danger ratings that could be forecasted and used to guide which work activities can be conducted on specific days. The development of the FPI will include the following:

1. Develop an FPI methodology for Liberty CalPeco's service territory based on SDG&E and PG&E methodologies. Factors considered include climatological, geographical, and fuel source conifer and timber understory fuels in Liberty CalPeco's service territory. The FPI calculation includes fuel moisture (both dead and live), "green-up" factor, ambient temperature, relative humidity, and Fosberg Fire Weather Index, among other factors. This work will establish the number of FPI classes as well as the fuel and weather criteria that delineate FPI classes.
2. Identify FPI zones / polygons. Several FPI zones will be developed to capture approximately homogeneous fuels, weather, and topography within each zone. The number of zones and their extent will be developed at project execution and will encompass all of Liberty CalPeco's service territory.
3. Establish Fire Potential Index (FPI) thresholds for each FPI zone based on historical weather analyses.
4. Extend existing proactive de-energization monitoring and operational support tool to include seven-day FPI calculation by zone.
5. Continue monitoring PSPS and FPI weather analytics systems

Program Timeline:

- **Before the upcoming wildfire season** – Implement fully functional FPI.
- **Before the next annual update** – Refine use of FPI to aid operational decision-making.

- **Within the next 3 years –** Continue to evaluate use cases for FPI.
- **Within the next 10 years** - Continue use of FPI to inform operational decisions.

Table 22: Forecast of a Fire Risk Index, Fire Potential Index, or Similar

Initiative activity	Year	Total per-initiative spend	Line miles to be treated	Spend/ treated line mile	Ignition probability drivers targeted	Risk reduction	Risk-spend efficiency	Other risk drivers addressed	Existing/ new	Existing: What proceeding has reviewed program	If new: Memorandum account	In / exceeding compliance with regulations	Cite associated rule	Comments
Forecast of a fire risk index, fire potential index, or similar	2019 plan													
	2019 actual													
	2020	70,000	2,055	34	All types of contact, all types of equipment failure	Unknown	Unknown	Unknown	New	N/A	WMP memorandum account	Exceeding	N/A	FPI under development by Reax as of Jan. 2020. Considers all line miles as treated since entire service territory is in scope. Line miles provided by GIS dept.
	2021	10,000	2,055	5	All types of contact, all types of equipment failure	Unknown	Unknown	Unknown	New	N/A	WMP memorandum account	Exceeding	N/A	
	2022	10,000	2,055	5	All types of contact, all types of equipment failure	Unknown	Unknown	Unknown	New	N/A	WMP memorandum account	Exceeding	N/A	
	2020-2022 plan total	90,000												

5.3.2.5 Personnel Monitoring Areas of Lines/Equipment in Elevated Fire Risk Conditions

Liberty CalPeco has defined new working procedures for elevated fire risk conditions under a recent update to the FPP. The new working procedures include Liberty CalPeco or contracted personnel monitoring areas of electric lines and equipment in elevated fire risk conditions. However, the anticipated cost of these working procedures is dependent on the number of elevated fire risk days and other variable factors that are unknown at this point.

Program Timeline:

- **Before the upcoming wildfire season** – Train and retain internal or contracted resources on the policies regarding need to monitor areas of electric lines in elevated fire risk conditions.
- **Before the next annual update** – Continue to monitor electric lines and equipment in elevated fire risk conditions.
- **Within the next 3-10 years –** Continue to monitor electric lines and equipment in elevated fire risk conditions.

5.3.2.6 Weather Forecasting and Estimating Impacts on Lines/Equipment

Liberty CalPeco consulted Reax Engineering to develop an operational support tool inclusive of weather forecasting functionality. Part of the scope of Reax's weather monitoring project included weather forecasting costs that are reflected in in total in the Advanced Monitoring and Weather Station table in Section 5.3.2.1. Liberty CalPeco may work with Reax or other consultants to estimate impacts of weather conditions on electric equipment but costs are unknown at this point.

Program Timeline:

- **Before the upcoming wildfire season –** Continue use of weather forecasting tool and evaluate options to estimate weather impacts on electric lines and equipment in Liberty CalPeco's service territory.
- **Before the next annual update –** Potentially develop tool to estimate weather impacts on electric lines and equipment primarily used for risk analysis. Continued use of existing weather forecasting tools.
- **Within the next 3-10 years** – Plans will be dependent upon whether new tool above is developed.

5.3.3 Grid Design and System Hardening

Liberty CalPeco's efforts toward Grid Design and System Hardening include various programs in this section, but covered conductor and an effort to identify and replace non-exempt hardware (per CalFire) are the most significant of these programs. The tables below summarize the current inspection and maintenance and/or replacement programs initiated by G.O.165, G.O. 174, and the new WMP initiatives related to strengthening Liberty CalPeco's electric grid.

Existing WMP-related Initiatives (in Base GRC Rates)

	WMP Initiative	Compliance-Driven and/or GRC program	Table Reference
1.	Capacitor Maintenance/Replacement	G.O. 165	1
2.	Circuit Breaker Maintenance/Replacement	G.O. 174	2
3.	Crossarm Maintenance/Replacement	G.O. 165	5
4.	Pole Replacements	G.O. 165	6
5.	Covered Conductor Program	(Topaz and 7300 line in GRC)	3
6.	Transformers Maintenance/Replacement	G.O. 165	14
7.	UG lines	Rule 20A	16

New WMP Initiatives (WMP Memo Account)

	WMP Initiative	Table Reference
1.	Expulsion Fuse Replacement	7
2.	Other Covered Conductor projects (non-GRC)	3
3.	Grid Topology Improvements – Sagehen & Medical Baseline Batteries	8
4.	Install System Automation Equip	9
5.	Pole Loading Assessment Program	13

Describe utility approach to the following categories of maintenance of transmission lines, distribution lines, and equipment, respectively:

1. Liberty CalPeco's maintenance programs and protocols are driven by its inspection programs, which meet requirements as outlined in General Orders 165 and 174. Liberty CalPeco performs detailed inspections on approximately 20% of the system and visually patrols the system on an annual basis utilizing the operations department staff. All substations have detailed inspections completed on an annual basis.
   In addition, when planning new projects, all existing equipment impacted within the project scope is evaluated for upgrade or replacement during the design process. The Planning and Engineering departments manage a handful of programs that target areas of the system for improvements or upgrades.

2. Non-routine maintenance:
   a. Liberty CalPeco tracks this type of work through paper forms. Outage reporting, maintenance, and repair activities that are performed during emergency work are turned into Planning and Engineering for evaluation and updating of asset records.
   b. Items identified needing repair or maintenance through inspections are turned into the Planning and Engineering departments for further evaluation. Other field activities or customer reports that identify issues are also tracked and addressed by the Planning and Engineering departments.

Discuss proactive replacement programs versus run-to-failure models for each group, including:

1. The general maintenance approach is that all distribution and transmission equipment fall under a run-to-failure model. However, Liberty CalPeco does have some proactive programs to replace aging facilities, submersible transformers, areas of bad underground and known hazards such as copper wire on secondary or live front transformers.

2. These programs are driven by utilizing metrics from SAIDI/SAIFI circuit reports or address environmental and/or safety concerns, as is the case for submersible and live front transformers.
3. These programs are based on information obtained through inspections, outage data or operational knowledge of the system. In addition to these programs, Liberty CalPeco is performing a complete system inventory under the Enhanced Detailed Visual Inspection initiative. This should help determine new opportunities for potential proactive maintenance programs by identifying areas with aging hardware, out dated or missing equipment, conventional fuses, lightning arrestors, etc.
4. Liberty CalPeco utilizes inspection data, engineering evaluations, manufacturer guidelines, and collaboration between departments to determine the need and prioritization of these programs.

5.3.3.1 Capacitor Maintenance and Replacement Program

Liberty CalPeco has no defined capacitor maintenance program. Maintenance is performed on an as-needed basis per inspections or as turned in by field personnel. Capacitor banks have historically been exempt equipment per CalFire, so maintenance on them has been a low priority to date. Liberty CalPeco plans to reassess its capacitor maintenance program and determine risk/cost benefit in the coming years.

Program Timeline:

- **Before the upcoming wildfire season and before the next annual update –** Continue maintenance as needed pursuant to G.O. 165 inspections and as turned in by field personnel. No identified program changes.
- **Within the next 3** years – Evaluate current inspection program and inventory of capacitors and evaluate risk benefit of capacitor maintenance program. Evaluate effectiveness of non-expulsion fusing with capacitor banks.
- **Within the next 10** years – If deemed beneficial, implement capacitor maintenance program. If deemed effective, replace all non-expulsion fusing and non-exempt hardware.

5.3.3.2 Circuit Breaker Maintenance and Installation

Liberty CalPeco has no defined breaker maintenance program aside from as needed pursuant to G.O.174 inspections. Liberty CalPeco intends to replace all oil circuit breakers with either gas or vacuum circuit breakers to reduce fire risk and improve reliability. Replacing oil circuit breakers with gas or vacuum greatly reduces the wildfire risk associated with this equipment. This, coupled with replacement of wood structures at substations, will alleviate any fire risk at the substation level. Liberty plans to have a breaker maintenance program in place by end of 2020. Ratepayers are unaffected by maintenance expenditures because it is an O&M expense.

Program Timeline:

- **Current Program** – Liberty CalPeco currently has no defined breaker maintenance program aside from as needed pursuant to G.O.174 inspections.

Liberty CalPeco intends to replace all oil circuit breakers with either gas or vacuum circuit breakers to reduce fire risk and improve reliability.

- **Before the upcoming wildfire season -** Continue maintenance as needed pursuant to G.O. 174 inspections and as turned in by field personnel. Proceed with breaker replacements.
- **Before the next annual update –** Continue maintenance as needed pursuant to G.O. 174 inspections and as turned in by field personnel. Proceed with breaker replacements.
- **Within the next 10 years** - Breaker maintenance program established and running. All OCBs replaced.

5.3.3.3 Covered Conductor Installation

Liberty CalPeco follows the covered conductor program as stated in the Wildfire Mitigation Plan, which is the reconductoring of bare electrical lines in various locations in Liberty CalPeco's Tier 2 and Tier 3 HFTD. Several factors drive the ability to begin reconductoring. These factors include: (1) receipt of the construction permit by regulatory authorizes, (2) availability of material, (3) resources to perform the work, and (4) line clearance (maintaining reliability). Liberty CalPeco began reconductoring in 2019 as the first two projects were prioritized based on the ability to receive the construction permit in the same year.

Liberty CalPeco intends to replace all overhead primary conductor with covered conductor, given that its service territory is in Tier 2 or 3 Wildfire Threat areas. Liberty CalPeco has not yet developed a methodology to accurately track the effectiveness of the covered conductor, but, generally, installing covered conductor greatly reduces the wildfire risk associated with primary overhead conductor. Covered conductor installations that occur outside of this program are a capital expenditure. Alternatives considered were rebuilds with open air conductor and undergrounding lines. Some underground sections are being designed per Rule 20. However additional underground projects may be evaluated in the future if they will greatly reduce risk in a particular area and are deemed cost-effective. Open air conductor was rejected due to limited risk mitigation.

Program Timeline:

- **Before the upcoming wildfire season -** Continue with covered conductor installation already in progress.
- **Before the next annual update –** Continue with covered conductor installation already in progress.
- **Within the next 3 years** – Continue to increase the amount of covered conductor installation.

- **Within the next 10 years -** Continue to increase the amount of covered conductor installation.

Initiative activity	Year	Total per-initiative spend	Line miles to be treated	Spend/ treated line mile	Ignition probability drivers targeted	Risk reduction	Risk-spend efficiency	Other risk drivers addressed	Existing/ new	Existing: What proceeding has reviewed program	If new: Memorandum account	In / exceeding compliance with regulations	Cite associated rule	Comments
Covered Conductor Installation	2019 plan	700,000	3	255,474	All types of object contact, conductor failure - all.	Unknown	Unknown	Unknown	Existing	WMP Approval	N/A	In compliance	N/A	Estimated $614,000 per mile, plus $15,000 per pole, estimated 50% of poles needing to be replaced.
	2019 actual	550,000	-	-	All types of object contact, conductor failure - all.	Unknown	Unknown	Unknown	Existing	WMP Approval	N/A	In compliance	N/A	20 poles installed, no conductor.
	2020	3,198,000	5	609,143	All types of object contact, conductor failure - all.	Unknown	Unknown	Unknown	Existing		N/A	In compliance	N/A	
	2021	8,337,000	11	775,535	All types of object contact, conductor failure - all.	Unknown	Unknown	Unknown	Existing		N/A	In compliance	N/A	
	2022	9,734,000	10	995,297	All types of object contact, conductor failure - all.	Unknown	Unknown	Unknown	Existing		N/A	In compliance	N/A	Includes the 60kV 640 transmission line.
	2020-2022 plan total	21,269,000												

5.3.3.4 Covered Conductor Maintenance

As covered conductor is installed, field personnel will review the condition of the covered conductor to evaluate the need for a maintenance program. At a minimum, conductor will be visually inspected during routine G.O. 165 inspections.

5.3.3.5 Crossarm Maintenance, Repair, Replacement

Liberty CalPeco has no defined crossarm maintenance program aside from as needed pursuant to G.O. 165 inspections. Liberty CalPeco performs maintenance on an as needed basis per inspections or as turned in by field personnel.

5.3.3.6 Distribution Pole Replacement and Reinforcement

Liberty CalPeco has a pole test and treatment program, pursuant to G.O. 165. This program inspects and treats all poles in a 10-year cycle. All poles are treated with a wood preservative and then inspected for structural integrity. If a pole needs to be reinforced, a steel stub is scheduled for installation at the bottom of the pole. If a pole cannot be steel-reinforced due to deterioration, then it is scheduled for replacement, pursuant to G.O. 165, to reduce fire risk and to improve reliability. Liberty CalPeco has not yet developed methodology to accurately track the effectiveness of pole testing and treating. Pole replacements that occur out of this program are capital expenditures that go through appropriate approval channels. No alternatives to this program are being considered.

Initiative activity	Year	Total per-initiative spend	Line miles to be treated	Spend/ treated line mile	Ignition probability drivers targeted	Risk reduction	Risk-spend efficiency	Other risk drivers addressed	Existing/ new	Existing: What proceeding has reviewed program	If new: Memorandum account	In / exceeding compliance with regulations	Cite associated rule	Comments
Distribution pole replacement and reinforcement, including with composite poles	2019 plan	45,000	12	3,750	All types of equipment / facility failure	Unknown	Unknown	Unknown	Existing	GO165	N/A	In compliance	GO165	See attached intrusive dist pole inspection schedule.
	2019 actual	300,000	12	25,000	All types of equipment / facility failure	Unknown	Unknown	Unknown	Existing	GO165	N/A	In compliance	GO165	
	2020	Unknown	Unknown	Unknown	All types of equipment / facility failure	Unknown	Unknown	Unknown	Existing	GO165	N/A	In compliance	GO165	
	2021	Unknown	Unknown	Unknown	All types of equipment / facility failure	Unknown	Unknown	Unknown	Existing	GO165	N/A	In compliance	GO165	
	2022	Unknown	Unknown	Unknown	All types of equipment / facility failure	Unknown	Unknown	Unknown	Existing	GO165	N/A	In compliance	GO165	
	2020-2022 plan total													

Current intrusive pole testing program involves testing all poles on a 10-year cycle.
Poles are replaced on an as needed basis per inspections or as turned in by field personnel.

5.3.3.7 Expulsion Fuse Replacement

Liberty CalPeco has started its expulsion fuse replacement program with a plan of fully implementing by 2026. This includes changing all of its current expulsion fuses to non-expulsion fuse types or electronic devices. This will alleviate spark hazards associated with its current expulsion fuse types (a non-exempt hardware per CalFire). The first priority is to replace all transformer fusing. In the coming years, the larger tap/lateral fusing will be replaced with non-expulsion type or electronic fault interrupters in order to coordinate with the downstream transformer fusing and upstream line reclosers or substation breakers. Liberty CalPeco plans to track ignition events going forward with an expectation that ignitions due to expulsion fusing will be completely alleviated by 2026.

Program Timeline:

- **Current Program** – Liberty is currently focused on replacing expulsion fuses with non-expulsion "Fault Tamers' at all overhead transformer locations.
- **Before the upcoming wildfire season** – Continue with transformer fuse replacements. Pilot dropout recloser program initiated. Start addressing non-exempt hardware at each location where fuses are changed out
- **Before the next annual update** – Continue with transformer fuse replacements. Pilot dropout recloser program underway. Continue addressing non-exempt hardware at each location where fuses are changed out.

- **Within the next 3 years** – Expand the fuse replacement program to all lateral and any mainline fuses. Target all fuses within 6-year program (started in 2019).
- **Within the next 10 years** – All expulsion fuses replaced with non-expulsion fuses or electronic device (such as dropout reclosers).

Initiative activity	Year	Total per-initiative spend	Line miles to be treated	Spend/ treated line mile	Ignition probability drivers targeted	Risk reduction	Risk-spend efficiency	Other risk drivers addressed	Existing/ new	Existing: What proceeding has reviewed program	If new: Memorandum account	In / exceeding compliance with regulations	Cite associated rule	Comments
Expulsion fuse replacement	2019 plan	721,550	2,055	351	Fuse failure - conventional blown fuse	Unknown	Unknown	Unknown	New	N/A	WMP memorandum account	In compliance	N/A	
	2019 actual	170,000	2,055	83	Fuse failure - conventional blown fuse	Unknown	Unknown	Unknown	New	N/A	WMP memorandum account	In compliance	N/A	
	2020	1,544,000	2,055	751	Fuse failure - conventional blown fuse	Unknown	Unknown	Unknown	New	N/A	WMP memorandum account	In compliance	N/A	
	2021	1,544,000	2,055	751	Fuse failure - conventional blown fuse	Unknown	Unknown	Unknown	New	N/A	WMP memorandum account	In compliance	N/A	
	2022	1,544,000	2,055	751	Fuse failure - conventional blown fuse	Unknown	Unknown	Unknown	New	N/A	WMP memorandum account	In compliance	N/A	
	2020-2022 plan total	4,632,000												

5.3.3.8 Grid Topology Improvements to Mitigate/Improve PSPS Events

Liberty CalPeco's grid topology efforts primarily reside in its Rule 20 undergrounding program. The Sagehen microgrid project would also qualify as a grid topology improvement to reduce PSPS because the customer would have generation onsite. Rule 20 projects are ongoing. The Sagehen project is a 2020 effort but may be delayed because of permitting issues. The underground projects are included in other efforts in this section, so costs are not included here. Only costs for the Sagehen microgrid are shown in the below table.

Program Timeline:

- **Current Program** – Include Rule 20 underground programs and identify the Sagehen project as a pilot program to improve grid topology.
- **Before the upcoming wildfire season** – Get Sagehen project online as pilot microgrid.
- **Before the next annual update** – Evaluate Sagehen if complete or complete Sagehen if delayed by permitting.
- **Within the next 3-10 years** – Evaluate risk/cost benefit of microgrid projects and plan others if cost-effective.

Initiative activity	Year	Total per-initiative spend	Line miles to be treated	Spend/ treated line mile	Ignition probability drivers targeted	Risk reduction	Risk-spend efficiency	Other risk drivers addressed	Existing/ new	Existing: What proceeding has reviewed program	If new: Memorandum account	In / exceeding compliance with regulations	Cite associated rule	Comments
Grid topology improvements to mitigate or reduce PSPS events	2019 plan													Installation of Sagehen Microgrid
	2019 actual													
	2020	616,000	4	154,000	All types of object contact, All typse of equpment/facility failure.	Unknown	Unknown	Unknown	New	N/A	WMP memorandum account	In compliance	N/A	
	2021	-	-	-										
	2022	-	-	-										
	2020-2022 plan total	616,000												

5.3.3.9 Installation of System Automation Equipment

Liberty CalPeco plans to continue replacing older reclosers and line air switches with new recloser technology with a focus on moving toward a robust Distribution Automation Control (DAC) scheme. These are being strategically placed for better sectionalization of lines during switching and PSPS events, but also in an effort to bring DAC into play in the next three years. The goal of DAC is to have an automated switching control in place, working in parallel with the current SCADA system, to keep as many customers in service as possible during a system event. Liberty CalPeco will prioritize more populated areas in its territory and will also prioritize devices with notorious issues, replacing them with newer, more reliable equipment. The resulting benefits include improved reliability, smaller PSPS zones affecting fewer customers, faster remote switching ability via SCADA, and reduced outage times.

- **Current Program** – Liberty CalPeco is replacing many older recloser types for improved reliability and adding SCADA control. Many older air switches/motor operated switches are also being targeted for replacement.
- **Before the upcoming wildfire season** – Continue with recloser installs already in progress.
- **Before the next annual update** – Continue with recloser installs already in progress.
- **Within the next 3 years –** Install reclosers at a rate of four per year. Implement Distribution Automation Control system.
- **Within the next 10 years** – Continue replacements/new installs as deemed necessary. Operate fully implemented Distribution Automation Control system.

Initiative activity	Year	Total per-initiative spend	Line miles to be treated	Spend/ treated line mile	Ignition probability drivers targeted	Risk reduction	Risk-spend efficiency	Other risk drivers addressed	Existing/ new	Existing: What proceeding has reviewed program	If new: Memorandum account	In / exceeding compliance with regulations	Cite associated rule	Comments
Installation of system automation equipment	2019 plan	440,000	2,055	214	All types of object contact, All typse of equpment/facility failure.	Unknown	Unknown	Unknown	New	N/A	WMP memorandum account	In compliance	N/A	
	2019 actual	Unknown	-	-	All types of object contact, All typse of equpment/facility failure.	Unknown	Unknown	Unknown	New	N/A	WMP memorandum account	In compliance	N/A	
	2020	360,000	2,055	175	All types of object contact, All typse of equpment/facility failure.	Unknown	Unknown	Unknown	New	N/A	WMP memorandum account	In compliance	N/A	
	2021	540,000	2,055	263	All types of object contact, All typse of equpment/facility failure.	Unknown	Unknown	Unknown	New	N/A	WMP memorandum account	In compliance	N/A	
	2022	360,000	2,055	175	All types of object contact, All typse of equpment/facility failure.	Unknown	Unknown	Unknown	New	N/A	WMP memorandum account	In compliance	N/A	
	2020-2022 plan total	1,260,000												

5.3.3.10 Maintenance, Repair, Replacement of Connectors

Liberty CalPeco has no program to replace any pole hardware other than on an emergency or urgent repair basis. Liberty CalPeco plans to inventory its entire service territory with an emphasis on poles with non-exempt hardware (per CalFire), open wire secondary, cracked grey wire secondary, and copper primary conductor sections. Liberty CalPeco will then replace all of this hardwire/wire on a reasonable timeline. Benefits will include fewer ignitions (with a drive to zero).
Program Timeline:

- **Current Program** – Liberty CalPeco has no program in place for maintenance, repair, and replacement of connectors except as needed in urgent or emergency situations.
- **Before the upcoming wildfire season** – Complete system inventory and include in GIS.
- **Before the next annual update** – Complete system inventory and include in GIS. Repair critical issues discovered in inventory.
- **Within the next 3 years** – Identify areas of maintenance needed in HFTD Tier 3 and complete replacements of non-exempt hardware in Tier 3 fire threat areas.
- **Within the next 10 years** – Identify areas of maintenance needed in HFTD Tier 2 and 3 and complete replacements of non-exempt hardware in Tier 2 and 3 fire threat areas.

5.3.3.11 Mitigation of Impact on Customers and Other Residents Affected During PSPS Event

None.

5.3.3.12 Other Corrective Actions

None.

5.3.3.13 Pole Loading Infrastructure Hardening and Replacement Program

Liberty CalPeco does not have a Pole Loading Assessment program but does pole loading calculations on all poles that are being replaced or have an increase in loading from proposed new attachments, pursuant to G.O. 95. Pole loading calculations are completed on all poles as part of the covered conductor installation program in the WMP to remove the possibility of pole failures for improved system reliability.

Program Timeline:

- **Current Program** – As part of the efforts outlined in 5.3.3.3, Liberty CalPeco is performing pole loading calculations as well as pole health evaluation to determine the strength and weight-bearing ability to support covered wire.
- **Before the upcoming wildfire season** – Continue pole loading calculations as part of covered conductor program.
- **Before the next annual update** – Continue pole loading calculations as part of covered conductor program.
- **Within the next 3 years –** – Continue pole loading calculations as part of covered conductor program.
- **Within the next 10 years** – Continue pole loading calculations as part of covered conductor program.

Initiative activity	Year	Total per-initiative spend	Line miles to be treated	Spend/ treated line mile	Ignition probability drivers targeted	Risk reduction	Risk-spend efficiency	Other risk drivers addressed	Existing/ new	Existing: What proceeding has reviewed program	If new: Memorandum account	In / exceeding compliance with regulations	Cite associated rule	Comments
13. Pole loading infrastructure hardening and replacement program based on pole loading assesment program	2019 plan	930,000	3	339,416	All types of object contact, All typse of equpment/facility failure.	Unknown	Unknown	Unknown	Existing	GO165	N/A	In compliance	GO165	Following covered conductor plan.
	2019 actual	550,000	1	550,000	All types of object contact, All typse of equpment/facility failure.	Unknown	Unknown	Unknown	Existing	GO165	N/A	In compliance	GO165	
	2020	1,515,000	5	288,571	All types of object contact, All typse of equpment/facility failure.	Unknown	Unknown	Unknown	Existing	GO165	N/A	In compliance	GO165	
	2021	2,820,000	11	262,326	All types of object contact, All typse of equpment/facility failure.	Unknown	Unknown	Unknown	Existing	GO165	N/A	In compliance	GO165	
	2022	3,535,000	10	361,452	All types of object contact, All typse of equpment/facility failure.	Unknown	Unknown	Unknown	Existing	GO165	N/A	In compliance	GO165	
	2020-2022 plan total	9,350,000												

5.3.3.14 Transformers Maintenance and Replacement

Liberty CalPeco has no defined transformer maintenance and replacement program. Liberty CalPeco performs maintenance and replacement as needed basis per inspections (G.O.165) or as turned in by field personnel. If transformer maintenance requests increase during G.O. 95 inspections or as turned in by field personnel, then Liberty CalPeco may reevaluate the need for a separate program beyond the G.O.165 inspection program.

Program Timeline:

- **Current Program** – Liberty CalPeco has no defined transformer maintenance program. Currently maintenance is performed on an as needed basis per inspections or as turned in by field personnel.
- **Before the upcoming wildfire season** – Continue maintenance as needed per inspections and as turned in by field personnel.
- **Before the next annual update** – Continue maintenance as needed pursuant to G.O. 165 inspections and as turned in by field personnel.
- **Within the next 3 years** – Continue maintenance as needed pursuant to G.O. 165 inspections and as turned in by field personnel.

- **Within the next 10 years** – Continue maintenance as needed pursuant to G.O. 165 inspections and as turned in by field personnel.

5.3.3.16 Undergrounding of Electric Lines and/or Equipment

Liberty CalPeco currently has no defined program to underground electric lines and/or equipment aside from the Rule 20 program. If undergrounding electric lines and/or equipment outside of the Rule 20 program becomes necessary, then Liberty CalPeco may reevaluate the need for a separate program.

Program Timeline:

- **Current Program** – Work with counties and cities to prioritize areas that qualify to be undergrounded pursuant to Rule 20.
- **Before the upcoming wildfire season** – Continue to underground pursuant to Rule 20.
- **Before the next annual update** – Continue to underground pursuant to Rule 20.
- **Within the next 3-10 years -** Evaluate the ability to expand the Rule 20 program to include undergrounding for wildfire mitigation

Initiative activity	Year	Total per-initiative spend	Line miles to be treated	Spend/ treated line mile	Ignition probability drivers targeted	Risk reduction	Risk-spend efficiency	Other risk drivers addressed	Existing/ new	Existing: What proceeding has reviewed program	If new: Memorandum account	In / exceeding compliance with regulations	Cite associated rule	Comments
Undergrounding electric lines and/or equipment	2019 plan	-	-	-										
	2019 actual	-	-	-										
	2020	1,757,500	4	481,507	Overhead Primary Conductor	Unknown	Unknown	Non-Exempt Hardware	Existing	Rule 20 Program	N/A	In compliance	Rule 20	
	2021	6,100,000	1	4,880,000	Overhead Primary Conductor	Unknown	Unknown	Non-Exempt Hardware	Existing	Rule 20 Program	N/A	In compliance	Rule 20	
	2022	-	-	-										
	2020-2022 plan total	7,857,500												

5.3.3.17 Updates to Grid Topology to Minimize Risk of Ignition in HFTDs

See discussion in 5.3.3.8.

5.3.3.18 Other Corrective Actions

Tree Attachment Removal

Current Program: Out of convenience, prior utilities attached secondary and service conductors to trees, so as to avoid new pole installations. Liberty CalPeco's Tree Attachment Removal program will install poles to remove these tree attachments and attach to utility owned poles.[5] Currently, poles are installed on an as needed basis per customer request to remove a service from a dead tree, scheduled by the customer for removal, or as turned in by field personnel that have identified a tree as dead or dying and a pole installation request is made to Engineering.

[5] Advice Letter No. 133-E, Report on Possible Wildfire Mitigation Plan Off Ramps, including Tree Attachment Removal as a necessary modification to Liberty CalPeco's 2019 Wildfire Mitigation Plan.

Initiative activity	Year	Total per-initiative spend	Line miles to be treated	Spend/ treated line mile	Ignition probability drivers targeted	Risk reduction	Risk-spend efficiency	Other risk drivers addressed	Existing/ new	Existing: What proceeding has reviewed program	If new: Memorandum account	In / exceeding compliance with regulations	Cite associated rule	Comments
Other Corrective Action - Tree Attachment Removal	2019 plan	200,000	2,055	97	All types of contact, all types of equipment failure	Unknown	Unknown	Unknown						
	2019 actual	244,148	2,055	-	All types of contact, all types of equipment failure	Unknown	Unknown	Unknown						
	2020	600,000	2,055	292	All types of contact, all types of equipment failure	Unknown	Unknown	Unknown	New	N/A	WMP Memo Account	In compliance	GO165	Following covered conductor plan.
	2021	600,000	2,055	292	All types of contact, all types of equipment failure	Unknown	Unknown	Unknown	New	N/A	WMP Memo Account	In compliance	GO165	
	2022	600,000	2,055	292	All types of contact, all types of equipment failure	Unknown	Unknown	Unknown	New	N/A	WMP Memo Account	In compliance	GO165	
	2020-2022 plan total	2,244,148												

Wire Upgrade Program

Open Wire Secondary Replacement:

In the past there was a construction standard that allowed for the installation of open wire secondary. Open wire secondary uses three or four bare conductors spread out on a cross arm to extend secondary voltage from pole to pole. The current construction standard requires the installation of a triplex or quadraplex conductor, which is three or four insulated conductors wrapped together. The open wire secondary replacement program was created to replace all open wire secondary with covered triplex or quadraplex conductor throughout the service territory to reduce potential vegetation contacts as part of the WMP.

Grey Wire Replacement:

In the past, there was a quadraplex and triplex secondary and service conductor that used a grey insulation for protection on it. Liberty CalPeco field personnel have discovered that this grey insulation, overtime, in some cases, has begun to develop small cracks and fractures that have led to the insulation actually falling off, leaving gaps and exposing the conductor to the elements, without any protection. With the insulation falling off, in small sections, the triplex or quadraplex bare conductor creates, not only a safety issue, but also a potential to cause wildfires due to the energized conductor shorting and falling to the

ground. The Grey Wire replacement program was created to replace all grey wire secondary and service conductor throughout the service territory to reduce the risk of a wildfire as part of the WMP.

Initiative activity	Year	Total per-initiative spend	Line miles to be treated	Spend/ treated line mile	Ignition probability drivers targeted	Risk reduction	Risk-spend efficiency	Other risk drivers addressed	Existing/ new	Existing: What proceeding has reviewed program	If new: Memorandum account	In / exceeding compliance with regulations	Cite associated rule	Comments
Other Corrective Action - Wire Upgrade Program	2019 plan													
	2019 actual													
	2020	150,000	2,055	73	All types of contact, all types of equipment failure	Unknown	Unknown	Unknown	New	N/A	WMP Memo Account	In compliance	GO165	Following covered conductor plan.
	2021	250,000	2,055	122	All types of contact, all types of equipment failure	Unknown	Unknown	Unknown	New	N/A	WMP Memo Account	In compliance	GO165	Following covered conductor plan.
	2022	350,000	2,055	170	All types of contact, all types of equipment failure	Unknown	Unknown	Unknown	New	N/A	WMP Memo Account	In compliance	GO165	Following covered conductor plan.
	2020-2022 plan total	750,000												

5.3.4 Asset Management and Inspections

Liberty CalPeco's maintenance programs and protocols are almost entirely driven by its inspection of distribution and transmission lines, which meet schedule requirements as outlined in G.O. 165 and G.O. 174. In addition, when planning new projects, Liberty CalPeco evaluates all existing equipment impacted within the project scope for upgrade or replacement during the design process. The repair and/or replacement of equipment is initiated by field personnel through detailed inspections, visual patrols, or other work activities, and is then evaluated by either the planning or engineering department, depending on equipment type. All repair timelines are in accordance with G.O. 95 and 128 standards.

All distribution and transmission equipment fall under a run-to-failure approach with one exception being substations and the equipment therein. Substation breakers are maintained and tested by the Substation Department.

Liberty CalPeco currently does not have an "enhanced inspection" program. However, with the implementation of iRestore, the company will be able to plan and prioritize inspections and maintenance efforts using risk-based decision-making.

5.3.4.1&2 Detailed Inspections of Distribution and Transmission Lines and Equipment

Liberty CalPeco's inspection program meets the minimum requirements as outlined in G.O. 165. The detailed inspections are carried out by Liberty CalPeco personnel and involve careful examination of assets. When issues are found, they are then evaluated by the planning and engineering departments for a final decision or work plan for repair or replacement.

Before the upcoming wildfire season:

Program Timeline:

- **Current Program** – Continue with G.O. 165 inspections.
- **Before the next annual update –** Convert the G.O. 165 inspection program from a paper format to electronic. Perform system-wide inventory of system and G.O. 165 inspections of all overhead distribution assets.
- **Within the next 3-10 years** - Evaluate how new technologies such as LiDAR and drones can be incorporated to improve the efficiency and accuracy of distribution line inspection. Continue to evaluate new technologies that will improve how inspection data is collected and move to a more predictive maintenance program rather than reactive.

Initiative activity	Year	Total per-initiative spend	Line miles to be treated	Spend/ treated line mile	Ignition probability drivers targeted	Risk reduction	Risk-spend efficiency	Other risk drivers addressed	Existing/ new	Existing: What proceeding has reviewed program	If new: Memorandum account	In / exceeding compliance with regulations	Cite associated rule	Comments
Asset Survey/GIS Update	2019 plan													
	2019 actual													
	2020	6,000,000	2,055	2,920	All types of contact, all types of equipment failure	Unknown	Unknown	Unknown	New	N/A	WMP memorandum account	In compliance	GO165	Conduct System-wide survey of all assets
	2021	-	-	-										
	2022	-	-	-										
	2020-2022 plan total	6,000,000												

5.3.4.3 Improvements of Inspections

Liberty CalPeco's inspection program is done manually with paper maps and paper forms. However, Liberty CalPeco will modernize its inspection programs with the iRestore mobile asset inspection application. This new mobile solution, to be deployed on phones and tablets, will streamline inspections and data collection for all assets. It should also improve the tracking of repairs generated when facilities are identified to need them. A database will house all inspection information, which improve tracking and reporting of the inspection and subsequent repair cycles.

Program Timeline:

- **Before the upcoming wildfire season** - Begin development of new inspection application to be deployed on mobile devices.
- **Before the next annual update -** Complete testing of new inspection application, fully deploy app to operations work force.
- **Within the next 3 years -** Invest in mobile technology to support inspections such as more accurate GPS, up to date devices and software, etc. Also look to new technologies to improve inspections such as drones and LiDAR. Design programs for tracking emergency maintenance activities.
- **Within the next 10 years** - Continue to invest in technology that will support all manner of inspections. Evaluate overall staffing levels to ensure inspections do not fall out of compliance.

Initiative activity	Year	Total per-initiative spend	Line miles to be treated	Spend/ treated line mile	Ignition probability drivers targeted	Risk reduction	Risk-spend efficiency	Other risk drivers addressed	Existing/ new	Existing: What proceeding has reviewed program	If new: Memorandum account	In / exceeding compliance with regulations	Cite associated rule	Comments
Improvement of inspections	2019 plan													
	2019 actual													
	2020	890	2,055	0.4	Unknown	Unknown	Unknown	Unknown	New	N/A	WMP memorandum account	In compliance	GO165	Roll out of iRestore application, hire 3 inspectors to comply with GO 165 requirements, 2 inspector trucks, 1 wildfire coordinator vehicle
	2021	360	2,055	0.2	Unknown	Unknown	Unknown	Unknown	New	N/A	WMP memorandum account	In compliance	GO165	Add 1 additional inspector truck
	2022	260	2,055	0.1	Unknown	Unknown	Unknown	Unknown	New	N/A	WMP memorandum account	In compliance	GO165	
	2020-2022 plan total	1,510												

5.3.4.4&5 Infrared Inspections of Distribution Lines

Liberty CalPeco has not yet decided whether to incorporate infrared inspections of distribution lines. Liberty CalPeco will evaluate adding infrared inspections of distribution lines. If deemed beneficial, increase inspection program scheduling and/or inspection procedures

5.3.4.6 Intrusive Pole Inspections

Liberty CalPeco's intrusive pole inspection program is on a 10-year inspection cycle and performed by contractors. Wood poles that have previously passed intrusive inspections are also on the 10-year inspection cycle, which exceed the G.O. 165 requirement of 20 years. At a minimum, all poles are visually inspected and, when intrusive inspections are needed, they are excavated around the base of the pole and may include a sound-and-bore test. Poles are also treated with preservative paste or liquid at this time. Weakened poles are either reinforced or replaced based on shell thickness measurements.

Program Timeline:

- **Before the upcoming wildfire season** - No changes to existing program.
- **Before the next annual update -** Liberty CalPeco will evaluate the benefit of performing intrusive inspections internally versus using contractors.
- **Within the next 3-10 years -** Liberty CalPeco will adapt its plan to new technology and/or new regulations.
-

Initiative activity	Year	Total per-initiative spend	Line miles to be treated	Spend/ treated line mile	Ignition probability drivers targeted	Risk reduction	Risk-spend efficiency	Other risk drivers addressed	Existing/ new	Existing: What proceeding has reviewed program	If new: Memorandum account	In / exceeding compliance with regulations	Cite associated rule	Comments
Intrusive pole inspections	2019 plan													
	2019 actual	13,044	12	1,087	Unknown	Unknown	Unknown	Unknown	Existing	GO165	N/A	In compliance	GO165	Line miles to treated based on invoices from this program.
	2020	118,554	68	1,743	Unknown	Unknown	Unknown	Unknown	Existing	GO165	N/A	In compliance	GO165	Forecast based on number of poles planned to be treated
	2021	145,308	104	1,397	Unknown	Unknown	Unknown	Unknown	Existing	GO165	N/A	In compliance	GO165	
	2022	80,887	98	825	Unknown	Unknown	Unknown	Unknown	Existing	GO165	N/A	In compliance	GO165	
	2020-2022 plan total	357,793												

5.3.4.7&8 LiDAR Inspections of Distribution and Transmission Lines

Liberty CalPeco does not utilize LiDAR for distribution line inspections at this time.

Program Timeline:

- **Before the upcoming wildfire season** - Develop criteria for LiDAR pilot project to evaluate how Liberty CalPeco will develop use cases for LiDAR inspections.
- **Before the next annual update -** Execute the LiDAR pilot and evaluate data collected.
- **Within the next 3 years -** If the LiDAR pilot project is proven to aid wildfire mitigation efforts, incorporate LiDAR into inspection programs.
- **Within the next 10 years** - Liberty CalPeco will evaluate developing an in-house program versus using contractors to perform LiDAR inspections.

Initiative activity	Year	Total per-initiative spend	Line miles to be treated	Spend/ treated line mile	Ignition probability drivers targeted	Risk reduction	Risk-spend efficiency	Other risk drivers addressed	Existing/ new	Existing: What proceeding has reviewed program	If new: Memorandum account	In / exceeding compliance with regulations	Cite associated rule	Comments
LiDAR inspections of distribution and transmission electric lines and equipment	2019 plan													Distribution and transmission LiDAR projects would be one project, not separate.
	2019 actual													
	2020	250,000	2,055	122	Unknown	Unknown	Unknown	Unknown	New	N/A	WMP memorandum account	In compliance	GO165	
	2021	300,000	2,055	146	Unknown	Unknown	Unknown	Unknown	New	N/A	WMP memorandum account	In compliance	GO165	
	2022	300,000	2,055	146	Unknown	Unknown	Unknown	Unknown	New	N/A	WMP memorandum account	In compliance	GO165	
	2020-2022 plan total	850,000												

5.3.4.9&10 Other Inspections on Distribution Lines

Current Program: Liberty CalPeco does not have any other discretionary inspection programs for distribution electric lines at this time. After any outage, planned or otherwise, the impacted lines are patrolled and visually inspected. Any issues found will be corrected or reported as appropriate

Program Timeline:

- **Before the upcoming wildfire season** - No changes

- **Before the next annual update -** Liberty CalPeco will have programs and enterprise business systems in place to track these type of non-routine inspections.
- **Within the next 3-10 years -** Liberty CalPeco will evaluate new inspection initiatives that might support or enhance existing inspection programs.

5.3.4.11&12 Patrol Inspections of Distribution Lines

Liberty CalPeco performs annual patrols of all distribution lines in Tier 2 areas and every 6 months for those lines in Tier 3 by vehicle or helicopter as terrain allows.

Program Timeline:

- **Before the upcoming wildfire season** - No changes.
- **Before the next annual update -** No changes.
- **Within the next 3 years -** Evaluate the use of drone technology to enhance efficiency of patrol inspections.
- **Within the next 10 years** - Continue to evaluate technology that will assist with inspections.

5.3.4.13 Pole Loading Assessment Program

Current Program: As part of the efforts outlined in 5.3.3.3 (Covered Conductor), Liberty CalPeco is performing pole loading calculations as well as pole health evaluation to determine the strength and weight baring ability to support covered wire.

Initiative activity	Year	Total per-initiative spend	Line miles to be treated	Spend/ treated line mile	Ignition probability drivers targeted	Risk reduction	Risk-spend efficiency	Other risk drivers addressed	Existing/ new	Existing: What proceeding has reviewed program	If new: Memorandum account	In / exceeding compliance with regulations	Cite associated rule	Comments
Pole loading assessment program to determine safety factor	2019 plan	930,000	3	339,416	Primary Overhead Conductor	Unknown	Unknown	Non-Exempt Hardware	Existing	GO165	N/A	In compliance	GO165	Following covered conductor plan.
	2019 actual	-	-	-	Primary Overhead Conductor	Unknown	Unknown	Non-Exempt Hardware	Existing	GO165	N/A	In compliance	GO165	Following covered conductor plan.
	2020	2,025,000	6	353,403	Primary Overhead Conductor	Unknown	Unknown	Non-Exempt Hardware	Existing	GO165	N/A	In compliance	GO165	Following covered conductor plan.
	2021	3,030,000	10	295,034	Primary Overhead Conductor	Unknown	Unknown	Non-Exempt Hardware	Existing	GO165	N/A	In compliance	GO165	Following covered conductor plan.
	2022	3,535,000	10	354,564	Primary Overhead Conductor	Unknown	Unknown	Non-Exempt Hardware	Existing	GO165	N/A	In compliance	GO165	Following covered conductor plan.
	2020-2022 plan total	9,520,000												

Plan going forward is to continue pole loading calculations as part of covered conductor program.

5.3.4.14 QA/QC inspections

Current Program: Liberty CalPeco personnel audit some inspection records but there is no established program for tracking and recording them. [Reference Veg Man QA/QC section]

Program Timeline:

- **Before the upcoming wildfire season** - Liberty CalPeco will establish a program for QA/QC of equipment inspections, contingent on ability to hire resource in time
- **Before the next annual update -** Liberty CalPeco will implement a QA/QC for all types of line and substation inspections
- **Within the next 3 years -** Liberty CalPeco will have new enterprise business systems in place that will enable more robust tracking mechanisms such as integrated workforce management systems with built in quality checks

- **Within the next 10 years** - Liberty CalPeco will evaluate having independent or third-party audits of inspections to further validate inspection data and records

5.3.4.15 Substation Inspections

Liberty CalPeco currently performs substation inspections per its G.O. 174 plan. Substation inspections maintain public and worker safety, and regulatory compliance by staying in conformance with G.O. 174. It also identifies equipment needing maintenance and/or testing in accordance with prudent utility practice. Liberty CalPeco also maintains and tests relays in accordance with our protocols and in order to maintain compliance with NERC requirements. These are all maintenance activities which fall under O&M, thus do not affect rates.

Program Timeline:

- **Before the upcoming wildfire season** - Continue substation inspections in accordance with its GO174 plan
- **Before the next annual update -** Continue substation inspections in accordance with its GO174 plan
- **Within the next 3 years -** Evaluate current inspection program and inventory of substation equipment and evaluate risk/cost benefit of increased inspection program
- **Within the next 10 years** - If deemed beneficial, increase inspection program scheduling and/or inspection procedures

5.3.5 Vegetation Management and Inspections

1. **Address how the electrical corporation has collaborated with local land managers to leverage opportunities for fuel treatment activities and fire break creation, and compliance with other local, state, and federal forestry and timber regulations.**
   Liberty CalPeco is actively engaged with local land managers to explore opportunities for fuel treatment activities and fire break creation that will assist with mutual long-term management goals and will comply with state and federal forestry regulations. In 2019, Liberty CalPeco, along with its partners the California State Parks, the Lake Tahoe Basin Management Unit (LTBMU), the Tahoe National Forest, the California Tahoe Conservancy and the Tahoe Fire and Fuels Team applied for a California Climate Investment (CCI) grant to conduct comprehensive multi-jurisdictional forest resilience and fuel reduction treatments surrounding critical community infrastructure on the California side of the Lake Tahoe Basin (Basin). Ultimately, the grant was not funded, however, this Resilience Corridor Project represents a collaborative effort between federal, state and local agencies to conduct comprehensive multi-jurisdictional forest resiliency and fuels reduction treatments that aim to 1) create resilience corridors, 2) aid in resource surveys in support of future efforts, and 3) assist in conducting forest management research along with investigating innovative technology opportunities. In October, the project was approved and granted a categorical exclusion from documentation in an Environmental Assessment or Environmental Impact Statement as it meets the criteria outlined in the Water Infrastructure Improvement for the Nation Act of 2016,

streamlining vegetation management efforts in these areas. Liberty CalPeco plans to implement the first Forest Resilience Corridor project in 2020.

Also in 2020, Liberty CalPeco will host working groups with SME's, local and state agencies to understand the greatest needs in improving fuel reduction practices. Any further efforts developed in the working groups that reduce fire risk will be developed into a scope of work for the coming year and will become a part of a more comprehensive fuel reduction effort within the Vegetation Management Plan.

2. **Discuss how the electrical corporation identifies and determines which vegetation is at risk of ignition from utility electric lines and equipment.**

   Liberty CalPeco identifies and determines which vegetation is at risk of ignition through the implementation of inspection and maintenance programs to ensure compliance with all applicable laws and regulations pertaining to vegetation and electrical conductors.

   Liberty CalPeco performs Routine Vegetation Maintenance inspections of entire circuits to prescribe trimming and removal of vegetation as a safeguard against grow-ins or fall-ins and to conform to required laws and regulations. Liberty Utilities intends to perform such maintenance inspections and subsequent tree work once every three years per circuit. In prescribing trimming or removal the following factors are considered: 1.) The potential for vegetation to grow and/or encroach within the minimum allowed distances to the facilities within the cycle. 2.) The potential for vegetation to structurally fail into the facilities within the cycle. Additional site conditions and factors are considered in prescribing tree work such as length of span, line sag, planned maintenance cycles, location of vegetation within the span, species type, species characteristics, vegetation growth rate, arboricultural practices, environmental characteristics of the site, local climate, and elevation.

   In addition to routine cycle maintenance which is structured around a three year maintenance cycle, it has been determined necessary to perform additional inspections to help ensure electrical safety and reliability. Due to the nature of the increasing tree mortality within the service territory, Liberty CalPeco has implemented a program to inspect for dead and dying trees throughout its entire system by performing an accelerated inspection of the circuits under the Catastrophic Event Memorandum Account (CEMA).

   Liberty CalPeco proposes to implement four additional program initiatives in its 2020 WMP that will enhance its wildfire mitigation efforts:

Tier 3 Inspections:

Liberty CalPeco currently operates approximately 50 miles of overhead conductor in Tier 3 in the High Fire-Threat District. Liberty CalPeco plans to inspect its overhead system within Tier 3 of the High Fire-Threat District on an annual basis to prescribe any pruning or removals necessary to obtain compliance with regulation requirements.

Fuel Reduction/Wood Management Program:

In addition to planned Forest Resilience Corridor efforts, Liberty CalPeco recognizes the need for additional fuel reduction and wood management throughout the service territory. Vegetation left behind from clearing activities (i.e. logs, bole wood, and large branches), if left untreated, becomes an increasingly dry fuel source adjacent to power lines and an infestation risk to remaining trees by forest insects. Recently cut material, especially logs and large branches, provide ideal conditions for tree-damaging insects to breed and increase their populations. When the adult insects emerge from this material, they attack live trees in greater numbers. This can increase the number of dead trees, branches, and tops, amplifying the need for clearing activities and increasing long-term maintenance costs.

Cutting down hazardous trees and clearing limbs away from power lines ensures compliance and reduces ignition risk by eliminating strike and grow-in potential, but it does not address the fuel load that results from these activities. In the event of a fire, dead, dry fuel left behind by vegetation management activities will contribute to the intensity and rate of spread of the fire. There is also a risk of the fuel becoming ignited by power lines during wire-down, blown fuse, and other equipment failure events. Added benefits of reducing fuel load near powerlines is the protection of the powerlines from wildfire and increased effectiveness of suppression activities, regardless of the ignitions cause.

Liberty CalPeco's local and state agency partners (CAL Fire, Tahoe Regional Planning Agency, California Tahoe Conservancy, Tahoe Fire and Fuels Team, US Forest Service, and local fire agencies) have been highly supportive partners and have increased their emphasis on the need to reduce forest fuel load that results from power line vegetation management. Liberty CalPeco intends to work closely with these partners to develop best practices for an effective fuels management program that reduces both fire ignition risk and fire spread potential, while benefitting our local community and the environment.

Forest Resilience Corridor: See section 5.3.5.1 for details regarding this program.

QA/QC Program: Liberty CalPeco currently audits all vegetation inspection work as part of the review and permitting process for trees located on local, federal, and state agency land. Work quality is assessed for accuracy of the work order and for correct identification of tree work. Work corrections are made in the field and reviewed with the contractor. While Liberty CalPeco's existing process is able to identify issues and implement corrective action, it currently lacks the internal resources to implement an industry best practice QA/QC program. Liberty CalPeco has recognized the need and will develop a formal QA/QC audit program for vegetation management activities that use a third party contractor to ensure quality of work.

3. **Describe how (i.e., criteria, data, protocols, studies, etc.) the utility made the determination to trim any vegetation beyond required clearances in GO 95**
   Liberty CalPeco has adopted and incorporated General Order 95, Appendix E recommended clearances at time of trimming in its vegetation management plan. Minimum clearance, at time of trim, is 12 feet for distribution lines (up to 60kV) and

is 30 feet for 120kV lines. Liberty CalPeco does not have power lines operating in the 72kV-110kV category. Liberty CalPeco considers more than just line operating voltage when determining appropriate clearance and will obtain greater clearances as needed to ensure compliance until the next scheduled maintenance. The consideration to obtain greater clearances will be based on multiple factors, including: length of span, line sag, planned maintenance cycles, location of vegetation within the span, species type, species characteristics, vegetation growth rate, arboricultural practices, local climate, and elevation.

4. **Describe utility plan to mitigate identified trees with strike potential, including information about how (i.e., criteria, protocols, data, statutes, etc.) the electrical corporation identifies and defines "hazard trees" and "trees with strike potential" based on height and feasible path to strike powerlines or equipment. Describe utility plan to identify reliability/at-risk tree species to trim or remove, where feasible, per location-specific criteria.**

   Liberty CalPeco complies with GO 95 Rule 35, by removing trees when "dead, rotten or diseased trees or dead, rotten or diseased portions of otherwise healthy trees overhang or lean toward and may fall into a span of supply or communication lines." Additionally, Liberty CalPeco complies with Public Resources Code 4293 by removing "Dead tree, old decadent or rotten trees, trees weakened by decay or disease and trees or portions thereof that are leaning toward the line which may contact the line from the side or may fall on the line." Hazard trees are identified through vegetation inspection programs and are evaluated best practices derived from the *CalFire Power Line Fire Prevention Field Guide*, The *USFS Region 5 Hazard Tree Guidelines For Forest Service Facilities and Roads in the Pacific Southwest Region*, and *ANSI A300 Standards (Part 9) – Tree Risk Assessment.*

   "Trees with strike potential" are trees or parts of trees that have the potential to contact the electrical facilities if they were to fail. Assessing strike potential begins with determining if the tree is tall enough to reach the electrical facilities. Tree height is measured using forestry devices such as a line tape and clinometer, or laser rangefinder/hypsometer. If a tree, or part of a tree, is tall enough to reach an electrical facility, it must also have a path to the target. Direction of fall (slope, lean, etc.) and protection (trees or other objects blocking the path) are also considered when determining the strike potential of a tree.

   Liberty CalPeco's inspection process accounts for species growth and failure characteristics when determining if trees require remediation. Understanding species characteristics combined with local environmental conditions leads to the determination of whether a tree should be trimmed, removed, or left alone. Liberty CalPeco categorizes the growth potential of trees as slow, medium, and fast growing trees and are trimmed accordingly based on their growth potential. Trees with slow to medium growth potential are trimmed a minimum of 12 feet from the power line, while trees with fast growth potential are trimmed 15 feet or greater. In addition to growth rate and grow-in potential, species failure potential is also considered when identifying at-risk species. All trees are susceptible to structural defects, disease, and environmental conditions, and one of the factors for determining failure potential is

based on how individual species react to those conditions. A structural defect, like a forked top, may be considered moderate to high risk of failure in some species, while the same defect may be considered low risk in others. Liberty CalPeco is in the process of developing a tree failure database that will use tree related outage data to explore other opportunities for targeting reliability/at-risk species and how to treat them.

5. **Include a discussion of how the utility's overall vegetation management initiatives address risks that may arise from trimming or removing trees, including but not limited to erosion, wind, flooding, etc.**

   Vegetation management activities are necessary to protect the environment by ensuring that fires are not ignited by vegetation coming into contact with electrical equipment. Liberty CalPeco is committed to carrying out vegetation management in an environmentally responsible manner, while supporting the principles of ecologically sustainable development. Liberty CalPeco's vegetation management plan includes resource protection measures that are designed to comply with regulations adopted by State, Federal, and Local Government agencies. Implementing best practices for water quality, terrestrial wildlife, sensitive and rare plants, non-native invasive plant management, and hazardous spill control help to address environmental concerns that may arise from vegetation management activities.

5.3.5.1 Additional Efforts to Manage Community and Environmental Impacts

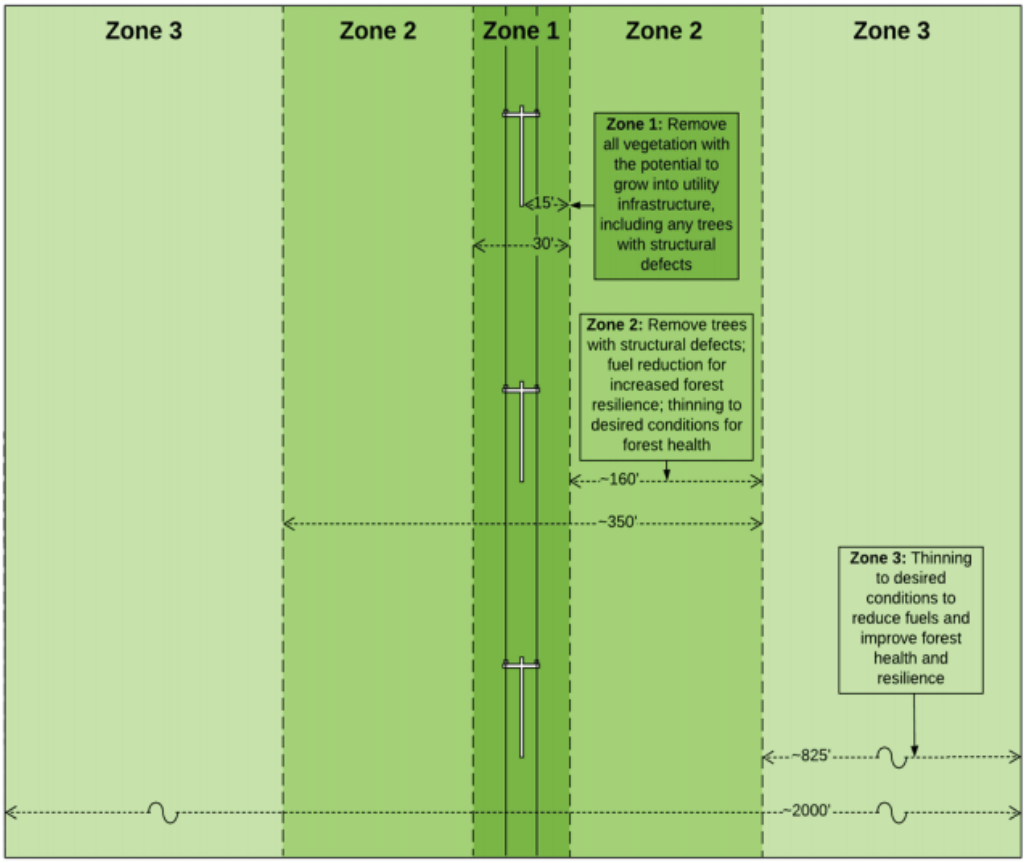
Liberty CalPeco is committed to carrying out vegetation management work in an environmentally responsible manner while supporting the principals of ecologically sustainable development. Liberty CalPeco strives to adhere to all regulations and policies as adopted by state, local, and federal agencies. Liberty CalPeco has not developed an initiative around additional efforts to manage community and environmental impacts.

The Forest Resilience Corridor Project is a comprehensive multi-jurisdictional effort in forest resiliency and fuels reduction surrounding critical community infrastructure. The proposed project area is on approximately (~) 7,600 acres of lands managed by the Lake Tahoe Basin Management Unit (LTBMU) and the Tahoe National Forest (Tahoe NF). The project comprises roughly 55 miles of Liberty Utilities (Liberty) power lines, with ~54 miles on the LTBMU and one mile on the Tahoe NF. Liberty CalPeco plans to implement the first Forest Resilience Corridor project in 2020. Further information about the Forest Resilience Corridor Project can be found at: https://www.fs.usda.gov/nfs/11558/www/nepa/111291_FSPLT3_4880627.pdf.

Vegetation Treatment Zones:
There are three treatments zones that the Resilience Corridor Project will enact around the power lines (Figure 2):

- Zone 1 (up to 15' each side of power line, ~200 acres): vegetation, including shrubs ≥ 18" high, with potential to grow into utility infrastructure will be removed, along with defect trees.

- Zone 2 (up to 175’ each side of power line, ~2,200 acres): trees with structural defects with the potential to strike utility infrastructure will be removed; fuels will be reduced to improve forest resilience to fire, insect, disease, and drought; and, thinning to desired conditions will improve forest health and resilience. The target average stand density is 60 BAF (basal area factor) with a range of 40-80 BAF. For trees less than 10” in diameter in the understory, a minimum of 10 tree per acre will be retained.
- Zone 3 (up to ~1000’ each side of power line, ~5,200 acres): reducing fuel loads and thinning the forest to desired conditions will improve forest health and resilience to disturbance. The target average stand density is 100 BAF, with a range of 80-120 BAF. For trees less than 10” in diameter in the understory, a minimum of 10 trees per acre will be retained. Liberty CalPeco will not perform work in zone 3.



Initiative activity	Year	Total per-initiative spend	Line miles to be treated	Spend/ treated line mile	Ignition probability drivers targeted	Risk reduction	Risk-spend efficiency	Other risk drivers addressed	Existing/ new	Existing: What proceeding has reviewed program	If new: Memorandum account	In / exceeding compliance with regulations	Cite associated rule	Comments
Additional efforts to manage community and environmental impacts	2019 plan	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	2019 actual	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	2020	$660,000	14	$47,143	Vegetation Contact	Unkown	Unkown	Unkown	Existing	WMP		Exceeding	N/A	
	2021	$660,000	Unkown	Unkown	Vegetation Contact	Unkown	Unkown	Unkown	Existing	WMP		Exceeding	N/A	
	2022	$660,000	Unkown	Unkown	Vegetation Contact	Unkown	Unkown	Unkown	Existing	WMP		Exceeding	N/A	
	2020-2022 plan total	$1,980,000	Unkown	Unkown	Vegetation Contact	Unkown	Unkown	Unkown	Existing	WMP		Exceeding	N/A	

- **Before the upcoming wildfire season** – Develop plan with USFS for implementation of first Forest Resilience Corridor project along Liberty CalPeco's 625 (60kV) power line.
- **Before the next annual update** – Complete 625 FRC project and describe effectiveness of the program in the next annual update.
- **Within the next 3 years** – Coordinate with stakeholders to implement plan and determine schedule for upcoming projects.

5.3.5.2&3 Detailed Inspections of Vegetation around Distribution Lines

Liberty CalPeco performs Routine Vegetation Maintenance through detailed inspections of entire circuits to prescribe trimming and removal of vegetation as a safeguard against grow-ins or fall-ins and to conform to required laws and regulations. Liberty CalPeco intends to perform such inspections and work once every three years per circuit. In prescribing trimming or removal, the following factors are considered: 1.) The potential for vegetation to grow and/or encroach within the minimum allowed distances to the facilities within the cycle. 2.) The potential for vegetation to structurally fail into the facilities within the cycle. Additional site conditions and factors are considered in prescribing tree work such as length of span, line sag, planned maintenance cycles, location of vegetation within the span, species type, species characteristics, vegetation growth rate, arboricultural practices, environmental characteristics of the site, local climate, and elevation.

Initiative activity	Year	Total per-initiative spend	Line miles to be treated	Spend/ treated line mile	Ignition probability drivers targeted	Risk reduction	Risk-spend efficiency	Other risk drivers addressed	Existing/ new	Existing: What proceeding has reviewed program	If new: Memorandum account	In / exceeding compliance with regulations	Cite associated rule	Comments
Detailed inspections of vegetation around distribution electric lines and equipment	2019 plan	500,000	200	2,500/mile	Vegetation Contact	Unkown	Unkown		Existing	2019 GRC		Exceeding	GO 95 Rule 35; PRC 4293	
	2019 actual	450,000	170	2,647/mile	Vegetation Contact	Unkown	Unkown		Existing	2019 GRC		Exceeding	GO 95 Rule 35; PRC 4294	
	2020	610,000	230	2,652/mile	Vegetation Contact	Unkown	Unkown		Existing	2019 GRC		Exceeding	GO 95 Rule 35; PRC 4295	
	2021	556,000	210	2,650/mile	Vegetation Contact	Unkown	Unkown		Existing	2019 GRC		Exceeding	GO 95 Rule 35; PRC 4296	
	2022	570,000	215	2,651/mile	Vegetation Contact	Unkown	Unkown		New	2022 GRC		Exceeding	GO 95 Rule 35; PRC 4297	
	2020-2022 plan total	1,736,000	655	2,650/mile	Vegetation Contact	Unkown	Unkown							

Detailed inspections and Routine Vegetation Maintenance is continuous and on-going.

5.3.5.4 Emergency Response Vegetation Management Due RFW

Liberty CalPeco currently responds to vegetation management emergencies as they are discovered by field reports from personnel, first responders, and reports from the general public. During red flag warnings or other urgent conditions, tree crews are available to respond to emergency situations as they arise. For the upcoming fire season and the years that follow, Liberty CalPeco will examine best practices established by other utilities to determine whether there is a need for enhanced emergency vegetation management response during red flag warnings.

Before the upcoming wildfire season – Liberty CalPeco's 2019 Fire Prevention Plan has established new operating guidelines and work restrictions depending on the forecasted fire danger using a proprietary Fire Potential Index (FPI). The FPI is currently in development, and will be ready for implementation for the upcoming wildfire season. By restricting work activities during extreme weather events and increasing patrols, there will be more field observations and potential for additional vegetation management work.
Before the next annual update – Liberty CalPeco will compare its current practices with the best practices established by other utilities and determine if there is a need to enhance the approach to emergency vegetation management during red flag warnings. If a need for greater response is identified, Liberty CalPeco will incorporate this approach in the 2021 WMP.
Before the next 3 to 10 Years – Implement emergency response plans that mitigate fire risk.

5.3.5.5 Fuel Management and Reduction of "slash" from Vegetation Management

Liberty CalPeco's current practice for slash and debris removal are based on historic industry practices. Only slash measuring less than 4" diameter is treated as follows:

- Residential Areas Accessible by Roads – Slash will be chipped. Chips may be hauled off site to a different location or may be broadcasted back onto the site.
- Rural or Forested Areas not Accessible by Roads – Slash will be lopped and scattered in a non-continuous manner outside of the utility right-of-way; or slash will be lopped and scattered as to ensure that the vertical height is not more than 18" above the ground.

Wood greater than 4" diameter is not removed from the work location unless required under certain government authorizations. Slash treatment is the responsibility of Liberty CalPeco's contractors and is included in the costs of performing tree work, and costs for slash treatment are not tracked separately. As described at the beginning of section 5.3.5, Liberty CalPeco has recognized the need to evaluate the current fuel management approach and develop a new methodology for fuels treatment that aligns more closely with joint goals of agency partners and the local community to ensure that vegetation management fuel load is treated in a manner that reduces both fire ignition risk and the potential for increased fire intensity.

Initiative activity	Year	Total per-initiative spend	Line miles to be treated	Spend/ treated line mile	Ignition probability drivers targeted	Risk reduction	Risk-spend efficiency	Other risk drivers addressed	Existing/ new	Existing: What proceeding has reviewed program	If new: Memorandum account	In / exceeding compliance with regulations	Cite associated rule	Comments
Fuel management and reduction of "slash" from vegetation management activities	2019 plan	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	2019 actual	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	2020	$2,000,000	Unkown	Unkown	Vegetation Contact	Unkown	Unkown	Unkown	New		2020 WMP	Exceeding		
	2021	$2,500,000	Unkown	Unkown	Vegetation Contact	Unkown	Unkown	Unkown	New		2021 WMP	Exceeding		
	2022	$2,500,000	Unkown	Unkown	Vegetation Contact	Unkown	Unkown	Unkown	New		2022 WMP	Exceeding		
	2020-2022 plan total	$7,500,000	Unkown	Unkown	Vegetation Contact	Unkown	Unkown	Unkown	New		2023 WMP	Exceeding		

Before the upcoming wildfire season – Liberty CalPeco plans to continue to work with the local and state agency land managers, as well as the local community to develop new standards for fuel reduction and slash treatment. Liberty CalPeco will host workshops with subject matter experts from these agencies to assist in the development of a fuel reduction and wood removal program that will reduce fire risk and benefit the local community and surrounding forest.

Before the next annual update – Liberty CalPeco intends to complete the program scope of work and justification and will begin to implement the new fuel reduction practices prior to the 2021 annual WMP update.

Within the next 3 years – Monitor program success and continue to work with stakeholders to update best practices. Continue to improve efficiency of the program.

5.3.5.6 Improvement of Inspections

Liberty CalPeco frequently reviews inspection protocols and procedures with its contractors and make adjustments accordingly. Every three years Liberty CalPeco has a third party assessment of the vegetation management program which analyzes vegetation management protocols, production, resource allocation, cycle length, workload, compliance, and other aspects of the program. The report validates aspects of the program and provides recommendations for improvements to align with industry best practice. By having work load, production, and cycle length examined, Liberty CalPeco can determine the need for improvements in its inspection protocols.

Before the upcoming wildfire season – Liberty CalPeco will work to select a qualified third party to perform the vegetation management system assessment which will be completed in the fall of 2020.
Before the next annual update – Liberty CalPeco will evaluate the results of the system assessment and detail any inspection improvements and will describe any improvements in the next annual update.
Between 3 and 10 years – Continue to evaluate inspection programs and examine results of the next system assessment.

5.3.5.7&8 LiDAR inspections of Vegetation Management around Distribution Lines

Liberty CalPeco has not used LiDAR to perform vegetation inspections along electric lines. As described in section 5.3.4.7, Liberty CalPeco is exploring use cases for LiDAR inspections and will develop pilot projects that help to determine if LiDAR is more efficient and cost effective than traditional inspection methods.

5.3.5.9&10 Other Vegetation Management on Distribution

Liberty CalPeco currently operates approximately 50 miles of overhead distribution and transmission in Tier 3 in the High Fire-Threat District. Liberty CalPeco plans to implement annual vegetation inspections for the overhead distribution system within Tier 3 of the High Fire-Threat District to prescribe any pruning or removals necessary to obtain compliance with regulation requirements.

Initiative activity	Year	Total per-initiative spend	Line miles to be treated	Spend/ treated line mile	Ignition probability drivers	Risk reduction	Risk-spend efficiency	Other risk drivers addressed	Existing/ new	Existing: What proceedin	If new: Memoran dum	In / exceeding complianc	Cite associated rule	Comments
Other Vegetation Management	2019 plan	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	2019 actual	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	2020	$400,000	50	$8,000	Vegetation Contact	Unkown	Unkown	Unkown	New		2020 WMP		GO 95 Rule 35; PRC 4293	
	2021	$400,000	50	$8,000	Vegetation Contact	Unkown	Unkown	Unkown	New		2021 WMP		GO 95 Rule 35; PRC 4293	
	2022	$400,000	50	$8,000	Vegetation Contact	Unkown	Unkown	Unkown	New		2022 WMP		GO 95 Rule 35; PRC 4293	
	2020-2022 plan total	$1,200,000	150	$8,000	Vegetation Contact	Unkown	Unkown	Unkown	New		2023 WMP		GO 95 Rule 35; PRC 4293	

Before the upcoming wildfire season – Liberty CalPeco will work to draft the Tier 3 Inspections to align with the already established inspection programs (Routine Maintenance & CEMA) to be able to begin inspections in 2020.

Before the next annual update – Liberty CalPeco will have completed the first cycle inspection of the Tier 3 Inspections and will have data to report on.

Within the next 3 years – Continue to implement enhanced inspections on an as needed basis and look for opportunities to implement additional enhanced inspections.

Within the next 10 years – Continue to implement enhanced inspections on an as needed basis and look for opportunities to implement additional enhanced inspections

5.3.5.11&12 Patrol Inspections of Vegetation around Distribution Lines

Liberty CalPeco's current Vegetation Management Plan is structured around a three-year maintenance cycle. Due to the nature of the increasing tree mortality within the service territory, Liberty CalPeco has identified the need to inspect for dead and dying trees throughout its entire system by performing an accelerated inspection of the circuits under the Catastrophic Event Memorandum Account (CEMA). Liberty CalPeco's electric distribution facilities are surveyed consisting of a Level 1 inspection, involving a basic visual ground inspection of trees or populations of trees to identify dead and dying trees. Additionally, contractor shall inspect for imminent hazards, GO 95 Rule 35 or PRC 4293 compliance infractions.

Initiative activity	Year	Total per-initiative spend	Line miles to be treated	Spend/ treated line mile	Ignition probability drivers targeted	Risk reduction	Risk-spend efficiency	Other risk drivers addressed	Existing/ new	What proceeding has account Existing:	Memorandum If new:	In / exceeding compliance with	Cite associated rule	Comments
Patrol inspections of vegetation around distribution electric lines and equipment	2019 plan													
	2019 actual	260,000	132	1,970/mile	Vegetation Contact	Unkown	Unkown		Existing					
	2020	300,000	150	2,000/mile	Vegetation Contact	Unkown	Unkown		Existing					
	2021	300,000	150	2,000/mile	Vegetation Contact	Unkown	Unkown		Existing					
	2022	300,000	150	2,000/mile	Vegetation Contact	Unkown	Unkown		Existing					
	2020-2022 plan total	900,000	450	2,000/mile	Vegetation Contact	Unkown	Unkown		Existing					

CEMA patrol inspections are continuous and on-going.

5.3.5.13 QA/QC of inspections

Liberty CalPeco currently audits all vegetation inspection work as part of the review and permitting process for trees located on local, federal, and state agency land. Work quality is assessed for accuracy of the work order and for correct identification of tree work. Work corrections are made in the field and reviewed with the contractor. While Liberty CalPeco's existing process is able to identify issues and implement corrective action, it currently lacks the internal resources to implement an industry best practice QA/QC program. Liberty CalPeco has recognized the need and will develop a formal QA/QC audit program for vegetation management activities that use a third party contractor to ensure quality of work.

Before the upcoming wildfire season: Begin to draft framework for QA/QC formal program Issue Requests for Proposals

Before the next annual update: Implement formal third party QA/QC program and report on progress for next annual update

Between 3 and 10 years: Evaluate findings and program results to determine if changes are needed for vegetation management program

Initiative activity	Year	Total per-initiative spend	Line miles to be treated	Spend/ treated line mile	Ignition probability drivers targeted	Risk reduction	Risk-spend efficiency	Other risk drivers addressed	Existing/ new	Existing: What program has reviewed proceeding	If new: Memorandum account	In / exceeding compliance with	Cite associated rule	Comments
Quality assurance / quality control of inspections	2019 plan	Unkown	Unkown	Unkown										
	2019 actual	Unkown	Unkown	Unkown	Vegetation Contact	Unkown	Unkown		Existing					Internal labor costs not currently tracked for audit/permitting tree work
	2020	250,000	Unkown	Unkown	Vegetation Contact	Unkown	Unkown		New		2020 WMP			
	2021	250,000	Unkown	Unkown	Vegetation Contact	Unkown	Unkown		New		2021 WMP			
	2022	250,000	Unkown	Unkown	Vegetation Contact	Unkown	Unkown		New		2022 WMP			
	2020-2022 plan total	750,000	Unkown	Unkown	Vegetation Contact	Unkown	Unkown		New		2023 WMP			

5.3.5.14 Recruiting and Training of Vegetation Management Personnel

Liberty CalPeco contracts with a third party company that specializes in utility arboriculture and provides utility arborists or pre-inspectors to conduct vegetation inspections along CalPeco powerlines. Under direction from the Vegetation Program Manager, it is the contract pre-inspection company's responsibility to recruit, train and provide qualified personnel to meet contractual requirements and to perform the scope of work agreed upon. Additionally, Liberty CalPeco contracts qualified line clearance tree crews to perform work prescribed by the pre-inspection company on the Liberty CalPeco system. It is the contract tree company's responsibility to recruit, train and provide qualified personnel to meet contractual requirements and to perform the scope of work agreed upon. Liberty CalPeco employs vegetation management staff under supervision to the Vegetation Program Management to assist in management of the contractors, workload and the program as a whole.

5.3.5.15 Remediation of at-risk species

Liberty CalPeco's inspection process accounts for species growth and failure characteristics when determining if trees require remediation. Understanding species characteristics combined with local environmental conditions leads to the determination of whether a tree should be trimmed, removed, or left alone. Liberty CalPeco categorizes the growth potential of trees as slow, medium, and fast growing trees and are trimmed accordingly for their growth potential. In addition to growth rate and grow-in potential, species failure potential is also considered when identifying at-risk species. All trees are susceptible to structural defects, disease, and environmental conditions, and one of the factors for determining failure potential is based on how individual species react to those conditions. A structural defect, like a forked top, may be considered moderate to high risk of failure in some species, while the same defect may be considered low risk in others. Liberty CalPeco is in the process of developing a tree failure database that will use tree related outage data to explore other opportunities for targeting reliability/at-risk species and how to treat them.

Before the upcoming wildfire season: Begin to develop a tree failure database to track system reliability and species failure characteristics.

Before the next annual update: Implement outage investigations and tree failure database to be able to compile data for system reliability and identifying at-risk-species.

Within the next 3 years: Begin implementing remediation tactics based off gathered data. Ongoing research, database development and reliability/species failure analysis.

Within the next 10 years: Ongoing research, database development and reliability/species failure analysis. Further develop and adjust remediation tactics for at-risk-species and areas.

5.3.5.16 Removal and Remediation of Trees with Strike Potential to Lines Equipment

Liberty CalPeco complies with GO 95 Rule 35, by removing trees when "dead, rotten or diseased trees or dead, rotten or diseased portions of otherwise healthy trees overhang or lean toward and may fall into a span of supply or communication lines." Additionally, Liberty CalPeco complies with Public Resources Code 4293 by removing "Dead tree, old decadent or rotten trees, trees weakened by decay or disease and trees or portions thereof that are leaning toward the line which may contact the line from the side or may fall on the line." Hazard trees are identified through vegetation inspection programs and are evaluated by best practices derived from the CalFire Power Line Fire Prevention Field Guide, The USFS Region 5 Hazard Tree Guidelines For Forest Service Facilities and Roads in the Pacific Southwest Region, and ANSI A300 Standards (Part 9) – Tree Risk Assessment.

"Trees with strike potential" are trees or parts of trees that have the potential to contact the electrical facilities if they were to fail. Assessing strike potential begins with determining if the tree is tall enough to reach the electrical facilities. Tree height is measured using forestry devices such as a line tape and clinometer, or laser rangefinder/hypsometer. If a tree, or part of a tree, is tall enough to reach an electrical

facility, it must also have a path to the target. Direction of fall (slope, lean, etc.) and protection (trees or other objects blocking the path) are also considered when determining the strike potential of a tree. Costs summarized in the table below include all tree work performed under Liberty CalPeco's routine, off-cycle, and CEMA programs. There is currently no way to separate costs between trees that were removed for strike potential from trees that were pruned for line clearance.

Before the upcoming wildfire season: Removal and remediation of trees with strike potential is continuous and ongoing through Routine Vegetation Maintenance and CEMA programs in accordance with required laws and regulations.

5.3.5.17 Substation Inspections

5.3.5.18 Substation Vegetation Management

Within the substation footprint, the ground is kept clear from vegetation on an as-needed basis using herbicide, pre-emergent and hand treatment.

5.3.5.19 Vegetation Inventory System

Liberty CalPeco manages tree work inventories and workloads through the Vegetation Management System (VMS) database. The VMS tracks circuit inspections, notification and tree work progress, provides work orders, notification letters and report generating functions, retains historical inspection and tree work data, and also has a variety of query options to specify select tree inventories as needed (i.e. routine circuit work on Federal lands for a specific inspection year or a random sample for quality control or assurance audits). Trees are inventoried if that specific tree is requiring remediation for the current inspection, therefore a new tree is only added to the inventory in VMS if it is being listed for tree work. Every tree inventoried on the system is assigned its own Tree Identification Number. If a tree that has been worked in the past requires work again, that specific tree record is updated to create a new work order and inspection record for the current inspection taking place but the unique Tree ID Number for that tree does not change. The past work orders and inspection records for that tree are retained. During the inspection process, trees not requiring work are not inventoried and/or updated. Photographs, Tree Work Authorization Forms and other documents associated with specific trees can be linked to the tree records through local network drives. Each individual tree is also assigned a status drop down in order to track notifications, project progress, and tree work completion. Upon receipt of a signed and completed work requests, an individual tree records status is changed to a completed status.

Before the upcoming wildfire season: Liberty CalPeco vegetation management plans to continue discussing improvements in tracking overall circuit work. Liberty CalPeco plans to continue discussions to implement dashboard screen to better track overall circuit progress and status.

Liberty CalPeco will continue to make improvements to the vegetation inventory system as needed to improve process efficiencies and meet reporting requirements

5.3.5.20 Veg management to achieve clearances around lines/equip

Liberty CalPeco has adopted and incorporated General Order 95, Appendix E recommended clearances at time of trimming in its vegetation management plan. Minimum clearance, at time of trim, is 12 feet for distribution lines (up to 60kV) and is 30 feet for 120kV lines. Liberty CalPeco does not have power lines operating in the 72kV-110kV category. Liberty CalPeco considers more than just line operating voltage when determining appropriate clearance and will obtain greater clearances as needed to ensure compliance until the next scheduled maintenance. The consideration to obtain greater clearances will be based on multiple factors, including: length of span, line sag, planned maintenance cycles, location of vegetation within the span, species type, species characteristics, vegetation growth rate, arboricultural practices, local climate, and elevation. Costs associated with pruning to achieve appropriate clearance are combined in the table under section 5.3.5.16. Liberty CalPeco does not currently have a way of separating costs between these initiatives across multiple programs.

> **Before the upcoming wildfire season:** Liberty CalPeco has adopted and incorporated General Order 95, Appendix E recommended clearances at time of trimming in its vegetation management plan. Liberty CalPeco plans to continue to develop a formalized Quality Control and Quality Assurance auditing system to ensure proper clearances are being achieved and compliance is met.
>
> **Before the next annual update:** Implement a formalized Quality Control and Quality Assurance auditing system to ensure proper clearances are being achieved at time of trimming.
>
> **Within the next 3 years:** Continue to monitor QA and QC results. Determine effectiveness of clearances achieved on successive cycle patrols. Establish more accurate circuit forecasting.
>
> **Within the next 10 years:** Continue to monitor QA and QC results. Determine effectiveness of clearances achieved on successive cycle patrols. Establish more accurate circuit forecasting.

5.3.6 Grid Operations and Protocols

Liberty CalPeco's efforts toward Grid Operations and Protocols include various programs included in this section and focus on an effort for a flexible system in the event of an emergency. Improved and emerging technology (as discussed in the Situational Awareness and Collaborative Research sections) will greatly enhance the ability to detect, but especially to predictively anticipate ignition events before an event actually happens. Grid hardening efforts and automatic recloser installations and enhancements should minimize the impact of PSPS events and allow for more rapid restoration after these events. See below for a summary of the current inspection and maintenance and/or replacement programs initiated by GO165 and GO 174 and the new WMP initiatives related to strengthening Liberty CalPeco's electric grid. Liberty CalPeco is also working toward better training for field personnel during elevated fire risk and evaluating the cost/benefit of added resources to accompany crews during high fire threat conditions as defined in our Fire Prevention Plan.

5.3.6.1 Automatic Recloser Operations

Liberty CalPeco plans to continue replacing older reclosers and line air switches with new recloser technology. The reclosers will be placed strategically to allow for better sectionalizing of overhead lines during switching and PSPS events, but also in an effort to bring Distribution Automation Control into play within the next 3 years. In addition, fire season settings are implemented on all line reclosers in the area. Priority work efforts are focused on the more populated areas in Liberty CalPeco's territory for the recloser planned installs and also to devices with notorious issues (e.g. Form 6 recloser controls). The benefit to customers comes with better reliability, smaller PSPS zones affecting less customers, and distribution automation control reducing outage times.

Liberty is currently focused on replacing many older recloser types at existing locations for improved reliability and adding SCADA control. Also, many older air switches/motor operated switches are being targeted for replacement.

Initiative activity	Year	Total per-initiative spend	Line miles to be treated	Spend/ treated line mile	Ignition probability drivers targeted	Risk reduction	Risk-spend efficiency	Other risk drivers addressed	Existing/ new	Existing: What proceeding has reviewed program	If new: Memorandum account	In / exceeding compliance with regulations	Cite associated rule	Comments
Automatic recloser operations	2019 plan	440,000	2,055	214	All types of contact, all types of equipment failure	Unknown	Unknown	Unknown	Existing	2019 WMP	WMP memorandum account	In compliance	N/A	Reclosers are put on one shot during fire season for wildfire prevention.
	2019 actual	-	2,055	-	All types of contact, all types of equipment failure	Unknown	Unknown	Unknown	Existing	2019 WMP	WMP memorandum account	In compliance	N/A	Reclosers are put on one shot during fire season for wildfire prevention.
	2020	360,000	2,055	175	All types of contact, all types of equipment failure	Unknown	Unknown	Unknown	Existing		WMP memorandum account	In compliance	N/A	Reclosers are put on one shot during fire season for wildfire prevention.
	2021	540,000	2,055	263	All types of contact, all types of equipment failure	Unknown	Unknown	Unknown	Existing		WMP memorandum account	In compliance	N/A	Reclosers are put on one shot during fire season for wildfire prevention.
	2022	360,000	2,055	175	All types of contact, all types of equipment failure	Unknown	Unknown	Unknown	Existing		WMP memorandum account	In compliance	N/A	Reclosers are put on one shot during fire season for wildfire prevention.
	2020-2022 plan total	1,260,000												

Program Timeline:

- **Before the upcoming wildfire season** – Continue with recloser installs already in progress.
- **Before the next annual update** – Continue with recloser installs already in progress
- **Within the next 3 years** – Install reclosers at a rate of 4 per year, implement Distribution Automation Control system.
- **Within the next 10 years** – Continue replacements/new installs as deemed necessary. Distribution Automation Control system in operation

5.3.6.2 Crew-accompanying ignition prevention and suppression resources and services

Liberty CalPeco does not have dedicated fire suppression personnel on staff. On elevated fire risk days, a member from each working crew is assigned as the Fire Safety Monitor to ensure fire prevention operational protocols are being followed. During extreme fire risk days, work activities are extremely limited. If work must be performed, a dedicated Fire Safety Leader is assigned to the crew and assumes responsibility for Fire Prevention activities. See Fire Prevention Plan for more details.

Program Timeline:

- **Before the upcoming wildfire season**: Continue with resources in place.
- **Before the next annual update**: Perform cost/benefit analysis to determine the potential risk mitigated by using contracted fire prevention resources during fire season.
- **Within the next 3 years**: Evaluate effectiveness of resources/services and continue or discontinue as appropriate.
- **Within the next 10 years**: Evaluate effectiveness of resources/services and continue or discontinue as appropriate.

5.3.6.3 Personnel work procedures and training in conditions of elevated fire risk

See the attached Liberty CalPeco FPP.

5.3.6.4 Protocols for PSPS re-energized

Liberty CalPeco plans to re-energize customers as quickly and efficiently as possible once deemed safe to do so based on current and future predicted weather forecasts. In PSPS zones, crews will energize mainline first, with lateral fuses and devices open. All overhead line will be inspected prior to re-energization, be it by foot, vehicle, or air. Essentially whatever resources are available and deemed an efficient method to patrol and ensure public and worker safety.

Program Timeline:

- **Before the upcoming wildfire season**: PSPS re-energization plan in place as part of WMP.
- **Before the next annual update**: PSPS re-energization plan in place as part of WMP.
- **Within the next 3 years**: Evaluate effectiveness of re-energization plan and make continuous improvement.
- **Within the next 10 years**: Evaluate effectiveness of re-energization plan and make continuous improvement

5.3.6.5 PSPS events and mitigation of PSPS impacts

Efforts to mitigate impacts of PSPS events are currently underway and include covered conductor, resiliency corridors of covered conductor, undergrounding of overhead

conductor, public outreach and education, coordination with emergency partners to limit impact to customers, and efforts to notify early and minimize outages to our medical baseline customers. These initiatives are all accounted for in various sections of the WMP.

5.3.6.6 Stationed and on-call ignition prevention and suppression

Liberty CalPeco is currently evaluating the cost/risk/benefit of stationing additional resources strategically during fire threat days. There is currently not any additional resources used for this purpose beyond what crews have on the jobsite. No current program beyond what crews have with them on the jobsite ('Indian cans' and fire extinguishers).

Program Timeline:

- **Before the upcoming wildfire season**: Evaluate cost/risk/benefit of having additional resources on hand.
- **Before the next annual update**: Evaluate cost/risk/benefit of having additional resources on hand.
- **Within the next 3 years**: Continue evaluation and add necessary resources if deemed appropriate.
- **Within the next 10 years**: Continue evaluation and add necessary resources if deemed appropriate.

5.3.7. Data Governance

5.3.7.1 Centralized repository for data

Liberty CalPeco will have a dedicated location to wildfire risk in its SharePoint platform which will allow storage, processing, and utilization of data. The wildfire risk SharePoint location is a large subset of the overall RBDM SharePoint dedicated location. The data repository initiative is already underway, and will be useful by this upcoming fire season. Going forward the data repository will be organized, managed, and maintained effectively.

Initiative activity	Year	Total per-initiative spend	Line miles to be treated	Spend/ treated line mile	Ignition probability drivers targeted	Risk reduction	Risk-spend efficiency	Other risk drivers addressed	Existing/ new	Existing: What proceeding has reviewed program	If new: Memorandum account	In / exceeding compliance with regulations	Cite associated rule	Comments
Data Governance	2019 plan													
	2019 actual													
	2020	465	2,055	0.2	Unknown	Unknown	Unknown	Unknown	New	N/A	WMP memorandum account	N/A	N/A	Data Requirements for WMP Delivery, Risk Analyis/Data Management, Hire 1 Operations Analyst
	2021	415	2,055	0.2	Unknown	Unknown	Unknown	Unknown	New	N/A	WMP memorandum account	N/A	N/A	Data Requirements for WMP Delivery, Risk Analyis/Data Management, Operations Analyst
	2022	365	2,055	0.2	Unknown	Unknown	Unknown	Unknown	New	N/A	WMP memorandum account	N/A	N/A	Data Requirements for WMP Delivery, Risk Analyis/Data Management, Operations Analyst
	2020-2022 plan total	1,245												

5.3.7.2 Collaborative research on utility ignition and/or wildfire

Liberty CalPeco collaborates or plans to collaborate with several academic and professional institutions on wildfire research. The collaborative programs are as follows:

ALERTWildfire: Liberty CalPeco is proposing to work with ALERTWildfire to support the local ALERTTahoe wildfire camera network. ALERTWildfire deploys pan-tilt-zoom (PTZ) cameras monitoring high fire risk areas to allow for discovery of ignition events and support fire resources throughout a wildfire event. ALERTWidlfire's first project, ALERTTahoe provided camera coverage for the majority of Liberty CalPeco's service territory. Liberty CalPeco plans to partner with ALERTWildfire to update the cameras in the Lake Tahoe area to provide camera control to Liberty. See alertwildfire.org/about for more information. Projected costs for ALERTWildfire are represented in Section 5.3.2.2.

University of Nevada Reno (UNR), High Impedance Fault Detection: Liberty CalPeco is proposing to partner with the University of Nevada Reno to study high impedance faults in Liberty CalPeco's service territory. From UNR's proposal: "In

order to reduce the risk of fire and public safety hazard resulting from protection system failure to accurately identify and clear high impedance faults (HIF) in the Tahoe area, a modern HIF detection system must be designed and implemented in the Tahoe area. A sponsored collaborative study with the University of Nevada, Reno (UNR) will assess state-of-the-art relay technologies in a simulated environment and produce a suite of new protection system options for the Tahoe area."

Texas A&M Distribution Fault Anticipation: – Developed by Texas A&M and presented at the Wildfire Technology Innovation Summit, Distribution Fault Anticipation (DFA) is a technology that anticipates potential line failure events that have the potential to ignite wildfires. Liberty Utilities plans to deploy DFA on 10 distribution feeders originating in HFTD Tier 2 and Tier 3 areas. Projected costs for DFA are represented in Section 5.3.2.2.

Program Timeline:

- **Before the upcoming wildfire season**, partner with ALERTWildfire and UNR.
- **Before the next annual update**, finalize studies / programs with ALERTWildfire and UNR.
- **Within the next 3 years**, Deploy Texas A&M DFA and continue to evaluate partnerships with academic and professional institutions.
- **Within the next 10 years**, continue to evaluate partnerships with academic and professional institutions.

Initiative activity	Year	Total per-initiative spend	Line miles to be treated	Spend/ treated line mile	Ignition probability drivers targeted	Risk reduction	Risk-spend efficiency	Other risk drivers addressed	Existing/ new	Existing: What proceeding has reviewed program	If new: Memorandum account	In / exceeding compliance with regulations	Cite associated rule	Comments
Continuous monitoring sensors	2019 plan													
	2019 actual													
	2020	200,000	157	1,274	All types of contact, all types of equipment failure	Unknown	Unknown	Unknown	New	N/A	WMP memorandum account	Exceeding	N/A	Relays capable of HIFD to be installed along Tahoe City 7300 circuit.
	2021	-	-	-										
	2022	-	-	-										
	2020-2022 plan total	200,000												

5.3.7.3 Documentation and Disclosures of Wildfire-Related Data and Algorithms

Liberty CalPeco will document and disclose in entirety its process to evaluate wildfire risk in its service territory. Through a combination of its internal resources and external consultants, wildfire risk will be addressed comprehensively as a large subset of Liberty CalPeco's overall risk profile in its RBDM framework. An additional data expert position will be added to Liberty CalPeco's team to bolster its analytical capability before the next annual report. Forecasting and stress testing are features of the wildfire risk evaluation models. In the next three years, Liberty CalPeco expects to dedicate more resources towards its enterprise risk program as needed, and take advantage of new information and analytical technology as it becomes available

5.3.7.4 Tracking and Analysis of Near Miss Data

Near miss tracking data is being tracked in the company's outage management system, Responder. Additionally, Liberty CalPeco currently utilizes its Smart M.Apps tool which allows the company to track its reported incidents by location, date, time duration, equipment in question, and outage cause, overlaid on a variety of maps such as HFTD areas. Before the next annual filing, Liberty CalPeco expects its wildfire-related data and mapping overlays to increase in quality. Within the next three years, the company will take advantage of all available technologies and capabilities which would improve or build upon its current Smart M.Apps tool.

5.3.8 Resource Allocation Methodology

As defined in the Commission's Decision D.19-04-020 Voluntary Agreement, Liberty CalPeco is required to file its risk-based decision-making ("RBDM") framework in its upcoming General Rate Case ("GRC") filing. Liberty CalPeco expects its GRC to be filed in the early part of 2021. Additionally, the company continues to improve its data collection methods, analytical capability, and robustness of its enterprise risk management ("ERM") program to satisfy the requirements as stated in the Voluntary Agreement for Small and Multi-Jurisdictional Utilities ("SMJU's").

The threat of a wildfire in the Liberty CalPeco service territory is a risk the company and its parent companies take very seriously. Providing its customers safe and reliable service are paramount objectives of the company. The devastating consequences of wildfires include loss of service, property, and in some cases, life. The wildfire risk mitigation programs discussed within the Liberty CalPeco WMP are explicitly designed to keep its customers and surrounding populations safe.

In order to objectively compare and evaluate wildfire risk mitigation strategies, the company utilizes its current ERM methodology to identify inherent risk, residual risk, existing controls, and future mitigation efforts after determining the likelihood and impact of wildfire risk in the Liberty CalPeco service territory. The company is diligently working towards a RBDM framework which incorporates elements of the IOU S-MAP/RAMP proceedings, as well as adopting the Commission's recommendations towards a probabilistic modeling methodology with Multi-Attribute Risk Score ("MARS")/Multi-Attribute Value Function ("MAVF") scoring.

The company's ERM methodology at a high-level resembled many of its other peer utility ERM methodologies before their submittal of the enhanced RBDM frameworks contained in their GRC filings. As ordered by the Commission, Liberty CalPeco will have its enhanced RBDM framework completed and used to evaluate, compare, and make risk-informed investment decisions by its next GRC filing.

Current Method	Planned Method
Qualitative, detailed descriptions of risk analysis.	Introduction of bow-tie analysis of drivers-event-consequences.
Likelihood Score SME-reliant.	Introduction of data-driven probabilistic calculations from internal, peer utility, national, and academic data sources.
Utilization of Heat Map with Linear Scaling.	Introduction of MARS/MVAP quantitative scoring based on calculations introduced in IOU S-MAP/RAMP proceedings; Assumptions are rarely linear.
Linear Likelihood vs. Impact product calculations	Introduction of scenario-based modeling techniques for high & low-impact analysis.
Existing Controls and Planned Mitigations.	Include two alternative proposals for mitigations.

In order to best implement these enhancements into its planned RBDM framework, Liberty CalPeco will leverage its technical internal resources supplemented by outside consultants in order to achieve its goals of meeting and striving to exceed Commission requirements.

5.3.9 Emergency Planning and Preparedness

1. The emergency preparedness and response plans described in the WMP comply with Public Utilities Code Section 768.6 and 8386.[6,7] Specifically, the WMP complies with the following mandates:

- Sharing elements of vested interest of the WMP and emergency response plan with relevant cities and counties to provide input and feedback.
- Direction to routinely update and improve the WMP.
- Accounting of responsibilities of persons responsible for executing the WMP.
- Appropriate and feasible procedures for notifying customers that may be impacted.
- Plans to prepare for and restore service, including workforce mobilization.

[6] FindLaw, California Code – PUC 768.6, https://codes.findlaw.com/ca/public-utilities-code/puc-sect-768-6.html.

[7] FindLaw, California Code – PUC 8386, https://codes.findlaw.com/ca/public-utilities-code/puc-sect-8386.html.

- Plans for community outreach and public awareness before, during, and after a wildfire.
- Emergency communications that include plans to translate messages into the top three languages in California, based on census data.
- Protocols for compliance with Commission reporting guidelines.

5.3.9.1.a. Plans to prepare for and restore service, including workforce mobilization (including mutual aid and contractors) and prepositioning equipment and employees

5.3.9.1.a Narrative:

Workforce Mobilization

Liberty CalPeco has addressed limitations in resource sufficiency through mutual aid agreements. Mutual assistance entities include NV Energy, Western Energy Institute Mutual Assistance Roster, and the California Utilities Emergency Association.

The Incident Commander has responsibility for mobilizing resources, contracting for additional assistance and supplies, and calling for assistance from neighboring utilities through Mutual Aid Agreements. The Incident Commander will also direct the requests for additional internal and external resources. The Incident Commander must approve the use of Mutual Aid.

Depending upon the timeline in preparing for, and responding to, a particular emergency event, Liberty CalPeco's EOC members will determine immediate needs if they require additional support outside of utility personnel. The type, size, and duration of an emergency event will determine, in varying degrees, the amount of resources required to respond to the event. Resource requests may include trade and non-trade personnel to assist in safety stand-by, damage assessment, planning or liaison activities, or materials and equipment necessary to facilitate restoration of utilities.

Activation levels for emergency/disaster response designated as such based on a five-level scale. For Level 1 events, considered to be catastrophic in impact, emergency support will be required from external resources and public safety partners.

	Description	Action
nt	Minor disruption of operating systems, business systems, or electric service that can be managed with existing resources at the local or department level.	Normal activity, daily internal crew assignments
l	An event that maximizes the resources and management capability of the local region and may require additional resources and support.	Possible crew transfer between areas; utility contractor crews (overhead line and tree) limited to normal daily complement.
	A disaster or major emergency that may affect several areas of our electric system and may require the services of all operations personnel.	Regional or System ICS may be initiated and Regional EOC's may be opened. All available operations personnel are utilized. Utility contractor, mutual aid Assistance, tree crews, and support functions such as logistics will be used as needed.
nt	A disaster or major emergency that affects several areas of our electric system and requires the services of all operations personnel.	Regional or System ICS will be initiated. All available operations personnel are utilized. Utility contractor, mutual aid assistance, tree crews, and support functions such as logistics will be used as needed.
ct	A disaster or major emergency requiring a corporate response to minimize corporate risk. This level requires policy guidance, strategic planning, and coordination of internal and external resources, internal communication and coordination, dissemination of public information.	Regional and/or system ICS will be initiated. All available operations personnel are utilized. Utility contractor, mutual aid assistance, tree crews, and support functions such as logistics will be used as needed.

Response Coordination

Liberty CalPeco will respond to immediate life safety concerns as the top priority. Once a hazardous situation is reported, immediate response will be provided by line crews, trouble man, inspectors or other trained personnel to assess and mitigate risk.

i. All field response employees shall undergo safety training aligned with their respective roles.
ii. All electrical switching and reporting shall be managed by the appropriate controlling parties to enhance employee and public safety.
iii. Liberty CalPeco will provide regular public information, typically in the form of media messages or alerts, regarding unsafe or hazardous areas or conditions that the public should be informed about.
iv. In the event of an area emergency that is life or property threatening, the Emergency Alert System ("EAS") shall be enabled through the local or county Emergency Management or Public Safety office. Liberty CalPeco will advise the emergency management agencies when such alert is essential.
v. Public safety agencies will be utilized, as necessary, for traffic control and perimeter safety until qualified personnel arrive to clear the hazard situation. Agencies will be used, if necessary, to control public disturbances and establish safety controls for the public.
vi. Employees will be monitored for appropriate meal breaks, hours worked, and safety compliance; when emergencies are expected to last more than 24 hours. Shifts will be established to cover work, and employees will be given appropriate rest periods.
vii. Weather and road conditions will be are monitored for worsening conditions so that workers are not stranded at remote work locations.
viii. Work may be curtailed until safe work conditions prevail.

Damage Assessment

During an emergency, company crews, linemen, troublemen, electric inspectors, utility designers and/or engineers will be first called for damage assessment. All damage will be recorded by the teams on circuit maps using standardized symbols. To the extent practicable, downed or damaged facilities shall be isolated, secured, and warnings applied utilizing cones, warning tape, or other barriers or warnings. Restoration of service will occur upon addressing the results of any damage and remediation needs.

Restoration

Service restoration is unique to each emergency and restoration prioritization is influenced by a number of factors including safety, accessibility, availability of repair parts, availability of personnel, etc. This element of the plan identifies general restoration prioritization guidelines but allows for the Incident Commander, or designee, to alter priorities according to the circumstances of the emergency and in coordination with essential load customers and government agencies.

Restoration Guidelines include:

i. Restore radial transmission and substations;

ii. Restore distribution circuits with essential customers such as health care facilities, utilities, public safety, governmental facilities, and lifeline customers;
iii. Restore circuits with the greatest number of customers;
iv. Restore primary taps, followed by secondary lines;
v. Restore individual services which are accessible and serviceable;
vi. Restore essential customers.

Below is the priority list of essential customers. Priority assumes circuits, equipment, and services are accessible and repairable.

1. Health Care Facilities
    a. Primary Care Hospitals
2. Utility Services/Districts
    a. Public Utility Districts
    b. Telecommunications
    c. Water/Water Treatment
    d. Pipeline
3. Public safety agencies
    a. Public Safety Dispatch Centers
    b. Law enforcement facilities/holding facilities
    c. Fire operations facilities
    d. Transportation equipment and facilities
4. Government facilities
5. Green Cross/Life Line

5.3.9.1.b. Emergency communications, including community outreach, public awareness, and communications efforts before, during, and after a wildfire in English, Spanish, and the top three primary languages used in California other than English or Spanish, as determined by United States Census data.

Liberty CalPeco provides available notification and communications material in English and will do so in Spanish in 2020. Liberty CalPeco does not currently translate to additional languages but welcomes community engagement to ensure a standard scheme of notifications are provided to Chinese, Tagalog, and Vietnamese speaking populations as necessary.

5.3.9.1.c. Showing that the utility has an adequate and trained workforce to promptly restore service after a major event, taking into account mutual aid and contractors

Liberty CalPeco employees participate in Emergency Management Plan training annually. They are trained and refreshed on the roles and responsibilities of each functional area in support of the ICS at the company level or the Incident Commander at the regional level. In addition, emergency response exercises are designed so employees can practice using the WMP as a test of its effectiveness. The utility participates in regional exercises to train employees and exercise the Emergency Management Plan. Liberty CalPeco plans to engage identified stakeholders in a coordinated effort to cohesively develop individual communication and emergency response plans between potentially affected jurisdictions and public safety partners in 2020. Part of this

effort will include acquiring a list of available resources to participate in mutual aid agreements for emergency response. As part of its resource adequacy plan, Liberty CalPeco expects to hire an Emergency Manager in 2020 to oversee all related emergency response activities and public safety partnership engagements.

3. Liberty CalPeco is in close coordination with Cal OES, county OES, and local public safety partners ("PSP"), including but not limited to: fire departments, Sheriff's offices, police, and highway patrol. All PSP are on our early notification list and will be communicated with as early as possible in the event of an impending PSPS or other power related emergency. However, due to the fact that we are a small utility with low staffing levels we would not likely be able to staff a utility employee in each county OES office during an event. As an alternative we would invite county OES participation in our EOC.

   It is well known and understood that we have a significant population of Spanish speakers throughout our service territory. We follow the same best practices as our local school districts with regards to language accommodations and preferences. School districts routinely communicate in English and Spanish only in their public communications and outreach.

5.3.9.1 Adequate and trained workforce for service restoration

Liberty CalPeco has identified the need to hire additional in-house staff to better prepare the company and community in the event of an emergency.

Fire Prevention Coordinator – Oversees fire prevention initiatives and will serve as company liaison for first responders and public safety partners. Ensures training and preparedness is provided to employees and contractors. Oversees compliance of fire prevention policies and regulations. This position will be related to most initiatives but can be mentioned in under coordination with fire suppression agencies, emergency response, and stakeholder engagement/outreach.

Fire Operations Specialist – Will assist Fire Prevention Coordinator by providing training and implementation of fire prevention policies. Will conduct safety audits on field crews and ensure daily fire conditions are communicated within the organization. Will assist with community outreach related to wildfire mitigation initiatives and assist with emergency preparedness and PSPS training.

Initiative activity	Year	Total per-initiative spend	Line miles to be treated	Spend/ treated line mile	Ignition probability drivers targeted	Risk reduction	Risk-spend efficiency	Other risk drivers addressed	Existing/ new	Existing: What proceeding has reviewed program	If new: Memorandum account	In / exceeding compliance with regulations	Cite associated rule	Comments
Adequate Workforce	2019 plan													
	2019 actual													
	2020	240,000	2,055	117	Unknown	Unknown	Unknown	Unknown	New	N/A	WMP memorandum account	N/A	N/A	Hire Fire Prevention Coordinator and Fire Operations Specialist
	2021	240,000	2,055	117	Unknown	Unknown	Unknown	Unknown	New	N/A	WMP memorandum account	N/A	N/A	Hire Fire Prevention Coordinator and Fire Operations Specialist
	2022	240,000	2,055	117	Unknown	Unknown	Unknown	Unknown	New	N/A	WMP memorandum account	N/A	N/A	Hire Fire Prevention Coordinator and Fire Operations Specialist
	2020-2022 plan total	720,000												

5.3.9.2 Community outreach, public awareness, and communications efforts

Efforts include:

- Community workshops – Spring and early summer annually in the following communities: Coleville/Walker, Markleeville, South Lake Tahoe, North Lake Tahoe, Truckee/Glenshire, Loyalton, and Portola. Workshops would be annual events.
- Public Safety Partner workshops – Liberty CalPeco hosts and participates in public safety partner workshops, meetings and strategy sessions year round. Topics ranging from primary emergency contacts, protocols, and operations are discussed to promote seamless cooperation and communication.
- Website information – The Wildfire Mitigation section of the website provides information about the Liberty CalPeco's wildfire mitigation program, PSPS, etc. Information is available year round on the website
- Direct Customer Emails – Emails are sent to our customer data base in the spring through the end of fire season on various wildfire mitigation and PSPS topics. Email topics are designed to inform, educate, and engage customers around our mitigation efforts and PSPS program.

- Informational videos – Videos have been created on various wildfire mitigation and PSPS topics. Video topics are designed to inform, educate, and engage customers around our mitigation efforts and PSPS program. These videos are used on social media, websites, and customer emails in the spring and through fire season
- Social media posts - Social media posts are made in the spring and through the end of fire season on various wildfire mitigation and PSPS topics. Social media topics are designed to inform, educate, and engage customers around our mitigation efforts and PSPS program.
- Collateral distribution – Brochures on wildfire mitigation and PSPS have been created and are available year round in our customer lobbies, public events, and through public safety partners.
- Community service group presentations – primarily during the spring and through fire season staff provides presentations covering the wildfire mitigation and PSPS program
- Government and chamber of commerce presentations – primarily during the spring and through fire season staff provides presentations covering the wildfire mitigation and PSPS program
- Community guest speaking engagements – primarily during the spring and through fire season staff provides presentations covering the wildfire mitigation and PSPS program
- Trained frontline staff to engage and educate on customer calls – Front line staff is trained to respond to questions about the wildfire mitigation and PSPS program year round.

5.3.9.3 Customer Support in Emergencies

First Liberty CalPeco continues to improve its information distribution to keep public safety partners, customers, and visitors well informed during any emergency involving electric service. Information is the most important resource enabling quality decision making and situational understanding during an emergency.

Secondly, we continue to work with regional partners such as city governments, public utility districts, fire departments, and county emergency services to identify locations that are available for cooling/warming/charging services, central information locations and more.

Third, Liberty is prepared to staff its call center 24/7 during significant emergencies to provide information and help direct customers to services and facilities.

5.3.10 Stakeholder Cooperation and Community Engagement

5.3.10.1 Community Involvement

Liberty CalPeco is plans to collaborate with community stakeholders such critical services providers, telecommunication companies, and government agencies, in a two-

phase stakeholder engagement initiative focusing on its WMP. The outreach is proposed in two phases:

Phase 1 – Engage Expert Working Group During Plan Development. Phase 1 includes outreach to a portfolio of experts that participated a series of three Expert Working Group meetings to inform future actions related to the WMP to assure input and future coordination from those with insight related to critical and key services. The Expert Working Group can identify gaps in any key areas of the WMP, further develop key objectives of the plan, and advise on additional details of plan sections for inclusion in future WMP and suggest content for public outreach.

Phase 2 – Public Outreach for Plan Review. Phase 2 includes a series of public outreach sessions to be held at key locations based on population densities and areas identified with infrastructure that could potentially be impacted by wildfires. Experts may participate to orient and inform the public, gather and respond to specific questions, and generally opine on key areas of the WMP.

The outreach initiative will facilitate more informed implementation of WMP targets and will develop outward-facing partnerships for continued activities. Formalized outreach enhances expert and community collaboration in support of the WMP in an open discussion forum. Structured outreach reflects the community-based touchpoint based on Liberty CalPeco's desire to formalize collaboration and coordination activities to enhance WMP effectiveness and promote public safety.

In 2020, Liberty CalPeco plans to host community workshops in the following locations:

- Portola
- Loyalton
- Truckee/Glenshire
- Kings Beach
- Tahoe City
- South Lake Tahoe
- Coleville/Walker
- MarkleevilleCommunity Speaking Engagements
- Tahoe City/North Tahoe Breakfast Club keynote speaker
- Others TBD

Initiative activity	Year	Total per-initiative spend	Line miles to be treated	Spend/ treated line mile	Ignition probability drivers targeted	Risk reduction	Risk-spend efficiency	Other risk drivers addressed	Existing/ new	Existing: What proceeding has reviewed program	If new: Memorandum account	In / exceeding compliance with regulations	Cite associated rule	Comments
Community Engagement	2019 plan													
	2019 actual													
	2020	75,000	2,055	36	N/A	Unknown	Unknown	Unknown	New	N/A	WMP memorandum account	N/A	N/A	
	2021													
	2022													
	2020-2022 plan total	75,000												

5.4 Method for enterprise-wide safety risk and wildfire risk assessment

Starting with its next GRC application,[8] Liberty CalPeco will begin using the risk-based decision-making ("RBDM") framework authorized by the Commission in D.19-04-020. Additionally, the company continues to improve its data collection methods,

[8] Scheduled to be submitted in the first quarter of 2021.

analytical capability, and robustness of its enterprise risk management ("ERM") program to satisfy the requirements included in D.19-04-020.

In order to objectively compare and evaluate wildfire risk mitigation strategies, Liberty CalPeco utilizes its current ERM methodology to identify inherent risk, residual risk, existing controls, and future mitigation efforts after determining the likelihood and impact of wildfire risk in the Liberty CalPeco service territory. Liberty CalPeco is diligently working towards a RBDM framework that incorporates elements of the IOU S-MAP/RAMP proceedings, as well as adopting the Commission's recommendations towards a probabilistic modeling methodology with MARS/MAVF scoring.

Liberty CalPeco's current ERM methodology resembles many of the ERM methodologies utilized by peer utilities prior to their submittal of enhanced RBDM frameworks in recent GRC filings. As ordered by the Commission, Liberty CalPeco's RBDM framework will be completed and used to evaluate, compare, and make risk-informed investment decisions going forward.

Current Method	Planned Method
Qualitative, detailed descriptions of risk analysis.	Introduction of bow-tie analysis of drivers-event-consequences.
Likelihood Score SME-reliant.	Introduction of data-driven probabilistic calculations from internal, peer utility, national, and academic data sources.
Utilization of Heat Map with Linear Scaling.	Introduction of MARS/MVAP quantitative scoring based on calculations introduced in IOU S-MAP/RAMP proceedings; Assumptions are rarely linear.
Linear Likelihood vs. Impact product calculations	Introduction of scenario-based modeling techniques for high & low-impact analysis.
Existing Controls and Planned Mitigations.	Include two alternative proposals for mitigations.

The table above compares Liberty CalPeco's current and future methodologies for identifying and mitigating risk. Liberty CalPeco will leverage its technical internal resources, supplemented by outside consultants, to meet Commission requirements for RBDM.

5.5 Planning for workforce and other limited resources

Liberty CalPeco requires adequate staffing in order to fully implement its WMP. As stated previously in Section 5.1, retaining and attracting new employees has been a challenge because of the high cost of living in Lake Tahoe. Nevertheless, Liberty CalPeco plans to hire ten additional employees this year to create a wildfire mitigation team. This new team includes three inspectors, two fire operations personnel, one project manager, an environmental specialist, and three support staff. Below is a brief description of Liberty CalPeco's staffing needs:

- Inspectors – Inspects overhead lines and equipment to comply with G.O. 165 requirements.
- Fire Prevention Coordinator – Oversees fire prevention initiatives and will serve as company liaison for first responders and public safety partners. Ensures training and preparedness is provided to employees and contractors. Oversees compliance of fire prevention policies and regulations. This position will be related to most initiatives

but can be mentioned in under coordination with fire suppression agencies, emergency response, stakeholder engagement/outreach.

- Fire Operations Specialist – Assists Fire Prevention Coordinator by providing training and implementation of fire prevention policies. Will conduct safety audits on field crews and ensure daily fire conditions are communicated within the organization. Will assist with community outreach related to wildfire mitigation initiatives and assist with emergency preparedness and PSPS training.
- Project Manager – Manages schedule and progress of WMP project implementation.
- Sr. Accountant – Tracks costs and sets up jobs to account for WMP initiatives.
- Capital Administrator – Takes the lead on tracking WMP capital job progress. Helps schedule jobs, ensure appropriate inventory, and closes jobs when complete.

5.6 Expected outcomes of 3-year plan

5.6.1 Planned utility infrastructure construction and upgrades

Liberty CalPeco is in the process of fully assessing the potential outcomes of current risk drivers on its system. Once an RBDM framework has been implemented, Liberty CalPeco will also be able to forecast the impact of planned capital replacements and upgrades.

5.6.2 Protocols on Public Safety Power Shut-off

5.6.2.1

Liberty CalPeco is developing best practices to establish safeguards for customers, and the public, during PSPS events. In addition, Liberty CalPeco is investigating potential opportunities to provide mobile generation, enhanced communication devices, charging stations, battery storage for medical baseline customers, and other necessary customer facilities for PSPS events.

Liberty CalPeco's strategies to improve public safety during high wildfire risk conditions include:

ix. Providing all field response employees with safety training aligned with their respective roles.
x. Managing all electrical switching and reporting with appropriate controlling parties to enhance employee and public safety.
xi. Providing regular public information, typically in the form of media messages or alerts, regarding unsafe or hazardous areas or conditions.
xii. Utilizing the Emergency Alert System ("EAS") through the local or county Emergency Management or Public Safety office in the event of an area emergency that is life or property threatening. Liberty CalPeco will advise the emergency management agencies when such alert is necessary.
xiii. Partnering with public safety agencies, as necessary, for traffic control and perimeter safety until qualified personnel arrive to clear the hazard situation.

5.6.2.2

Liberty CalPeco utilizes weather stations throughout its service territory and collaborates with a fire and weather scientific consultant, the National Weather Service ("NWS") in Reno, Nevada,

and local fire officials, to monitor local weather conditions and evaluate when a PSPS should be initiated. The initiation of PSPS events are influenced by the following factors:

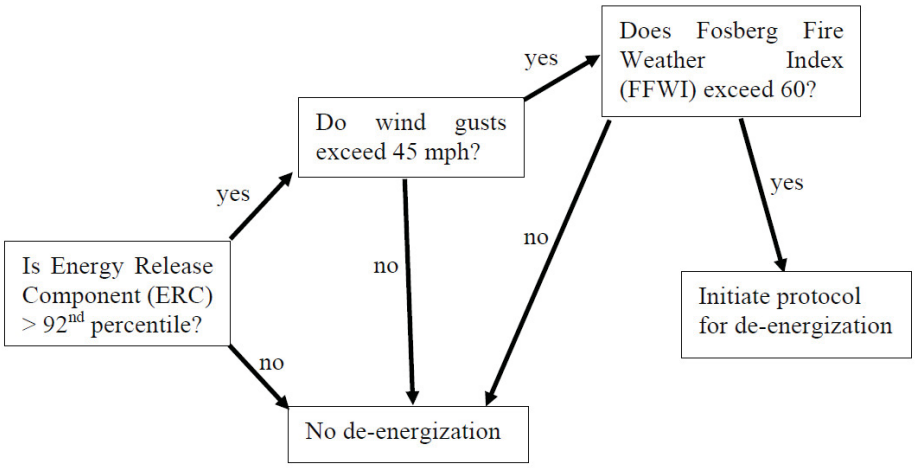
- Red Flag Warnings – Issued by the NWS to alert of the onset, or possible onset, of critical weather or dry conditions that would lead to swift increases in wildfire activity.
- Low Humidity Levels – Potential fuels are more likely to ignite when water vapor levels are low.
- Forecast Sustained Winds & Gusts – High winds can strengthen fuel embers causing fires to ignite. Winds also can blow embers from lower fire risk areas into high risk areas, increasing the potential of wildfires.
- Dry Fuel Conditions – Trees and other vegetation act as fuel for wildfires. Fuels with low moisture levels easily ignite and can spread rapidly.

In a case where the NWS reports three-second gusts greater than 50 mph, Liberty CalPeco will check the location of those speeds, and areas where those speeds would peak, for the proximity of service equipment. If the gusts are near service equipment, the equipment is assessed to see if it is scheduled for repair. Liberty CalPeco then monitors humidity and temperature levels to evaluate fuel conditions and forest susceptibility to fire for those areas. If an area is identified to be at risk of causing a wildfire, Liberty CalPeco will first attempt to de-energize that line so that load at the end of the line can continue to be served. In the event that load has to be dropped, Liberty CalPeco will attempt to minimize the lost load and customer disruption.

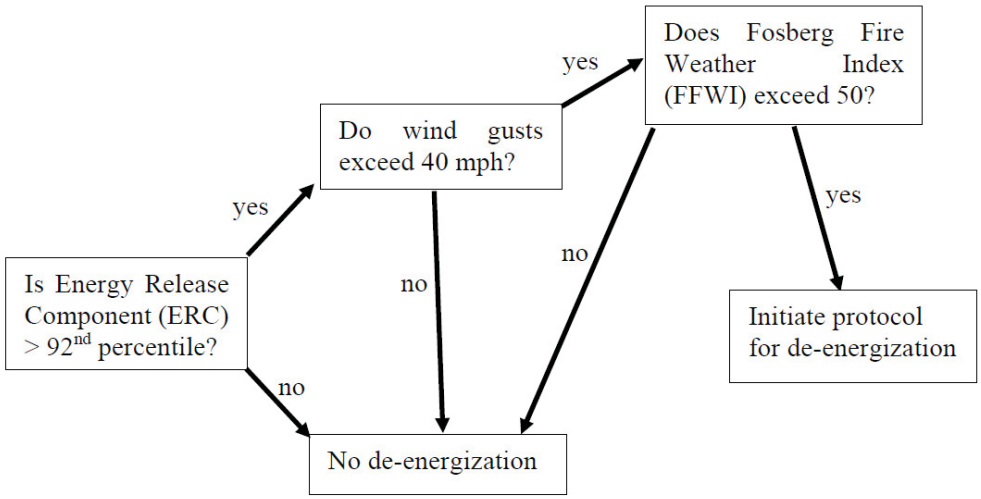
Liberty CalPeco employs two de-energization decision trees, one for the Topaz and Muller 1296 r3 PSPS zones, and another for all other zones. In each case, the following three criteria are evaluated simultaneously to test whether any exceed the defined threshold. The three criteria include:

- Observed Energy Release Component (“ERC”)
- Observed wind gust
- Observed Fosberg Fire Weather Index (“FFWI”)

The figure below represents the de-energization decision tree for Topaz and Muller 1296 r3 PSPS zones.



The figure below represents the de-energization decision tree for all other zones.



5.6.2.3 Strategy to provide for safe and effective re-energization of any area that was de-energized due to PSPS protocol.

Once Liberty CalPeco has confirmed that conditions have subsided to the point that an energized grid does not pose a wildfire threat, the utility will begin the process of re-energizing power lines.

Once a decision to re-energize has been made, Liberty CalPeco will:

- Patrol affected circuits prior to re-energization.
- Inform all media and partners of the successful conclusion of the de-energization event and provide an update when power has been restored.
- Inform all customers impacted by the de-energization event that power has been restored via Everbridge (email, voice, and/or text).
- Post the time of power restoration(s) on the Liberty CalPeco website and social media at the conclusion of the de-energization event.

- Follow up with media and partners to facilitate effective communication and to determine if additional steps or efforts would be beneficial in the future.
- Provide a report to the Director of the Safety and Enforcement Division no later than 10 business days after the conclusion of the PSPS event that includes (i) an explanation of the decision to shut off power; (ii) all factors considered in the decision to shut off power, including wind speed, temperature, humidity, and moisture in the vicinity of the de-energized circuits; (iii) the time, place, and duration of the shut-off event; (iv) the number of affected customers, broken down by residential, medical baseline, commercial/industrial, and other; (v) any wind-related damage to overhead power-line facilities in the areas where power is shut off; (vi) a description of the notice to customers and any other mitigation provided; and (vii) any other matters the utility believes are relevant to the Commission's assessment of the reasonableness of Liberty CalPeco's decision to shut off power.

Prior to re-energization, Liberty CalPeco will inspect all de-energized circuits to facilitate safe operation when energized and that identified corrective actions are addressed and hazards are cleared. Once the de-energized circuits have been patrolled, immediate corrections implemented, and the fire threat has subsided, Liberty CalPeco will re-energize the line.

The process used to re-energize lines will be updated to conform to changes mandated in Commission proceeding R.18-12-005.

5.6.2.4 Company standards relative to customer communications, including consideration for the need to notify priority essential services – critical first responders, public safety partners, critical facilities and infrastructure, operators of telecommunications infrastructure, and water utilities/agencies. This section, or an appendix to this section, shall include a complete listing of which entities the electrical corporation considers to be priority essential services. This section shall also include description of strategy and protocols to ensure timely notifications to customers, including access and functional needs populations, in the languages prevalent within the utility's service territory.

Advanced Notice

Liberty CalPeco will work to provide as much advanced notification as prudent to customers that may be affected by a PSPS event, and Liberty CalPeco plans to provide even more advanced warning of a PSPS event to public safety partners, local utilities, and critical infrastructure, before a PSPS event is imminent. In order to avoid desensitization of the public, advanced notice to customers will be provided in a shorter timeframe and only when a PSPS event is likely. Under these considerations, Liberty CalPeco has developed the following notification guidelines:

- Up to eight days in advance – cities, counties, emergency services (public safety partners), regional utilities, cell tower operators, and critical facilities.
- Up to 72 hours in advance – medical baseline or medically sensitive patients, and cities, counties, emergency services (public safety partners), regional utilities, cell tower operators, and critical facilities.
- Up to 48 hours in advance – all affected or potentially affected customers, public safety partners, CPUC, and the media.
- Up to 24 hours in advance – all affected or potentially affected customers, public safety partners, CPUC and the media.
- Immediately before de-energization – all affected or potentially affected customers, public safety partners, CPUC and the media.
- During the PSPS Event – all affected or potentially affected customers, public safety partners, CPUC, and the media.
- At the conclusion of the PSPS Event – all affected or potentially affected customers, public safety partners, CPUC, and the media.

List of Priority Entities / Critical Facilities

1. Health Care Facilities
    a) Primary Care Hospitals
2. Utility Services/Districts
    a) Public Utility Districts
    b) Telecommunications
    c) Water/Water Treatment
    d) Pipeline
3. Public safety agencies
    a) Public Safety Dispatch Centers
    b) Law enforcement facilities/holding facilities
    c) Fire operations facilities
    d) Transportation equipment and facilities
4. Government facilities
5. Green Cross/Life Line

Notification Responsibility

Liberty CalPeco will lead the communication effort and outreach of PSPS events. Liberty CalPeco will be clear with its public safety partners when the information is intended to be public. When notifications are intended to be public, Liberty CalPeco will provide clear messaging and request that each partner and media outlet assist in the distribution of the same information and messaging. To this point, Liberty CalPeco has embarked on a system-wide

outreach and awareness campaign to help customers and partners understand and prepare for a PSPS event.

Stakeholder Group	Description
Customers	· Any person, organization, or critical facility receiving electricity from Liberty CalPeco
Local Government / Critical Agencies	· Primary Care Hospitals · Public Utility Districts (Truckee Donner, South Tahoe) · Counties (Alpine, El Dorado, Mono, Nevada, Placer, Plumas, Sierra) · Cities/Towns (Portola, South Lake Tahoe, Truckee) · Telecommunications Water/Water Treatment Public Safety Dispatch Centers · Law enforcement/holding facilities · Local tribal governmental agencies · Fire operations facilities · Transportation equipment and facilities · Local Emergency Planning Committees · CAL FIRE · California Department of Transportation · USFS · Sierra Front Wildfire Cooperators · CPUC SED
Mutual Assistance Agreements	· NV Energy · Western Energy Institute Mutual Assistance Roster · California Utilities Emergency Association
Commission	· Utility Safety Branch · Energy Branch · Energy Division · Office of Emergency Services Warning Center · Others, as requested

5.6.2.5
Liberty CalPeco provides on-going public electric safety courses and information so that the public will be prepared when an emergency event occurs. These programs are provided year-round to all levels of schools, business, service clubs and also trade shows and expositions. Additionally, Liberty CalPeco routinely provides electric safety training to local and regional law enforcement, fire, county and state transportation, and other emergency response agencies. Public Safety Training is the responsibility of all.

During an emergency event, Liberty CalPeco may utilize stand-by personnel, trained in general electrical safety, to observe and report hazardous conditions and assist in perimeter safety around identified hazards due to unsafe conditions until qualified electric personnel arrive.

Personnel safety is identified as a key element within Liberty CalPeco's Emergency Response Plan. Electric trade personnel, including ground person, helpers, apprentices, journeyman lineman, trouble men, and inspectors are provided the highest level of safety and skills training to perform in both daily and emergency situations. Only trained personnel may perform safety sensitive functions including switching, de-energizing, overhead and underground operations, repairing and assessing damage.

To improve employee and public safety, the design, installation and operation of equipment and automatic protection schemes for transmission and substation equipment must remain in place. Employees follow procedures in accordance with OSHA 1910.269 regulations. Non-trade personnel that are mobilized to assist with emergency repair (metering, meter reading, construction, etc.) are trained in general electric safety before assisting in emergency field response.

Liberty CalPeco will respond to immediate life safety concerns as its top priority. Once a hazardous situation is reported, immediate response will be provided by line crews, trouble men, inspectors or other trained personnel to assess and mitigate risk.

i. All field response employees shall undergo safety training aligned with their respective roles.
ii. All electrical switching and reporting shall be managed by the appropriate controlling parties to enhance employee and public safety.
iii. Liberty CalPeco will provide regular public information, typically in the form of media messages or alerts, regarding unsafe or hazardous areas or conditions that the public should be informed about.
iv. In the event of an area emergency that is life or property threatening, the EAS shall be enabled through the local or county Emergency Management or Public Safety office. Liberty CalPeco will advise the emergency management agencies when such alert is essential.
v. Public safety agencies will be utilized, as necessary, for traffic control and perimeter safety until qualified personnel arrive to clear the hazard situation. Agencies will be used, if necessary, to control public disturbances and establish safety controls for the public.
vi. Employees will be monitored for appropriate meal breaks, hours worked, and safety compliance; when emergencies are expected to last more than 24 hours. Shifts will be established to cover work, and employees will be given appropriate rest periods.
vii. Weather and road conditions will be are monitored for worsening conditions so that workers are not stranded at remote work locations.
viii. Work may be curtailed until safe work conditions prevail.

Ongoing Emergency Response Planning

Leaning on the experienced of other utilities and PSPS reports, Liberty CalPeco is working to align its emergency response and operational protocols to those of first responders and public safety partners in its service territory. As part of its on-going emergency response planning

activities, Liberty CalPeco will conduct stakeholder outreach sessions to gain feedback on the WMP and related activities. The outreach is proposed in two phases:

- Phase 1 – Engage Expert Working Group During Plan Development. Phase 1 includes outreach to a group of experts to participate in a series of three Expert Working Group meetings to inform future actions related to the WMP to assure input and future coordination from those with insight related to critical and key services. The Expert Working Group can identify gaps in any key areas of the plan, further develop key objectives of the plan, and suggest additional content for inclusion in future WMPs and suggest content for public outreach.
- Phase 2 – Public Outreach for Plan Review. Phase 2 includes a series of Public Outreach sessions held at key locations, based on population densities and areas identified with infrastructure, which could potentially be impacted by wildfires. Experts may participate to orient and inform the public, gather and respond to specific questions, and generally opine on key areas of the plan.

This outreach activity will aid in the implementation of plan targets and development of outward-facing partnerships for continued activities. The formalized outreach will enhance expert and community collaboration in support of the WMP in an open discussion forum. A structured outreach reflects the community-based touchpoint based on Liberty CalPeco's desire to formalize collaboration and coordination activities to enhance WMP effectiveness and promote public safety.

Attachment

Liberty CalPeco's Fire Prevention Plan for Overhead Electric Facilities

Fire Prevention Plan for Overhead Electric Facilities

REVISION HISTORY

The Liberty Utilities (CalPeco Electric), LLC (U 933-E) (Liberty CalPeco) Wildfire Prevention Department (Department) updated the Fire Prevention Plan (FPP or Plan) October 2019.[1] The Department will oversee the execution of required training for Liberty CalPeco personnel and contractors prior to the 2020 fire season.

PURPOSE

In 2017 and 2018, California experienced some of the most destructive wildfires in its history. The combination of drought, extreme winds and build-up of dry vegetation contributed to increased wildland fires. The wildfire season and associated forest fire risk factors have increased due to warmer spring and summer temperatures, reduced snowpack, and earlier spring snowmelt, leading to higher levels of dry fuels. Liberty CalPeco recognizes that the operations, maintenance and construction on the electric grid, and characteristics of associated equipment may present an ignition risk. Our goal is to develop reasonable and actionable plans to mitigate ignition risks, be prepared to suppress small fires, keep our employees safe while working in wildland areas and provide general fire safety precautions for field operations.

Liberty CalPeco developed this Plan in compliance with Ordering Paragraph 3 of California Public Utilities Commission (CPUC) Decision (D.) 12-01-032 and the revisions of D.17-12-024 pursuant to General Order (GO) 166 Standard 11 and information specified in GO 166 Standard 1, Part E as applicable to Liberty CalPeco's service territory (See Attachment 1). The FPP identifies operational protocols for Liberty CalPeco overhead facilities that lie within Tiers 2 and 3 of the High Fire-Threat District (HFTD) Map adopted by the CPUC on January 19, 2018. The Plan delineates operational pathways in working with electrical assets and overhead facilities that may pose a fire ignition threat under notification of rated fire watch conditions.

The FPP establishes procedures to be followed by the utility for facilities in Tier 2 or 3 of the HFTD or during the Fire Precautionary Period, which is considered to be sustained by the Department of Forestry and Fire Protection (CAL FIRE). Due to the high alpine climate of Liberty CalPeco's electric service territory, late fall and winter months present a seasonal swing of reduced risk due to snow conditions as compared to spring and summer months. Liberty CalPeco personnel operate with consideration of stringent fire safety requirements for high risk areas and conditions. Currently, a combination of Red Flag Warning (RFW) notifications, interpretations from the Reax predictive tool, and information gathered from Liberty CalPeco weather stations will help determine avenues and countermeasures to mitigate the threat of utility-caused fire ignitions during

[1] Navigant Consulting, Inc., a Guidehouse company (Navigant) assisted Liberty CalPeco in preparing this report for filing, based on the information the utility provided. The information presented in this report represents Navigant's professional judgment based on the information available at the time this report was prepared with Liberty CalPeco's overall decision-making. Navigant is not responsible for the reader's use of, or reliance upon, the Plan, or any decisions based on the Plan. NAVIGANT MAKES NO REPRESENTATIONS OR WARRANTIES, EXPRESSED OR IMPLIED. Readers of this Plan are advised that they assume all liabilities incurred by them, or third parties, as a result of their reliance on the Plan, or the data, information, recommendations, and opinions contained in the report.

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periods of "Normal," "Elevated," and "Extreme" fire ratings. (*See* Fire Potential Index.) These procedures include practices for field operations and maintenance (O&M) activities in applicable areas and conditions.

The FPP establishes procedures and routine operational practices that:

1) Provide employees and contractors an understanding of the enacted processes and procedures that will improve reliable and safe operation of overhead electric facilities in high-risk areas or under fire weather conditions;
2) Establish Liberty CalPeco standards of equipment and vehicle use and operations during fire risk seasons and work near potential ignition sources;
3) Determine work restrictions during cautionary periods issued by internal meteorological and predictive tools and RFWs, as designated by the National Weather Service (NWS);
4) Outline the operational and communication procedures when working adjacent to or immediately after a fire ignition within the service territory;
5) Present the future use of the Fire Potential Index (FPI) as it relates to additional risk measurements that may be warranted and discerning the appropriate operational procedures for field activities; and
6) Introduce general fire safety considerations and precautions for performing work in high risk areas and/or during high risk weather periods.

DEFINITIONS

Activity: Specific operation of a piece of equipment, such as a chainsaw or tractor.

Baseline Fire Tools: Items available to field personnel to prevent and quickly suppress small ignitions for a designated worksite. These tools include but are not limited to:

Fire Box: Container available at the worksite containing fire suppression equipment and additional as deemed appropriate for the performed activity.
Indian Can: Canister containing fire suppressant material.
Shovel: Rounded tip with a length of approximately 48 inches.
Wildland McLeod tool: Fire hand tool used for raking and scraping.

Fire Potential Index: Ranking system that aligns predetermined operational practices with elevated risks restrictions due to the threat of potential ignition. Liberty CalPeco has identified three tiers of risk: normal fire risk, elevated fire risk, and extreme fire risk. The Fire Potential Index tool is currently being developed and will be updated in the next revision cycle of the FPP.

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.

Fire Safety Monitor: Designated field supervisor or crew member responsible for fire safety requirement oversight during Elevated Fire Risk working conditions.

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Manager in Charge: Non-represented employee designated by Liberty CalPeco to implement this policy during normal hours of operation.

Mechanical Operations: Any activity that requires the use of motorized power equipment.

On-call Supervisor: Employee designated by Liberty CalPeco to implement this policy in the absence of the Manager in Charge.

Operating Area: Property on which active operations, including transportation, are to be conducted. The area within 100 feet of the traveled surface of roads is generally considered part of the Operating Area, whether or not it is included in the rights-of-way or easements.

Red Flag Warning (RFW): The National Weather Service will typically declare a RFW within a zone when wind gusts exceed 30 miles per hour (mph), and the relative humidity is less than 20 percent for more than three hours. Other factors considered include timber conditions and forecasts for weather elements, such as dry lightning. Typically, the RFW is issued for a specified period.

ASSESSMENT METHODOLOGY

Liberty CalPeco pursued a structured approach to determining whether an FPP was required for Liberty CalPeco facilities under the Rulemaking (R.) 08-11-005, as described in the final decision. The approach utilized the information collected to identify specific facilities that meet the Plan criteria for inclusion in the FPP. This Plan is sufficient for most routine work activities. In the event a project-specific fire plan is deemed necessary, the Project Manager, or Project Manager's designee, will coordinate with field crew to frame additional criteria. The assessment methodology for the FPP is described below.

1) Liberty/Reax Fire Forecast: Reax is a predictive tool that captures three main methods of fire weather condition measurement: Energy Release Component (ERC), wind gusts, and the Fosberg Fire Weather Index (FFWI). Liberty CalPeco will issue proactive patrols and inspection procedures during applicable work if a triggered scenario is revealed through the predictive software tool. When the Reax tool predicts potential fire weather conditions, the Manager in Charge or designee will refer to the tiered risk categories in this Plan and initiate operational protocols based on the determined rating.

2) Red Flag Warnings: Fire Weather Zone Boundaries were compared to Liberty CalPeco's service territory, and it was identified that the territory spans portions of three different zones. Liberty CalPeco will monitor the applicable zones 271, Zone 272, and Zone 273. Historical data for the past 10 years' RFWs within each of these zones was collected for each occurrence, so that wind data could be collected and evaluated for each identified RFW.[2]

[2] Alerts may be monitored using the links below and Liberty CalPeco will make best efforts to subscribe to automatic alert notifications: http://inws.wrh.noaa.gov/page/faq and https://inws.wrh.noaa.gov/alerts.

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During Red Flag Events, Liberty CalPeco will monitor wind gusts at the peak elevation located at Bliss State Park using the link below or other available data.[3]

Liberty CalPeco has identified 46 Public Safety Power Shut-off (PSPS) zones that are based on isolation points within certain circuits or areas. If Reax forecasts for these zones that the ERC, wind, and FFWI will come within 80%, 90%, or 100% of the thresholds for de-energization, Liberty CalPeco will enact a PSPS upon or just before reaching 100%. During a PSPS event, Liberty CalPeco will suspend noncritical operational work to focus efforts on current conditions and proactive patrols after de-energizing and when restoring power. Liberty CalPeco adheres to the guidelines provided in R. 18-12-005, an open proceeding that prescribes utilities' PSPS processes, among other issues. Liberty CalPeco will provide updated protocols for internal PSPS practices in the 2020 version of its Wildfire Mitigation Plan.

3) Liberty CalPeco Design Standards: An engineer examined the Liberty CalPeco facilities design standards to evaluate the minimum standard for wind loading design. The design standard utilizes the criteria specified in GO 95 Section IV. However, this is a minimum design standard, and facilities are often oversized for a variety of reasons. Liberty CalPeco will review applicable wind loading design standards, monitor regulatory changes to standard design requirements, and update standards for minimum wind loading design criteria as deemed prudent.

4) Wind Data: NWS Remote Automatic Weather Stations were mapped for the area within 25 miles of the Liberty CalPeco service territory. Wind gust data from the NWS site is monitored for each RFQ. The station automatically records the maximum instantaneous gust over the past hour, while wind speed averages are recorded by the stations over 10-minute periods. Because it is not possible to discern if gusts lasted three seconds or more, it is assumed that all maximum gusts meet the three-second criteria to guard against underestimating a fire threat.

   In addition to fire weather and fuels data from the NWS and United States Department of Agriculture National Fire Danger Rating System, Liberty CalPeco tracks instantaneous meteorological conditions received from the 10 weather stations in the service territory. Liberty CalPeco also proposes to install 20 additional weather stations during 2020. The server data capturing meteorological conditions will serve as a principle variable underlying the development of the FPI. Until the FPI is developed and adopted by Liberty CalPeco, operational designations for fire ratings will be derived from the meteorological data expressed above.

5) Mapping: Tiers 2 and 3 of the HFTD are overlaid on the Liberty CalPeco service territory map. All Liberty CalPeco facilities are mapped without underground facilities, which are not subject to the Plan requirements. Operational work within Tier 2 and 3 of the HFTD or in response to issued RFWs are subject to more stringent fire safety requirements, as described in this Plan. The

[3] Bliss State Park: https://wrcc.dri.edu/cgi-bin/rawMAIN.pl?caCDLB

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attached map complies with GO 95 Rule 21.2-D.

6) Fire Potential Index (FPI): The FPI is used as means to develop guidelines for utility and contractor operations and maintenance crews to follow under Liberty CalPeco's defined categories of wildfire risk. The Wildfire Prevention Department is responsible for determining and communicating the FPI on a daily basis. The current status of the FPI will be posted on the Liberty CalPeco intranet and will communicate the status to the Manager in Charge. The FPI rating framework is currently in development.

FIRE POTENTIAL INDEX

Liberty CalPeco is currently developing a FPI methodology that comprehensively assesses the fire risk utilizing several data points to influence operation and maintenance decisions related field work. The FPI forecasting application is anticipated to capture data from situational awareness tools and seven-day projections and will then present a fire ranking that aligns with a "Normal," "Elevated," and "Extreme" fire potential. The FPI is scheduled for completion in 2020 and will be included in the FPP for the next filing cycle.

The three FPI Risk conditions are defined as follows:

Extreme Fire Risk: As determined by the Wildfire Prevention Department, 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. The Extreme Fire Risk status is indicated as "red."

Elevated Fire Risk: As determined by the Wildfire Prevention Department, 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 Elevated Fire Risk status is indicated as "yellow."

Normal Fire Risk: As determined by the Wildfire Prevention Department, Normal Fire Risk is defined as periods where 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 Normal Fire Risk status is the default operational state and the FPI is indicated as "green."

PROCEDURE

General Safety Instructions for Utility and Contractor Crews

- **General Fire Awareness:** During the execution of work activities and use of company equipment and

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vehicles, all operating personnel must be actively aware and consider actions that may reduce fire risks and personal exposure.

- Activities such as idling a vehicle near brush, grassland, or at-risk vegetation is prohibited, and drivers should always perform a perimeter check after exiting the vehicle and inspect underneath for potential fuel risk.
- The Fire Safety Monitor/Leader should remain alert of crew vehicles traveling over low vegetation or brush.
- Smoking is only permitted in site-specific designated areas or within a 10' clearance of any vegetation or grass.
- When possible during days with high temperatures and low humidity, wet down adjacent vegetation when performing work with equipment that may spark or has an exposed exhaust system.
- Consider the need to disable reclosers on potentially impacted equipment or de-energize circuits within the operating area to prevent potential sparks.

- **Safety Briefings:** When assigned to work within wildland areas, the tailboard safety briefing shall include review of the following:
  - 1. The current daily FPI Rating;
  - 2. Job site-specific fire risks;
  - 3. Elimination of tasks that pose an elevated fire risk;
  - 4. Actions to reduce personal exposure; and
  - 5. Any other possible fire risk mitigation actions.
- **Fire Safety Tools Responsibility:** The crew leader must check the availability and condition of the baseline fire tools during the daily truck safety inspection and make fire suppression equipment readily accessible near operating areas.
- **Tailboard Fire Briefings**: If, during the execution of work, the job site-specific fire risks are elevated, the crew leader shall stop work and hold a tailboard meeting to discuss revised actions. If warranted by elevated jobsite risk conditions, the crew leader may elect to declare the next highest level of Fire Potential Index Rating for the job site.
- **Fire Reporting and Actions:**
  - All fires must be reported to dispatch and follow appropriate incident reporting requirements to the CPUC Safety Enforcement Division (SED).
  - If the work crew cannot quickly extinguish a minor fire or rapidly accelerating fire conditions are encountered, the crew leader shall immediately report the situation to dispatch and relocate the crew, equipment, and materials to a safe location.

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Safety Instructions for Working Under Extreme Risk Index Conditions

When working under Extreme Risk Index conditions, the crew leader shall designate a crew member as a Fire Safety Leader. The Fire Safety Leader will not be assigned any job site tasks and will be assigned the specific duties of fire risk awareness and prevention, detecting and extinguishing minor fires, and placing the baseline fire tools in a location that is easily accessible by the work crew. Liberty CalPeco will utilize alerts from Reax to determine if a proactive patrol of electrical equipment and vegetation clearances is warranted. Liberty CalPeco will activate proactive fire patrols if it receives a 90% or 100% alert from Reax.

Operating Procedures – Extreme Risk Index Conditions

As a general rule, all work should be suspended during Extreme Risk Index conditions		
Activity	**Description**	**Stipulations**
Travel with Company Trucks and Vehicles	**Paved roads or bare improved roads**	**Allowed**
	Off-road and unimproved roads	**Permitted for performance of only those activities that reduce wildfire risks and/or restore customer outages**
Facility Inspections and Patrols	**Driving and climbing inspections of poles, equipment, vegetation and security**	**Assign a Fire Safety Leader**
Overhead Line Corrective Maintenance and Repairs	**Replacement and/or installation of splices, fuses, lightning arrestors, and insulators**	**Perform only those activities that reduce wildfire risks and/or restore customer outages; assign a Fire Safety Leader**
Pole Setting and Removal	**Paved roads or bare improved roads**	**Not allowed**
	Off-road and unimproved roads	**Not allowed**
Replacing and Stringing Conductor	**Paved roads or bare improved roads**	**Not allowed**
	Off-road and unimproved roads	**Not allowed**
Vegetation Management Near Poles and Towers	**Use of powered hand tools (chainsaws and weed eaters) to clear low-lying vegetation and noxious and invasive plant control**	**Not allowed**
T&D Overhead Line Vegetation Management	**Minor maintenance tree trimming and associated branch removals using buckets and/or hand tools to maintain company clearance standards**	**Perform only those activities that reduce wildfire risks and/or restore Customer outages; assign a Fire Safety Leader**
	Cycle trimming using buckets and/or hand tools to maintain company clearance standards	**Not allowed**
Reciprocating Construction Equipment	**Truck mounted compressors and/or generators**	**Assign a Fire Safety Leader**
	Non-truck mounted compressors and/or generators	**Not allowed**
	Welders and grinders	**Not allowed**
Blasting	**Blasting of rock with explosives**	**Not allowed**

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Safety Instructions for Working Under Elevated Risk Index Conditions

When working under Elevated Risk Index conditions, the crew leader shall designate a crew member as a Fire Safety Monitor. In addition to the assigned work duties at the job site, the Fire Safety Monitor is responsible for fire risk awareness and prevention, detecting and extinguishing minor fires, and placing the baseline fire tools in a location that is easily accessible by the work crew.

Operating Procedures - Elevated Risk Index Conditions

As a general rule, work may be limited during Elevated Risk Index conditions		
Activity	**Description**	**Stipulations**
Travel with Company Trucks and Vehicles	**Paved roads or bare improved roads**	**Allowed**
	Off-road and unimproved roads	**Permitted for performance of only those activities allowed under High Risk Conditions**
Facility Inspections and Patrols	**Driving and climbing inspections of poles, equipment, vegetation and security**	**Assign a Fire Safety Monitor**
Overhead Line Corrective Maintenance and Repairs	**Replacement and/or installation of splices, fuses, lightning arrestors and insulators**	**Perform only those activities which reduce wildfire risks and/or restore Customer outages; assign a Fire Safety Monitor**
Pole Setting and Removal	**Paved roads or bare improved roads**	**Assign a Fire Safety Monitor**
	Off-road and unimproved roads	**Not allowed**
Replacing and Stringing Conductor	**Paved roads or bare improved roads**	**Assign a Fire Safety Monitor**
	Off-road and unimproved roads	**Not allowed**
Vegetation Management Near Poles and Towers	**Use of powered hand tools (chainsaws and weed eaters) to clear low-lying vegetation and noxious and invasive plant control**	**Not allowed**
T&D Overhead Line Vegetation Management	**Minor maintenance tree trimming using buckets and/or hand tools to maintain company clearance standards**	**Perform only those activities which reduce wildfire risks and/or restore Customer outages; assign a Fire Safety Monitor**
	Cycle trimming and associated tree/branch removals using buckets and/or hand tools to maintain company clearance standards	**Not allowed**
Reciprocating Construction Equip.	**Truck-mounted compressors and/or generators**	**Assign a Fire Safety Monitor**
	Non-truck-mounted compressors and/or generators	**Not allowed**
	Welders and grinders	**Not allowed**
Blasting	**Blasting of rock with explosives**	**Not allowed**

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Safety Instructions for Working Under Normal Risk Index Conditions

When working under Normal Risk Fire Index conditions, workers should still maintain high awareness of the fire risk and safety hazards within the operating area.

Operating Procedures - Normal Risk Index Rating

As a general rule, work can proceed during Normal Risk Index conditions following General Safety Instructions		
Activity	**Description**	**Stipulations**
Travel with Company Trucks and Vehicles	**Paved roads or bare improved roads**	**No restrictions**
	Off-road and unimproved roads	**No restrictions**
Facility Inspections and Patrols	**Driving and climbing inspections of poles, equipment, vegetation and security**	**No restrictions**
Overhead Line Corrective Maintenance and Repairs	**Replacement and/or installation of splices, fuses, lightning arrestors and insulators**	**No restrictions**
Pole Setting and Removal	**Paved roads or bare improved roads**	**No restrictions**
	Off-road and unimproved roads	**No restrictions**
Replacing and Stringing Conductor	**Paved roads or bare improved roads**	**No restrictions**
	Off-road and unimproved roads	**No restrictions**
Vegetation Management Near Poles and Towers	**Use of powered hand tools (chainsaws and weed eaters) to clear low-lying vegetation and noxious and invasive plant control**	**Follow safety instructions for working under High Risk Index conditions**
T&D Overhead Line Vegetation Management	**Minor maintenance tree trimming using buckets and/or hand tools to maintain company clearance standards**	**No restrictions**
	Cycle trimming and associated tree/branch removals using buckets and/or hand tools to maintain company clearance standards	**No restrictions**
Reciprocating Construction Equipment	**Truck mounted compressors and/or generators**	**No restrictions**
	Non-truck mounted compressors and/or generators	**Assign a Fire Safety Monitor**
	Welders and grinders	**Assign a Fire Safety Monitor**
Blasting	**Blasting of rock with explosives**	**Truck must have permit with restrictions; assign a Fire Safety Monitor**

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ACTIVE FIRE SAFETY PRECAUTIONS

Liberty CalPeco values safety as a core competency of field and hot work performed in high risk areas. For all contractors and utility personnel, these precautions exist for critical work performed within Tiers 2 and 3 of the HTFD under threat of wildland fire. If a small fire ignites and rapid suppression is not achieved by field personnel, field crew are directed to stop work, retreat to a safe area adjacent to the work site, immediately call upon dispatch services, and alert nearby fire and impacted agencies and entities.

All contractors and utility personnel working adjacent to active wildland fires should consider the following:

- Use Personal Protective Equipment (P.P.E.) when working within or adjacent to and uncontrolled fire perimeter if required at the determination of the Fire Safety Leader or designee.
- Maintain communication lines through operational protocols when a fire ignites,. This includes correspondence made with office and dispatch centers, local law and fire agencies, customers, and impacted jurisdictions, if any.[4] The Incident Commander (IC), once designated, should coordinate and effectuate these activities.
- Take increased precaution when driving near flames or in smoky conditions. Road obstructions may pose a risk, and drivers and crew should have a general awareness of nearby access and evacuation routes.
- Determine if de-energizing any potentially impacted electrical assets or those that pose a risk to spreading the active wildland fire is necessary. Field crew should adhere to Liberty CalPeco PSPS procedures where applicable.
- Designate an Emergency Operations Center and adhere to the Incident Command Structure led by an IC to oversee response, fire exhaustion, and recovery efforts.
- Perform any routine investigations after fire suppression. Report incident data to SED and execute necessary reporting procedures as part of Liberty CalPeco business practices.

ATTACHMENTS

1) Attachment 1- Liberty CalPeco service territory map
2) Attachment 2- Liberty CalPeco service territory overlaid with the HFTD

[4] Notifications to customers during and post-fire suppression should occur in English and Spanish.

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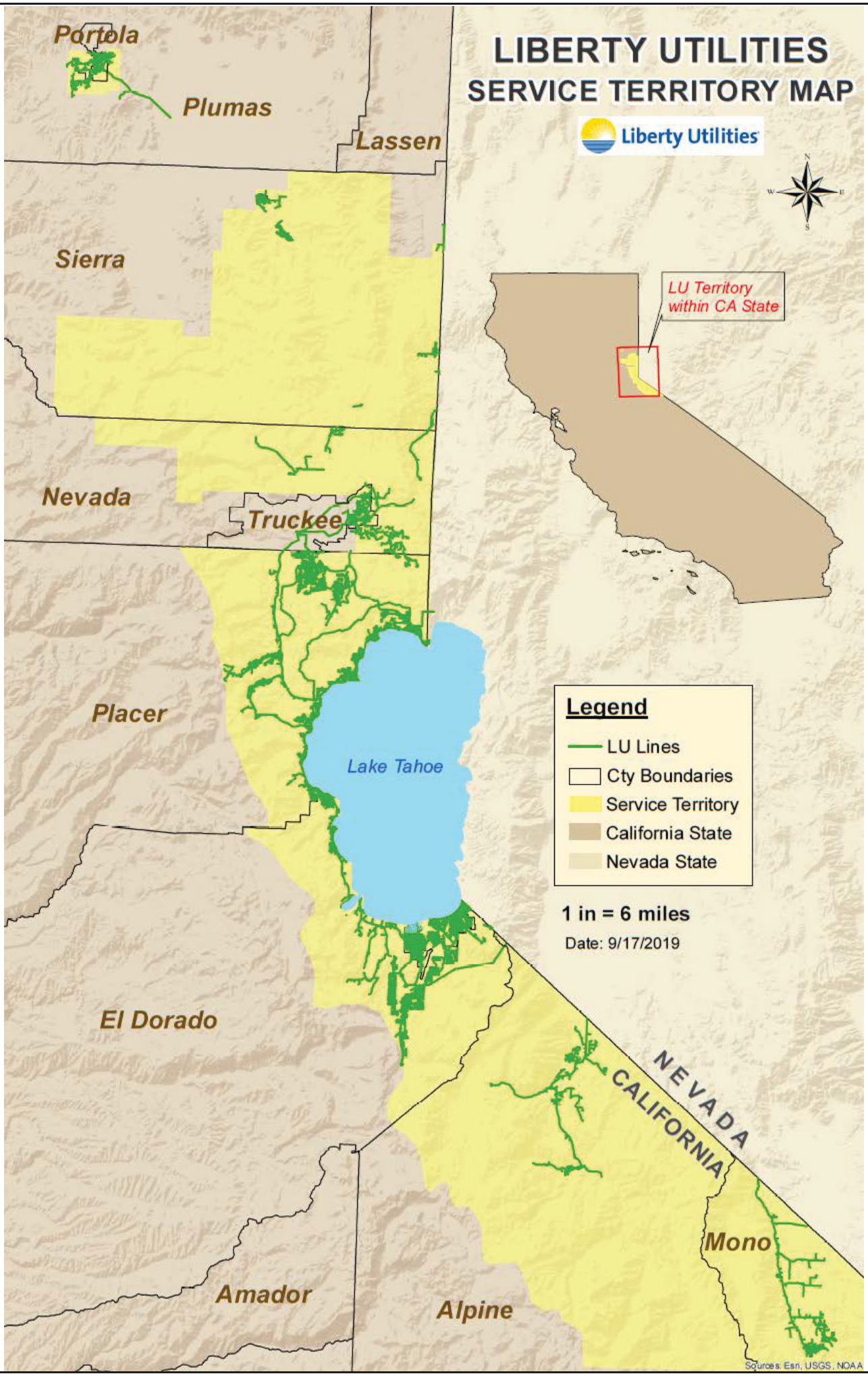
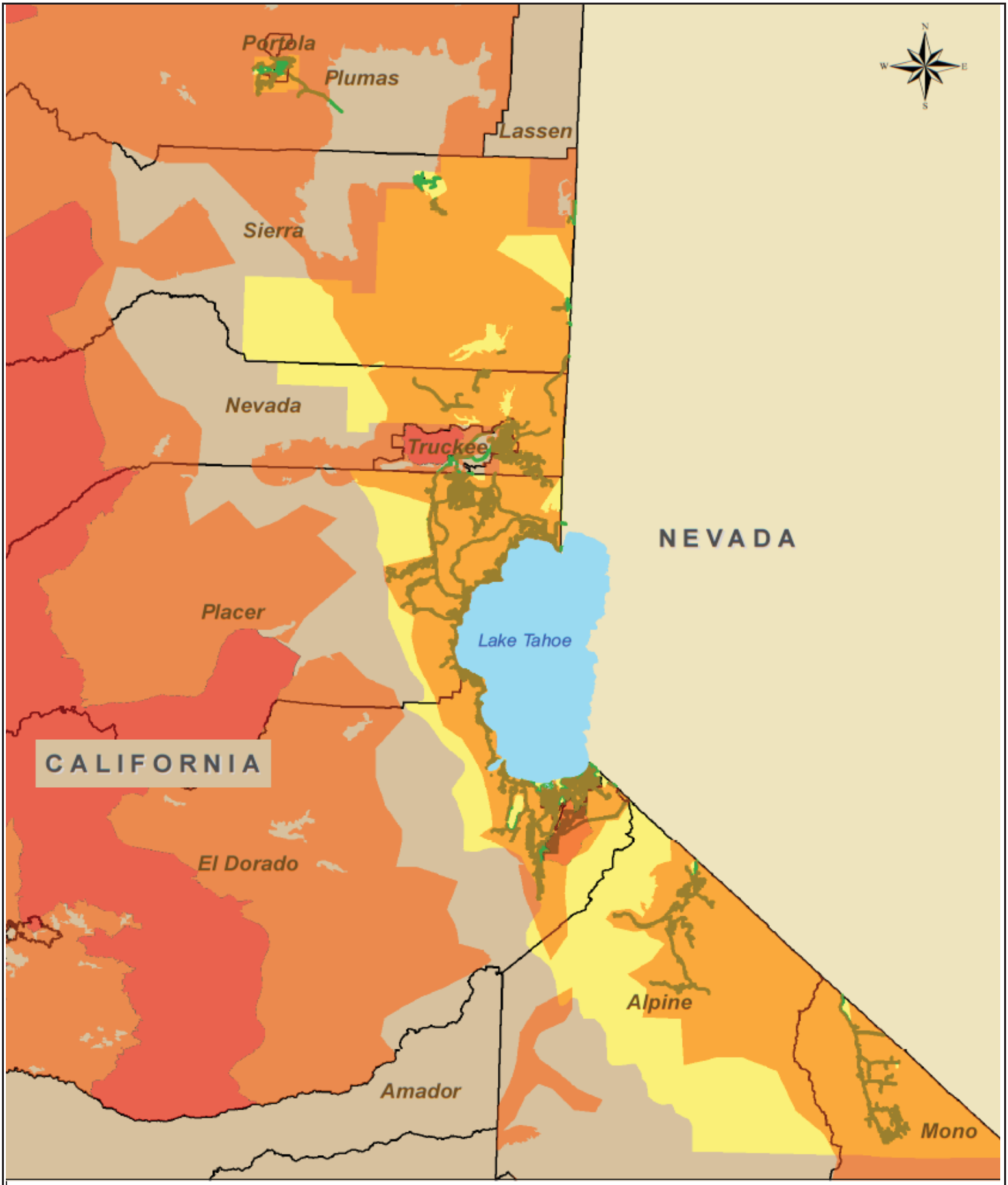

LIBERTY UTILITIES
SERVICE TERRITORY MAP
Liberty Utilities
Portola
Plumas
Lassen
Sierra
Nevada
Truckee
Placer
Lake Tahoe
El Dorado
Amador
Alpine
Mono
NEVADA
CALIFORNIA
LU Territory within CA State
Legend
LU Lines
Cty Boundaries
Service Territory
California State
Nevada State
1 in = 6 miles
Date: 9/17/2019
Sources: Esri, USGS, NOAA



Legend

- LU Lines
- California
- Nevada
- Service Territory
- Tier 2 Fire Threat
- Tier 3 Fire Threat

HIGH FIRE THREAT WITHIN LIBERTY UTILITIES SERVICE TERRITORY

Date: 6/27/2019

1 in = 11 miles

Liberty Utilities
701 National Ave
Tahoe Vista, CA 96148