State of California – A Natural Resources Agency
Gavin Newsom, Governor

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Caroline Thomas Jacobs, Director

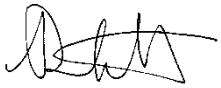
October 21, 2024

Dear Stakeholders,

Enclosed is the Office of Energy Infrastructure Safety's (Energy Safety's) Annual Report on Compliance regarding Southern California Edison Company's execution of its 2022 Wildfire Mitigation Plan.

This Annual Report on Compliance is hereby published as of the date of this letter. Southern California Edison Company may file a public response to this Annual Report on Compliance within 14 calendar days of the date of publication. Comments must be submitted to Energy Safety's E-Filing system in the 2022 Annual Report on Compliance docket.[1]

Sincerely,



Patrick Doherty
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[1] Submit responses to the 2022-ARC docket via the Office of Energy Infrastructure Safety's E-Filing system (https://efiling.energysafety.ca.gov/Lists/DocketLog.aspx?docketnumber=2022-ARC [accessed October 17, 2024]).

OFFICE OF ENERGY INFRASTRUCTURE SAFETY

2022 ANNUAL REPORT ON COMPLIANCE

SOUTHERN CALIFORNIA EDISON COMPANY

October 2024

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

Executive Summary

The Office of Energy Infrastructure Safety (Energy Safety) is tasked with evaluating and either approving or denying Wildfire Mitigation Plans (WMP) annually filed by electrical corporations pursuant to Public Utilities Code section 8386 *et seq*. The law also directs Energy Safety to ensure that the electrical corporations have complied with their plans.

Energy Safety's evaluation found that Southern California Edison (SCE) completed 63 of its 65 (97%) 2022 WMP initiatives, including all ten initiatives with the largest allocated expenditure.

In general, SCE spent nearly $16 million less than what was budgeted for its 2022 WMP initiatives (1%). Despite spending less, SCE reports that it met nearly all its 2022 WMP initiative activity targets.

With respect to SCE's ignition risk and outcome metrics in 2022, performance metrics data showed that the ignition rate for a mile of distribution line is approximately three times that of a mile of transmission line. Ignition counts and rates have both been slowly climbing since 2015 excepting a large decrease in 2022. The primary drivers for ignitions were object contact and facility/equipment failures. Total unplanned outage events increased in 2022 within the SCE territory, with 20,000 outages reported.

SCE also reported two fatalities and five injuries related to wildfires ignited by SCE equipment in 2022. The ignition risk and outcome metric results for 2022 show that there are still opportunities for SCE to improve its performance and reduce the risk of catastrophic wildfire caused by its equipment.

SCE's inconsistent WMP initiative reporting created a challenge for Energy Safety's assessment of compliance. SCE must improve the consistency and transparency of in initiative identification and tracking, including the financial reporting. Additionally, the independent evaluator identified quality control and data accuracy issues and accordingly made recommendations concerning these shortfalls.

Pursuant to Government Code section 15475.1, Energy Safety's primary objective is to ensure that electrical corporations reduce wildfire risk and comply with energy infrastructure safety measures. Energy Safety's annual compliance evaluation of Southern California Edison Company's (SCE's) execution of its 2022 WMP is a comprehensive look at whether SCE's execution of its 2022 WMP reduced the risk of SCE's equipment igniting a catastrophic wildfire.

Energy Safety conducted its compliance review process through a variety of means including audits, field inspections, and analysis of data submitted by SCE to Energy Safety. Energy Safety also evaluated several performance metrics, including metrics that reveal the risk on SCE's system. Energy Safety additionally reviewed the SCE's self-assessment in its Electrical Corporation Annual Report on Compliance and the findings of its independent evaluator.

Energy Safety acknowledges SCE undertook significant efforts in 2022 to reduce its wildfire risk through the achievement of most of its initiatives and program targets. Energy Safety found that SCE's missed targets did not significantly hinder SCE's ability to mitigate its wildfire risk. In general, the margins of the misses were minor and attributable to external environmental permitting issues or material procurement delays.

On balance, SCE was largely successful in executing its plan for wildfire risk mitigation. While Energy Safety acknowledges that SCE achieved its overarching objectives, there are still areas for improvement and continued learning.

1. Introduction

This Annual Report on Compliance presents the Office of Energy Infrastructure Safety's (Energy Safety's) statutorily mandated assessment of Southern California Edison Company's (SCE's) compliance with its 2022 Wildfire Mitigation Plan (WMP). (Pub. Util. Code § 8386.3(c)(4).)

In the sections that follow, Energy Safety describes the statutory regulatory basis for its reporting, the information supplied by the electrical corporation, and the independent analysis conducted by Energy Safety to examine SCE's execution of its 2022 WMP and how its infrastructure performed in 2022 relative to wildfire risk. Finally, Energy Safety provides its conclusions, observations, and recommendations for further actions by SCE.

1.1 Compliance Process

The statutory objective of electrical corporation wildfire mitigation planning efforts is to ensure that electrical corporations are constructing, maintaining, and operating their infrastructure in a manner that will minimize the risk of catastrophic wildfire. (Pub. Util. Code § 8386(a).) The objective of a WMP, and consequently the focus of Energy Safety's assessment of compliance, is wildfire risk reduction. An electrical corporation's obligations extend beyond meeting WMP targets.

Energy Safety's 2022 Compliance Process establishes the parameters for this Annual Report on Compliance. Consistent with the 2022 Compliance Process, this report considers the totality of all compliance assessments completed with respect to SCE's 2022 WMP. This includes all inspection, audit, investigation, and data analysis work performed by Energy Safety, as well as separate electrical corporation and independent third-party evaluations of compliance. (Compliance Process, p. 6.)

Energy Safety evaluated whether the electrical corporation implemented the initiatives in its 2022 WMP, looking specifically at whether the electrical corporation funded and performed the work stated for each initiative. (Compliance Process, p. 7.)

Energy Safety also considered the electrical corporation's stated goals and objectives of its plan, its performance of initiatives essential to reducing wildfire risk and achieving its objectives, and the ultimate performance of its infrastructure relative to its wildfire risk, as measured by changes in the occurrence of events that correlate to wildfire risk. (Compliance Process, p. 7.)

2. Southern California Edison Company 2022 Wildfire Mitigation Plan Update

SCE submitted a WMP in 2020 covering a three-year term from 2020 through the end of 2022. SCE submitted annual updates to the original 2020 WMP, including a 2022 Update to its 2020 WMP that is the subject of this Annual Report on Compliance. (2022 WMP Update.)

Energy Safety approved SCE's 2022 WMP Update on July 20, 2022. (2022 WMP Approval.)

SCE's stated purpose was to continue successful wildfire mitigation practices from previous years in the face of intensifying drought and extreme wildfire risk. Among other things, SCE's 2022 WMP Update proposed to implement:

- An enhanced, comprehensive grid hardening strategy anchored in advanced risk modeling and analytics;
- Risk-informed inspection, repair and replacement programs;
- Continuation of comprehensive vegetation management;
- Deployment of improved technology, data, and risk analytics capabilities;
- Increased situational awareness and response;
- Augmented activities for Public Safety Power Shutoff (PSPS) mitigation, resilience and community engagement, particularly on behalf of under-represented groups and access and functional needs (AFN) customers; and
- New mitigations to address risks associated with transmission lines and secondary conductors. (2022 WMP Update, p. 2.)

In general, SCE described its 2022 WMP Update as an

> …actionable, measurable, and adaptive plan through 2022 to reduce the risk of potential ignitions associated with SCE's electrical infrastructure in High Fire Risk Areas (HFRA) by increasing system hardening, bolstering situational awareness, and enhancing operational practices. These objectives are, in turn, supported and enabled by greater data governance, improvements in risk assessment and mapping, as well as other stakeholder and resource initiatives. (2022 WMP Update, p. 124.)

In its 2022 WMP Update, SCE developed a risk-ranked list for each activity, typically using circuit segments or structures, and indicated what percentage of the scope addressed the circuit segments or structures in the top 25% of the risk-ranked list.

SCE noted that this metric represents a relative risk-ranking based on SCE's risk models, and not absolute risk. SCE stated that

> …[m]erely mitigating the top 25% highest-risk circuit segments or structures could incorrectly lead to a conclusion that the remaining absolute risk on the system after those mitigations are completed is acceptable… [and] it is only absolute risk that should determine where to stop. (2022 WMP Update, p. 127.)

The 65 initiatives from SCE's 2022 WMP Update are assessed as part of this review and described in Section 5.1, Table 2.

3. Southern California Edison Company Annual Report on Compliance

Public Utilities Code section 8386.3(c)(1) directs electrical corporations to file a report addressing the electrical corporation's compliance with their WMP during a compliance year. This document is known as the Electrical Corporation Annual Report on Compliance (EC ARC).

Energy Safety's 2022 Compliance Process outlines the requirements for an EC ARC. The EC ARC must detail the electrical corporation's self-assessment of its compliance with the 2022 WMP during the 2022 compliance period. Energy Safety's 2021 Compliance Operational Protocols also apply to EC ARCs for the 2022 compliance period. These Protocols outline the requirements for EC ARCs, including an assessment by the electrical corporation of whether it met its intended risk reduction by implementing all of its approved WMP initiatives (i.e., the degree to which initiative activities have reduced ignition probabilities), and descriptions of all planned WMP initiative spending versus actual WMP initiative spending, and an explanation of any differentials between the planned and actual spending. (Compliance Operational Protocols, p. 10.)

SCE submitted its EC ARC to Energy Safety on March 31, 2023. (EC ARC.) The following is a narrative summary of the EC ARC.

In general, SCE asserted that it substantially complied with its 2022 WMP Update. According to SCE's EC ARC, in 2022 SCE tracked 39 specific wildfire-related initiatives included in its 2022 WMP Update, including grid hardening, enhanced inspection and repair programs, continuation of extensive vegetation management, increased situational awareness and response, and augmented activities for PSPS resilience and community engagement, particularly for underrepresented groups and access and functional needs (AFN) customers. (EC ARC, p. 2.)

SCE also tracked ten additional vegetation management targets in response to an Energy Safety requirement to create 2022 targets for additional vegetation management initiatives

that can be measured quantitatively. SCE tracked these as additional vegetation management targets but did not characterize them as formal WMP activities[1].

3.1 EC ARC Information on Initiative Completion

To substantiate its claim that it substantially complied with its 2022 WMP Update, SCE stated that it met its intended risk reduction by completing the majority of its approved WMP initiatives and activities. Specifically, in 2022, SCE reported it met or exceeded 38 of its 39 WMP initiatives and all of its additional vegetation management targets. For the one initiative not reported as complete (Legacy Facilities, SH-11), SCE claimed to have achieved two out of three of the sub-components of that initiative's target and stated it would complete the remaining component in Q3 2023.

SCE's claimed activities completed in 2022 with met or exceeded targets include the following:

- Installed approximately 1,399 circuit miles of covered conductor;
- Completed approximately 15 miles of undergrounding;
- Completed 316,823 distribution and 34,358 transmission structure inspections in HFRA;
- Completed hazard tree assessments on more than 460 circuits and performed over 5,000 hazard tree mitigations;
- Cleared brush at the base of more than 100,000 poles;
- Installed 160 weather stations, resulting in more than 1,620 weather stations installed across HFRA;
- Equipped approximately 560 weather station locations with artificial intelligence/machine learning (AI/ML) capabilities for improved forecasting;
- Installed 16 High-Definition (HD) cameras;
- Installed 15 sectionalization devices;
- Installed/replaced fusing at 369 fuse locations; and
- Delivered more than 3,460 Critical Care Backup Batteries (CCBB) to medical baseline customers and issued 3,129 customer rebates for portable power stations and portable generator rebates. (EC ARC, p. 3.)

SCE reported its self-assessment of its compliance with its 2022 WMP Update initiatives within the EC ARC. The main location for this information is in Attachment A and Attachment B of the EC ARC. Attachment A generally concerns quantifiable, "top-line" WMP initiative targets, while Attachment B contains information on expenditures toward certain WMP initiative activities that may not be contained in Attachment A. A summary table of SCE's self-

[1] SCE identified a total of 49 initiatives with targets within its 2022 WMP Update, Table 5.3-1, which consists of 39 initiatives representing various categories, and the additional ten vegetation management initiatives not described as formal WMP activities.

reported compliance with both types of WMP initiatives is in Appendix B to this document. While a narrative summary of SCE's self-reported compliance appears below, please refer to Appendix B for more information.

As already mentioned, SCE noted one instance of non-attainment of a WMP initiative in its EC ARC. For Legacy Facilities (SH-11), SCE had three 2022 WMP Update targets: 1) perform four projects and 13 assessments related to Grounding Studies and Lightning Arrestor Assessments and Remediations, 2) perform one low voltage site hardening project at a legacy facility site, and 3) perform grid hardening on three hydro control circuits at three legacy facility sites. SCE claimed to have met all of these targets in 2022, except that it only completed two of the targeted three grid hardening projects on legacy hydro control circuits. SCE stated that external environmental permitting issues were the cause of the delay in the missed project. (EC ARC, Attach. A, p. 16.)

From the examination of the data provided in the EC ARC, it is also apparent that there was one other missed WMP activity target. SCE aggregates its ongoing pilot programs under one WMP activity - Alternative Technology Pilot Programs (7.1.E). SCE allocated planned expenditure for this activity and discussed seven unique pilots within it. For one pilot, Early Fault Detection (EFD), SCE targeted to install 50 EFD units. SCE reported in its EC ARC that it only installed 46 units (92%) due to material procurement delays. SCE did not provide specific updates to its goal(s) for the other six pilots.

Additionally, 16 WMP activities that were included in SCE's 2022 WMP Update were either not described or accounted for in the SCE EC ARC WMP Attachment A – SCE Q4 2022 WMP Progress Update (Updated) and were only mentioned in Attachment B – SCE 2022 WMP Cost Variance Explanation where specifics to targets achieved are generally not stated or were not included in the SCE ARC at all. (2022 WMP Update, pp. 128-149.) Unaccounted activities appear in Table 1.

Table 1: SCE Unaccounted WMP Initiative Activities

2022 WMP Update Initiative	2022 Activity
Intrusive Pole Inspections (7.3.4.6)	This activity has an annual quantitative goal of 143,600 intrusive pole inspections.

2022 WMP Update Initiative	2022 Activity
Alternate Technology Pilot Programs (7.1.E)	Complete the respective goal(s) for the seven following ongoing pilot programs: • Meter Alarming for Downed Energized Conductor: Continue to collect data on downed wire for covered conductor. • Advanced Unmanned Aerial Systems Study: Continue to build internal UAS capabilities by equipping and training first responders on the use of UAS. Continue exploring flight automation. Evaluate next generation drone platforms. • Distribution Open Phase Detection: Continue monitoring the performance of existing units, perform lab testing on algorithms, and capture learnings in an assessment report. Install logic at two additional locations. • Asset Defect Detection Using Machine Learning Object Detection: Utilize new tagging platform for tagging asset defects for training and testing algorithms. Continue prioritizing and developing algorithms to identify defects on assets from images. • Early Fault Detection: Install 50 units and strive to add up to 150 early fault detection units. • High Impedance Relays: Expand the existing pilot to 20 additional locations. • Satellite and Other Imaging Technology for Fire Spotting: Develop a user interface (UI) and an application programming interface (API) for the pilot. Work to develop a map to be housed online that will display fire ignitions from HD cameras and/or satellites.

2022 WMP Update Initiative	2022 Activity
Additional Efforts to Manage Community and Environmental Impacts (7.3.5.1)	This activity has an annual planned expenditure with a routine goal of maintaining processes to mitigate the customer and environmental impacts of vegetation management activities and thus address the risk of unanticipated constraints to executing work in a timely fashion.
Improvements of Inspections (7.3.5.6)	This activity did not have an annual planned expenditure. The purpose of this activity is to identify and address deficiencies in inspection protocols and implementation by improving training and evaluation of inspectors.
Other Discretionary Inspections of Vegetation Around Distribution Electric Lines and Equipment, Beyond Inspections Mandated by Rules and Regulations (7.3.5.9)	This activity did not have an annual planned expenditure. The purpose of this activity is to inspect rights-of-way and adjacent vegetation that may be hazardous, which exceeds or otherwise go beyond those mandated by rules and regulations, in terms of frequency, inspection checklist requirements or detail, analysis of and response to problems identified, or other aspects of inspection or records kept.
Other Discretionary Inspections of Vegetation Around Transmission Electric Lines and Equipment, Beyond Inspections Mandated by Rules and Regulations (7.3.5.10)	This activity did not have an annual planned expenditure. The purpose of this activity is to conduct inspections of rights-of-way and adjacent vegetation that may be hazardous, which exceeds or otherwise go beyond those mandated by rules and regulations, in terms of frequency, inspection checklist requirements or detail, analysis of and response to problems identified, or other aspects of inspection or records kept.

2022 WMP Update Initiative	2022 Activity
Patrol Inspections of Vegetation Around Distribution Electric Lines and Equipment (7.3.5.11)	This activity has an annual planned expenditure with a routine goal of conducting supplemental patrols to provide assurance that vegetation encroachments do not occur during peak fire season and high wind conditions.
Patrol Inspections of Vegetation Around Transmission Electric Lines (7.3.5.12)	This activity has an annual planned expenditure with a routine goal of conducting supplemental patrols to provide assurance that vegetation encroachments do not occur during peak fire season and high wind conditions.
Identification and Remediation of At-Risk Species (7.3.5.15)	This activity did not have an annual planned expenditure. The purpose of this activity is specific actions not otherwise described in other WMP initiatives, taken to reduce the ignition probability and wildfire consequences attributable to at-risk species, such as trimming, removal, and replacement.
Vegetation Management to Achieve Clearances Around Electric Lines and Equipment (7.3.5.20)	This activity has an annual planned expenditure with a routine goal of maintaining vegetation management activities to maintain enhanced clearance distances from transmission and distribution lines and equipment.

2022 WMP Update Initiative	2022 Activity
Vegetation Management Activities Post-Fire (7.3.5.21)	This activity did not have an annual planned expenditure. The purpose of this activity is activities or protocols that differentiate post-fire vegetation management from programs described in other WMP initiatives; supporting documentation for the tool and/or standard the utility uses to assess the risk presented by vegetation post-fire; and how the utility includes fire-specific damage attributes into its assessment tool/standard.
Protocol for PSPS Re-energization (7.3.6.5)	This activity has an annual planned expenditure with a routine goal of maintaining the established protocols for patrolling lines after a PSPS de-energization and the development of a weather visualization tool.
PSPS Incident Management Team (7.3.6.6.1)	This activity has an annual planned expenditure with a routine goal of maintaining the PSPS incident management team (IMT) that oversee the execution of the PSPS protocol.
Customer Resiliency Equipment (7.3.6.6.2.1.3)	This activity has an annual planned expenditure with a routine goal of continuing to provide customers with financial assistance in developing their resiliency to prepare for de-energizations from PSPS and other emergencies.
Allocation Methodology Development and Application (7.3.8.1)	This activity has an annual planned expenditure with a routine goal of using risk analysis to determine the key drivers of ignition risk, develop mitigation options, and evaluate these options using risk and other analysis to select preferred mitigation options and the scope of work necessary.

2022 WMP Update Initiative	2022 Activity
Preparedness and Planning for Service Restoration (7.3.9.5)	This activity has an annual planned expenditure with a routine goal of continuing to conduct distribution and transmission line patrols subject to PSPS events.

3.2 EC ARC Information on Initiative Funding

Information supplied by SCE on its initiative funding appears in Appendix C. While a narrative description appears below, please refer to Appendix C for more detail.

In general, SCE spent nearly $16 million less than what was budgeted for its 2022 WMP Update initiatives (1%). Despite spending less, SCE reports that it met nearly all its 2022 WMP Update initiative and activity targets. In the case of the one partially completed initiative, SCE reported only using $436,000 of the $2.5 million budgeted for the initiative. (EC ARC, Attach. B.)

4. Independent Evalutor ARC for Southern California Edison Company

Energy Safety, in consultation with the Office of the State Fire Marshal, annually publishes a list of entities qualified to serve as independent evaluators (IEs) of WMP compliance. (Pub. Util. Code § 8386.3(c)(2)(A).) Each electrical corporation is then required to hire an IE from the list to perform an independent WMP compliance assessment. (Pub. Util. Code § 8386.3(c)(2)(B)(i).)

The IE reviews and assesses the electrical corporation's compliance with its approved WMP. As part of its review the IE must determine whether the electrical corporation failed to fund any activities included in its plan.

On July 1 of each year, the IE issues its Independent Evaluator's Annual Report on Compliance (IE ARC) for a given electrical corporation. (Pub. Util. Code § 8386.3(c)(2)(B)(i).)

The 2022 IE ARC for SCE was prepared by NV5, Inc. and Guidehouse, Inc. (IE ARC.) The IE ARC included a review of the wildfire mitigation initiatives and activities implemented by SCE in 2022, accounted for whether SCE met its performance objective targets, had underfunded

any of those initiatives, and had followed its quality assurance/quality control (QA/QC) processes.

The IE determined that SCE largely achieved the initiative objectives (IE ARC, p. 3.) The IE also determined that, while SCE did not spend all of the budgeted funds for several initiatives, this did not appear to significantly impact completion of SCE's portfolio of its initiatives. Finally, the IE concluded that SCE applied and followed its QA/QC processes. (IE ARC, p. 3.)

The IE conducted a field inspection of SCE's field-verifiable WMP initiatives, to analyze SCE's progress toward meeting its WMP initiative commitments. To test SCE's assertion that it met its 2022 WMP Update initiative target of completing tree attachment remediation on at least 500 trees, the IE sampled 29 of the 964 claimed tree attachment remediations in SCE's HFRA. The IE revealed that 99 tree attachment remediations should not have been included in the 964 total claimed remediations as they were a result of tree attachments burned in a fire in prior years being replaced. (IE ARC, pp. 18-19.)

Finally, due to issues in physically accessing the original sample of 29 remediation locations, an additional sample of 26 assets was developed and used for the field verification. The IE performed the field verifications on the updated sampled items and did not identify areas of concerns or discrepancies. (IE ARC, p. 19.)

The IE made observations and recommendations to SCE:

- With respect to tree attachment remediation, the IE identified a gap in controls for data accuracy and tracking. The IE recommended SCE develop additional controls to ensure the accuracy of the information and data being used.
- The IE identified concerns with the location data for some of SCE's large volume initiative activities, which caused delays and issues with the verifications.
- While the IE believed that SCE maintains a robust QA/QC program over its vegetation management and asset inspection activities, this program could be enhanced with detailed program mapping to provide a more comprehensive layout of the programs and their associated documentation.

In general, the IE found that of the 39 WMP initiative activities evaluated, one small volume quantifiable initiative activity target was not met: Legacy Facilities (SH-11). (IE ARC, p. 3.)[2] SCE self-reported this missed target. The IE also evaluated seven of the ten additional vegetation management targets established by SCE and found all seven activities to be in compliance. (IE ARC, p. 11, p. 17, pp. 24-26.)

[2] Energy Safety's assessment of compliance for the 2022 WMP Update determined that an additional 26 activities should be counted as initiatives, including the 10 vegetation management initiatives already identified in the 2022 WMP Update, Table 5.3-1, which results in a total of 65 initiatives that were assessed as part of this review. Although the IE determined that one initiative was not met, Energy Safety determined that two initiative activities were not met due to a review of information received from SCE subsequent to the IE ARC's publication.

5. Energy Safety Evaluation of WMP Initiative Completion

Energy Safety's evaluation of SCE's performance in completing its initiative activities in 2022 indicates that SCE attained 63 of its 65 initiative activities and made significant progress on the two remaining uncompleted initiatives. The subsections below describe Energy Safey's evaluation of SCE's execution of its WMP in 2022.

5.1 Southern California Edison Company 2022 WMP Initiative Activities Assessed by Energy Safety

As already noted, SCE, the IE, and Energy Safety produced differing figures on the total number of initiative activities and their targets that appear in SCE's 2022 WMP Update. Energy Safety's final determination is based on information sourced from SCE's 2022 WMP Update, quarterly data reports (QDR), EC ARC, IE ARC, and responses to data requests from SCE. (EC ARC; IE ARC; 2022 Q4 QDR; DR 236; DR 236 Response; DR 246; DR 246 Response; DR 256; DR 256 Response.) The 65 initiatives that Energy Safety assessed are shown in Table 2.

Table 2: SCE WMP Initiative Activities in its 2022 WMP Update

2022 WMP Update Initiative	2022 Activity (2022 WMP Update, pp. 128-149)
Weather Stations (SA-1) (7.3.2.1)	Install 150 weather stations. Strive to install up to 175 weather stations subject to resource and execution constraints.
Weather and Fuels Modeling (SA-3) (7.3.2.5)	Equip 400 weather station locations with machine learning capabilities. Strive to equip up to 500 weather station locations with machine learning capabilities subject to resource and execution constraints.

2022 WMP Update Initiative	2022 Activity (2022 WMP Update, pp. 128-149)
Fire Science (SA-8) (7.3.2.3.2)	Calibrate fire potential index (FPI) 2.0 and evaluate its performance over the 2022 fire season. Improve fire spread modeling applications (i.e., FireSim and FireCast) to include 1) fire suppression and 2) buildings destroyed by fire.
Distribution Fault Anticipation (DFA) (SA-9) (7.3.2.2.1)	Evaluate the performance of installed fault anticipation technology and develop recommendations for future use.
High Definition (HD) Cameras (SA-10) (7.3.2.2.2)	Install 10 HD cameras. Strive to install up 20 HD cameras subject to resource and execution constraints.
Covered Conductor (SH-1) (7.3.3.3.1)	Install 1,100 circuit miles of covered conductor. Strive to install up to as many as 1,250 circuit miles of covered conductor subject to resource constraints and other execution risks.
Undergrounding Overhead Conductor (SH-2) (7.3.3.16)	Install 11 circuit miles of targeted undergrounding. Strive to install up to 13 miles of targeted undergrounding subject to resource constraints and other execution risks.
Branch Line Protection Strategy (SH-4) (7.3.3.7)	Install or replace fusing at 350 fuse locations. Strive to install or replace fusing at up to 483 locations subject to resource constraints and other execution risks.
Remote Controlled Automatic Reclosers (RARs) Settings Update (SH-5) (7.3.3.9)	Install 15 sectionalizing devices such as RARs/Remote Controlled Switches (RCSs). Strive to install up to 31 sectionalizing devices such as RARs/RCSs subject to resource constraints and other execution risks.

2022 WMP Update Initiative	2022 Activity (2022 WMP Update, pp. 128-149)
Circuit Breaker Relay Hardware for Fast Curve (SH-6) (7.3.3.2)	Replace / upgrade 104 relay units. Strive to replace / upgrade up to 125 relay units subject to resource constraints and other execution risks.
PSPS-Driven Grid Hardening Work (SH-7) (7.3.3.8.1)	Evaluate approximately 70 highly impacted circuits including 2021 PSPS events to determine additional deployment of PSPS mitigations.
Transmission Open Phase Detection (SH-8) (7.3.3.17.1)	Deploy open phase logic on five transmission lines. Strive to deploy open phase logic on up to 11 transmission lines subject to resource constraints and other execution risks.
Tree Attachment Remediation (SH-10) (7.3.3.3.2)	Remediate 500 tree attachments. Strive to complete up to 700 tree attachment remediations subject to resource constraints and other execution risks.
Legacy Facilities (SH-11) (7.3.3.17.2)	Hydro Control Circuits: Perform grid hardening on three control circuits at three legacy facility sites. Low Voltage Site Hardening: Perform one grid hardening project at a legacy facility site. Grounding studies/lightning arrestor assessments and remediations: Perform four remediation projects at legacy facility sites. Additionally, complete 13 assessments.
Microgrid Assessment (SH-12) (7.3.3.8.2)	Actively attempt to obtain approval of easement with the landowner of the microgrid pilot site. If approval is received, move forward with microgrid project. If an approval is not received by June 30, 2022, or rejected, start to pursue other microgrid opportunities.

2022 WMP Update Initiative	2022 Activity (2022 WMP Update, pp. 128-149)
C-Hooks (SH-13) (7.3.3.15)	Replace C-Hooks on 10 structures. Strive to replace up to 21 C-Hooks subject to execution risks such as environmental clearance.
Long Span Initiative (LSI) (SH-14) (7.3.3.12)	Remediate 1,400 spans. Strive to remediate up to 1,800 spans subject to resource constraints and other execution risks.
Vertical Switches (SH-15) (7.3.3.17.3)	Install 15 vertical switches. Strive to install 25 vertical switches.
Vibration Damper Retrofit (SH-16) (7.3.3.3.3)	Retrofit vibration dampers on 100 structures where covered conductor is already installed. Strive to retrofit vibration dampers on up to 115 structures where covered conductor is already installed.
Rapid Earth Fault Current Limiter (REFCL) (SH-17) (7.3.3.12.2)	Produce a report summarizing performance and lessons learned from previous REFCL installations. Initiate engineering and material purchase for the ground fault neutralizers (GFNs) to be constructed in 2023 at Acton and Phelan Substations.
Distribution High Fire Risk-Informed (HFRI) Inspections and Remediations (IN-1.1) (7.3.4.9.1)	Inspect 150,000 structures via both ground and aerial inspections. Strive to inspect up to 180,000 structures via both ground and aerial inspections subject to resource constraints and other factors.
Transmission High Fire Risk-Informed (HFRI) Inspections and Remediations (IN-1.2) (7.3.4.10)	Inspect 16,000 structures via both ground and aerial inspections. Strive to inspect up to 19,000 structures via both ground and aerial inspections subject to resource constraints and other factors.

2022 WMP Update Initiative	2022 Activity (2022 WMP Update, pp. 128-149)
Infrared Inspection of Energized Overhead Distribution Facilities and Equipment (IN-3) (7.3.4.4)	Inspect 4,408 distribution overhead circuit miles.
Infrared Inspection, Corona Scanning, and High-Definition Imagery of Energized Overhead Transmission Facilities and Equipment (IN-4) (7.3.4.5)	Inspect 1,000 transmission overhead circuit miles.
Generation High Fire Risk-Informed Inspections and Remediations in HFRA (IN-5) (7.3.4.9.2)	Inspect 190 generation-related assets.
Inspection and Maintenance Tools (IN-8) (7.3.4.3)	Design capability for the legacy distribution ground inspection application in 2022 to transition to a single digital inspection platform in a future year. Conduct assessment to identify enhancements for field crew application and evaluate applicability of enhancements by year-end 2022.
Transmission Conductor & Splice Assessment (IN-9) (7.3.4.5.1)	Inspect 75 spans with Line Vue, inspect 50 splices with X-Ray, and obtain 5 conductor samples. Strive to inspect up to 150 spans with Line Vue, inspect up to 70 splices with X-Ray, and obtain up to 15 conductor samples subject to execution constraints.
Hazard Tree Management Program (VM-1) (7.3.5.16.1)	Inspect 330 circuits and assess any trees with strike potential along those circuits.

2022 WMP Update Initiative	2022 Activity (2022 WMP Update, pp. 128-149)
Expanded Pole Brushing (VM-2) (7.3.5.5.2)[3]	Inspect and clear (where clearance is needed) 78,700 poles. Strive to inspect and clear (where clearance is needed) up to 170,000 distribution poles. These poles are in addition to poles subject to California Public Resources Code (PRC) 4292.
Expanded Clearances for Legacy Facilities (VM-3) (7.3.5.5.3)[4]	Perform expanded clearances at 32 legacy facility locations.
Dead and Dying Tree Removal (VM-4) (7.3.5.16.2)	Inspect 900 unique circuits and prescribe mitigation for dead and dying trees with strike potential along those circuits.
Vegetation Management Work Management Tool (Arbora) (VM-6) (7.3.5.19)	Implement the following programs within Arbora: • Hazardous tree program (HTP) (including dead & dying tree removal and hazard tree mitigation) • Routine line clearing
Customer Care Programs (PSPS-2) (7.3.6.6)	Enroll 2,750 customers in the Critical Care Battery Backup (CCBB) program. Continue to identify new eligible customers each month to offer the program. Issue 3,000 rebates and strive to issue 4,000 rebates for portable power station rebates and portable generator rebates.
Customer Education and Engagement – Community Meetings (DEP-1.2) (7.3.10.1.1)	Host at least nine wildfire community safety meetings in targeted communities based on the impact of 2021 PSPS events and ongoing wildfire mitigation activities.

[3] This initiative is identified as 7.3.5.5.2 in the 2022 WMP Update narrative but identified as 7.3.5.5.1 in Table 12 of the 2022 WMP Update.
[4] This initiative is identified as 7.3.5.5.3 in the 2022 WMP Update narrative but identified as 7.3.5.5.2 in Table 12 of the 2022 WMP Update.

2022 WMP Update Initiative	2022 Activity (2022 WMP Update, pp. 128-149)
Customer Education and Engagement – Marketing Campaign (DEP-1.3) (7.3.10.1.2)	Reach a PSPS awareness goal of 50%.
SCE Emergency Responder Training (DEP-2) (7.3.9.1)	Have all PSPS IMT and task force members fully trained and qualified or requalified by July 1, 2022. Expand unmanned aircraft system (UAS) program by technically qualifying 50 UAS operators that have passed the Federal Aviation Administration (FAA) 107 exam.
Customer Research and Education (DEP-4) (7.3.10.1.3)	Conduct at least six PSPS-related surveys in 2022, including: • PSPS tracker survey, • Wildfire safety community meeting feedback survey, • Community resource center/community crew vehicles (CRC/CCV) feedback survey, • In-language wildfire mitigation communications effectiveness survey, • PSPS working group and advisory board survey, and • Voice of customer survey.
Aerial Suppression (DEP-5) (7.3.10.3)	Enter into three memorandum of understandings (MOUs) with local county fire departments to provide standby cost funding for up to five aerial suppression resources strategically placed around the SCE service area.
Wildfire Safety Data Mart and Data Management (WiSDM/Ezy) (DG-1) (7.3.7.1)	Ezy Data: Expand cloud AI platform and enable light detection and ranging (LiDAR) data storage capability. WiSDM: Complete wildfire data repository design and consolidate wildfire data storage onto wildfire data repository platform.

2022 WMP Update Initiative	2022 Activity (2022 WMP Update, pp. 128-149)
Detailed Inspections and Management Practices for Vegetation Clearances Around Distribution Electrical Lines, and Equipment (7.3.5.2)	Inspect approximately 600,000 trees adjacent to distribution lines, based on current unique tree inventory count. Tree inventory is subject to fluctuations based on actual field conditions.
Detailed Inspections and Management Practices for Vegetation Clearances Around Transmission Infrastructure Lines, and Equipment (7.3.5.3)	Inspect approximately 100,000 trees adjacent to transmission lines, based on current unique tree inventory count. Tree inventory is subject to fluctuations based on actual field conditions.
Emergency Response Vegetation Management Due to Red Flag Warning or Other Urgent Climate Conditions (7.3.5.4)	Inspect and clear (where clearance is needed) approximately 26,400 poles in identified areas of concern (AOC). These poles are included in the count of the expanded pole brushing (VM-2) goal.
Recruiting and Training of Vegetation Management Personnel (7.3.5.14)	Maintain the current staffing levels of 95 International Society of Arboriculture (ISA) certified arborists performing work within SCEs service territory. This is inclusive of SCE personnel and contractors.
Substation Inspections (7.3.5.17)	Perform substation inspections on 169 substations. Inspect all 169 substations five times a year for General Order (GO) 174 substations (146 substations) and International Organization for Standardization (ISO) & Federal Energy Regulatory Commission (FERC) substations (23 substations), for a total of 845 inspections.
Vegetation Inspections Audited Annually (7.3.5.13)[5]	Perform risk-based circuit mile quality control inspections on approximately 15% of the total tree inventory.

[5] SCE occasionally refers to this activity as VM-5.

2022 WMP Update Initiative	2022 Activity (2022 WMP Update, pp. 128-149)
Poles Brushed per PRC 4292 (7.3.5.5.1)	Inspect and clear (where clearance is needed) 55,100 poles in state responsibility area with the equipment identified by PRC 4292.
LiDAR Vegetation Inspections – Distribution (7.3.5.7)	Inspect at least 500 HFRA circuit miles.
LiDAR Vegetation Inspections – Transmission (7.3.5.8)	Inspect at least 1600 HFRA circuit miles.
Substation Vegetation Inspections (7.3.5.18)	Perform vegetation management substation inspections in Tier 2 & Tier 3, totaling 169 substations.
Intrusive Pole Inspections (7.3.4.6)[6]	This activity has an annual quantitative goal of 143,600 intrusive pole inspections.
Additional Efforts to Manage Community and Environmental Impacts (7.3.5.1)	This activity has an annual planned expenditure with a routine goal of maintaining processes to mitigate the customer and environmental impacts of vegetation management activities and thus address the risk of unanticipated constraints to executing work in a timely fashion.
Improvements of Inspections (7.3.5.6)	This activity did not have an annual planned expenditure. The purpose of this activity is to identify and address deficiencies in inspection protocols and implementation by improving training and evaluation of inspectors.

[6] Activities without an SCE-defined initiative identifier contain additional routine operations conducted by SCE. However, SCE's 2022 WMP Update did not characterize these as formal WMP initiatives.

2022 WMP Update Initiative	2022 Activity (2022 WMP Update, pp. 128-149)
Other Discretionary Inspections of Vegetation Around Distribution Electric Lines and Equipment, Beyond Inspections Mandated by Rules and Regulations (7.3.5.9)	This activity did not have an annual planned expenditure. The purpose of this activity is to inspect rights-of-way and adjacent vegetation that may be hazardous, which exceeds or otherwise go beyond those mandated by rules and regulations, in terms of frequency, inspection checklist requirements or detail, analysis of and response to problems identified, or other aspects of inspection or records kept.
Other Discretionary Inspections of Vegetation Around Transmission Electric Lines and Equipment, Beyond Inspections Mandated by Rules and Regulations (7.3.5.10)	This activity did not have an annual planned expenditure. The purpose of this activity is to conduct inspections of rights-of-way and adjacent vegetation that may be hazardous, which exceeds or otherwise go beyond those mandated by rules and regulations, in terms of frequency, inspection checklist requirements or detail, analysis of and response to problems identified, or other aspects of inspection or records kept.
Patrol Inspections of Vegetation Around Distribution Electric Lines and Equipment (7.3.5.11)	This activity has an annual planned expenditure with a routine goal of conducting supplemental patrols to provide assurance that vegetation encroachments do not occur during peak fire season and high wind conditions.
Patrol Inspections of Vegetation Around Transmission Electric Lines and Equipment (7.3.5.12)	This activity has an annual planned expenditure with a routine goal of conducting supplemental patrols to provide assurance that vegetation encroachments do not occur during peak fire season and high wind conditions.
Identification and Remediation of At-Risk Species (7.3.5.15)	This activity did not have an annual planned expenditure. The purpose of this activity is specific actions not otherwise described in other WMP initiatives, taken to reduce the ignition probability and wildfire consequences attributable to at-risk species, such as trimming, removal, and replacement.

2022 WMP Update Initiative	2022 Activity (2022 WMP Update, pp. 128-149)
Vegetation Management to Achieve Clearances Around Electric Lines and Equipment (7.3.5.20)	This activity has an annual planned expenditure with a routine goal of maintaining vegetation management activities to maintain enhanced clearance distances from transmission and distribution lines and equipment.
Vegetation Management Activities Post-Fire (7.3.5.21)	This activity did not have an annual planned expenditure. The purpose of this activity is activities or protocols that differentiate post-fire vegetation management from programs described in other WMP initiatives; supporting documentation for the tool and/or standard the utility uses to assess the risk presented by vegetation post-fire; and how the utility includes fire-specific damage attributes into its assessment tool/standard.
Protocols for PSPS Re-energization (7.3.6.5)	This activity has an annual planned expenditure with a routine goal of maintaining the established protocols for patrolling lines after a PSPS de-energization and the development of a weather visualization tool.
PSPS Incident Management Team (7.3.6.6.1)	This activity has an annual planned expenditure with a routine goal of maintaining the PSPS IMT that oversee the execution of the PSPS protocol.
Customer Resiliency Equipment (7.3.6.6.2.1.3)[7]	This activity has an annual planned expenditure with a routine goal of continuing to provide customers with financial assistance in developing their resiliency to prepare for de-energizations from PSPS and other emergencies.

[7] SCE occasionally refers to this activity as 7.3.6.6.2.3

2022 WMP Update Initiative	2022 Activity (2022 WMP Update, pp. 128-149)
Allocation Methodology Development and Application (7.3.8.1)	This activity has an annual planned expenditure with a routine goal of using risk analysis to determine the key drivers of ignition risk, develop mitigation options, and evaluate these options using risk and other analysis to select preferred mitigation options and the scope of work necessary.
Preparedness and Planning for Service Restoration (7.3.9.5)	This activity has an annual planned expenditure with a routine goal of continuing to conduct distribution and transmission line patrols subject to PSPS events.

2022 WMP Update Initiative	2022 Activity (2022 WMP Update, pp. 128-149)
Alternative Technology Pilot Programs (7.1.E)[8]	Complete the respective goal(s) for the seven following ongoing pilot programs: • Meter Alarming for Downed Energized Conductor: Continue to collect data on downed wire for covered conductor. • Advanced Unmanned Aerial Systems Study: Continue to build internal UAS capabilities by equipping and training first responders on the use of UAS. Continue exploring flight automation. Evaluate next generation drone platforms. • Distribution Open Phase Detection: Continue monitoring the performance of existing units, perform lab testing on algorithms, and capture learnings in an assessment report. Install logic at two additional locations. • Asset Defect Detection Using Machine Learning Object Detection: Utilize new tagging platform for tagging asset defects for training and testing algorithms. Continue prioritizing and developing algorithms to identify defects on assets from images. • Early Fault Detection: Install 50 units and strive to add up to 150 early fault detection units. • High Impedance Relays: Expand the existing pilot to 20 additional locations. • Satellite and Other Imaging Technology for Fire Spotting: Develop a UI and an API for the pilot. Work to develop a map to be housed online that will display fire ignitions from HD cameras and/or satellites.

5.2 Energy Safety Analysis of WMP Initiative Activity Attainment – Data Requests

The majority of SCE's 2022 WMP Update initiative activities in 2022 are accounted for in SCE's

[8] SCE aggregates its ongoing pilot programs under this activity. SCE allocates planned expenditure for this activity to be distributed to all pilot programs.

EC ARC, IE ARC, and QDR submissions. However, SCE's approved 2022 WMP Update proposed several WMP initiative activities for the 2022 compliance year that were not described in its EC ARC, IE ARC, or in the QDR submissions reviewed by Energy Safety. Each activity outlined in SCE's WMP must be accounted for by SCE in its EC ARC and QDR submissions. In cases where this accounting did not occur, Energy Safety requested further data from SCE on those activities that were unaccounted for, including a description of the work completed in 2022. A list of nine initiatives that were unaccounted for in other documents and for which Energy Safety requested additional information through a data request appears in Table 3 (DR 246 and DR 256). [9]

Table 3: SCE WMP Initiative Data Requests

2022 WMP Update Initiative	Unaccounted 2022 WMP Update Activity	Selected SCE Description of 2022 Work in Response to Data Request
Intrusive Pole Inspections (7.3.4.6)	143,600 intrusive pole inspections	Completed 142,759 intrusive pole inspections. (DR 246, Request 1.)
Pole Loading Assessment Program (7.3.4.13) [10]	2,000 pole remediations	The Pole Loading Assessments Program ended in 2021. The WMP, Table 12 incorrectly identified a target of 2,000 pole remediations, which are not part of the Pole Loading Assessment Program but an outcome from the program. Therefore, this initiative is removed from the initiative count for 2022. (DR 246, Request 2.)

[9] This table only describes nine of the 16 unaccounted initiatives listed in Section 3 of this ARC that required further information in the form of a data request response. Energy Safety did not submit data requests for seven initiatives and relied on statements made within the IE ARC, Table 2-6 – Verification of Funding to conclude that additional work was completed for the respective initiatives, and the results of the SVM Audit Report for vegetation management initiatives.

[10] This initiative is numbered 7.3.4.14 on Page 385 of the 2022 WMP Update but numbered 7.3.4.13 on Table 12 within same document.

2022 WMP Update Initiative	Unaccounted 2022 WMP Update Activity	Selected SCE Description of 2022 Work in Response to Data Request
New Technologies and Innovations / Alternative Technology Pilot Programs (7.1.E)	Achievement status for the following sub-initiatives: • Meter Alarming for Downed Energized Conductor • Advanced Unmanned Aerial Systems Study • Distribution Open Phase Detection	• *Meter Alarming for Downed Energized Conductor* – For 2022, SCE completed the data collection on downed wire for covered conductors. Upon analysis of the few cases where downed wire covered conductor was energized, no data was generated from the meters that could be used to determine that a wire was down. • *Advanced Unmanned Aerial Systems Study* – SCE increased its fleet to over 150 aircraft registered through the FAA and added 50 new UAS pilots. They support WMP efforts through continuous utility pole inspections and system troubleshooting. SCE explored flight automation demonstration during 2022. SCE also acquired a Censys Technologies Sentara aircraft system for Beyond Visual Line of Sight and entered discussions with Skydio aircraft to facilitate development of a utility and inspections-focused UAS solution. • *Distribution Open Phase Detection (D-OPD)* – In 2022, SCE completed installation of D-OPD logic at the two planned locations in 2022 and continued to monitor open phase detection events on existing installs.

2022 WMP Update Initiative	Unaccounted 2022 WMP Update Activity	Selected SCE Description of 2022 Work in Response to Data Request
New Technologies and Innovations / Alternative Technology Pilot Programs (7.1.E) (continued)	• Asset Defect Detection Using Machine Learning Object Detection • High Impedance Relays • Satellite and Other Imaging Technology for Fire Spotting	• *Asset Defect Detection Using Machine Learning Object Detection* – In 2022, SCE completed deployment of insulator and transformer models and began development work on transmission defect models to broaden the ability to identify defects in both distribution and transmission. • *High Impedance Relays* – In 2022, SCE expanded the existing pilot to add an additional 20 locations in HFRA to assess the effectiveness of detecting high impedance (Hi-Z) conditions. SCE also conducted an analysis of the pilot installations, monitoring and analyzing the data from events captured in 2022 and prior. • *Satellite and Other Imaging Technology for Fire Spotting* – In 2022, SCE developed a UI and API to visualize and observe fires using satellites and other data sources. This has allowed SCE to better monitor fire activity occurring within SCE's service territory without having to physically drive to these locations. SCE developed Weather and Fire Detections systems maps that provide the customer real-time situational awareness capabilities to weather and fire events in SCE's service territory, which is housed on SCE.com. (DR 256, Request 1.)

2022 WMP Update Initiative	Unaccounted 2022 WMP Update Activity	Selected SCE Description of 2022 Work in Response to Data Request
Additional Efforts to Manage Community and Environmental Impacts (7.3.5.1)	In 2022, SCE will continue to explore expanding its overall customer service evaluation effort to measure customer interactions associated with its vegetation management work. SCE will also continue its efforts to improve its software and data capabilities to integrate data across various vegetation management programs and bundle vegetation management work.	SCE tracked customer feedback and continued to expand its overall customer service evaluation effort to improve overall customer service. (DR 256, Request 2.)
Patrol Inspections of Vegetation Around Distribution Electric Lines and Equipment (7.3.5.11)	SCE performs supplemental vegetation inspections to verify certain circuits are free from vegetation encroachments into the minimum vegetation clearance distance. SCE assesses the need for patrols based on various risk factors and analyzes all methods of alternative patrols, selecting the most appropriate patrol based on the need for inspection.	In 2022, inspections from supplemental patrols resulted in more than 6,000 mitigations. (DR 256, Request 3.)

2022 WMP Update Initiative	Unaccounted 2022 WMP Update Activity	Selected SCE Description of 2022 Work in Response to Data Request
Patrol Inspections of Vegetation Around Transmission Electric Lines and Equipment (7.3.5.12)	Refer to 7.3.5.11 description above.	Refer to response provided for 7.3.5.11. (DR 256, Request 4.)
Vegetation Management to Achieve Clearances Around Electric Lines and Equipment (7.3.5.20)	No targets for 2022 aside from continuation of data analysis to determine the effectiveness of enhanced clearances on reducing vegetation-caused outages and ignition events. The results and methodology used in the initial analysis will be used to refine SCE's approach as appropriate.	SCE performs enhanced line clearances to mitigate the risk of vegetation contact with energized conductors. In addition to this work, SCE goes beyond compliance regulations and completes expanded line clearing to further target wildfire mitigation and SCE is participating in a joint investor-owned utility (IOU) study on enhanced vegetation clearances for wildfire mitigation technical work. (DR 256, Request 5.)

2022 WMP Update Initiative	Unaccounted 2022 WMP Update Activity	Selected SCE Description of 2022 Work in Response to Data Request
Protocols for PSPS Re-energization (7.3.6.5)	SCE will be further piloting the use of UAS and remote sensing capabilities to assist with PSPS patrols and data gathering for situational awareness during any events that may be necessary in 2022. Although SCE is in the early phases of the pilot, UAS are proving to be valuable to supplement in-person patrols, allowing qualified personnel to more quickly assess circuit conditions on conductor segments that traverse rugged and heavily vegetated terrain and would otherwise require a lengthy hike or helicopter patrols. If the UAS pilot continues to be successful, SCE plans to update its protocols to increase use of UAS, where appropriate. SCE's use of UAS is described in more detail in Section 7.3.8.1 of this WMP. In addition, SCE intends to explore the potential for installing remote sensors on SCE equipment to help assess a circuit's readiness to return to service.	For circuits de-energized in 2022 due to PSPS, SCE followed its standard protocols for re-energization. If multiple circuits were de-energized, the restoration plans prioritized circuits based on various factors such as the sequence of de-energization, essential services, and critical care customers. Upon receiving the all-clear declaration from weather services and approval from the PSPS IMT incident commander to begin restoration, restoration notifications were sent to impacted customers, and circuits or circuit segments under PSPS protocols were patrolled and re-energized. Some circuits required helicopter patrols, which were coordinated by the PSPS IMT. (DR 256, Request 6.)

2022 WMP Update Initiative	Unaccounted 2022 WMP Update Activity	Selected SCE Description of 2022 Work in Response to Data Request
Customer Resiliency Equipment (7.3.6.6.2.3)	Section 7.3.6.6.2.3 Customer Resiliency Equipment, pg. 454 and Table 5.3.1 Customer Care Programs PSPS-2, pg. 146.	*Critical Care Backup Battery Program:* In SCE's 2022 WMP Update, SCE set a goal to deliver 2,750 free backup batteries. SCE surpassed its goal by delivering 3,467 free batteries. *Portable Power Station and Portable Generator Rebate Program:* As stated in SCE's 2022 WMP Update, SCE implemented targeted marketing strategies including display retargeting campaigns, geo-targeted ads for customers in HFRAs, and paid search campaigns. This approach enabled SCE to process 3,129 rebates, exceeding its 2022 goal. (DR 256, Request 7.)

2022 WMP Update Initiative	Unaccounted 2022 WMP Update Activity	Selected SCE Description of 2022 Work in Response to Data Request
Preparedness and Planning for Service Restoration (7.3.9.5)		In 2022, circuit restorations from PSPS events were prioritized based on safety, particularly regarding night-time patrolling risks. The PSPS IMT collaborated with Weather Services to anticipate re-energization periods, allowing for the pre-positioning of qualified restoration personnel, including patrol aircraft, to minimize restoration time and customer outage duration. Post de-energization, the PSPS IMT monitored the period of concern (POC) and developed restoration plans, prioritizing circuits based on various factors such as the sequence of de-energization, essential services, and critical care customers. Field crews, often pre-positioned, typically conducted patrols within eight hours, with visual inspections usually occurring during daylight for safety and accuracy. (DR 256, Request 8.)

5.3 Energy Safety Analysis of Substantial Vegetation Management Audits

Public Utilities Code section 8386.3(c)(5) requires Energy Safety to perform an audit to determine whether the electrical corporation "substantially complied with the substantial portion" of its vegetation management requirements in its WMP. (Pub. Util. Code § 8386.3(c)(5)(C).) Energy Safety refers to this audit as the Substantial Vegetation Management (SVM) audit. Pursuant to section 8386(c)(5), Energy Safety conducted an audit of SCE's compliance with the vegetation management requirements in its 2022 WMP Update.

On July 31, 2024, Energy Safety issued its SVM Audit for SCE. (SVM Audit.) The purpose of the SVM Audit is to assesses whether SCE met its quantitative commitments and verifiable

statements in its 2022 WMP Update related to vegetation management activities.

In the SVM Audit, Energy Safety found that SCE did not provide information consistent with the completion of work for two of the 21 vegetation management initiatives and required SCE to provide a Corrective Action Plan response within 20 days from the issuance of the audit with a final SVM Audit Report issued by Energy Safety after review of the plan. (SVM Audit, p. 1.) On August 20, 2024, SCE submitted its corrective action plan to Energy Safety (SVM Action Plan.) In response, Energy Safety issued its SVM Audit Report on October 1, 2024, which found the two initiatives identified in the SVM Audit were subsequently verified as completed. (SVM Audit Report.)

The specific findings from Energy Safety's SVM Audit Report are included as part of the detailed findings described in Appendix D.

5.4 Energy Safety Field Inspection Analysis

Energy Safety performs inspections utilizing an electrical corporation's initiative activity data applicable to the WMP year compliance period. Energy Safety conducts two types of inspections: 1) inspections of grid hardening and other work related to WMP initiatives related to physical infrastructure, and 2) inspections of general wildfire safety concerns at an inspection site. The second category of general wildfire safety concerns is not strictly related to WMP initiatives, and these inspections are additional to Energy Safety's WMP initiative-related inspection work.[11]

In this Section, Energy Safety distinguishes its inspection activities related to WMP initiatives on grid hardening and physical infrastructure (WMP Inspections) and inspection activities related to general wildfire safety concerns (GWS Inspections).

For the 2022 compliance period, Energy Safety conducted 6,546 GWS inspection activities and 1,332 WMP inspection activities in SCE's territory. The results of these inspection activities are described in Table 4 and Table 5.[12]

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[11] If Energy Safety observes a general wildfire safety concern during an inspection activity, then that is recorded as a "defect" or "Wildfire Safety Concern (WSC)." If Energy Safety observes non-compliance with a WMP initiative during an inspection activity that an electrical corporation claimed to have occurred at a site, then that is recorded as a "violation."

[12] Energy Safety uses the term "inspection activity" to refer to a specific question or condition assessed during an inspection. For example, if Energy Safety is inspecting a particular utility pole and looking for eight different conditions associated with a WMP initiative, then that would count as eight WMP inspection activities. If a general wildfire safety inspection occurs at the same time at that utility pole, and 20 general wildfire safety conditions are assessed, then that would count as 20 general wildfire safety inspection activities. In this example, a single utility pole inspection would lead to 28 inspection activities.

Table 4: Energy Safety 2022 Observations of General Wildfire Safety Concerns

GWS Inspection Metrics for 2022 in SCE's Territory	Totals
Total GWS Inspection Activities	6,546
Total Defects or Wildfire Safety Concerns Observed	23
Rate of Defects or Wildfire Safety Concerns	0.35%
Defects Overdue for Correction	0
Defect Timely Correction Rate	100%

Table 5: Energy Safety 2022 Observations of WMP Violations

WMP Inspection Metrics for 2022 in SCE's Territory	Totals
Total WMP Inspection Activities	1,332
Total Violations Observed	21
Violation Rate	1.58%
Violations Overdue for Correction	0
Violation Timely Correction Rate	100%

5.5 Southern California Edison Company WMP Initiative Activity Attainment in 2022

The two 2022 WMP Update initiative activities that SCE did not complete are summarized in Table 6. Energy Safety identified the incomplete initiatives is based on the analysis of SCE's EC ARC, the IE ARC, and Energy Safety's independent examination of SCE's transmission and distribution system, as well as data submitted by SCE for the 2022 compliance year. Based on its analysis, Energy Safety believes that any activity not described in Table 6 is complete for the 2022 compliance year.

The first unmet initiative, the Alternate Technology Pilot Programs initiative (7.1.E), completed only 92% of the targeted 50 early fault protection installations. For this initiative,

SCE spent $2.3 million of the budgeted $7 million (33%). The budgeted amount represented 0.14% of the overall 2022 WMP Update budget.

For the second unmet initiative, the Legacy Facilities initiative (7.3.3.17.2, SH-11), one of its targets was not met. In this case, SCE completed work on two of three targeted hydroelectric control circuits in 2022 and completed the third targeted circuit in 2023. For this initiative, SCE spent $436,000 of the budgeted $2.6 million. This budgeted amount represented 0.03% of the overall 2022 WMP Update budget.

The misses associated with these initiatives were relatively small and not associated with large portions of SCE's overall budget for 2022 WMP Update work. As a result, Energy Safety believes that these two initiative misses did not materially hinder SCE's ability to execute its 2022 WMP Update.

Table 6: SCE Non-Attainment of WMP Initiative Activities

2022 WMP Update Initiative	2022 Initiative Activity	Details of Non-Attainment and Rationale
Alternate Technology Pilot Programs (7.1.E) Complete the respective goals for the seven following ongoing pilot programs: • Early Fault Detection Target: Install 50 units and strive to add up to 150 early fault detection units.	• Early Fault Detection Actual: completed 46 (44 units on distribution and two units on transmission)	Early Fault Detection target not met due to material procurement delays. (EC ARC, Attach. B.)

2022 WMP Update Initiative	2022 Initiative Activity	Details of Non-Attainment and Rationale
Legacy Facilities (SH-11) (7.3.3.17.2) Hydro Control Circuits Target: 3 Low Voltage Site Hardening Target: 1 Grounding Studies/Lightening Arrestor Assessment Target: 13 Grounding Studies/Lightening Arrestor Remediations Target: 4	Hydro Control Circuits: completed 2 of 3 Low Voltage Site Hardening: completed 1 of 1 Grounding Studies/Lightening Arrestor Assessment: completed 13 of 13 Grounding Studies/Lightening Arrestor Remediations: completed 4 of 4	One hydro control circuit project delayed in 2022 pending completion of a state permitting process. SCE affirmed that the third hydro control circuit was field complete, and the project assigned a ready for service date of December 20, 2023. (DR 236, Request 1.)

6. Wildfire Risk Reduction: Performance Metrics and Overall WMP Execution

The Compliance Process applicable to the 2022 WMP compliance year defines goals for Energy Safety that extend beyond assessing compliance with WMP initiatives. Specifically, Energy Safety examines the ultimate performance of an electrical corporation's infrastructure relative to its wildfire risk, as measured by changes in the occurrence of events that correlate to wildfire risk. Energy Safety also considers whether the electrical corporation exhibited issues related to its execution, management, or documentation in the implementation of its WMP, if applicable.

This section of the report outlines the metrics chosen by Energy Safety to evaluate the performance of an electrical corporation's infrastructure relative to risk. These metrics include data on ignitions and PSPS events in the territory of the electrical corporation. The data utilized by Energy Safety were provided by SCE in its QDR submissions; but were analyzed and presented here using Energy Safety's own methodology. Where necessary, explanations of Energy Safety's methodology are provided.

6.1 Ignition Risk Metrics and Outcomes Metrics

Energy Safety assessed the performance of SCE's infrastructure relative to its wildfire risk, as measured by changes in the occurrence of events that correlate to wildfire risk.

Energy Safety requires electrical corporations to report data, such as ignitions in the HFTD, that help Energy Safety assess whether an electrical corporation reduced its wildfire risk while also reducing its reliance on PSPS. In 2022, Energy Safety assessed each electrical corporation's infrastructure performance for the calendar years 2015 through 2022 with particular attention on the 2022 outcomes.

The collection of metrics evaluated are grouped into two categories: Ignition Risk Metrics, and Outcome Metrics. A list of all the metrics in each category is described fully in their respective following sections. For these sections, Energy Safety relied on data reported in the fourth quarter 2023 QDR for the year 2022 values and third quarter 2022 QDR for all prior year values. (2022 Q3 QDR; 2023 Q4 QDR.)[13]

Normalizing Metrics:

For applicable performance metrics, the normalizing metrics Energy Safety uses are: "Overhead Circuit Miles" (OCM), "High Wind Warning Overhead Circuit Mile Days" (High Wind Warning Days or HWWOCMD), and "Red Flag Warning Overhead Circuit Mile Days" (Red Flag Warning Days or RFWOCMD). To see the values for each year used, see Appendix E, Figure 23 through Figure 25. (2022 Q3 QDR, Tables 6 and 8; 2023 Q4 QDR, Tables 4 and 7.)

Energy Safety uses these normalizing metrics to ensure a more nuanced interpretation of wildfire risk outcomes. For example, the outcome metric of "acres burned" is impacted directly by the presence of hot dry winds and, thus, this metric is presented in both raw counts and normalized by RFWOCMD. In this way, the acres burned are presented "accounting for" year by year variances in weather conditions that directly influence the outcome.

Findings:

Ignition risk and outcomes metrics findings include:

- The ignition rate for distribution lines is approximately three times that of transmission lines in 2022.
- Ignition counts and rates have both been slowly climbing since 2015 excepting a large decrease in 2022.

[13] Since the format of the required data reporting of all electrical corporations changed near the end of 2022, all data for 2015-2021 are gained from the Q3 2022 reporting (old format) and all data for 2022 are gained from the Q4 2023 reporting (new format).

- The primary drivers for ignitions were object contact and facility/equipment failures.
- The SCE wire down event counts show no material pattern up or down for either distribution or transmission lines.
- Total unplanned outage event counts have generally held constant except for a significant increase in 2022, which is primarily driven by the increase in distribution outage events.
- Outage events from vegetation contact are generally moving downward and, for 2022, are less than one fiftieth of all outages.
- Acres burned have been decreasing since 2017. When accounting for yearly variance in the weather, the normalized acres burned showed a similar pattern.
- Counts for number of structures burned, and value of assets destroyed have been relatively low in recent years.

6.1.1 Ignition Risk Metrics

Energy Safety reviewed the following metrics associated with ignition risk:

- *Ignitions* – Incidents in which electrical corporation infrastructure was involved,
- *Wire Down Events* – Incidents in which overhead electrical lines fall to the ground, land on objects, or become disconnected from their moors,
- *Unplanned Outages* – All unplanned outages experienced,
- *Vegetation-Caused Outages* – A subset of unplanned outages experienced in which the cause was determined to be vegetation contact with electrical lines,
- *PSPS Events* – Planned outages called public safety power shutoff (PSPS) events.

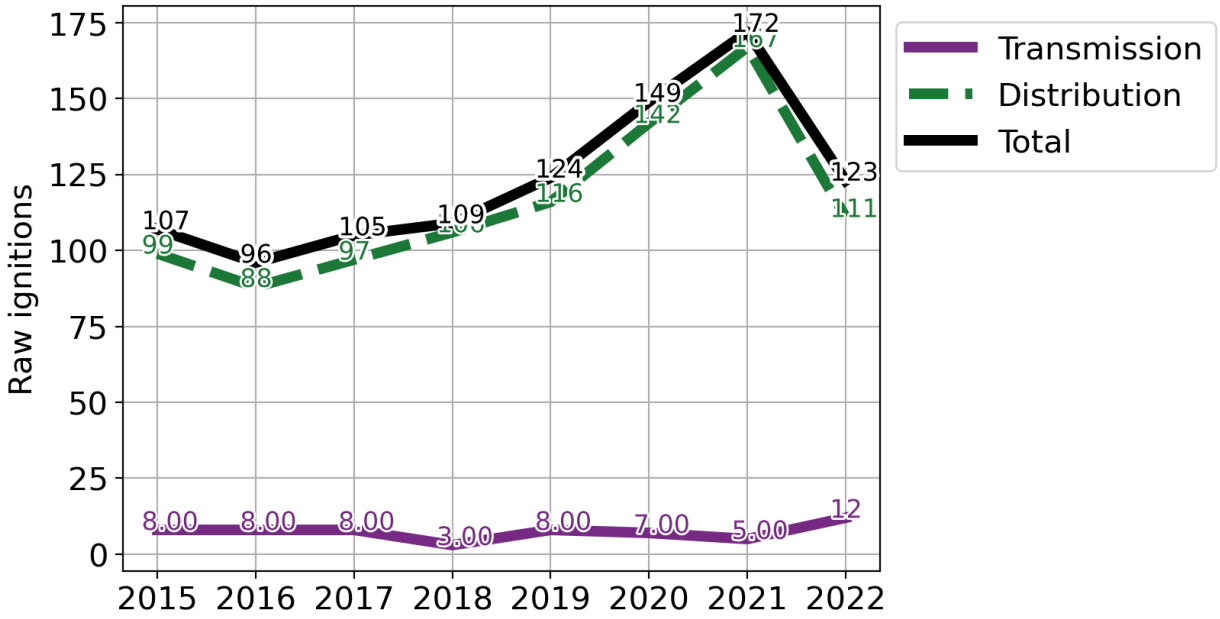
6.1.1.1 Ignition Data Analysis

The Ignition Data Analysis section examines ignitions stemming from distribution and transmission lines located within the SCE territory to include the non-HFTD, HFTD Tier 2 and HFTD Tier 3 areas. (2022 Q3 QDR, Table 7.2; 2023 Q4 QDR, Table 6.) In addition to showing raw ignition counts, ignitions are normalized by OCM, HWWOCMD, and RFWOCMD. SCE's service territory is divided into three primary area designations: Non-HFTD, HFTD Tier 2, and HFTD Tier 3. For a sense of scale, the percent of OCM for each territory type is as follows: non-HFTD = 72%, HFTD Tier 2 = 12%, and HFTD Tier 3 = 16%. (2022 Q3 QDR, Tables 6 and 8; 2023 Q4 QDR, Tables 4 and 7.)

Raw Ignition Counts:

Distribution line ignitions from 2015 to 2021 increased each year and decreased from 2021 to 2022 (Figure 1). However, transmission line ignitions are generally holding constant over the same period but with an increase in 2022.

Figure 1: SCE Ignition Counts (2015-2022) by Distribution and Transmission Lines

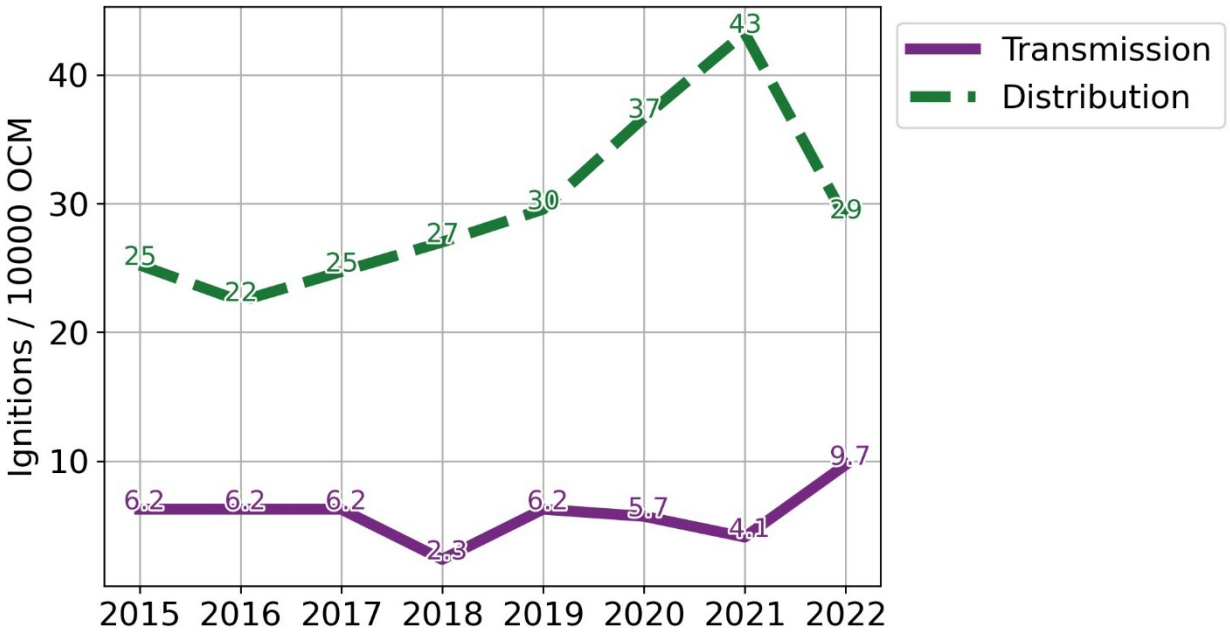


Ignitions Normalized by Overhead Circuit Miles:

To account for concurrent grid expansion within the territory and allow for comparisons with other utilities, ignitions normalized by overhead circuit miles (OCM) are provided and delineated by distribution and transmission lines (Figure 2). The normalized ignition rates show the same general pattern as the raw ignition counts.

The raw ignition counts show that ignitions for distribution lines make up most of the total number. The normalized numbers indicate that, per mile, the distribution lines also have three times more ignitions than transmission lines for 2022.

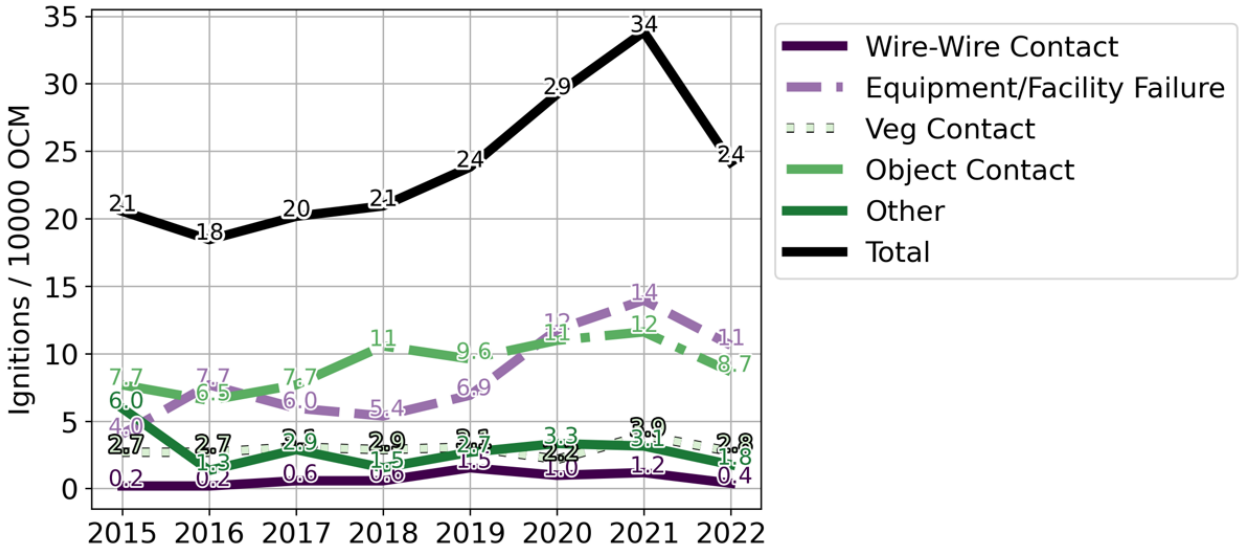
Figure 2: SCE Ignitions Normalized by Overhead Circuit Miles (2015-2022) by Distribution and Transmission Lines



Ignitions Normalized by Overhead Circuit Miles Delineated by Risk Driver:

To determine what is driving the increasing of normalized ignitions by OCM, the ignitions are delineated by Risk Driver (Figure 3). The overall occurrence is driven mostly by ignitions due to equipment or facility failures along with object contacts. This suggests that efforts to reduce ignitions should focus on initiatives that impact equipment and facility failures, and any activities that would mitigate impacts from object contact.

Figure 3: SCE Ignitions Normalized by Overhead Circuit Miles (2015-2022) by Risk Drivers



Ignitions by HFTD Detail and normalized by High Wind Warning Overhead Circuit Mile Days and Red Flag Warning Overhead Circuit Mile Days:

To see more detail on normalized ignitions by Risk Driver for each HFTD level for distribution lines and then transmission lines as well as all ignition analyses normalized by HWWOCMD and RFWOCMD, see Appendix E (Figure 26 through Figure 36).

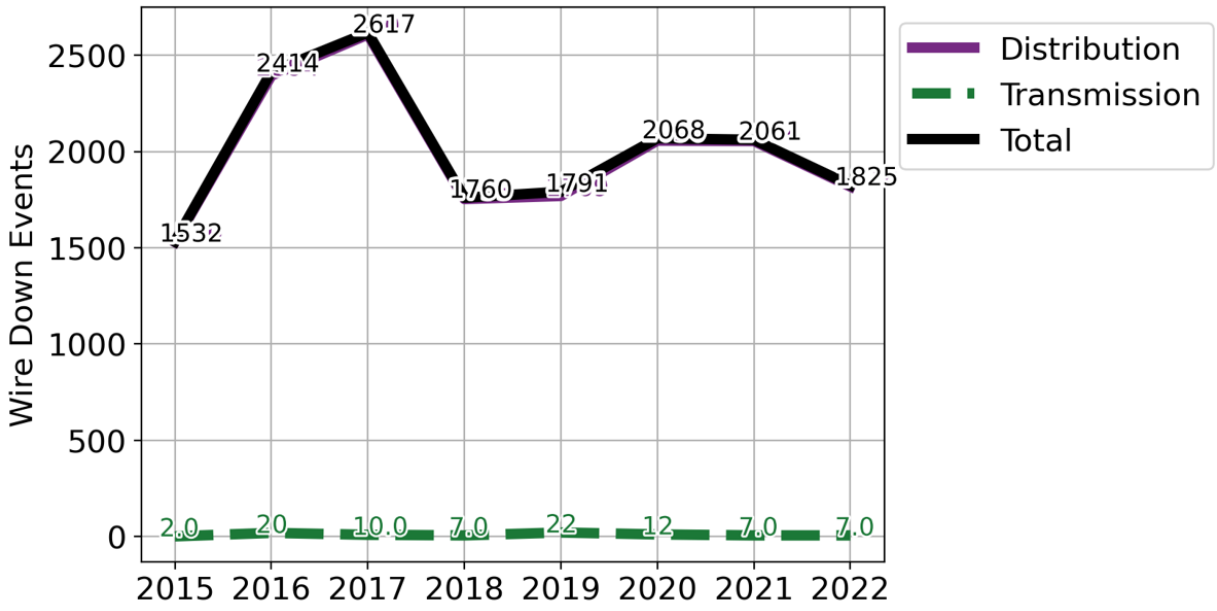
6.1.1.2 Wire Down Events Data Analysis

Wire down events are wildfire risks where a wire is touching the ground or an object or has become disconnected from its mooring. This type of event poses a risk of ignition or a danger to people if that wire is also energized with electricity. The data source for wire down information is the QDR. (2023 Q4 QDR, Table 5; 2022 Q3 QDR, Table 7.1.)

Raw Wire Down Event Counts:

The SCE wire down event counts show no material trends up or down for either distribution or transmission lines (Figure 4). This shows that the frequency of wire down events is not changing.

Figure 4: SCE Wire Down Event Counts (2015-2022) by Distribution and Transmission Lines



Wire Down Events Normalized by High Wind Warning Overhead Circuit Mile Days and Red Flag Warning Overhead Circuit Mile Days:

Please see Appendix E (Figure 37 and Figure 38) for wire down events normalized by HWWOCMD and RFWOCMD.

6.1.1.3 Outage Event Data Analysis

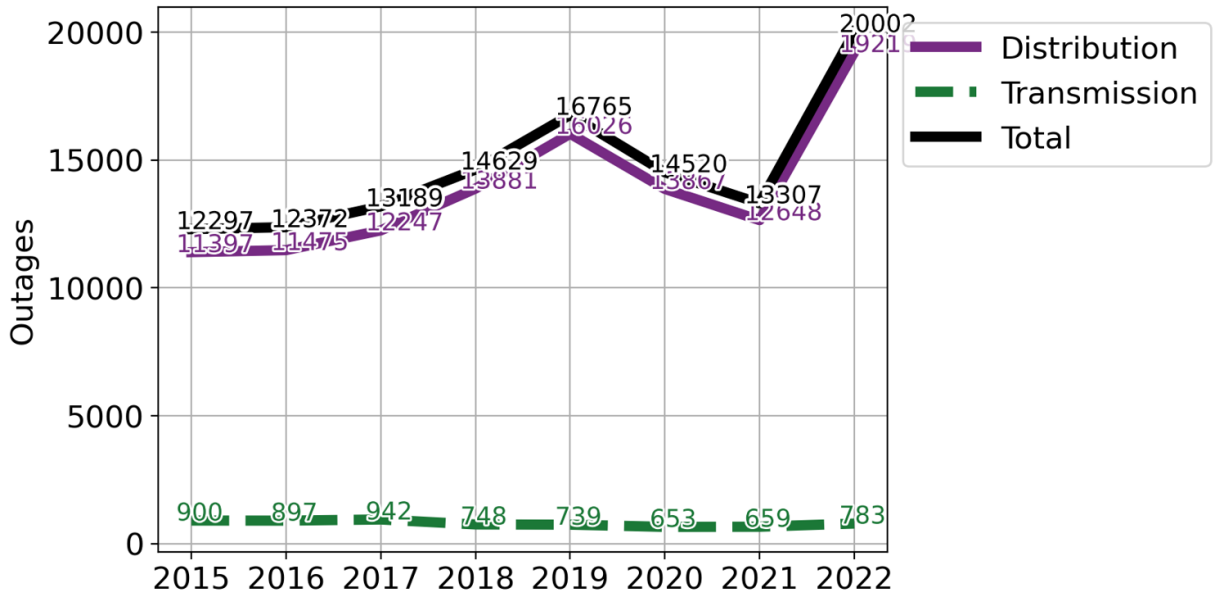
Power outages (outages) are unplanned power outage events (does not include PSPS events) tabulated by circuits and not by number of customers impacted. Outage events are tracked as outcomes that may cause ignitions and impact a customer's quality of life. As some customers are dependent upon access to electricity for their survival and health, it is desired for unplanned outages to decrease over time. The data source for outage event information is the QDR. (2022 Q3 QDR, Table 7.1; 2023 Q4 QDR, Table 5.)

Raw Outage Event Counts:

Total unplanned outage event counts have generally held constant except for a significant increase in 2022, which is primarily driven by the increase in distribution outage events (Figure 5).

This shows that what has appeared to be a constant level of outage events until 2021 may be increasing in the future, and that careful monitoring in subsequent years is warranted.

Figure 5: SCE Outage Events (2015-2022) by Distribution and Transmission Lines



Outage Events Normalized by High Wind Warning Overhead Circuit Mile Days and Red Flag Warning Overhead Circuit Mile Days:

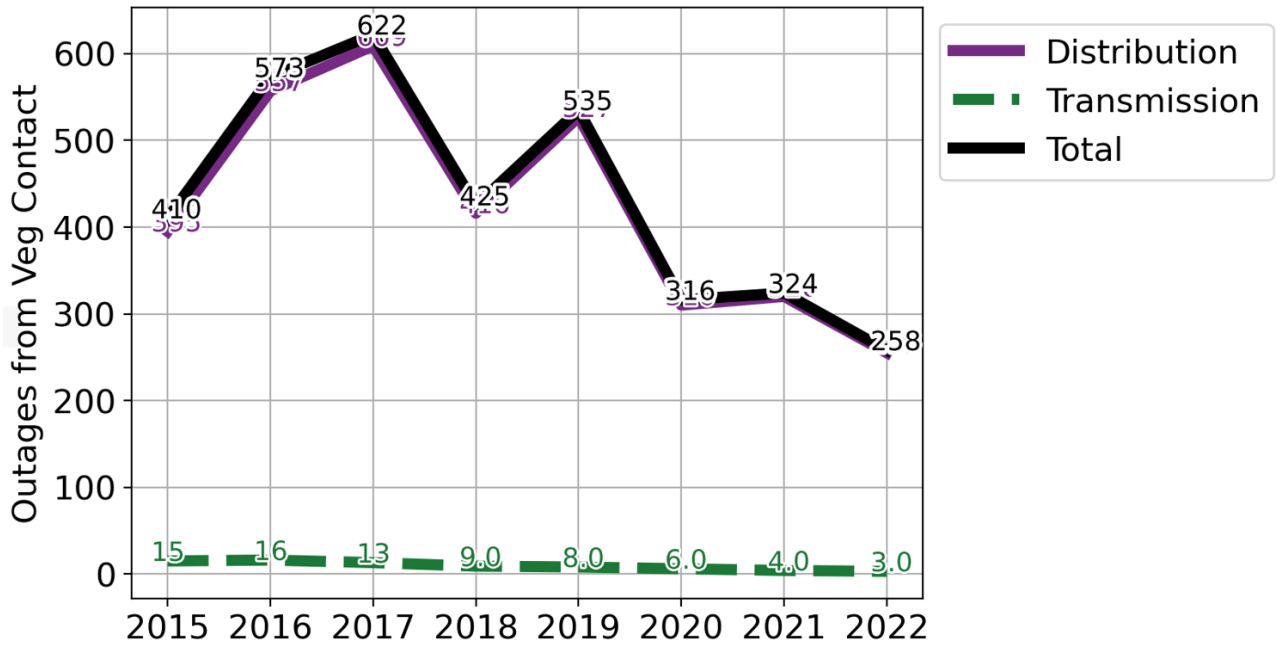
Please see Appendix E (Figure 39 and Figure 40) for outage events normalized by HWWOCMD and RFWOCMD.

Outage Events from Vegetation Contact Counts:

Outage events caused by vegetation contact are only a small percentage of overall outage events (Figure 6 as compared to Figure 5). Outage events caused by vegetation contact have been curving down since a total of 622 in 2017 to an all-time low in 2022 of 258. This is reflected in both distribution and transmission lines.

This indicates that outage events from vegetation contact were less than one fiftieth of all outages in 2022. Further, the increase in 2022 of the total outage events was not caused by vegetation contact.

Figure 6: SCE Outage Events from Vegetation Contact (2015-2022) by Distribution and Transmission Lines



Outage Events from Vegetation Contact Counts Normalized by High Wind Warning Overhead Circuit Mile Days and Red Flag Warning Overhead Circuit Mile Days:

Please see Appendix E (Figure 41 and Figure 42) for outage events caused by vegetation contact normalized by HWWOCMD and RFWOCMD.

6.1.1.4 Public Safety Power Shutoff Event Data Analysis

PSPS events are planned outages used as a wildfire mitigation tool during extreme fire conditions such as hot, dry, windy days. While useful as a wildfire mitigation measure, PSPS events carry their own risks and adverse impacts on customers – particularly vulnerable customers who need electricity to survive. As such, electrical corporations take mitigating actions to reduce the frequency, scope, duration, and impacts of PSPS events.

As PSPS events are typically issued during extreme fire conditions, the PSPS outcomes are presented first in raw count form, and then normalized by RFWOCMD to account for variances in weather across years.

The following four PSPS event parameters are presented for each year and comprise the PSPS event data analysis:

- *Frequency* is measured as the number or count of all PSPS events,
- *Scope* is measured as the total number of utility circuits impacted because of all PSPS events,
- *Duration* is measured by the total number of customer-hours because of all PSPS events, and

- *Impact is* measured by the number of critical infrastructure locations-hours impacted by all PSPS events.

The data source for PSPS event information is the QDR. (2022 Q3 QDR, Table 11; 2023 Q4 QDR, Table 10.)

Frequency of Public Safety Power Shutoff Events:

The number of PSPS events has decreased from a total of 10 in 2020 to three in 2022 (Figure 7). In 2022, the number returns to the same value as 2018. The weather-normalized version shows the highest value in 2021, but a similar large decrease in 2022 (Figure 8).

For 2022, SCE reported a large decrease in ignitions with a relatively low usage of PSPS events. Additional years of data will reveal the extent to which PSPS events continue to be a valuable wildfire mitigation strategy.

For the subsequent PSPS metrics of Scope, Duration, and Impacts, the fact that the weather adjusted pattern mirrors the raw count indicates that new insights are not gained by the adjustment.

Figure 7: SCE PSPS Event Frequency (2015-2022)

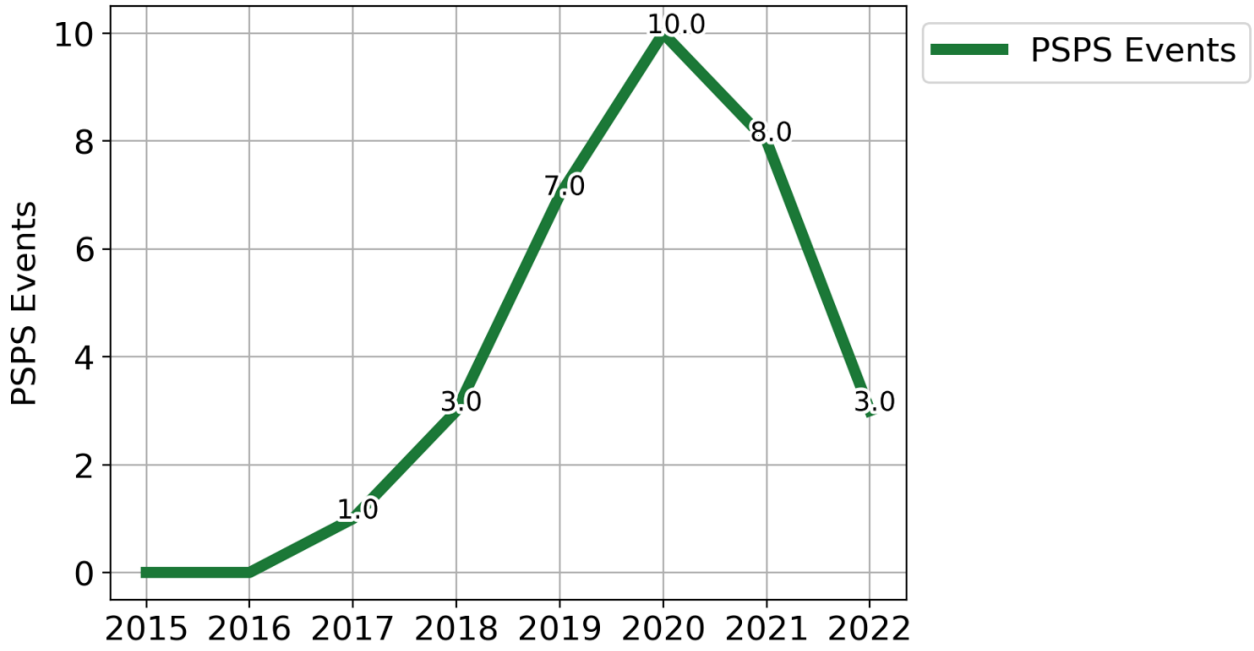
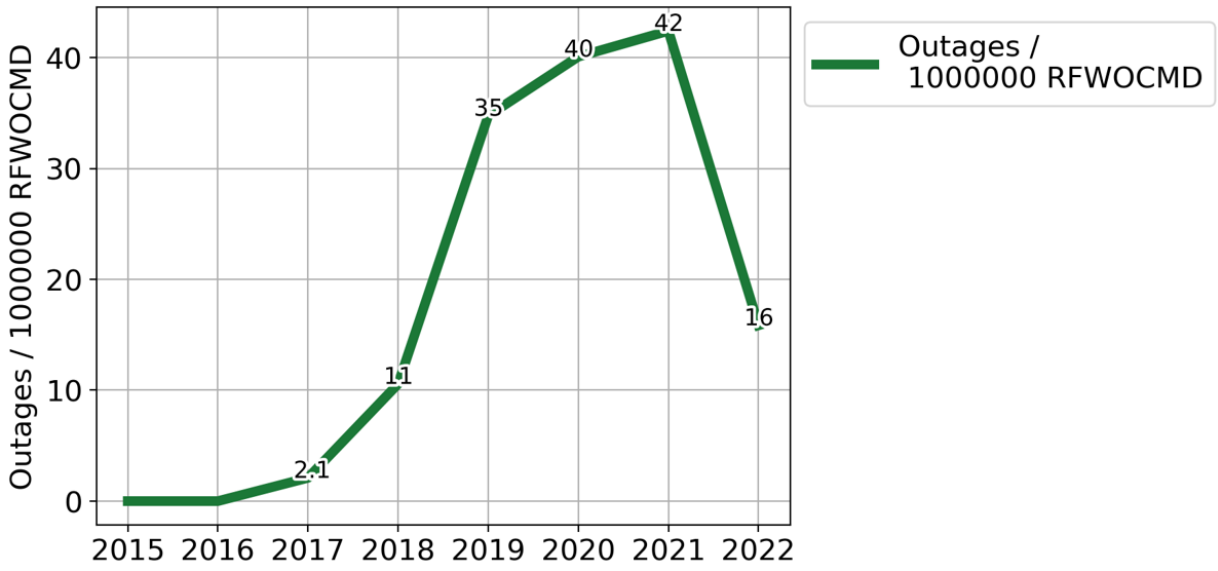


Figure 8: SCE PSPS Event Frequency Normalized by RFWOCMD (2015-2022)



Scope of Public Safety Power Shutoff Events:

The number of utility circuits impacted by PSPS events is similarly at the highest value of 424 circuits in 2020, with a decrease to 13 in 2022 (Figure 9). When accounting for variances by year in weather, the highest value is again in 2020, with a similar decrease in 2022 (Figure 10).

Figure 9: SCE PSPS Event Scope (2015-2022)

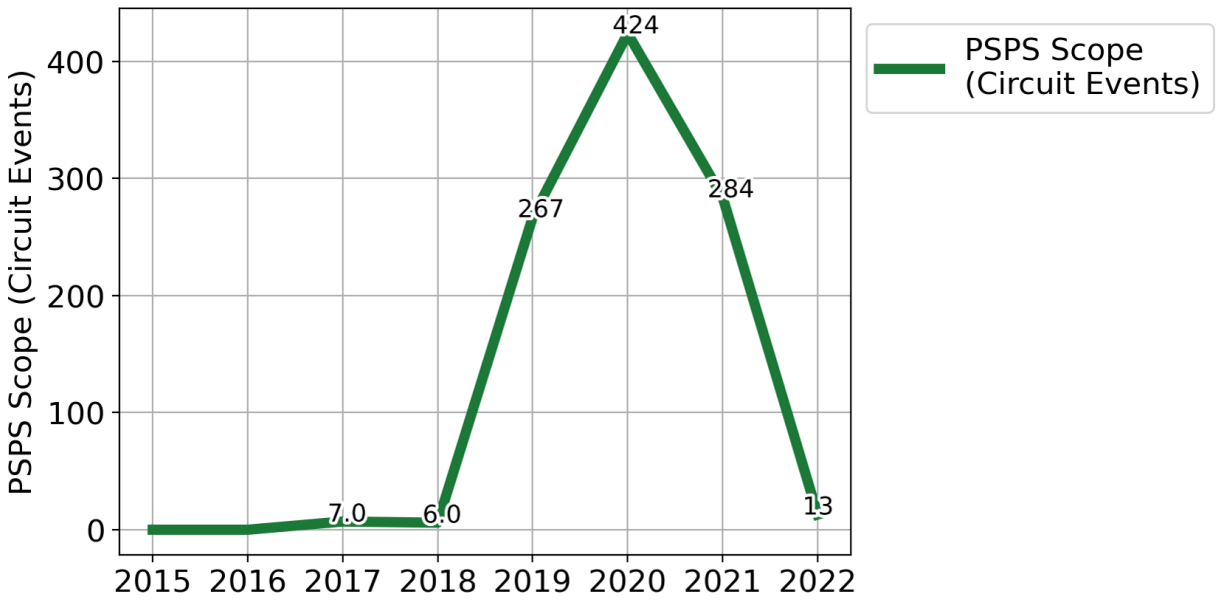
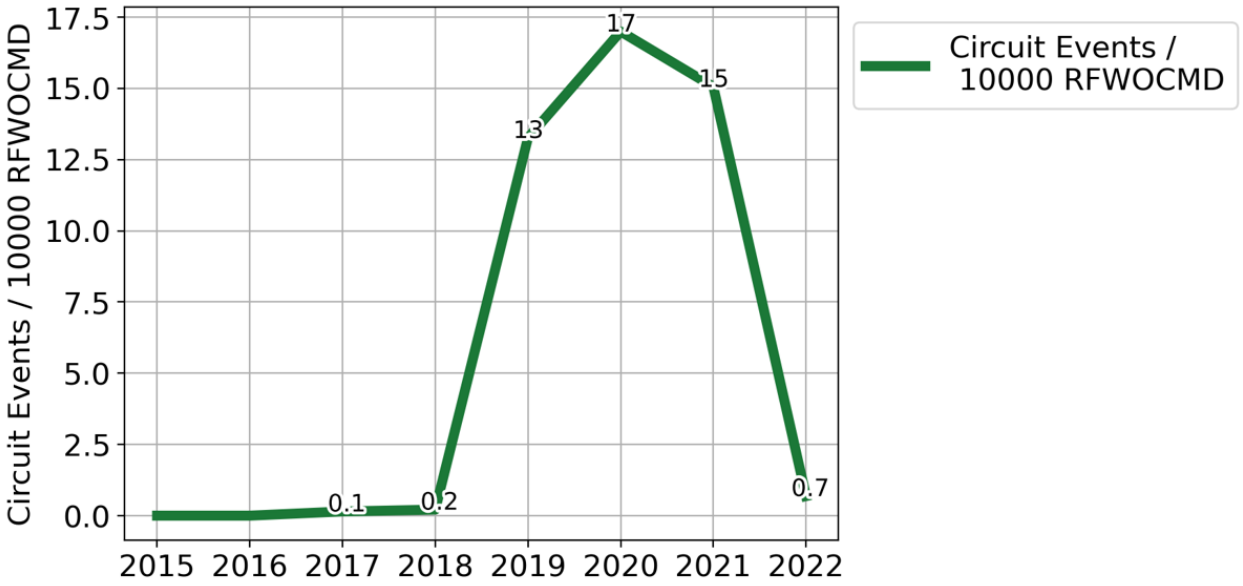


Figure 10: SCE PSPS Event Scope Normalized by RFWOCMD (2015-2022)



Duration of Public Safety Power Shutoff Events:

The total number of customer-hours impacted by all PSPS events for each year has highest value of almost 53 million in 2019, and a decrease to 140 thousand in 2022 (Figure 11). When accounting for yearly changes in weather, the normalized customer-hours show the same pattern (Figure 12). These findings imply SCE improvement in PSPS event management in 2022.

Figure 11: SCE PSPS Event Duration (2015-2022)

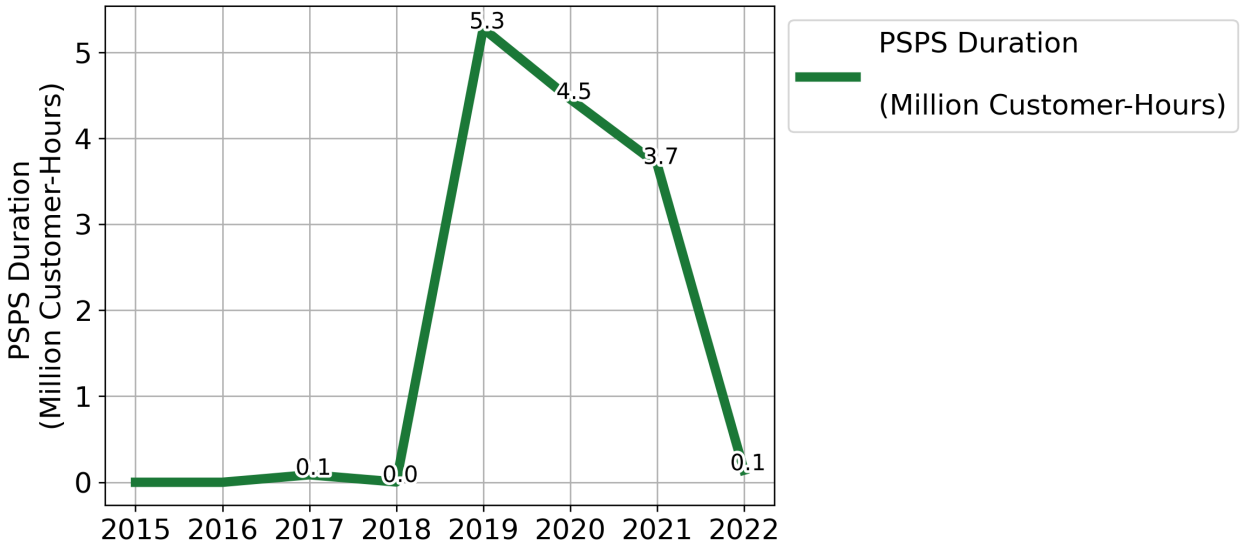
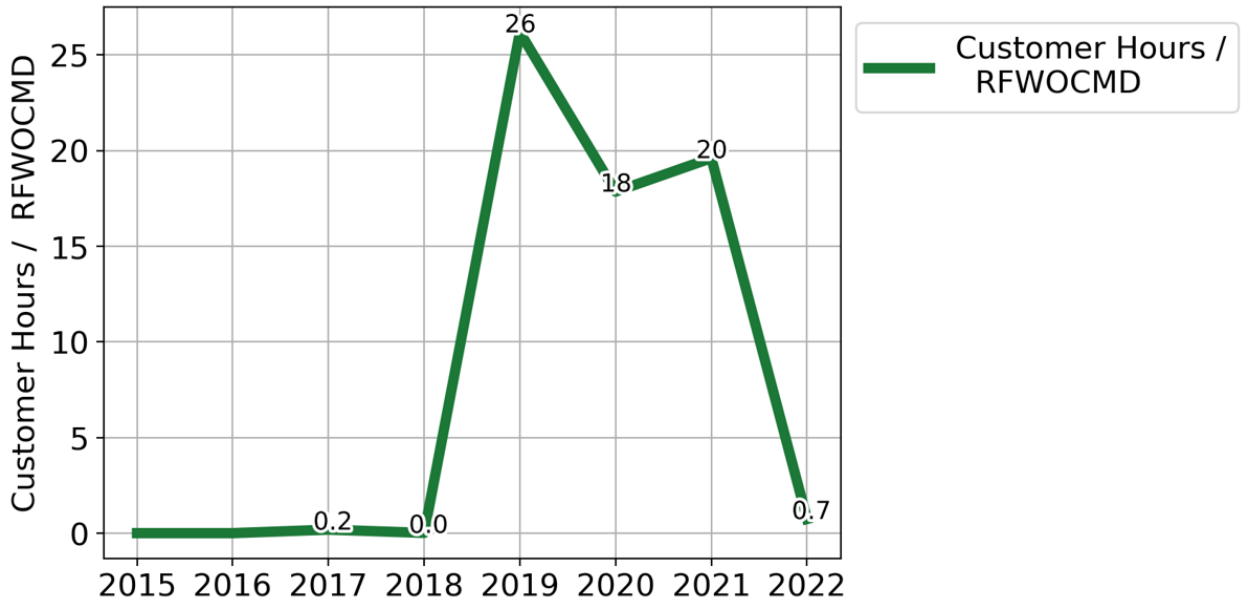


Figure 12: SCE PSPS Event Duration Normalized by RFWOCMD (2015-2022)



Impacts of Public Safety Power Shutoff Events:

The impacts of PSPS events or number of critical infrastructure location-hours have a high value of 5,568 in 2019, and a decrease to 317 in 2022 (Figure 13). When accounting for yearly changes in weather, the normalized impacts of PSPS events also show the same results (Figure 14).

Figure 13: SCE PSPS Event Impacts (2015-2022)

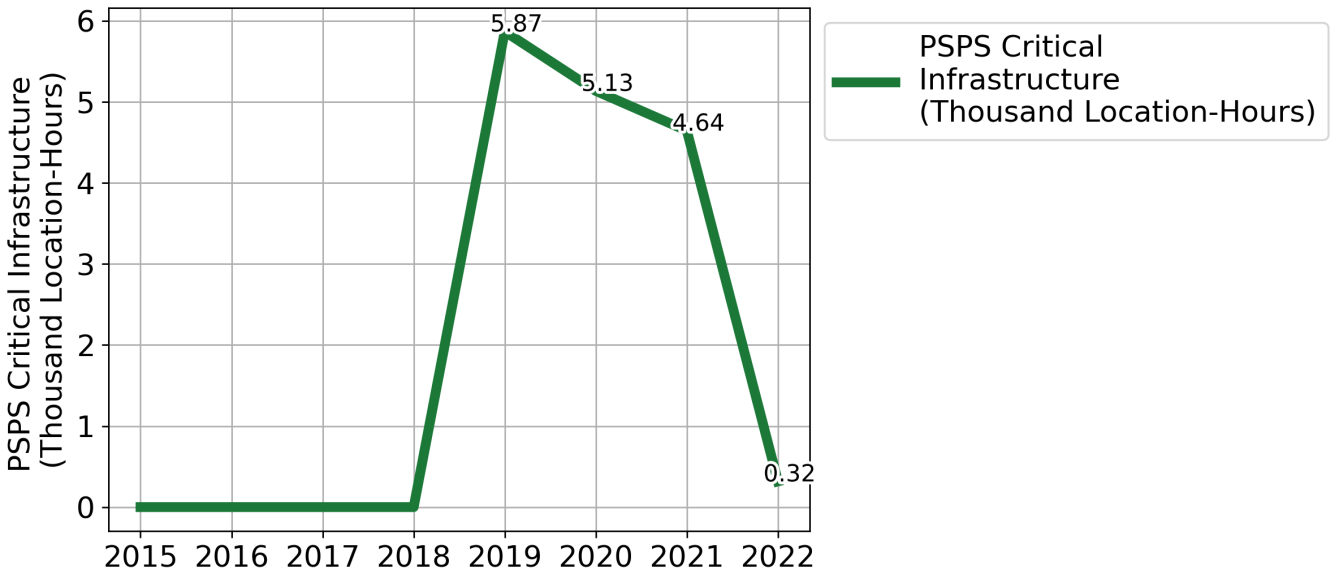
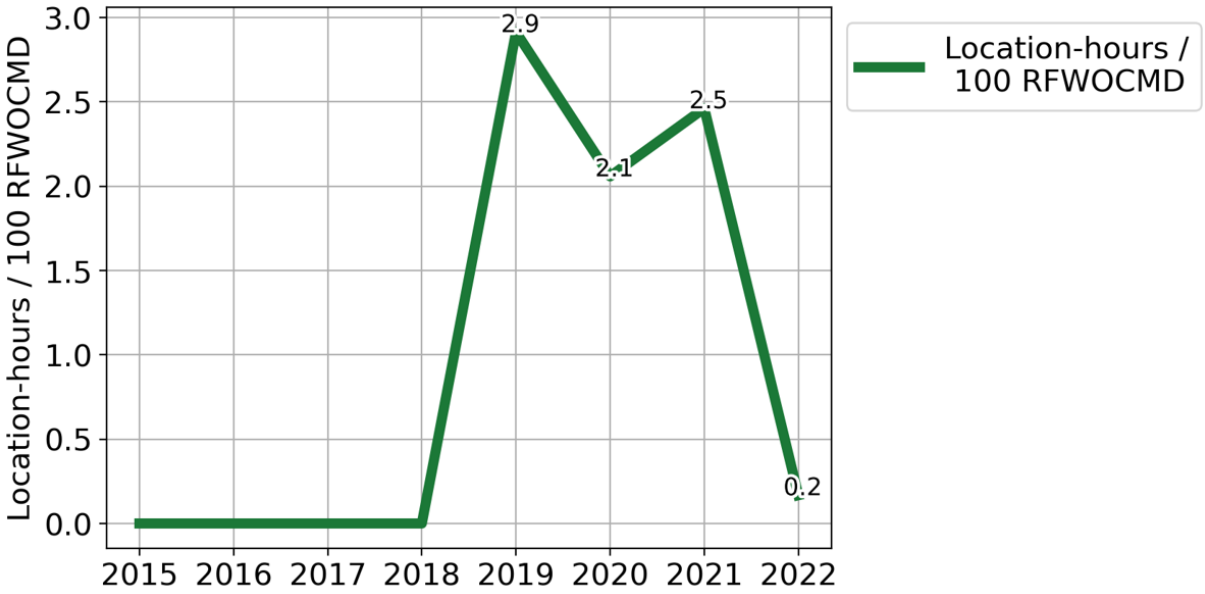


Figure 14: SCE PSPS Event Impacts Normalized by RFWOCMD (2015-2022)



6.1.2 Outcome Metrics

This section presents outcome metrics on electrical corporation-related wildfires including:

- *Acres burned* – The total number of acres burned due to electrical corporation caused fires,
- *Structures damaged/destroyed* - The total number of structures damaged or destroyed due to electrical corporation caused fires,
- *Injuries/fatalities* - The total number of injuries and fatalities due to electrical corporation caused fires,
- *Value of assets destroy*ed - The total value of assets destroyed due to electrical corporation caused fires.

The data source for outcomes metrics information is the QDR. (2022 Q3 QDR, Table 2; 2023 Q4 QDR, Table 2.)

This analysis includes self-reported data for wildfires that occurred within SCE territory in 2022. SCE has also reported that the catastrophic Fairview fire is under investigation by SCE and CalFIRE. (2023-2025 WMP Update, pp. 47-48.)

Acres Burned:

The total number of acres burned by SCE-ignited wildfires was at 292,000 in 2017 and ended in 2022 with approximately 29,000 (Figure 15). This shows that acres burned have been decreasing since 2017. When accounting for yearly variance in the weather, the normalized acres burned showed a similar pattern (Figure 16).

Figure 15: SCE Total Acres Burned (2015-2022)

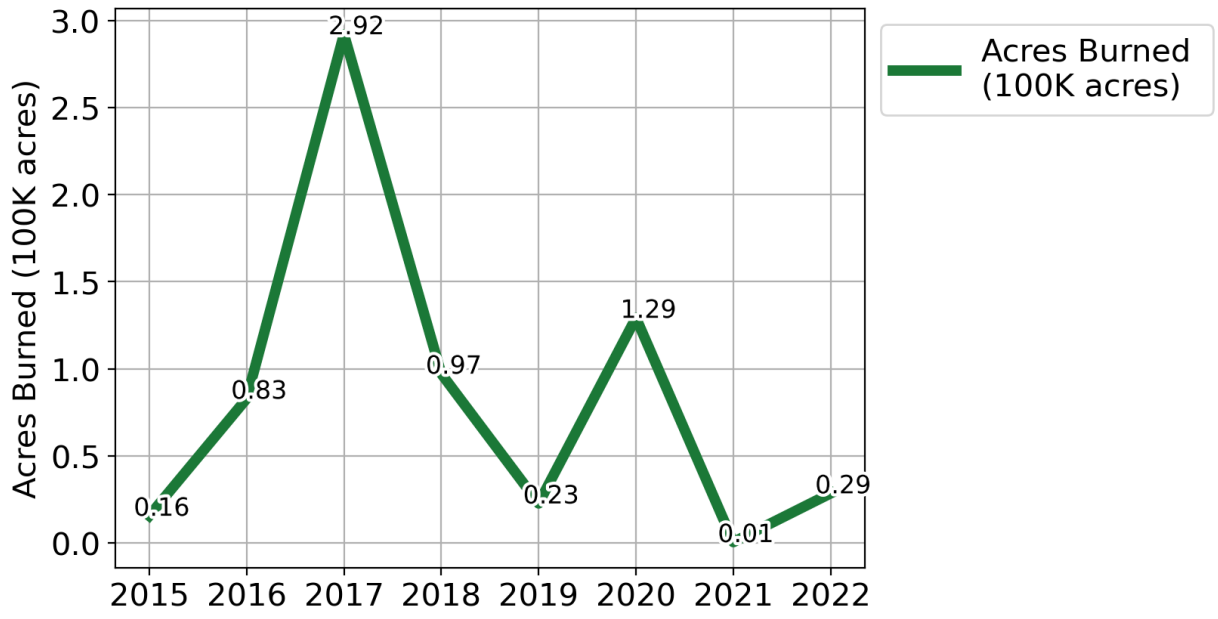
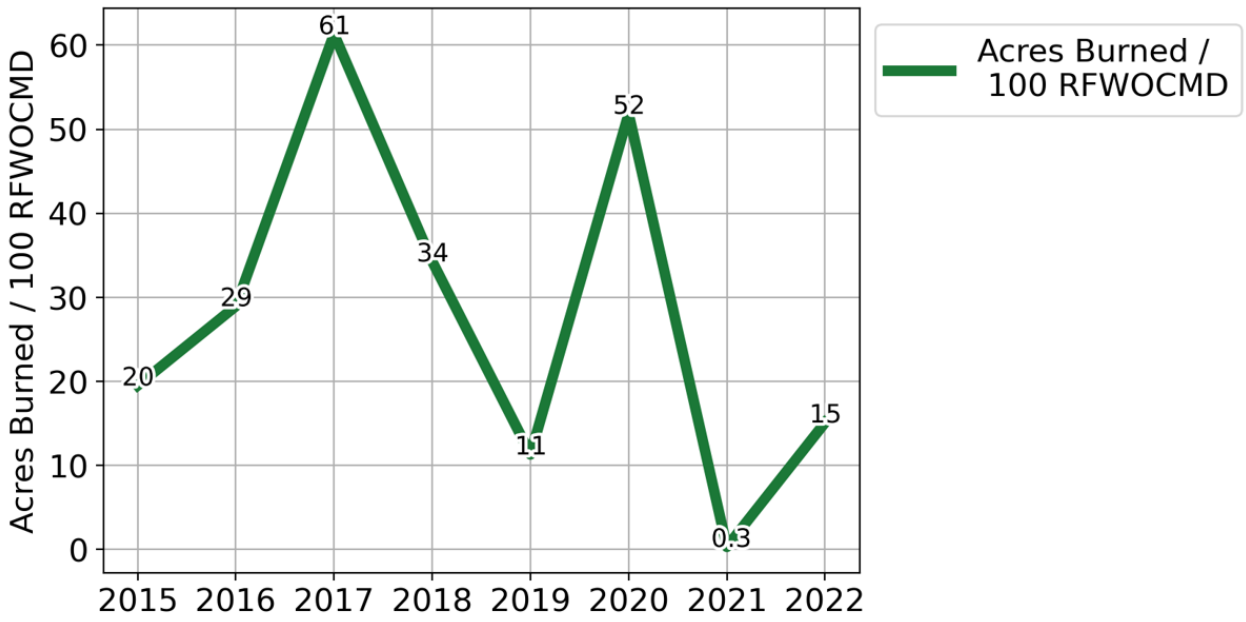


Figure 16: SCE Total Acres Burned Normalized by RFWOCMD (2015-2022)



Structures Damaged or Destroyed:

The number of structures damaged or destroyed by SCE-ignited wildfires shows a high value of 1,667 in 2018, and a general decrease to 56 in 2022 (Figure 17). When accounting for variances in yearly weather by normalizing by RFWOCMD, the same pattern is observed (Figure 18).

Figure 17: SCE Structures Damaged or Destroyed (2015-2022)

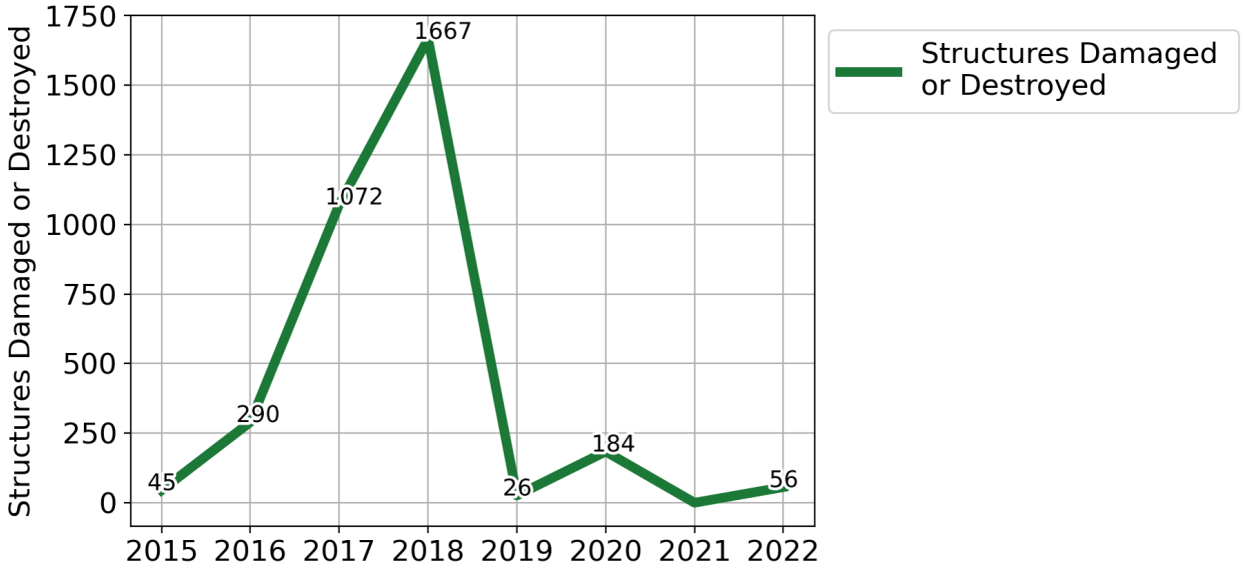
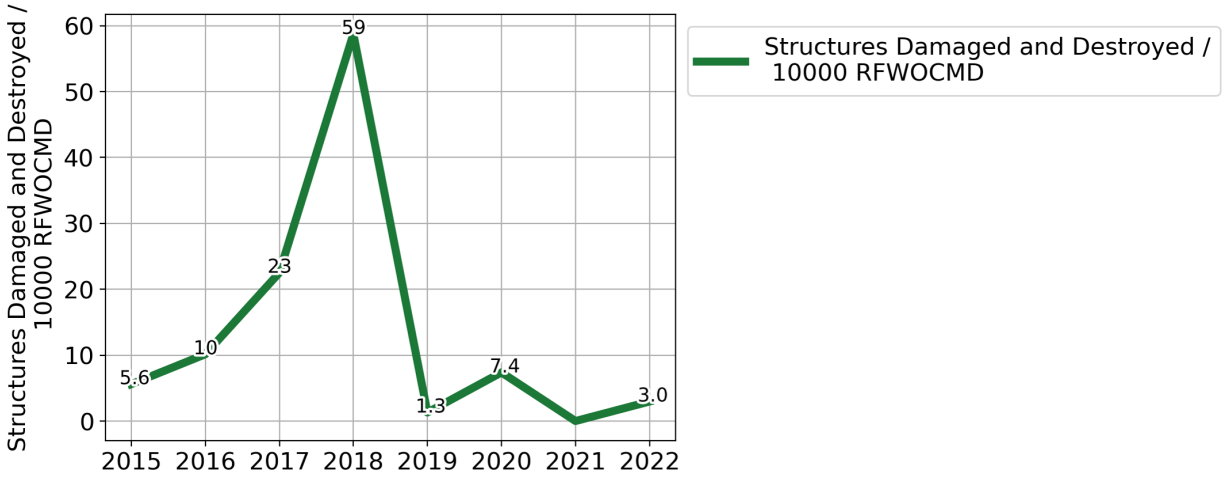


Figure 18: SCE Structures Damaged or Destroyed Normalized by RFWOCMD (2015-2022)



Injuries and Fatalities:

The highest number of injuries and fatalities combined occurred in 2020. This high value is only represented by injuries as there were no fatalities in that year. In 2022, there were two fatalities and five injuries (Figure 19). The injuries and fatalities normalized by RFWOCMDs shows the relatively high counts for 2022 are not explained by a high number of RFWOCMD (Figure 20).

Figure 19: SCE Injuries and Fatalities (2015-2022)

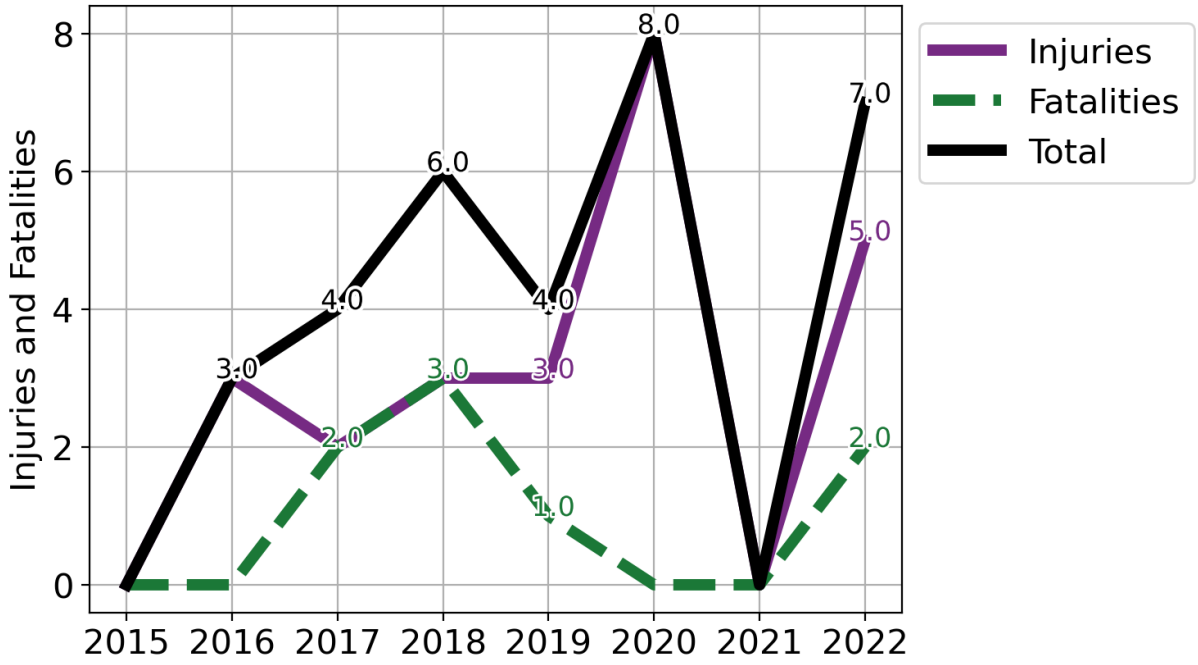
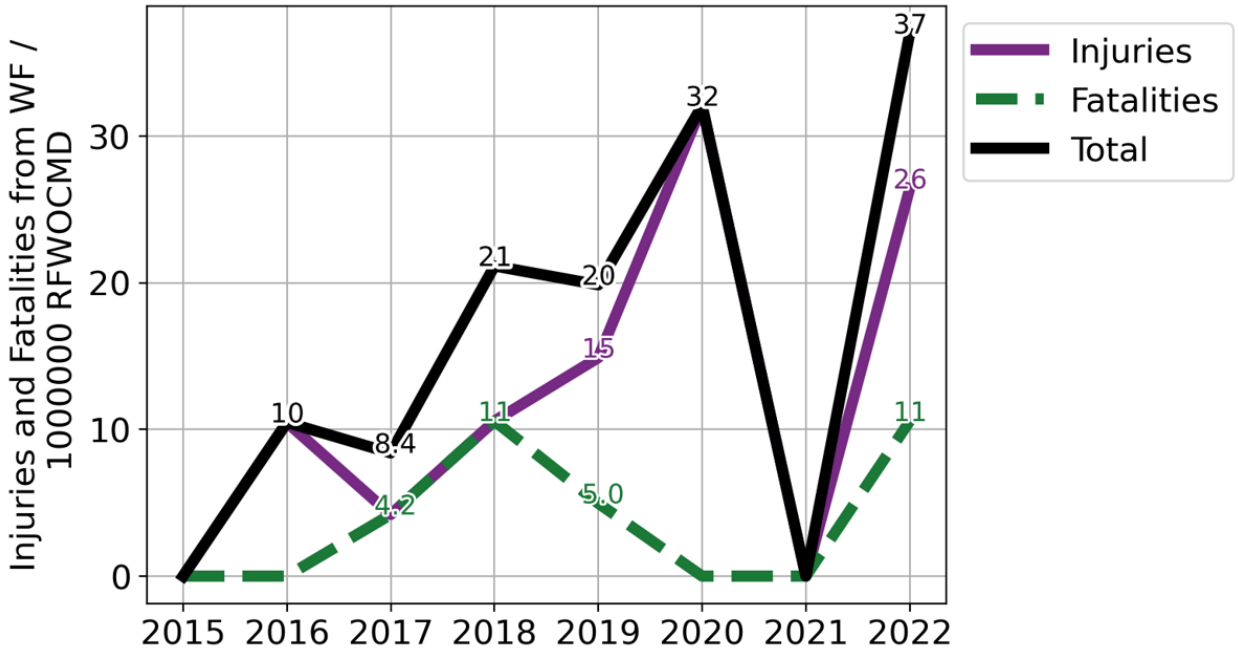


Figure 20: SCE Injuries and Fatalities Normalized by RFWOCMD (2015-2022)



Value of Destroyed Assets:

The value of structures damaged or destroyed by SCE-ignited wildfires had the highest value of $3.3 billion in 2018 but has since dropped to a low of $60,000 in 2022 (Figure 21). The weather adjusted values show the same pattern (Figure 22).

Figure 21: SCE Value of Destroyed Assets (2015-2022)

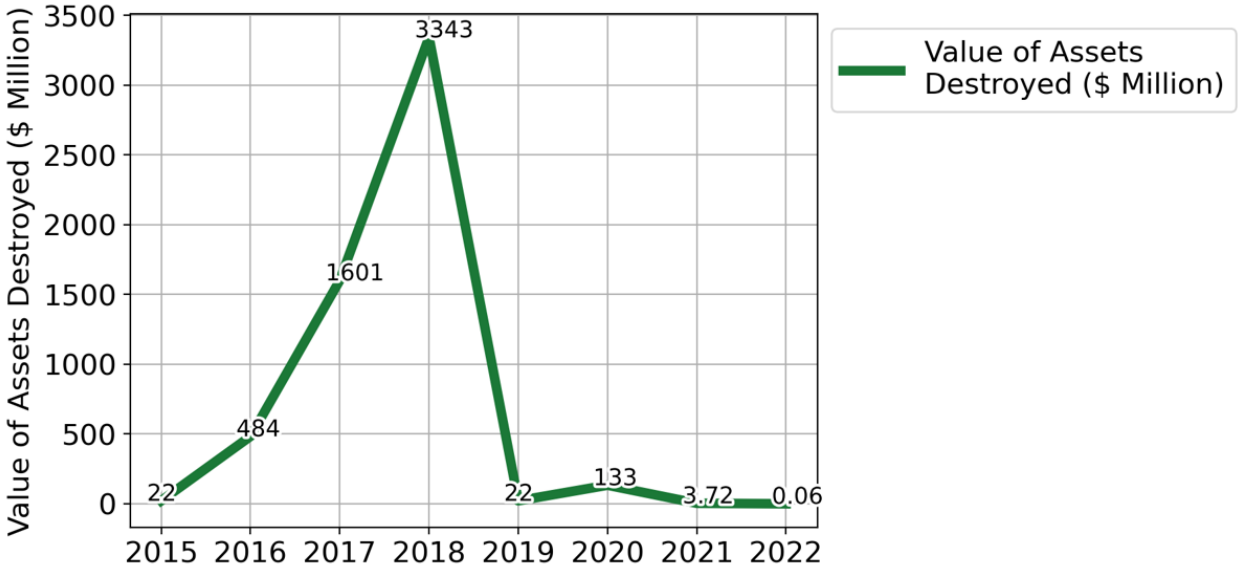
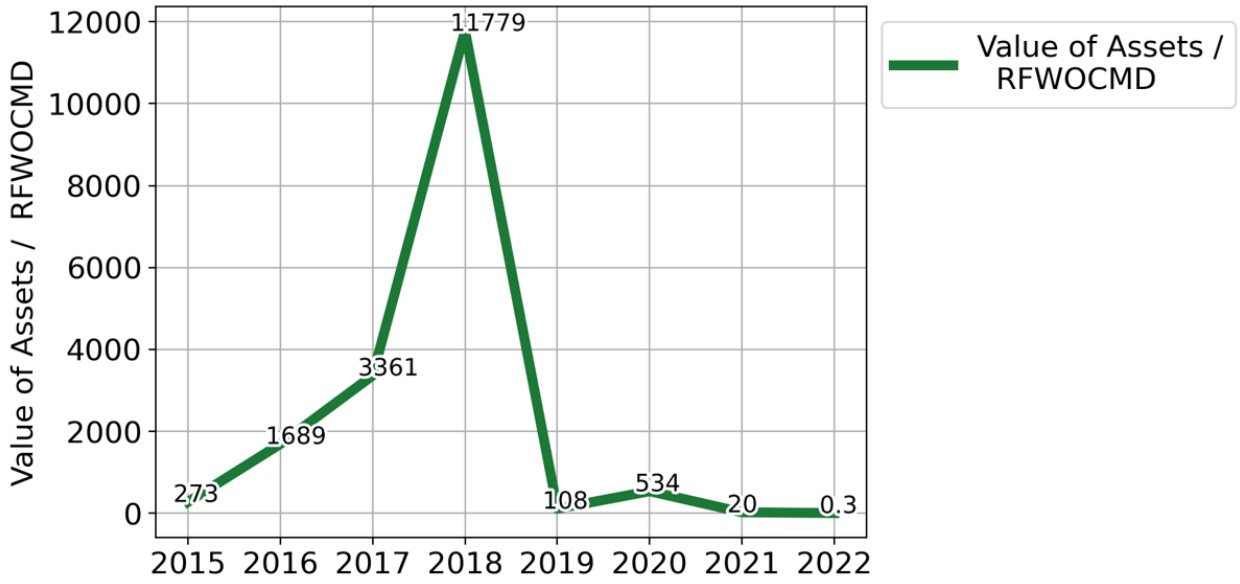


Figure 22: SCE Value of Destroyed Assets Normalized by RFWOCMD (2015-2022)



6.2 Issues Related to Southern California Edison Execution, Management, or Documentation of its WMP Implementation

The IE identified opportunities for improvement in the following areas. (IE ARC, Section 2, pp. 19-20 and Section 3, p. 77.)

- With respect to tree attachment remediation, the IE identified a gap in controls for data accuracy and tracking. The IE recommended SCE develop additional controls to ensure the accuracy of the information and data being used.
- The IE identified concerns with the accuracy of location data for some of SCE's large volume initiative activities, which caused delays and issues with the verifications.
- While the IE believed that SCE maintains a robust QA/QC program over its vegetation management and asset inspection activities, this program could be enhanced with detailed program mapping to provide a more comprehensive layout of the programs and their associated documentation.

Additionally, for some initiatives included in this review, the following inconsistencies in data reporting were noted by Energy Safety, which made it difficult for Energy Safety to determine the number of initiatives in scope for this review and ultimately whether attainment status was supported by an IE assessment:

- The number of initiatives identified within the 2022 WMP Update, Table 5.3-1, is not inclusive of all initiatives for 2022 and is missing 16 of 65 initiatives identified during

this review as discussed in Section 3.[14]

- The initiative numbering used in the 2022 WMP Update, Table 12, does not align with the numbering used in the 2022 WMP Update narrative (for example, Pole Loading Assessment Program) as discussed in Section 5.[10]
- The 2022 Q4 QDR does not include achievement status for all initiatives (for example, Intrusive Pole Inspections) as shown in Appendix A.
- 16 initiatives were omitted from the EC ARC, Attachment A, and may not have been directly assessed by the IE for target attainment (for example, Alternative Technology Pilot Programs) as discussed in Section 3.

In reviewing the Energy Safety field inspection results, SCE showed a very low violation rate and a 100% correction rate.

In conclusion, there is room for improvement in consistency and transparency in how SCE identifies and tracks initiatives. Additionally, the IE identified some data accuracy issues and made recommendations concerning them.

7. Conclusion

Overall, SCE had positive outcomes related to implementation of its 2022 WMP Update. It met its targets for 63 of the 65 initiatives (97%) assessed by Energy Safety. The two unmet initiatives were narrowly missed, and Energy Safety concludes that wildfire mitigation risk impacts were negligible. Of the 10 initiatives with the largest budgeted amount, all 10 were completed.

In general, SCE spent nearly $16 million less than what was budgeted for its 2022 WMP Update. Despite spending less than expected SCE claims that it met nearly all its 2022 WMP Update initiative and activity targets.

With respect to SCE's ignition risk and outcome metrics in 2022, the data showed that the ignition rate for distribution lines is approximately three times that of transmission lines. Ignition counts and rates have both been slowly climbing since 2015 excepting a large decrease in 2022. The primary drivers for ignitions were object contact and facility/equipment failures. Total unplanned outage events increased in 2022 within the SCE territory, with 20,000 outages reported.

SCE also reported two fatalities and five injuries related to wildfires ignited by SCE equipment in 2022. The ignition risk and outcome metric results for 2022 show that there are still opportunities for SCE to improve its performance and reduce the risk of catastrophic wildfire caused by its equipment.

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[14] Seven asset initiatives and nine vegetation management initiatives.

SCE's inconsistent WMP initiative reporting created a challenge for Energy Safety's assessment of compliance. There is room for improvement in consistency and transparency in how SCE identifies and tracks initiatives including the financial reporting. Additionally, the IE identified some data accuracy issues and made recommendations concerning those.

On balance, SCE was largely successful in executing its plan for wildfire risk mitigation. While Energy Safety acknowledges that SCE achieved its overarching objectives, there are still areas for improvement and continued learning.

Energy Safety will continue to monitor SCE's implementation of its ongoing wildfire mitigation activities to push SCE to improve its ability to eliminate utility-caused catastrophic wildfires in California.

8. References

Reference	Citation
EC ARC	Southern California Edison Company, "2022 Wildfire Mitigation Plan Annual Report on Compliance," March 31, 2023. Available: https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=53597&shareable=true.
IE ARC	NV5, Inc. and Guidehouse, Inc., "2022 Wildfire Mitigation Plan Independent Evaluator Annual Report on Compliance," June 30, 2023. Available: https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=54389&shareable=true.
2022 Q3 QDR	Southern California Edison Company, "2022-11-01 SCE 2022 Q3 QDR Metrics R0," November 1, 2022. Available: https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=53168&shareable=true.
2022 Q4 QDR	Southern California Edison Company, "SCE 2022 Q4 Tables 1-15 R1," March 2, 2023. Available: https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=53416&shareable=true.

Reference	Citation
2023 Q4 QDR	Southern California Edison Company, "Q4 2023 Non Spatial Data Tables 1-15 rev1," April 26, 2024. Available: https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=56536&shareable=true.
2022 WMP Update	Southern California Edison Company, "2022 Wildfire Mitigation Plan Update," February 18, 2022. Available: https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=52051&shareable=true.
2022 WMP Approval	Office of Energy Infrastructure Safety, "Decision on SCE's 2022 Wildfire Mitigation Plan Update," July 20, 2022. Available: https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=52703&shareable=true.
2023-2025 WMP Update	Southern California Edison Company, "2023 Wildfire Mitigation Plan Update," October 26, 2023. Available: https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=55866&shareable=true.
Compliance Operational Protocols	California Public Utilities Commission, "2021 Compliance Operational Protocols", February 16, 2021. Available: https://energysafety.ca.gov/wp-content/uploads/docs/misc/wsd/2021.02.16-compliance-operational-protocols.pdf.
Compliance Process	Office of Energy Infrastructure Safety, "2022 Compliance Process", October 2022. Available: https://energysafety.ca.gov/wp-content/uploads/2022-wmp-compliance-process.pdf.

Reference	Citation
DR 236	Southern California Edison Company, "Data Request: Energy Safety DR-236," June 3, 2024. Unpublished. Southern California Edison Company, "Response to Data Request: Energy Safety DR-236 – Request 1-2," June 5, 2024. Unpublished. Southern California Edison Company, "Response to Data Request: Energy Safety DR-236 – Request 3," June 21, 2024. Unpublished.
DR 246	Southern California Edison Company, "Data Request: Energy Safety DR-246," June 18, 2024. Unpublished. Southern California Edison Company, "Response to Data Request: Energy Safety DR-246 (Revised for Request 2)," June 20, 2024. Unpublished. Southern California Edison Company, "Response to Data Request: Energy Safety DR-246 Request 1," June 21, 2024. Unpublished. Southern California Edison Company, "Response to Data Request: Energy Safety DR-246 – Request 2," July 1, 2024. Unpublished.
DR 256	Southern California Edison Company, "Data Request: Energy Safety DR-256," July 19, 2024. Unpublished. Southern California Edison Company, "Response to Data Request: Energy Safety DR-256 – Request 2-8," July 29, 2024. Unpublished. Southern California Edison Company, "Response to Data Request: Energy Safety DR-256 – Request 1," July 30, 2024. Unpublished.
Pub. Util. Code § 8386	California Public Utilities Code Section 8386. Available: https://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?sectionNum=8386.&lawCode=PUC.

Reference	Citation
SVM Action Plan	Southern California Edison Company, "SCE 2022 SVM Audit Corrective Action Plan," August 20, 2024. Available: https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=57220&shareable=true
SVM Audit	Office of Energy Infrastructure Safety, "2022 Substantial Vegetation Management Audit, Southern California Edison," July 31, 2024. Available: https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=57113&shareable=true.
SVM Audit Report	Office of Energy Infrastructure Safety, "2022 Substantial Vegetation Management Audit Report, Southern California Edison," October 1, 2024. Available: https://efiling.energysafety.ca.gov/eFiling/Getfile.aspx?fileid=57455&shareable=true.

DATA DRIVEN
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APPENDICES

9. Appendices

Appendix A: Energy Safety Analysis of WMP Reporting Inconsistencies

Energy Safety receives data from the electrical corporations in the form of Quarterly Data Reports (QDR). These QDR submissions include information on the electrical corporation's progress toward meeting quantitative WMP initiatives. By analyzing the entire QDR dataset for 2022, Energy Safety can determine if the electrical corporation's data reflect attainment or non-attainment of quantitative WMP initiatives. Qualitative WMP initiatives are not considered in this analysis.

Differences in how SCE's initiative performance is reported in its WMP, QDR, EC ARC, and the IE ARC are summarized in Table 7. (2022 WMP Update, Table 5.3-1 & Table 12; 2022 Q4 QDR, Table 1; EC ARC, Appendix A; IE ARC.)

Table 7: SCE Quantitative WMP Initiatives with Dissonance

2022 WMP Update Initiative Activity	QDR Attainment Status	EC ARC Attainment Status	IE ARC Attainment Status	Dissonance
Intrusive Pole Inspections (7.3.4.6) Target: 143,600	Target: missing Actual: missing	Target: missing Actual: missing	Target: missing Actual: missing	Target and actual data are missing from the three reports (QDR, EC ARC and IE ARC). Actuals obtained from a DR.

2022 WMP Update Initiative Activity	QDR Attainment Status	EC ARC Attainment Status	IE ARC Attainment Status	Dissonance
Transmission HFRI Inspections and Remediations (IN-1.2) (7.3.4.10) Ground Target: 16,000; strive to achieve 19,000 Aerial Target: 16,000; strive to achieve 19,000	Ground Target: 16,000 Ground Actual: 17,225 Aerial Target: 16,000 Aerial Actual: 16,702	Ground Target: 16,000 Ground Actual: 17,225 Aerial Target: 16,000 Aerial Actual: 17,133	Ground Target: 16,000 Aerial Target: 16,000 Actual: IE comment that EC met target of at least 16,000 ground and 16,000 aerial inspections completed.	Aerial actuals are different between the QDR and EC ARC.
Customer Care Programs (PSPS-2) (7.3.6.6) Enrollments Target: 2,750 Rebates Target: 3,000; strive to issue 4,000 rebates	Enrollments Target: 2,750 Enrollments Actual: 3,733 Rebates Target: 3,000 Rebates Actual: 3,145	Enrollments Target: 2,750 Enrollments Actual: 3,733 Rebates Target: 3,000 Rebates Actual: 3,129	Enrollments Target: 2,750 Enrollments Actuals: IE comment EC met target Rebates Target: 3,000 Rebates Actual: IE comment EC met target	QDR reported a higher number of activities completed than reported in the EC ARC. SCE affirmed in their EC ARC that following validation of records this activity was decreased from 3,145 to 3,129.
Covered Conductor (SH-1) (7.3.3.3.1) Target: 1,100 miles; strive to achieve 1,250	Target: 1,100 Actual: ~1,400	Target: 1,100 Actual: ~1,400	Target: 1,100 Actual: IE commented EC met or exceeded target	Actuals are different between the QDR and EC ARC.

2022 WMP Update Initiative Activity	QDR Attainment Status	EC ARC Attainment Status	IE ARC Attainment Status	Dissonance
Undergrounding Overhead Conductor (SH-2) (7.3.3.16) Target: 11 miles; strive to achieve 13	Target: 11 Actual: 14	Target: 11 Actual: 15	Target: 11 Actual: IE comment EC met target	Actuals are different between the QDR and EC ARC.
Detailed Inspections and Management Practices for Vegetation Clearances around Transmission Infrastructure Lines and Equipment (7.3.5.3) Target: ~100,000	Target: ~100,000 Actual: 74,025	Target: reduced from ~100,000 to 71,286 Actual: 74,025	Target: IE comment that EC reduced target from ~100,00 to 71,286 Actual: IE comment EC completed minimum of 71,286	QDR reported target as ~100,000, EC ARC and IE ARC reported target as 71,286.

2022 WMP Update Initiative Activity	QDR Attainment Status	EC ARC Attainment Status	IE ARC Attainment Status	Dissonance
New Technologies and Innovations / Alternate Technology Pilot Programs (7.1.E) Early Fault Detection Target: Install 50 units and strive to add up to 150 early fault detection units High Impedance Relays Target: Expand the existing pilot to 20 additional locations	Unsure Early Fault Detection Target: 50 Early Fault Detection Actual: missing High Impedance Relays Target: missing High Impedance Relays Actuals: missing	Unsure Early Fault Detection Target: 50 Early Fault Detection Actual: 46 (EC ARC, Attach. B.) High Impedance Relays Target: missing High Impedance Relays Actuals: missing	Unsure Early Fault Detection Target: 50 Early Fault Detection Actual: 46 (IE ARC – Table 2-6.) High Impedance Relays Target: missing High Impedance Relays Actuals: missing	Not all pilot program targets and actuals were reported within the QDR, EC ARC and IE ARC.

As shown in the table above, reporting on many of SCE's initiative activities have the following types of discrepancies:

- Reporting sources are missing targets and or actuals.
- Reporting sources do not always agree with each other regarding the same initiative and its completion values.
- The 2022 WMP Update narrative and Table 12 targets do not always align.

Appendix B: SCE EC ARC Information on WMP Initiatives

Summarized in Table 8 is each of SCE's 60[15] initiative targets from its 2022 WMP Update, and SCE's self-reporting on compliance contained in its EC ARC.

Table 8: Information on WMP Initiative Activity Attainment

2022 WMP Update Initiative	2022 WMP Update Activity Target	2022 Actual (EC ARC)
Weather Stations (SA-1)	Install 150 weather stations. Strive to install up to 175 weather stations subject to resource and execution constraints.	SCE met target in Q4 by completing installation of 160 weather stations.
Weather and Fuels Modeling (SA-3)	Equip 400 weather station locations with machine learning capabilities. Strive to equip up to 500 weather station locations with machine learning capabilities subject to resource and execution constraints.	SCE met target in Q3 by equipping 564 weather station locations with machine learning capabilities.

[15] The EC ARC did not include reporting on five of the 16 activities noted in Table 1.

2022 WMP Update Initiative	2022 WMP Update Activity Target	2022 Actual (EC ARC)
Fire Science (SA-8)	Calibrate fire potential index (FPI) 2.0 and evaluate its performance over the 2022 fire season. Improve fire spread modeling applications (i.e., FireSim and FireCast) to include 1) fire suppression and 2) buildings destroyed by fire.	SCE met target by updating the FPI 2.0 methodology to include calibration and verification statistics. Building Loss Factor and a metric measuring suppression effectiveness have also been integrated into FireCast and is being evaluated for integration of fire spread modeling into the PSPS decision-making process.
Distribution Fault Anticipation (DFA) (SA-9)	Evaluate the performance of installed fault anticipation technology and develop recommendations for future use.	SCE met target in Q3 by completing evaluation of the performance of installed fault anticipation technology and developing recommendations for future use. Overall, there were 1,121 total events reviewed internally and 18 events with the vendor. Recommended improvements for future use have been summarized in a final report.
High Definition (HD) Cameras (SA-10)	Install 10 HD cameras. Strive to install up 20 HD Cameras subject to resource and execution constraints.	SCE met target in Q4 by completing installation of 16 HD cameras.
Covered Conductor (SH-1)	Install 1,100 circuit miles of covered conductor. Strive to install up to as many as 1,250 circuit miles of covered conductor subject to resource constraints and other execution risks.	SCE met target in Q4 by completing installation of approximately 1,399 circuit miles of covered conductor in HFRA.

2022 WMP Update Initiative	2022 WMP Update Activity Target	2022 Actual (EC ARC)
Undergrounding Overhead Conductor (SH-2)	Install 11 circuit miles of targeted undergrounding. Strive to install up to 13 miles of targeted undergrounding subject to resource constraints and other execution risks.	SCE met target in Q4 by completing installation of approximately 15 underground miles in HFRA.
Branch Line Protection Strategy (SH-4)	Install or replace fusing at 350 fuse locations. Strive to install or replace fusing at up to 483 locations subject to resource constraints and other execution risks.	SCE met target in Q3 by completing installation of 369 fuses.
Remote Controlled Automatic Reclosers Settings Update (SH-5)	Install 15 sectionalizing devices such as Remote Controlled Automatic Reclosers/Remote Controlled Switches (RARs/RCSs). Strive to install up to 31 sectionalizing devices such as RARs/RCSs subject to resource constraints and other execution risks.	SCE met target in Q4 by completing installation of 15 RARs/RCSs sectionalizing devices.
Circuit Breaker Relay Hardware for Fast Curve (SH-6)	Replace/upgrade 104 relay units. Strive to replace/ upgrade up to 125 relay units subject to resource constraints and other execution risks.	SCE met target in Q4 by replacing/upgrading 119 relay units in HFRA.

2022 WMP Update Initiative	2022 WMP Update Activity Target	2022 Actual (EC ARC)
PSPS-Driven Grid Hardening Work (SH-7)	Evaluate approximately 70 highly impacted circuits including 2021 PSPS events to determine additional deployment of PSPS mitigations.	SCE met target in Q1 with 104 circuits evaluated against the 70 targeted.
Transmission Open Phase Detection (SH-8)	Deploy open phase logic on five transmission lines. Strive to deploy open phase logic on up to 11 transmission lines subject to resource constraints and other execution risks.	SCE met target in Q3 by deploying open phase logic on six transmission lines. In Q4, open phase logic was deployed on an additional five transmission lines for a total of 11.
Tree Attachment Remediation (SH-10)	Remediate 500 tree attachments. Strive to complete up to 700 tree attachment remediations subject to resource constraints and other execution risks.	SCE met target in Q3 by completing remediation of 703 tree attachments in HFRA. In Q4 completed an additional 261 remediations for a total of 964.
Legacy Facilities (SH-11)	Hydro Control Circuits: Perform grid hardening on three control circuits at three legacy facility sites. Low Voltage Site Hardening: Perform one grid hardening project at a legacy facility site. Grounding Studies / Lightning Arrestor Assessments and Remediations: Perform four remediation projects at legacy facility sites. Additionally, complete 13 assessments.	Work at two of three control circuits completed. Remaining control circuit project will be completed in Q3 2023. SCE met target in Q4 by performing one grid hardening project at a legacy facility. SCE met target in Q4 by completing four remediation projects and 13 assessments.

2022 WMP Update Initiative	2022 WMP Update Activity Target	2022 Actual (EC ARC)
Microgrid Assessment (SH-12)	Actively attempt to obtain approval of easement with the landowner of the microgrid site, and if approval is received, move forward with microgrid project. If an approval is not received by June 30, 2022, or rejected, start to pursue other microgrid opportunities.	SCE met target in Q4 by completing assessments on other potential microgrid sites after unsuccessfully obtaining an easement agreement with the landowner of the proposed microgrid site. No new sites were identified in the subsequent assessment. SCE will continue to re-evaluate its approach, re-run its assessment, and explore potential cooperative opportunities for microgrids.
C-Hooks (SH-13)	Replace C-Hooks on 10 structures. Strive to replace up to 21 C-Hooks subject to execution risks such as environmental clearance.	SCE met target in Q4 by completing replacement of 10 C-Hooks in HFRA.
Long Span Initiative (LSI) (SH-14)	Remediate 1,400 spans. Strive to remediate up to 1,800 spans subject to resource constraints and other execution risks.	SCE met target in Q2 with 1,589 remediations. Completed an additional 105 remediations through Q4 for a total of 1,694.
Vertical Switches (SH-15)	Install 15 vertical switches. Strive to install 25 vertical switches.	SCE met target in Q4 by completing installation of 16 vertical switches in HFRA.

2022 WMP Update Initiative	2022 WMP Update Activity Target	2022 Actual (EC ARC)
Vibration Damper Retrofit (SH-16)	Retrofit vibration dampers on 100 structures where covered conductor is already installed. Strive to retrofit vibration dampers on up to 115 structures where covered conductor is already installed.	SCE met target in Q4 by retrofitting 125 vibration dampers where covered conductor is already installed in HFRA.
Rapid Earth Fault Current Limiter (REFCL) (SH-17)	Produce a report summarizing performance and lessons learned from previous REFCL installations. Initiate engineering and material purchase for the GFNs to be constructed in 2023 at Acton and Phelan Substations.	SCE met target in Q4 to produce report summarizing performance from previous REFCL installations and initiated engineering and material purchase for the ground fault neutralizers (GFNs) to be constructed in 2023 at Acton and Phelan substations.
Distribution High Fire Risk-Informed (HFRI) Inspections and Remediations (IN-1.1)	Inspect 150,000 structures via both ground and aerial inspections. Strive to inspect up to 180,000 structures via both ground and aerial inspections subject to resource constraints and other factors.	SCE met target by completing 159,679 ground and 157,144 aerial inspections in HFRA.
Transmission High Fire Risk-Informed (HFRI) Inspections and Remediations (IN-1.2)	Inspect 16,000 structures via both ground and aerial inspections. Strive to inspect up to 19,000 structures via both ground and aerial inspections subject to resource constraints and other factors.	SCE met target by completing 17,225 ground and 17,133 aerial inspections in HFRA.

2022 WMP Update Initiative	2022 WMP Update Activity Target	2022 Actual (EC ARC)
Infrared Inspection of Energized Overhead Distribution Facilities and Equipment (IN-3)	Inspect 4,408 distribution overhead circuit miles.	SCE met target miles in Q2 after remaining flights were completed the first week of June. ~4,408 miles of inspections were completed in 2022 against the 2-year, 8,816-mile inspection target that was set in 2021; 4,409 miles of inspections completed in 2021. Approximately 50% of the remaining HFRA distribution miles were inspected in 2021 with the remainder inspected in 2022.
Infrared Inspection, Corona Scanning, and High-Definition Imagery of Energized Overhead Transmission Facilities and Equipment (IN-4)	Inspect 1,000 transmission overhead circuit miles.	SCE met target in Q3 by completing 1,075 inspections on transmission circuit miles in HFRA.
Generation High Fire Risk-Informed Inspections and Remediations in HFRA (IN-5)	Inspect 190 generation-related assets.	SCE met target in Q4 by completing 222 generation inspections in HFRA.

2022 WMP Update Initiative	2022 WMP Update Activity Target	2022 Actual (EC ARC)
Inspection and Maintenance Tools (IN-8)	Design capability for the legacy Distribution Ground inspection application in 2022 to transition to a single digital inspection platform in a future year. Conduct assessment to identify enhancements for field crew application and evaluate applicability of enhancements by year-end 2022.	SCE met target in Q3 to design capability for the legacy distribution ground inspection application. Completed identification and feasibility assessment of enhancement capabilities, and migration to a single digital inspection platform is tentatively scheduled for 2024. SCE met target in Q4 with the assessment, identification, and evaluation of applicability of enhancements for field crew application. Field crew application enhancements were rolled out to ~60 distribution contract users.
Transmission Conductor & Splice Assessment (IN-9)	Inspect 75 spans with Line Vue, inspect 50 splices with X-Ray, and obtain five conductor samples. Strive to inspect up to 150 spans with Line Vue, inspect up to 70 splices with X-Ray, and obtain up to 15 conductor samples subject to execution constraints.	SCE met target in Q4 by completing inspections on 79 spans with Line Vue. SCE met target in Q2 by inspecting 63 splices with X-Ray. SCE met target in Q4 by inspecting six conductor samples.
Hazard Tree Management Program (VM-1)	Inspect 330 circuits and assess any trees with strike potential along those circuits.	SCE met target in Q4 by completing inspection and assessments of 467 circuits.

2022 WMP Update Initiative	2022 WMP Update Activity Target	2022 Actual (EC ARC)
Expanded Pole Brushing (VM-2)	Inspect and clear (where clearance is needed) 78,700 poles. Strive to inspect and clear (where clearance is needed) up to 170,000 distribution poles. These poles are in addition to poles subject to California Public Resources Code (PRC) 4292.	SCE met target in Q4 by inspecting and clearing (where clearance was needed and access possible) 105,377 poles in HFRA.
Expanded Clearances for Legacy Facilities (VM-3)	Perform expanded clearances at 32 legacy facility locations.	SCE met target in Q4 by completing expanded clearance at 32 sites.
Dead and Dying Tree Removal (VM-4)	Inspect 900 unique circuits and prescribe mitigation for dead and dying trees with strike potential along those circuits.	SCE met target in Q4 by completing inspection of 926 circuits.
Vegetation Management Work Management Tool (Arbora) (VM-6)	Implement the following programs within Arbora: Hazardous Tree Program (HTP) (including Dead & Dying Tree Removal and Hazard Tree Mitigation) Routine Line Clearing	SCE met target in Q4 by implementing the vegetation management work management tool for the HTP, which includes hazard tree mitigation plan (HTMP) and dead and dying tree removal, and for routine line clearing. As with other large system implementations, SCE will continue to monitor performance, and as applicable, run legacy systems in parallel.

2022 WMP Update Initiative	2022 WMP Update Activity Target	2022 Actual (EC ARC)
Customer Care Programs (PSPS-2)	Enroll 2,750 customers in the critical care battery backup (CCBB) program. Continue to identify new eligible customers each month to offer the program. Issue 3,000 rebates and will strive to issue 4,000 rebates for portable power station rebates and portable generator rebates.	CCBB: Program has completed 3,733 customer enrollments and 3,466 deployments. Portable power station rebates and portable generator rebates: Program has issued 3,129 customer rebates.
Customer Education and Engagement – Community Meetings (DEP-1.2)	Host at least nine wildfire community safety meetings in targeted communities based on the impact of 2021 PSPS events and ongoing wildfire mitigation activities.	SCE met target in Q2 by conducting 10 community safety meetings
Customer Education and Engagement – Marketing Campaign (DEP-1.3)	Reach a PSPS awareness goal of 50%.	SCE met target in Q4 with PSPS awareness at 57%.
SCE Emergency Responder Training (DEP-2)	Have all PSPS IMT and task force members fully trained and qualified or requalified by July 1, 2022. Expand UAS program by technically qualifying 50 UAS operators that have passed the Federal Aviation Administration (FAA) 107 exam.	IMT: SCE met target in Q2 by fully training and qualifying/requalifying 346 PSPS IMT and Task Force members. UAS: SCE met target in Q3 by technically qualifying 56 UAS Operators.

2022 WMP Update Initiative	2022 WMP Update Activity Target	2022 Actual (EC ARC)
Customer Research and Education (DEP-4)	Conduct at least six PSPS-related surveys in 2022, including the PSPS tracker survey, wildfire safety community meeting feedback survey, community resource center/community crew vehicles (CRC/CCV) feedback survey, in-language wildfire mitigation communications effectiveness survey, PSPS working group and advisory board survey, and the voice of customer survey.	SCE met target in Q4 by conducting 6 PSPS related surveys, including PSPS tracker survey, wildfire safety community meeting feedback survey, CRC/CCV feedback survey, in-language wildfire mitigation communications effectiveness survey, PSPS working group and advisory board survey, and the voice of customer survey.
Aerial Suppression (DEP-5)	Enter into three memorandum of understandings (MOUs) with local county fire departments to provide standby cost funding for up to five aerial suppression resources strategically placed around the SCE service area.	SCE met target in Q2 by entering into three MOUs signed by SCE and each respective county, and by funding a total of five aerial suppression resources.
Wildfire Safety Data Mart and Data Management (WiSDM/Ezy) (DG-1)	Ezy Data: Expand cloud AI platform and enable LIDAR data storage capability. WiSDM: Complete wildfire data repository design and consolidate wildfire data storage onto wildfire data repository platform.	Ezy Data: Activity scope was completed in Q2 following the deployment of two new distribution defect detection models. Completed the solution design and analysis for LiDAR data. WiSDM: Completed wildfire data repository design. Successfully met in Q4 with the data mapping, ingestion, and verification of 70+ datasets into the WiSDM platform.

2022 WMP Update Initiative	2022 WMP Update Activity Target	2022 Actual (EC ARC)
Detailed Inspections and Management Practices for Vegetation Clearances Around Distribution Electrical Lines, and Equipment *(Additional Vegetation Management Target)*	Inspect approximately 600,000 trees adjacent to distribution lines, based on current unique tree inventory count. Tree inventory is subject to fluctuations based on actual field conditions.	SCE met target in Q4 by completing inspection of 656,691 trees adjacent to distribution lines, based on current unique tree inventory count.
Detailed Inspections and Management Practices for Vegetation Clearances Around Transmission Infrastructure Lines, and Equipment *(Additional Vegetation Management Target)*	Inspect approximately 100,000 trees adjacent to transmission lines, based on current unique tree inventory count. Tree inventory is subject to fluctuations based on actual field conditions.[38]	SCE met target in Q4 by completing inspection of 74,025 trees adjacent to transmission lines, based on current unique tree inventory count.
Emergency Response Vegetation Management Due to Red Flag Warning or Other Urgent Climate Conditions *(Additional Vegetation Management Target)*	Inspect and clear (where clearance is needed) approximately 26,400 poles in identified area of concern (AOC). These poles are included in the count of the Expanded Pole Brushing (VM-2) goal.	SCE met target in Q4 by inspecting and clearing (where clearance needed and access possible) 27,518 poles.

2022 WMP Update Initiative	2022 WMP Update Activity Target	2022 Actual (EC ARC)
Recruiting and Training of Vegetation Management Personnel *(Additional Vegetation Management Target)*	Maintain the current staffing levels of 95 International Society of Arboriculture (ISA) certified arborists performing work within SCEs service territory. This is inclusive of SCE personnel and contractors.	SCE met target in Q4 with current staffing level at 175 ISA certified arborists performing work within SCE service territory.
Substation Inspections *(Additional Vegetation Management Target)*	Perform substation inspections on 169 substations. Inspect all 169 substations five times a year for General Order (GO) 174 substations (146 substations) and International Organization for Standardization (ISO) & Federal Energy Regulatory Commission (FERC) substations (23 substations), for a total of 845 inspections.	SCE met target in Q4 by completing 1,283 inspections; 146 GO 174 substations and 23 ISO & FERC substations were inspected five or more times.
Vegetation Inspections Audited Annually *(Additional Vegetation Management Target)* [39]	Perform risk-based circuit mile QC inspections on approximately 15% of the total tree inventory.	SCE met target in Q4 by completing 468,857 QC inspections, or 28% of total tree inventory.
Poles Brushed per PRC 4292 *(Additional Vegetation Management Target)*	Inspect and clear (where clearance is needed) 55,100 poles in state responsibility area with the equipment identified by PRC 4292.	SCE met target in Q4 by inspecting and clearing (where clearance needed and access possible) 72,328 poles.

2022 WMP Update Initiative	2022 WMP Update Activity Target	2022 Actual (EC ARC)
LiDAR Vegetation Inspections – Distribution *(Additional Vegetation Management Target)*	Inspect at least 500 HFRA circuit miles.	SCE met target in Q3 by inspecting 1,207 circuit miles in HFRA. LiDAR resources were made available to different programs which enabled SCE to inspect AOC circuits via LiDAR.
LiDAR Vegetation Inspections – Transmission *(Additional Vegetation Management Target)*	Inspect at least 1600 HFRA circuit miles.	SCE met target in Q4 by inspecting 1,696 HFRA circuit miles.
Substation Vegetation Management *(Additional Vegetation Management Target)* (7.3.5.18)	Perform vegetation management substation inspections in Tier 2 & Tier 3, totaling 169 substations.	SCE met target in Q3 by inspecting 175 substation inspections.
Intrusive Pole Inspections (7.3.4.6)	This activity has an annual quantitative goal of 143,600 intrusive pole inspections.	SCE did not provide any progress updates on this activity.
Additional Efforts to Manage Community and Environmental Impacts (7.3.5.1)	This activity has an annual planned expenditure with a routine goal of maintaining processes to mitigate the customer and environmental impacts of vegetation management activities and thus address the risk of unanticipated constraints to executing work in a timely fashion.	SCE incurred an increase in the volume of routine work related to surveys and monitoring, leading to over expenditure.

2022 WMP Update Initiative	2022 WMP Update Activity Target	2022 Actual (EC ARC)
Patrol Inspections of Vegetation Around Distribution Electric Lines and Equipment (7.3.5.11)	This activity has an annual planned expenditure with a routine goal of conducting supplemental patrols to provide assurance that vegetation encroachments do not occur during peak fire season and high wind conditions.	SCE incurred a decrease in the volume of routine work than what was originally forecasted, leading to under expenditure.
Patrol Inspections of Vegetation Around Transmission Electric Lines and Equipment (7.3.5.12)	This activity has an annual planned expenditure with a routine goal of conducting supplemental patrols to provide assurance that vegetation encroachments do not occur during peak fire season and high wind conditions.	SCE incurred a decrease in the volume of routine work than what was originally forecasted, leading to under expenditure.
Vegetation Management to Achieve Clearances Around Electric Lines and Equipment (7.3.5.20)	This activity has an annual planned expenditure with a routine goal of maintaining vegetation management activities to maintain enhanced clearance distances from transmission and distribution lines and equipment.	SCE conducted vegetation mitigation activities in the service territory and achieved compliance.
Protocols for PSPS Re-energization (7.3.6.5)	This activity has an annual planned expenditure with a routine goal of maintaining the established protocols for patrolling lines after a PSPS de-energization and the development of a weather visualization tool.	SCE was able to continue routine work on this activity for less expenditure than was forecasted.

2022 WMP Update Initiative	2022 WMP Update Activity Target	2022 Actual (EC ARC)
PSPS Incident Management Team (7.3.6.6.1)	This activity has an annual planned expenditure with a routine goal of maintaining the PSPS IMT that oversee the execution of the PSPS protocol.	SCE was able to carry out all duties related to PSPS operations but at a cost lower than originally forecasted.
Customer Resiliency Equipment (7.3.6.6.2.1.3)	This activity has an annual planned expenditure with a routine goal of continuing to provide customers with financial assistance in developing their resiliency to prepare for de-energizations from PSPS and other emergencies.	SCE incurred a decrease in the volume of routine work due to reduced need/usage of customer side generators due to lower frequency of PSPS events during the year, leading to under expenditure.
Allocation Methodology Development and Application (7.3.8.1)	This activity has an annual planned expenditure with a routine goal of using risk analysis to determine the key drivers of ignition risk, develop mitigation options, and evaluate these options using risk and other analysis to select preferred mitigation options and the scope of work necessary.	SCE incurred a decrease in the volume of routine work due to lower than anticipated levels of support needed for initiative deployment, leading to under expenditure.
Preparedness and Planning for Service Restoration (7.3.9.5)	This activity has an annual planned expenditure with a routine goal of continuing to conduct distribution and transmission line patrols subject to PSPS events.	SCE incurred a decrease in the volume of routine work due to experiencing fewer PSPS events than forecasted, leading to under expenditure.

2022 WMP Update Initiative	2022 WMP Update Activity Target	2022 Actual (EC ARC)
Alternative Technology Pilot Programs (7.1.E)	Complete the respective goal(s) for the seven following ongoing pilot programs: • Distribution Open Phase Detection: Continue monitoring the performance of existing units, perform lab testing on algorithms, and capture learnings in an assessment report. Install logic at two additional locations. • Early Fault Detection: Install 50 units and strive to add up to 150 early fault detection units. • High Impedance Relays: Expand the existing pilot to 20 additional locations.	• Distribution Open Phase Detection: Deployed at a lower cost than forecasted. • Early Fault Detection: Instead of the 50 planned installations, 46 Early Fault Detection units were installed in 2022. • High Impedance Relays: Deployed at a lower cost than forecasted.

2022 WMP Update Initiative	2022 WMP Update Activity Target	2022 Actual (EC ARC)
Alternative Technology Pilot Programs (7.1.E) (continued)	• Meter Alarming for Downed Energized Conductor: Continue to collect data on downed wire for covered conductor. • Advanced Unmanned Aerial Systems Study: Continue to build internal UAS capabilities by equipping and training first responders on the use of UAS. Continue exploring flight automation. Evaluate next generation drone platforms. • Asset Defect Detection Using Machine Learning Object Detection: Utilize new tagging platform for tagging asset defects for training and testing algorithms. Continue prioritizing and developing algorithms to identify defects on assets from images. • Satellite and Other Imaging Technology for Fire Spotting: Develop a UI and an API for the pilot. Work to develop a map to be housed online that will display fire ignitions from HD cameras and/or satellites.	• SCE did not report any progress updates on the following pilots: ○ meter alarming for downed energized conductor ○ advanced unmanned aerial systems study ○ asset defect detection using machine learning object detection ○ satellite and other imaging technology for fire spotting

Appendix C: SCE EC ARC Information on WMP Initiative Expenditures

Summarized in Table 9 is the forecast and actual expenditure for each category of initiatives from SEC's 2022 WMP Update, and SCE's self-reporting on expenditure contained in its EC ARC.

Table 9: EC ARC Information on WMP Initiative Expenditures

2022 WMP Update Initiative Activity	2022 WMP Update Identifier	2022 Expense Forecast ($K)	2022 Expense Actual ($K)	2022 Expense (Over)/Under Spend ($K) (EC ARC, Attach. B)
Advanced weather monitoring and weather stations	SA-1	$6,390	$6,487	($97)
Personnel monitoring areas of electric lines and equipment in elevated fire risk conditions	SA-3	$3,938	$6,122	($2,184)
Forecast of a fire risk index, fire potential index, or similar	SA-8	$2,873	$2,134	$739
Continuous monitoring sensors	SA-9	$399	$2,662	($2,263)
Continuous monitoring sensors	SA-10	$4,034	$2,066	$1,968
Covered conductor installation	SH-1	$720,560	$792,974	($72,414)
Undergrounding of electric lines and/or equipment	SH-2	$51,960	$29,704	$22,256

2022 WMP Update Initiative Activity	2022 WMP Update Identifier	2022 Expense Forecast ($K)	2022 Expense Actual ($K)	2022 Expense (Over)/Under Spend ($K) (EC ARC, Attach. B)
Expulsion fuse replacement	SH-4	$1,402	$58	$1,344
Installation of system automation equipment	SH-5	$3,615	$2,294	$1,321
Circuit breaker maintenance and installation to de-energize lines upon detecting a fault	SH-6	$10,193	$16,319	($6,126)
Updates to grid topology to minimize risk of ignition in HFTDs	SH-8	$2,516[16]	$1,193	$1,323
Covered conductor installation	SH-10	$16,552	$16,835	($283)
Updates to grid topology to minimize risk of ignition in HFTDs	SH-11	$2,585	$436	$2,149
Grid topology improvements to mitigate or reduce PSPS events	SH-12	$5,393	$-	$5,393
Transmission tower maintenance and replacement	SH-13	$250	$-	$250

[16] While the QDR and WMP have a planned expenditure of $2,516,000 for this activity, the EC ARC states the planned expenditure is $1,384,000.

2022 WMP Update Initiative Activity	2022 WMP Update Identifier	2022 Expense Forecast ($K)	2022 Expense Actual ($K)	2022 Expense (Over)/Under Spend ($K) (EC ARC, Attach. B)
Other corrective action	SH-14	$10,746	$11,922	($1,176)
Updates to grid topology to minimize risk of ignition in HFTDs	SH-15	$570	$642	($72)
Covered conductor installation	SH-16	$108	$174	($66)
Other corrective action	SH-17	$10,596	$12,036	($1,440)
Other discretionary inspection of distribution electric lines and equipment, beyond inspections mandated by rules and regulations	IN-1.1a & IN-1.1b[17]	$146,695	$136,127 & $29,525	($18,957)
Other discretionary inspection of transmission electric lines and	IN-1.2a & IN-1.2b[18]	$44,523	$25,789 & $8,853	$9,881
Infrared inspections of distribution electric lines and equipment	IN-3	$427	$467	($40)
Infrared inspections of transmission electric lines and equipment	IN-4	$209	$76	$133

[17] In its EC ARC expenditure table, SCE separates IN-1.1 into two parts.
[18] In its EC ARC expenditure table, SCE separates IN-1.2 into two parts.

2022 WMP Update Initiative Activity	2022 WMP Update Identifier	2022 Expense Forecast ($K)	2022 Expense Actual ($K)	2022 Expense (Over)/Under Spend ($K) (EC ARC, Attach. B)
Other discretionary inspection of distribution electric lines and equipment, beyond inspections mandated by rules and regulations	IN-5	$70	$153	($83)
Improvement of inspections	IN-8	$13,459	$12,998	$461
Transmission Conductor & Splice Assessment	IN-9	$1,500	$1,792	($292)
Removal and remediation of trees with strike potential to electric lines and equipment	VM-1	$42,636	$21,368	$21,268
Fuel management (including all wood management) and management of “slash” from vegetation management activities	VM-2 & Additional VM Target[19]	$20,589	$13,826	$6,763
Fuel management (including all wood management) and management of “slash” from vegetation management activities	VM-3	$1,185	$520	$665

[19] This activity aggregates expenditure for VM-2 and the Additional Vegetation Management Target “Poles brushed per PRC 4292”.

2022 WMP Update Initiative Activity	2022 WMP Update Identifier	2022 Expense Forecast ($K)	2022 Expense Actual ($K)	2022 Expense (Over)/Under Spend ($K) (EC ARC, Attach. B)
Removal and remediation of trees with strike potential to electric lines and equipment	VM-4	$31,258	$29,003	$2,255
Vegetation management enterprise system	VM-6	$10,300	$10,411	($111)
PSPS events and mitigation of PSPS impacts	PSPS-2	$35,691	$22,518	$13,173
Community engagement	DEP-1.2	$110	$6	$104
Community engagement	DEP-1.3	$11,443	$9,605	$1,838
Adequate and trained workforce for service restoration	DEP-2	$1,777	$299	$1,478
Community engagement	DEP-4	$6,038	$1,880	$4,158
Cooperation with suppression agencies	DEP-5	$18,000	$18,200	($200)
Centralized repository for data	DG-1	$20,619	$15,435	$5,184
Detailed inspections and management practices for vegetation clearances around distribution electrical lines and equipment	Additional Vegetation Management Target, 7.3.5.2	$14,828	$22,830	($8,002)

2022 WMP Update Initiative Activity	2022 WMP Update Identifier	2022 Expense Forecast ($K)	2022 Expense Actual ($K)	2022 Expense (Over)/Under Spend ($K) (EC ARC, Attach. B)
Detailed inspections and management practices for vegetation clearances around transmission electrical lines and equipment	Additional Vegetation Management Target, 7.3.5.3	$2,983	$410	$2,573
Quality assurance / quality control of VM	Additional Vegetation Management Target, 7.3.5.13[20]	$6,159	$5,523	$636
Remote sensing inspections of vegetation around distribution electric lines and equipment	Additional Vegetation Management Target, 7.3.5.7	$3,182	$992	$2,190
Remote sensing inspections of vegetation around transmission electric lines and equipment	Additional Vegetation Management Target, 7.3.5.8	$2,048	$2,094	($46)
Additional efforts to manage community and environmental impacts	7.3.5.1	$16,710	$29,940	($13,230)

[20] SCE occasionally refers to this activity as VM-5.

2022 WMP Update Initiative Activity	2022 WMP Update Identifier	2022 Expense Forecast ($K)	2022 Expense Actual ($K)	2022 Expense (Over)/Under Spend ($K) (EC ARC, Attach. B)
Patrol inspections of vegetation around distribution electric lines and equipment	7.3.5.11	$18,283	$10,679	$7,604
Patrol inspections of vegetation around transmission electric lines and equipment	7.3.5.12	$962	$10	$952
Vegetation management to achieve clearances around electric lines and equipment	7.3.5.20	$238,421	$226,523	$11,898
Protocols for PSPS re-energization	7.3.6.5	$709	$386	$323
PSPS Incident Management Team	7.3.6.6.1	$27,603	$27,862	($259)
Customer Resiliency Programs[21]	7.3.6.6.2.1.2[22]	$-[23]	$0.10	($0.10)
Customer Resiliency Equipment	7.3.6.6.2.1.3[24]	$2,595	$926	$1,669

[21] In the EC ARC expenditure table, SCE refers to this activity as Customer Resiliency Equipment. This is presumed to be Customer Resiliency Programs as it is in the WMP.
[22] SCE occasionally refers to this activity as 7.3.6.6.2.2
[23] SCE did not plan expenditure for this activity and did not explain why cost was incurred.
[24] SCE occasionally refers to this activity as 7.3.6.6.2.3

2022 WMP Update Initiative Activity	2022 WMP Update Identifier	2022 Expense Forecast ($K)	2022 Expense Actual ($K)	2022 Expense (Over)/Under Spend ($K) (EC ARC, Attach. B)
Allocation methodology development and application	7.3.8.1	$10,372	$9,980	$392
Preparedness and planning for service restoration	7.3.9.5	$7,337	$1,379	$5,958
Alternative Technology Pilot Programs	7.1.E	$6,985	$2,304	$4,681
Other discretionary inspection of distribution electric lines and equipment, beyond inspections mandated by rules and regulations	7.3.4[25]	$-[26]	$1	($1)
TOTAL		**$1,620,386[27]**	**$1,604,748**	**$15,636**

Energy Safety notes that the 2022 WMP Update, Table 12, did not identify planned expenditures for PSPS Driven Grid Hardening Work, Recruiting and Training of Vegetation Management Personnel, Substation Inspections, or Substation Vegetation Management Inspections, although initiative activities occurred, and targets were met. (2022 WMP Update, Table 12.)

[25] SCE did not clarify what activity this refers to. This is presumed to be general expenditure under the initiative category Asset Management and Inspections.
[26] SCE did not plan expenditure for this activity and did not explain why cost was incurred.
[27] This planned expenditure represents the original amount stated in the WMP and QDR. The EC ARC planned expenditure is $1,619,254 due to activity SH-8, which is $1,132 less in the EC ARC.

Appendix D: Substantial Vegetation Management Audit of SCE

On July 31, 2024, Energy Safety issued its SVM Audit for SCE and on August 20, 2024, SCE subsequently submitted its associated Corrective Action Plan. (SVM Action Plan.) The purpose of the SVM Audit is to assesses whether SCE met its quantitative commitments and verifiable statements in its 2022 WMP Update related to vegetation management. The Corrective Action Plan is an opportunity for the EC to respond to the SVM Audit findings with new information or a plan of action. Based on an additional assessment of the Corrective Action Plan, Energy Safety published the SVM Audit Report on October 1, 2024. (SVM Audit Report.) The findings from Energy Safety's SVM Audit Report are detailed in Table 10.

Table 10: Energy Safety's Findings from SCE 2022 SVM Audit Report of WMP Vegetation Management Initiatives

2022 WMP Update Initiative Number	2022 WMP Update Initiative Name	Determination
7.3.5.1	Additional Efforts to Manage Community and Environmental Impacts	Performed Required Work
7.3.5.2	Detailed Inspections and Management Practices or Vegetation Clearances around Distribution Electrical Lines and Equipment	Performed Required Work
7.3.5.3	Detailed Inspections and Management Practices for Vegetation Clearances Around Transmission Electric Lines and Equipment	Performed Required Work Refer to 7.3.5.2
7.3.5.4	Emergency Response Vegetation Management due to Red Flag Warning or Other Urgent Climate Conditions	Performed Required Work
7.3.5.5	Fuels Management (including all wood management) and Reduction of "slash" from Vegetation Management Activities	Performed Required Work

2022 WMP Update Initiative Number	2022 WMP Update Initiative Name	Determination
7.3.5.6	Improvement of Inspections	Performed Required Work
7.3.5.7	Remote Sensing Inspections of Vegetation Around Distribution Electric Lines and Equipment	Performed Required Work
7.3.5.8	Remote Sensing Inspections of Vegetation Around Transmission Electric Lines and Equipment	Performed Required Work
7.3.5.9	Other Discretionary Inspections of Vegetation Around Distribution Electric Lines and Equipment, Beyond Inspections Mandated by Rules and Regulations	Performed Required Work
7.3.5.10	Other Discretionary Inspections of Vegetation Around Transmission Electric Lines and Equipment, Beyond Inspections Mandated by Rules and Regulations	Performed Required Work Refer to 7.3.5.9
7.3.5.11	Patrol Inspections of Vegetation Around Distribution Electric Lines and Equipment	Performed Required Work
7.3.5.12	Patrol Inspections of Vegetation Around Transmission Electric Lines and Equipment	Performed Required Work Refer to 7.3.5.11
7.3.5.13	Quality Assurance / Quality Control of Vegetation Management	Performed Required Work
7.3.5.14	Recruiting and Training of Vegetation Management Personnel	Performed Required Work
7.3.5.15	Identification and Remediation of “At-Risk Species”	Performed Required Work

2022 WMP Update Initiative Number	2022 WMP Update Initiative Name	Determination
7.3.5.16	Removal and Remediation of Trees with Strike Potential to Electric Lines and Equipment	Performed Required Work
7.3.5.17	Substation Inspections	Performed Required Work
7.3.5.18	Substation Vegetation Management	Performed Required Work
7.3.5.19	Vegetation Management System	Performed Required Work
7.3.5.20	Vegetation Management to Achieve Clearances Around Electric Lines and Equipment	Performed Required Work
7.3.5.21	Vegetation Management Activities Post-Fire	Performed Required Work

Appendix E: Performance Metrics Appendix Figures

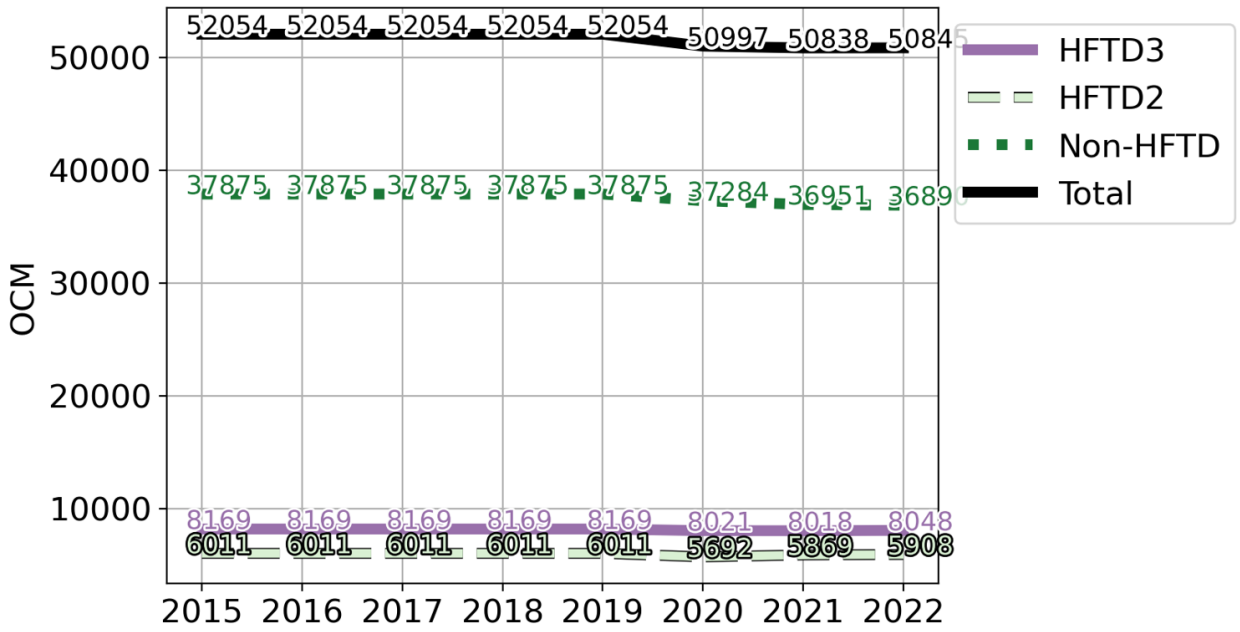
Data for this appendix come from the QDRs as reported by SCE. (2022 Q3 QDR, Tables 6, 7.1, 7.2, and 8; 2023 Q4 QDR, Tables 4, 5, 6, and 7.)

9.1.1 Normalizing Metrics

Overhead Circuit Miles:

The number of overhead circuit miles (OCM) have slight differences from 2021 to 2022 with a small increase noted in 2022 (Figure 23).

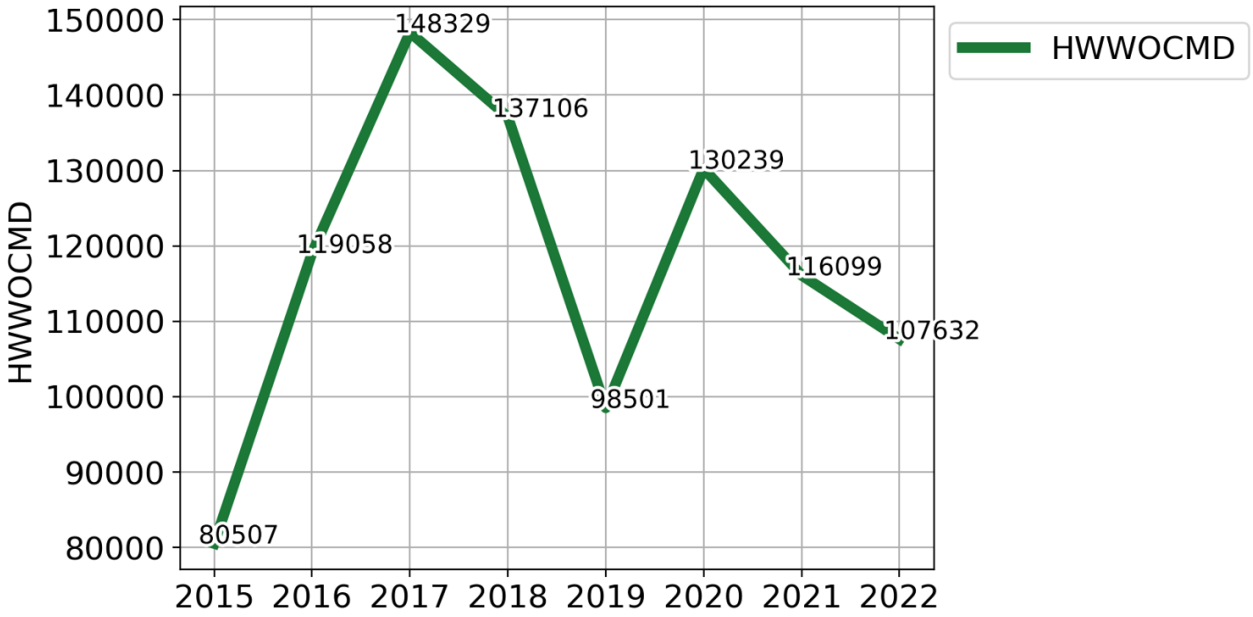
Figure 23: SCE Overhead Circuit Miles (2015-2022)



High Wind Warning Overhead Circuit Mile Days:

There has been a general decrease in the frequency of HWWOCMD from the highest value in 2017 to 2022 with a notable drop in 2019 (Figure 24). The year 2022 represents one of the lowest values since 2016.

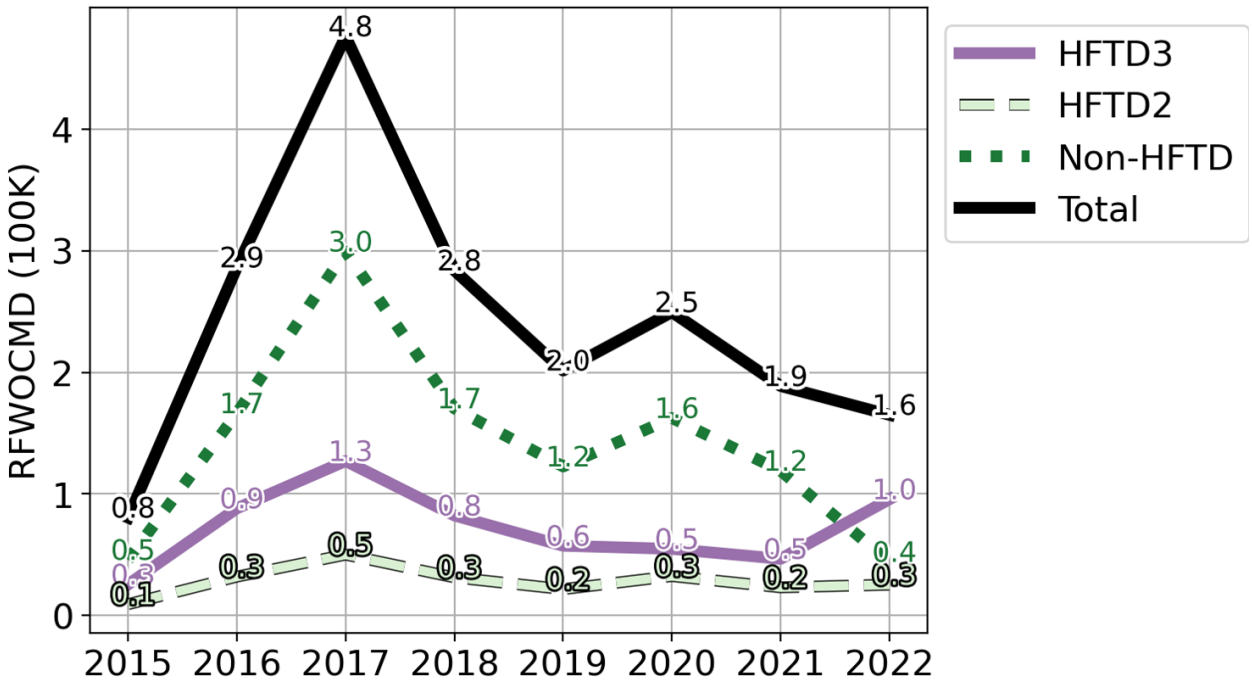
Figure 24: SCE High Wind Warning Overhead Circuit Mile Days (2015-2022)



Red Flag Warning Overhead Circuit Mile Days:

There has been a general decrease in the frequency of RFWOCMD from the highest value in 2017 to the most recent minimum in 2022, particularly noticeable in non-HFTD areas. However, there has been an increase in RFWOCMD events in Tier 3 HFTD areas for just 2022 (Figure 25). The large relative maximum in 2017 will likely show very low values for any metric normalized by RFWOCMDs for this year.

Figure 25: SCE Red Flag Warning Overhead Circuit Mile Days (2015-2022) by HFTD Locations

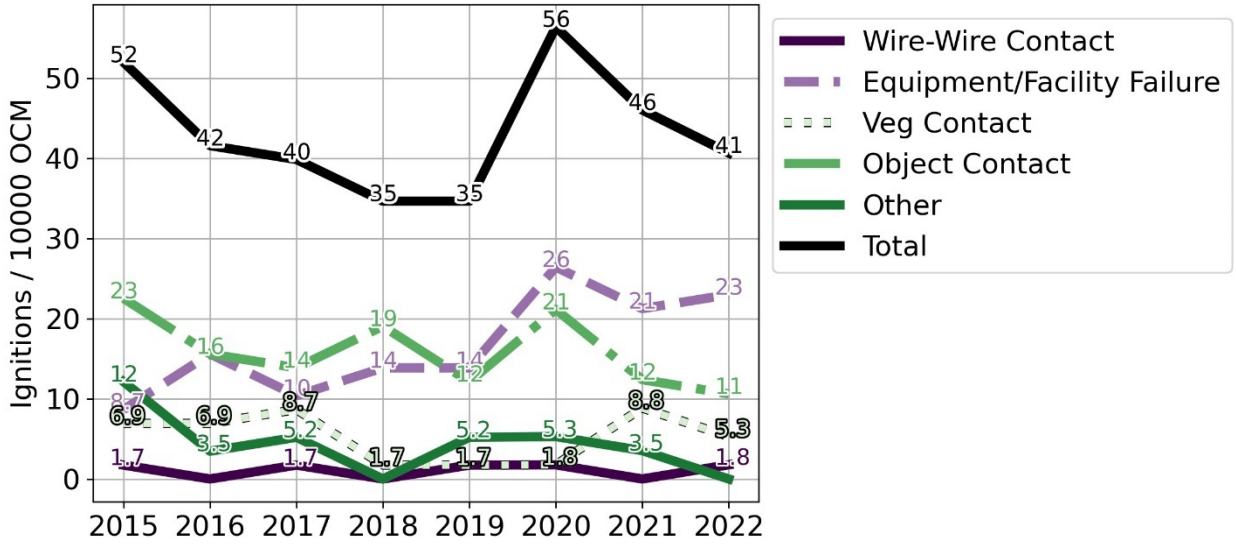


9.1.2 More Detailed Ignition Risk Findings

Distribution Ignitions Normalized by Overhead Circuit Miles in Tier 3 High Fire Threat District Delineated by Risk Driver:

Ignitions normalized by OCM in Tier 3 HFTD areas for distribution lines showed reductions from 2015 to 2019 driven by a downward pattern in object contacts. However, in 2020 a large spike in equipment or facility failures combined with a spike in object contacts resulted in an all-time high. Subsequent years showed a downward pattern due mostly to object contact reductions (Figure 26). The year 2022 shows more typical low values as compared to the maximum in 2020.

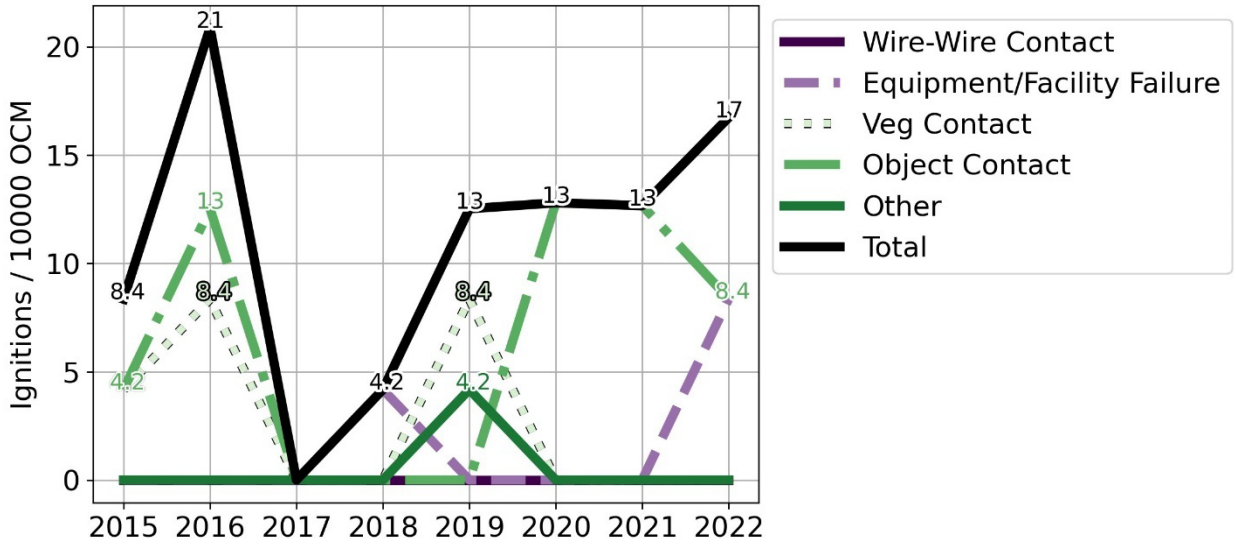
Figure 26: SCE Distribution Ignitions in HFTD Tier 3 Areas Normalized by Overhead Circuit Miles (2015-2022) by Risk Drivers



Transmission Ignitions Normalized by Overhead Circuit Miles in Tier 3 High Fire Threat District Delineated by Risk Driver:

Transmission Ignitions in Tier 3 HFTD areas normalized by OCM increased overall from a low in 2017 to a recent high in 2022. While object contact decreased from 2021 to 2022, equipment/facility failures increased in 2022 resulting in an increase of transmission ignitions for the year (Figure 27).

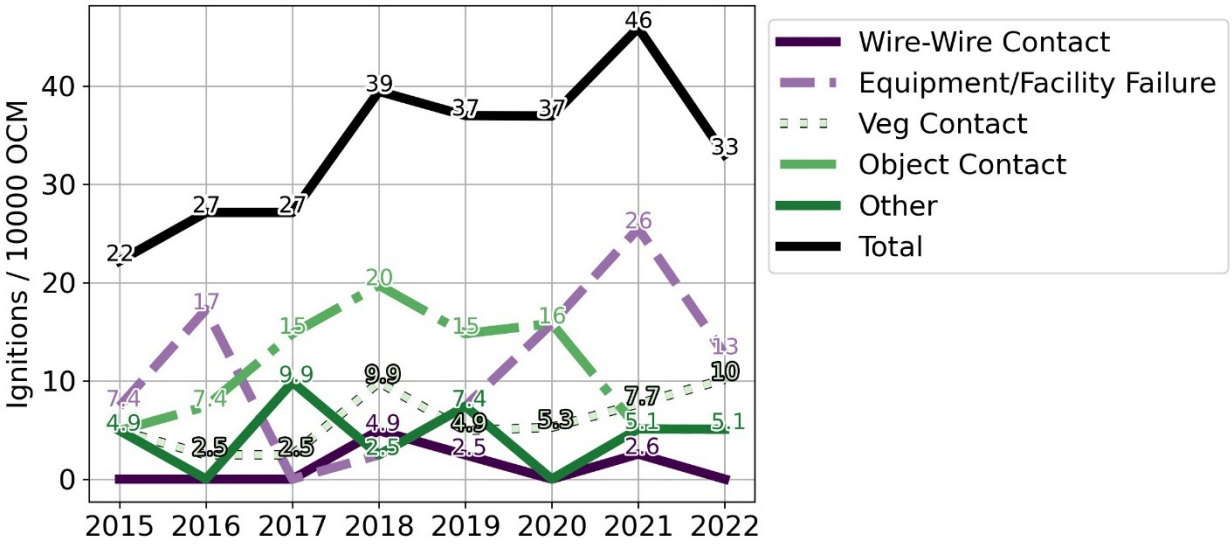
Figure 27: SCE Transmission Ignitions in HFTD Tier 3 Areas Normalized by Overhead Circuit Miles (2015-2022) by Risk Drivers



Distribution Ignitions Normalized by Overhead Circuit Miles in HFTD Tier Areas Delineated by Risk Driver:

For Tier 2 HFTD areas normalized by OCM, there was a decrease in distribution ignitions from 2021 to 2022 ending a long increasing pattern from 2015. All risk drivers decreased or held relatively steady compared to the previous year (Figure 28). Equipment or facility failures alternate with object contacts as the largest driver of the overall total occurrences.

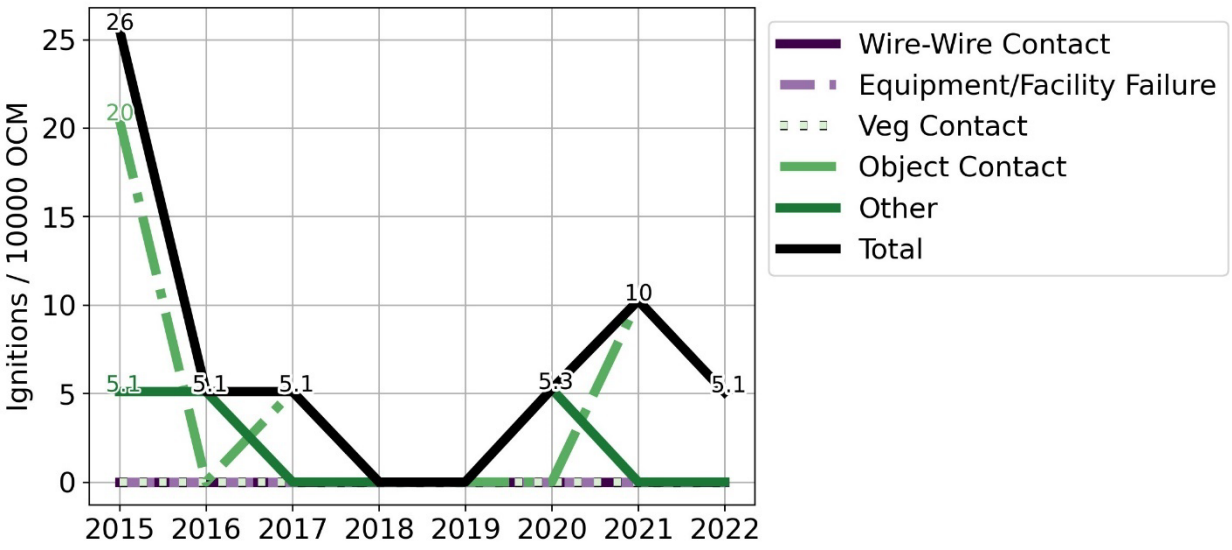
Figure 28: SCE Distribution Ignitions in HFTD Tier 2 Areas Normalized by Overhead Circuit Miles (2015-2022) by Risk Drivers



Transmission Ignitions Normalized by Overhead Circuit Miles in HFTD Tier 2 Areas Delineated by Risk Driver:

Transmission ignitions in HFTD Tier 2 areas, normalized by OCM, show a decrease in the overall number of normalized transmission ignitions from 2021 to 2022 (Figure 29). For 2022, the number returns to a more typical low level seen over the past seven years. Over the entire period, object contacts seem to be the largest contributor to the total numbers.

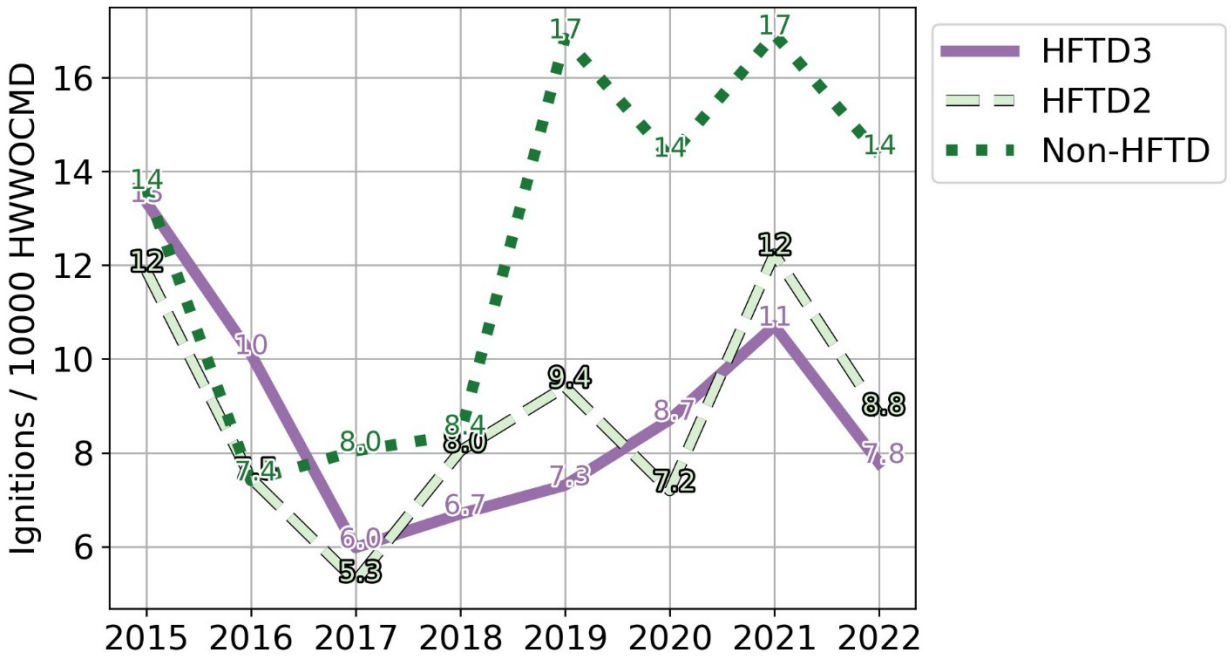
Figure 29: SCE Transmission Ignitions in HFTD Tier 2 Areas Normalized by Overhead Circuit Miles (2015-2022) by Risk Drivers



Ignitions Normalized by High Wind Warning Overhead Circuit Mile Days:

To account for year-by-year variations in weather, ignitions were normalized by HWWOCMD (Figure 30). The normalized ignition totals had a minimum point in 2017, which steadily increased to a new maximum in 2021. However, 2022 shows a material decrease for at least the one year.

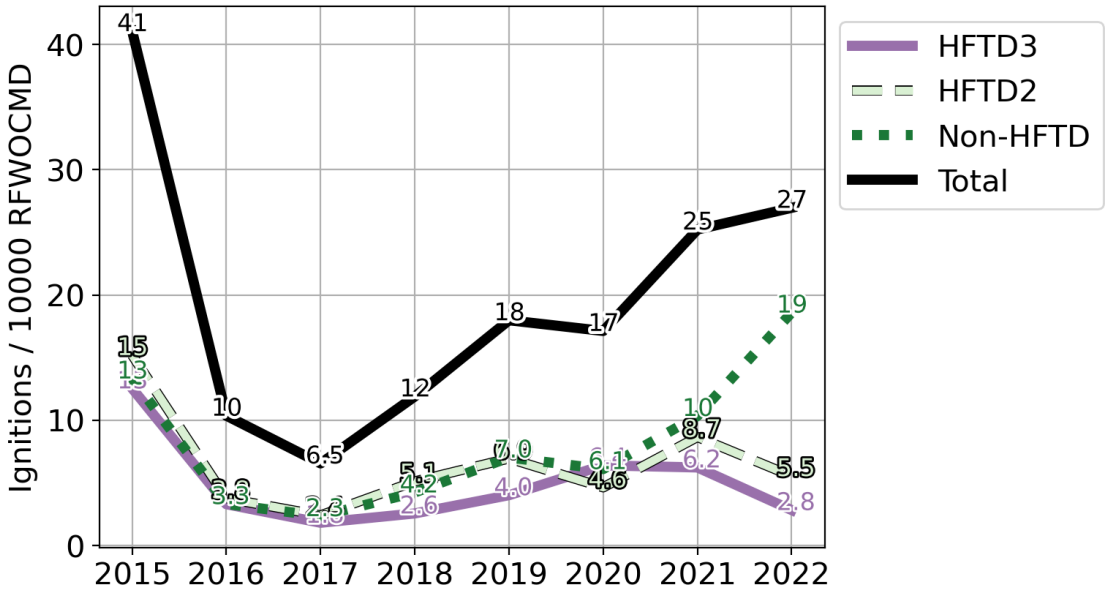
Figure 30: SCE Ignitions Normalized by HWWOCMD (2015-2022) Delineated by HFTD



Ignitions Normalized by Red Flag Warning Overhead Circuit Mile Days by High Fire Threat District Tiers:

The total number of normalized ignitions increased from 2021 to 2022, primarily driven by ignitions in non-HFTD areas. Despite the overall increase, there was a decrease in normalized ignitions in Tier 2 and Tier 3 HFTD areas for 2022 (Figure 31).

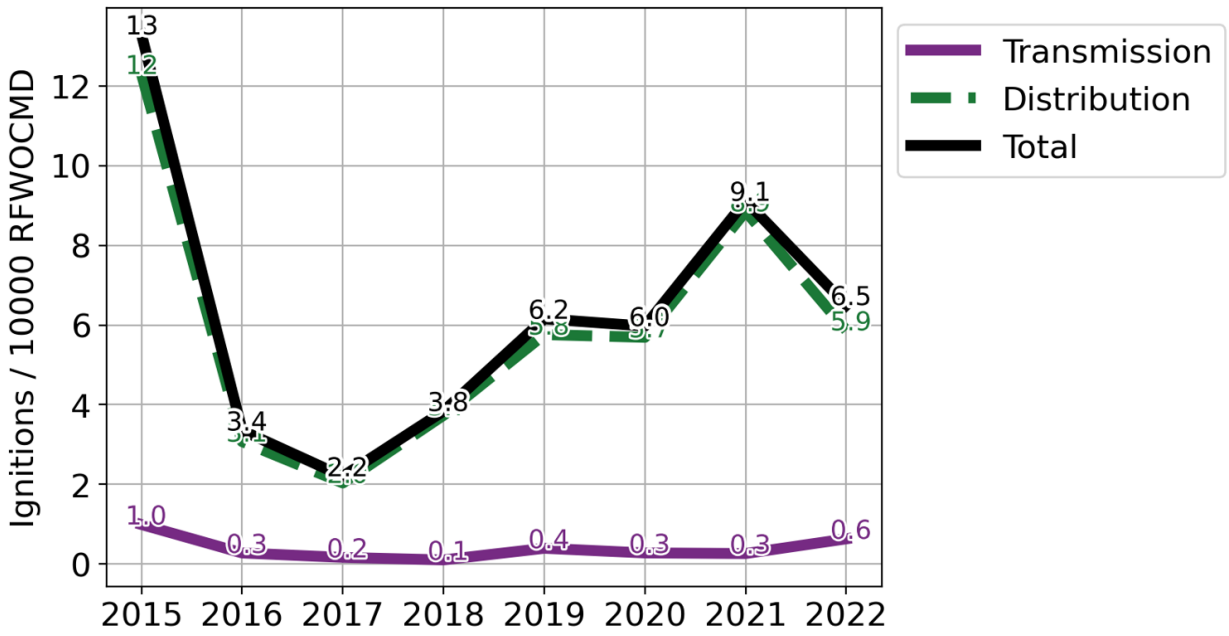
Figure 31: SCE Ignitions Normalized by RFWOCMD (2015-2022) by HFTD Tiers



Ignitions Normalized by Red Flag Warning Overhead Circuit Mile Days by Distribution and Transmission Lines:

Ignitions normalized by RFWOCMD by distribution and transmission lines show a departure in 2022 from the upward pattern starting in 2018 (Figure 32).

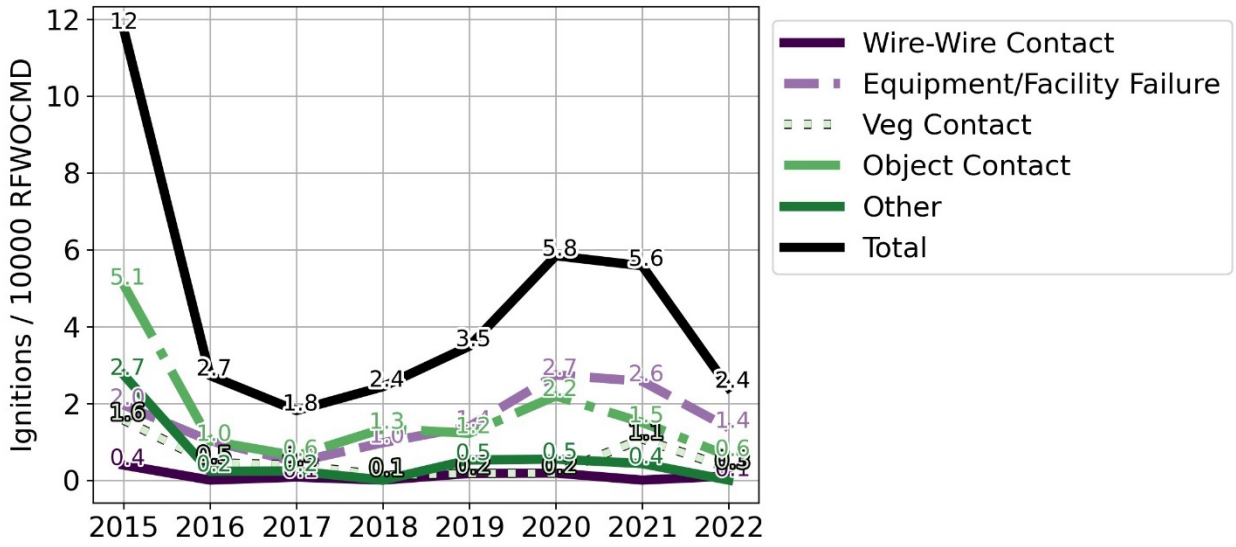
Figure 32: SCE Ignitions Normalized by RFWOCMD (2015-2022) by Distribution and Transmission Lines



Distribution Ignitions Normalized by Red Flag Warning Overhead Circuit Mile Days in Tier 3 High Fire Threat District Delineated by Risk Driver:

Distribution ignitions in Tier 3 HFTD areas normalized by RFWOCMD decreased from 2020 to 2022 (Figure 33). For 2022, all normalized ignitions ended with a relatively low value caused by a reduction in all risk driver categories.

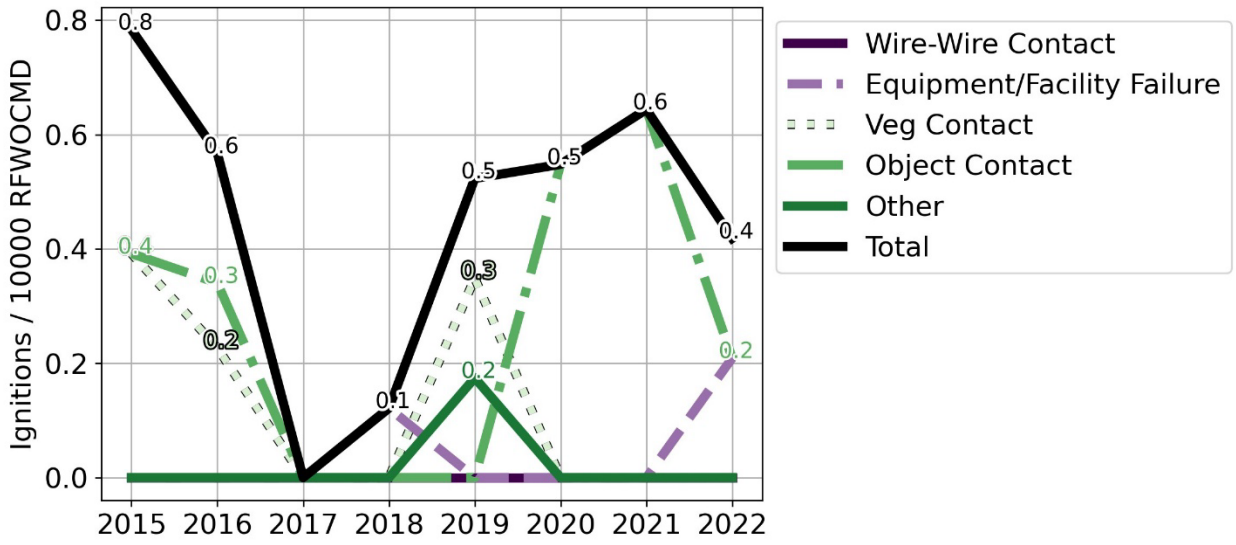
Figure 33: SCE Distribution Ignitions in HFTD Tier 3 Areas Normalized by RFWOCMD (2015-2022) by Risk Driver



Transmission Ignitions Normalized by Red Flag Warning Overhead Circuit Mile Days in Tier 3 High Fire Threat District Delineated by Risk Driver:

Transmission ignitions normalized by RFWOCMDs in Tier 3 HFTD areas decreased from 2021 to 2022 due mostly to a drop in object contacts (Figure 34). For the year 2022, the normalized ignitions ended somewhat below the average over the entire period.

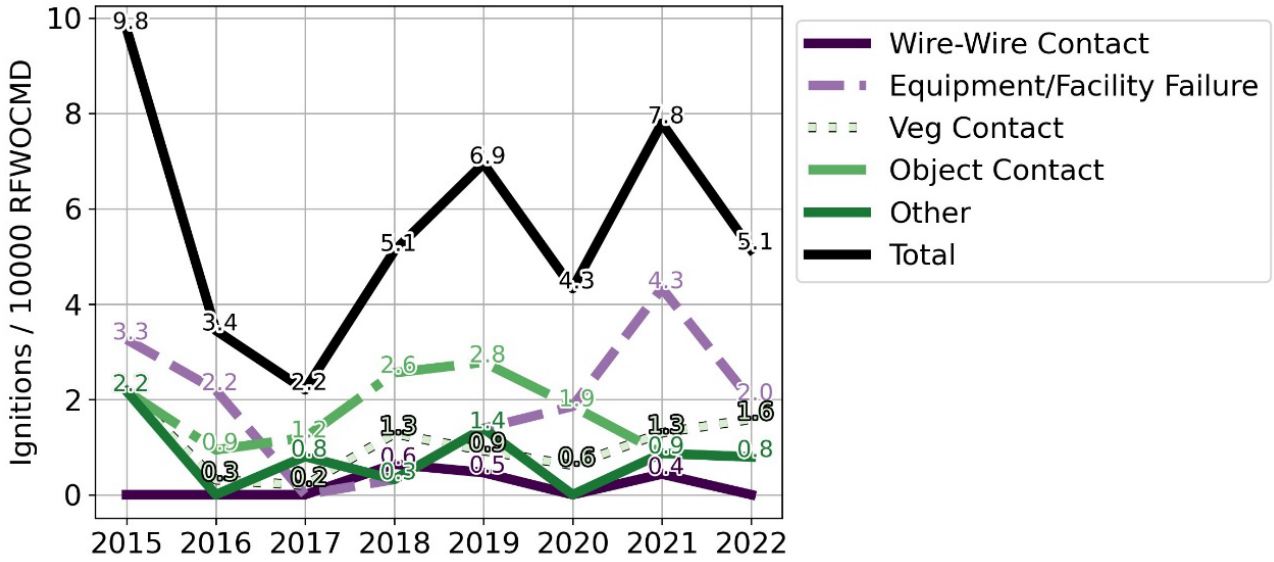
Figure 34: SCE Transmission Ignitions in HFTD Tier 3 Areas Normalized by RFWOCMD (2015-2022) by Risk Driver



Distribution Ignitions Normalized by Red Flag Warning Overhead Circuit Mile Days in Tier 2 High Fire Threat District Areas Delineated by Risk Driver:

For Tier 2 HFTD areas normalized by RFWOCMD, there was a decrease in overall distributions ignitions from 2021 to 2022. All risk drivers decreased compared to the previous year (Figure 35). For the year 2022, this lower value is still consistent with a very slight increasing pattern since 2017.

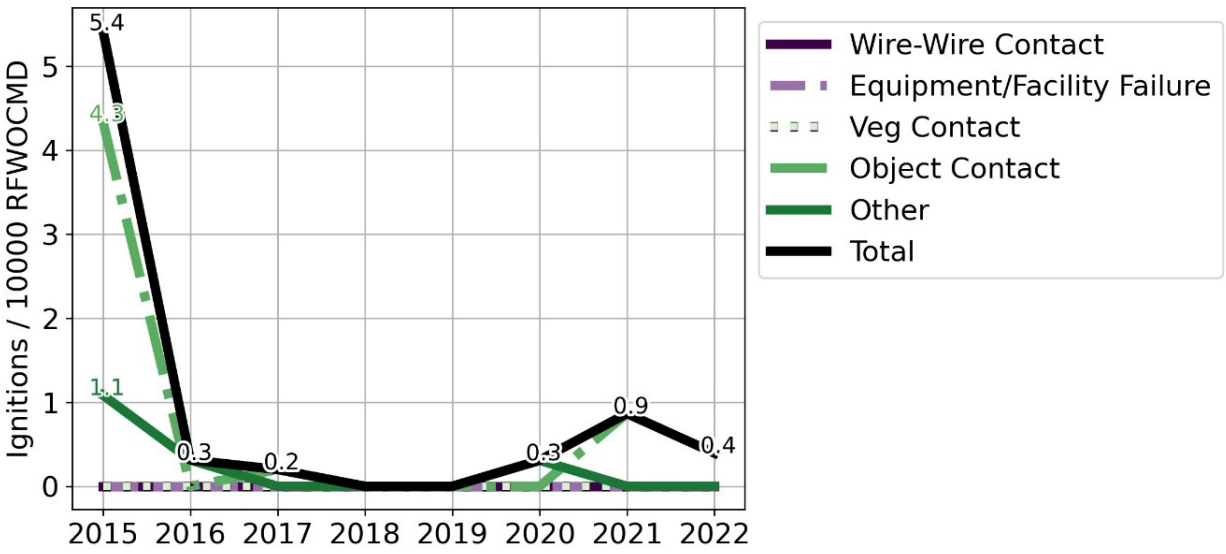
Figure 35: SCE Distribution Ignitions in HFTD Tier 2 Areas Normalized by RFWOCMD (2015-2022) by Risk Driver



Transmission Ignitions Normalized by Red Flag Warning Overhead Circuit Mile Days in Tier 2 High Fire Threat District Areas Delineated by Risk Driver:

For Tier 2 HFTD areas normalized by RFWOCMD, there was a decrease in overall transmission ignitions from 2021 to 2022 (Figure 36). For the year 2022, the low value is a return to the relatively very few normalized transmission ignitions since the large maximum in 2015.

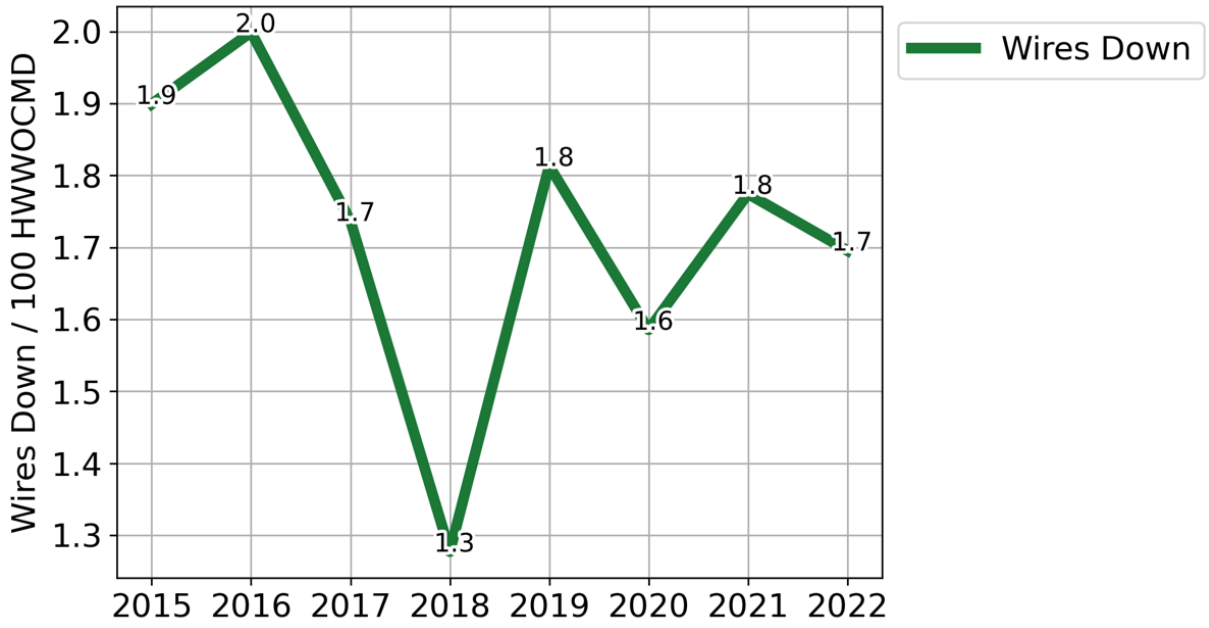
Figure 36: SCE Transmission Ignitions in HFTD Tier 2 Areas Normalized by RFWOCMD (2015-2022) by Risk Driver



Wire Down Events Normalized by High Wind Warning Overhead Circuit Mile Days:

When accounting for weather conditions that typically cause downed wires, the number of wire down events normalized by HWWOCMDs shows a large drop in 2018 (Figure 37). Otherwise, the pattern resembles the raw count data for wire downs with a similar slight reduction from 2021 to 2022.

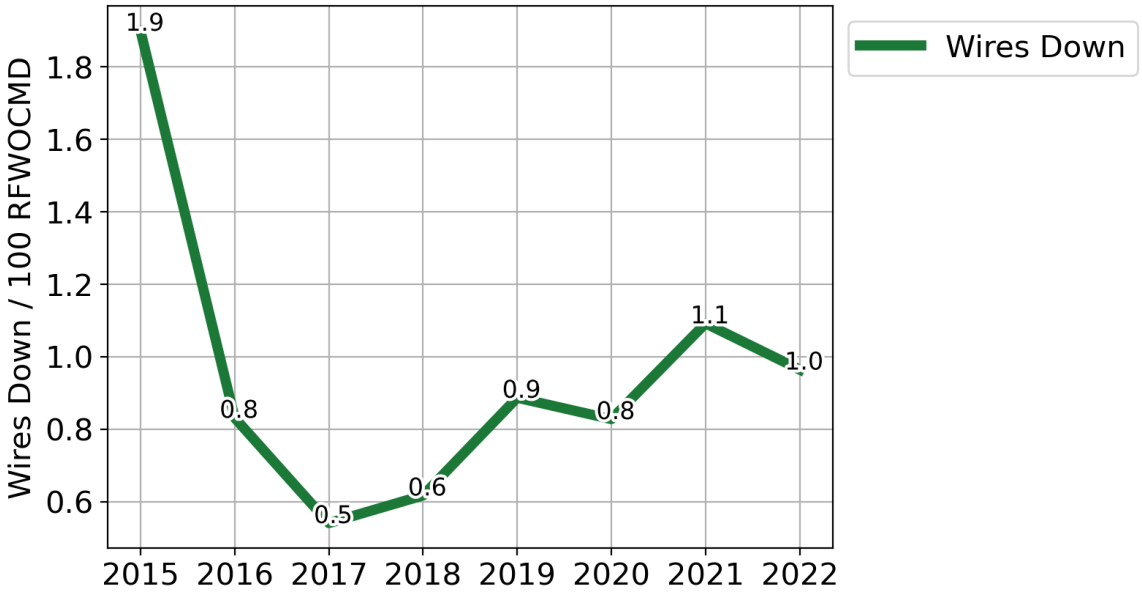
Figure 37: SCE Wire Down Events Normalized by HWWOCMD (2015-2022)



Wire Down Events Normalized by Red Flag Warning Overhead Circuit Mile Days:

Wire down events normalized by RFWOCMD have been relatively low since the high value in 2015 (Figure 38). However, the year 2022 represents the end of a slow increase over time since 2017.

Figure 38: SCE Wire Down Events Normalized by RFWOCMD (2015-2022)

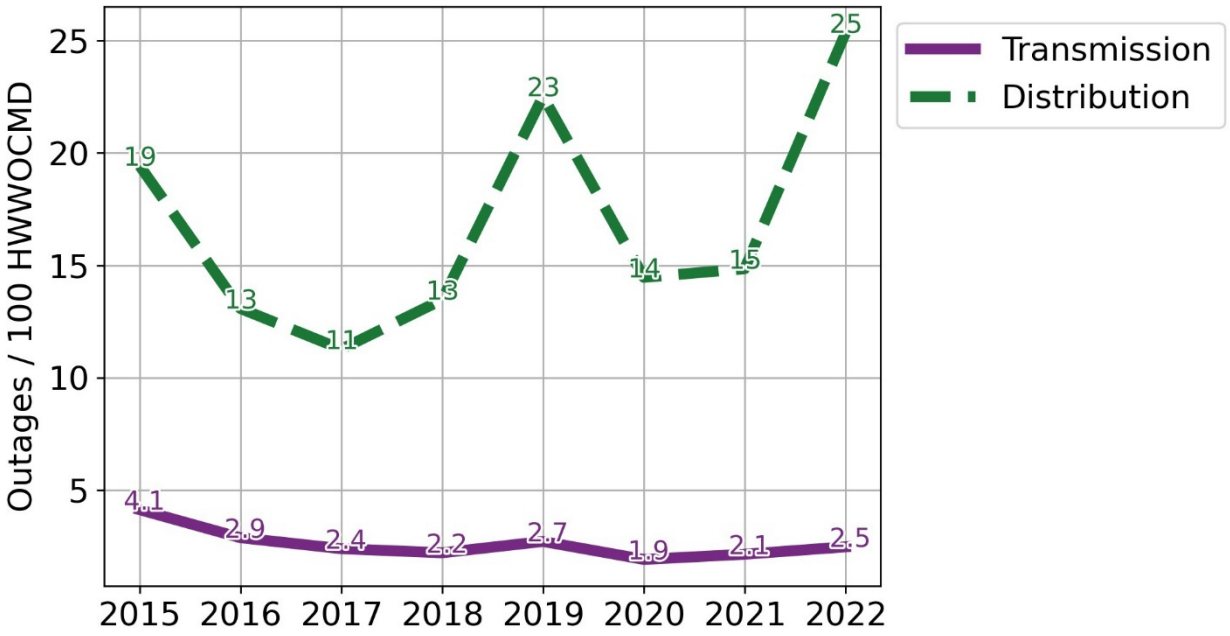


Outage Events Normalized by High Wind Warning Overhead Circuit Mile Days:

To view the outage event movement with respect to weather patterns that are typically associated, outage event counts have been normalized by HWWOCMD.

Once the outage event counts are adjusted for year-to-year variances in weather, the increase in 2022 remains (Figure 39).

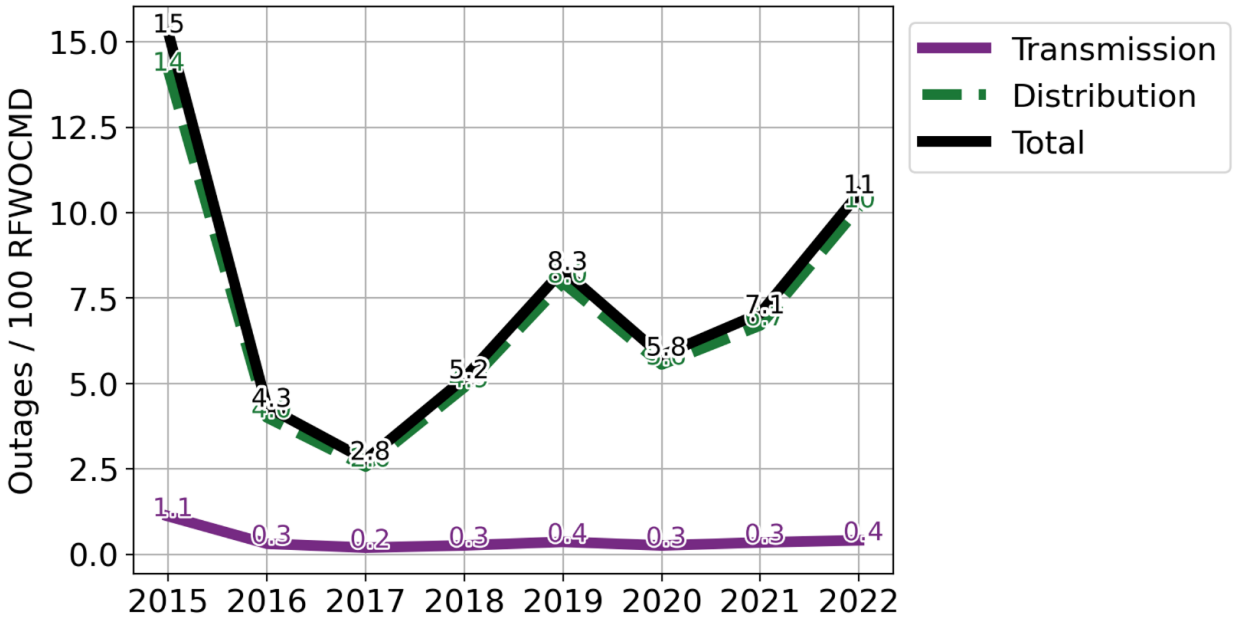
Figure 39: SCE Outage Events Normalized by HWWOCMD (2015-2022) by Distribution and Transmission Lines



Outage Events Normalized by Red Flag Warning Overhead Circuit Mile Days:

Unplanned outage events normalized by RFWOCMD show a steady increase each year since a large reduction in 2016 from the high of 2015 (Figure 40). Since 2016, the year 2022 represents a new high value.

Figure 40: SCE Outage Events Normalized by RFWOCMD (2015-2022) by Distribution and Transmission Lines

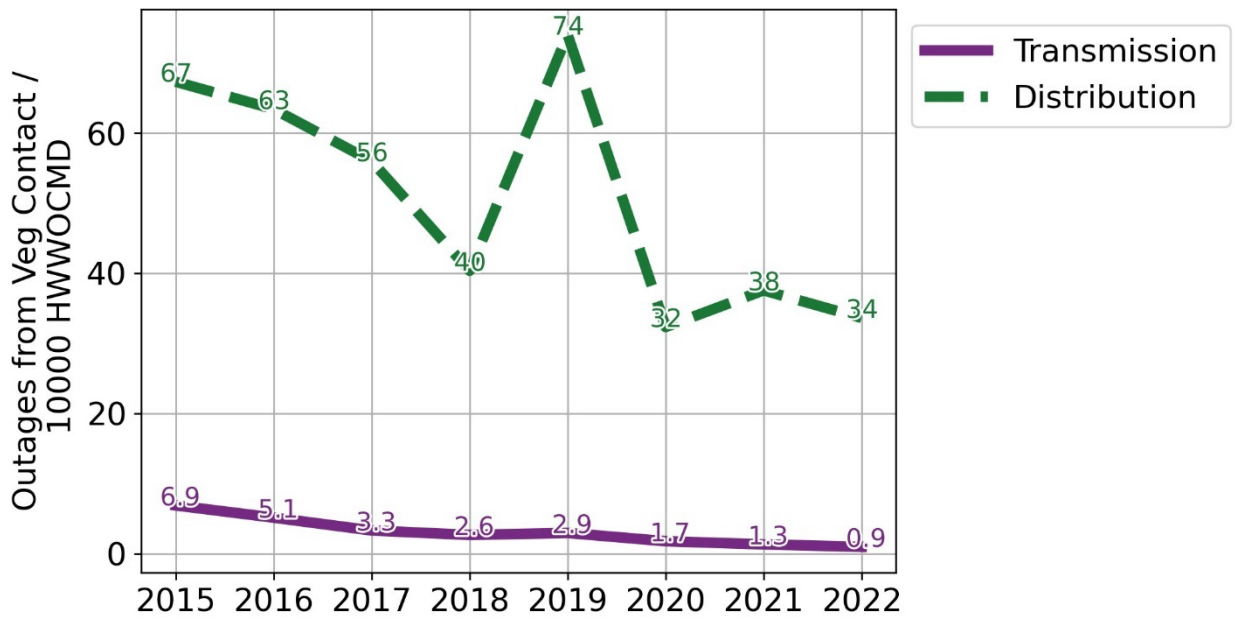


Outage Events from Vegetation Contact Counts Normalized by High Wind Warning Overhead Circuit Mile Days:

To gain insights on outage events from vegetation contacts adjusted for weather conditions, the raw counts were normalized by HWWOCMD.

With the exception of 2019, which shows the highest number overall, there is a decreasing pattern from 2015 to 2022 (Figure 41).

Figure 41: SCE Outage Events from Vegetation Contact Normalized by HWWOCMD (2015-2022) by Distribution and Transmission Lines



Outages Due to Vegetation Contact Normalized by Red Flag Warning Overhead Circuit Mile Days:

After 2015, outages from vegetation contact normalized by RFWOCMD maintained constant with a slight decrease from 2021 to 2022 (Figure 42). For the year 2022, the value is almost as low as the lowest value.

Figure 42: SCE Outages from Vegetation Contact Normalized by RFWOCMD (2015-2022) by Distribution and Transmission Lines