# Workshop Slides and Recording

## Workshop on the 2026-2028 Wildfire Mitigation Plans of PG&E, BVES, SDG&E, and SCE

The Office of Energy Infrastructure Safety held a public workshop on the 2026-2028 Base Wildfire Mitigation Plans of Pacific Gas and Electric (PG&E), Bear Valley Electric Service, Inc. (BVES), San Diego Gas & Electric (SDG&E), and Southern California Edison (SCE), on May 21, 2025. A recording of the meeting can be found on Energy Safety's YouTube channel.

Workshop Recording:

- Part 1 – PG&E (https://www.youtube.com/watch?v=PAbQ02pPwvU)
- Part 2 – BVES (https://www.youtube.com/watch?v=wLQskRqp2fQ)
- Part 3 – SDG&E and SCE (https://www.youtube.com/watch?v=OWd_xMkBlx4)
- Part 4 – Open Q&A (https://www.youtube.com/watch?v=ANHcHxgb6mc)

The slides presented during the meeting are attached to this document.

# 2026 - 2028 BASE WILDFIRE MITIGATION PLANS PUBLIC WORKSHOP

## For PG&E, BVES, SDG&E, and SCE WMPs

May 21, 2025

# WELCOME & INTRODUCTION

# SAFETY MESSAGE

- Be aware of your surroundings
- Know your emergency exits and evacuation route(s)
- Feel something, say something
- Take regular breaks; get up and stretch
- Keep emergency contact information readily available

# WMP BACKGROUND (1/1)

- Electrical corporations (ECs) are required to prepare and submit Wildfire Mitigation Plans (WMPs) to Energy Safety.

- WMPs describe how the EC is constructing, maintaining, and operating its electrical lines and equipment in a manner that will minimize the risk of catastrophic wildfires.

# WMP CYCLE (1/2)

- ECs submit a Base WMP every three years and provide updates in the interim years.
- Previously, ECs submitted their 2023-2025 Base WMPs in 2023.
- This year, in 2025, Energy Safety is evaluating a new three-year Base WMP for 2026 through 2028.
- Pacific Gas and Electric Company (PG&E), Bear Valley Electric Service (BVES), San Diego Gas and Electric Company (SDG&E), and Southern California Edison (SCE) submitted 2026-2028 Base WMPs in April and May 2025.

# WMP CYCLE (2/2)

- PacifiCorp, Liberty Utilities, Trans Bay Cable, Horizon West Transmission, and LS Power will submit Base WMPs for 2026-2028 in June and July 2025.
    - A workshop for these ECs' WMPs is scheduled for late-July.

- This workshop focuses on only 2026-2028 Base WMPs for PG&E, BVES, SDG&E, and SCE.

# WORKSHOP OBJECTIVES (1/2)

- Provide the public and other stakeholders with the opportunity to hear from PG&E, BVES, SDG&E, and SCE on four key elements from the WMPs:
    - Risk model changes; asset inspection process; mitigation effectiveness; equipment failure and ignition rate monitoring
- Forum for public and stakeholder questions.
- Information shared during the workshop may help inform written comments on the 2026-2028 Base WMPs.

# WORKSHOP OBJECTIVES (2/2)

Opening Comment dates can be found on the docket, most recently published as part of the WMP schedule on May 14. For the WMPs being presented today, opening comments are due on:

- PG&E: May 23, 2025
- BVES: May 30, 2025
- SDG&E: June 13, 2025
- SCE: June 27, 2025

We will close out the workshop with more information on next steps and how to submit written comments.

# WORKSHOP STRUCTURE (1/3)

- This workshop is structured to hear from each EC about its 2026-2028 Base WMP.
- Each EC will present on four elements, followed by a question-and-answer (Q&A) session when stakeholders and the public may ask questions specific to that EC's presentation.
- Each EC is given 1 hour and 20 minutes for its presentation and Q&A.
- Each EC presentation is subject to a time limit, monitored by an internal timekeeper who will provide live reminders as needed.

# WORKSHOP STRUCTURE (2/3)

Each EC will present on the following four elements:

1. At a high level, explain the major changes in your risk models since the 2023-2025 Base WMP. What were the drivers for these changes and how have they impacted your wildfire risk mitigation strategies?
2. Describe your detailed asset inspection process for transmission and distribution. How are inspection intervals determined? How are findings integrated into operational decisions?
3. Describe your methodology to determine and measure the effectiveness of wildfire mitigation initiatives/activities. How is the combined effectiveness of initiatives/activities determined?
4. How do you monitor equipment failure and ignition rates? How does data on equipment-specific risk inform your prioritization of maintenance or changes to inspection practice?

# WORKSHOP STRUCTURE (3/3)

**Breaks & Questions and Answers**

- There will be two 10-minute breaks and a one-hour lunch break.
- Each EC's presentation will be followed by a Q&A session.
- After all presentations, an open Q&A session will be held when questions may be asked about any of the elements discussed earlier or any other topic contained within the EC's 2026-2028 Base WMPs.

# AGENDA (1/2)

| | |
|---|---|
| 09:00 a.m. | Introduction from Energy Safety |
| 09:15 a.m. | PG&E Presentation and Q&A |
| *10:35 a.m.* | *Break* |
| 10:45 a.m. | BVES Presentation and Q&A |
| *12:05 p.m.* | *Lunch* |
| 01:05 p.m. | SDG&E Presentation and Q&A |
| 02:25 p.m. | SCE Presentation and Q&A |

# AGENDA (2/2)

| | |
|---|---|
| *03:45 p.m.* | *Break* |
| 03:55 p.m. | Open Q&A & Comment Session |
| 04:30 p.m. | Adjourn |

*For participant planning purposes, Energy Safety has provided this agenda. Please note the start times of each segment and the order of business are subject to change.*

# WORKSHOP LOGISTICS (1/1)

**Asking Questions:**

- Ask written questions in the Microsoft Teams chat at any time.
- Hold all verbal questions until the designated Q&A sessions.
- Raise your hand during the Q&A sessions to verbally ask a question.
- Ask questions specific to each EC's presentation during the Q&A session following the presentation.
- Ask questions applicable to one or all ECs during the open Q&A at the end of the day.

# PG&E PRESENTATION

# Energy Infrastructure and Safety Public Workshop

May 21, 2025

# Discussion Topics and Presenters

1. Risk Model Evolution
2. Detailed Asset Inspection Process
3. Effectiveness of Combined Mitigation Initiatives
4. Equipment Failure and Ignition Rates
5. Q&A

## PG&E SPEAKERS

**Andrew Abranches**, Vice President Wildfire Mitigation

**Michael Didyk**, Senior Manager Asset Failure Analysis

*Some of the measures included in this presentation are contemplated as additional precautionary measures intended to further reduce the risk of wildfires.*

# Risk Model Evolution

**Presented by:**
**Andrew Abranches**, Vice President, Wildfire Mitigation

# Prompt

**At a high level, explain the major changes in the electrical corporations' risk models since the 2023-2025 Base WMP.**

- What were the drivers for these changes and how have they impacted the electrical corporation's wildfire risk mitigation strategies?

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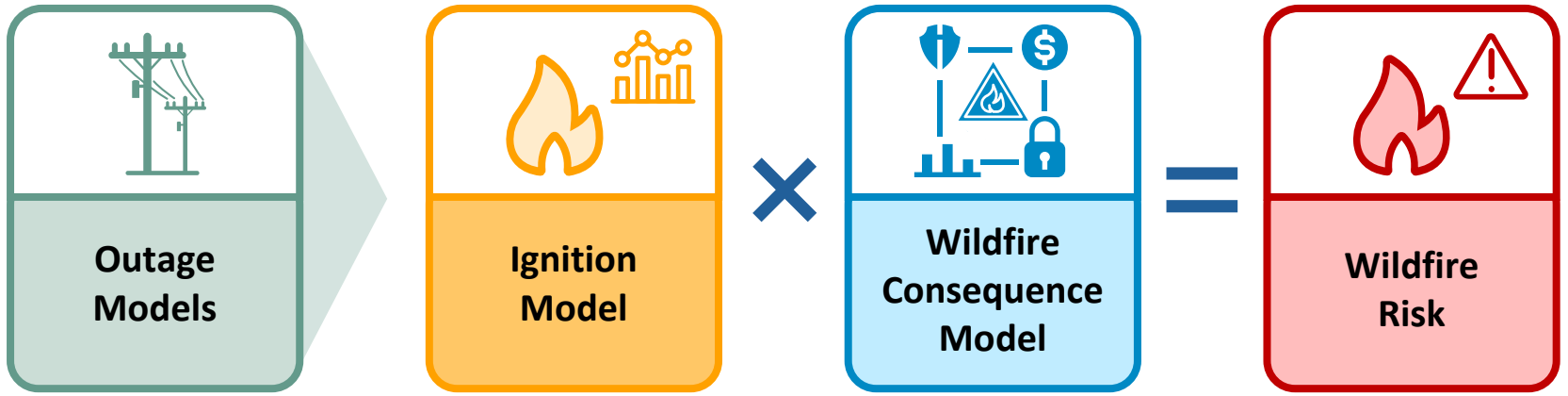
# Risk Methodology

We determine wildfire risk through our risk models which have improved in our upcoming WMP.

## How Our Distribution Risk Model Works




By assessing the causes of outages and ignitions and the consequences of a wildfire starting, we're able to pinpoint risk across our assets and equipment.

**Risk Modeling Improvements In 2026 - 2028**

- Refined outage models to account for equipment installed on each distribution pole individually
- Improved consequence modeling to simulate 24 hours and account for suppression and egress
- Adding additional data to outage, ignitions and consequence models to refine findings

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# Wildfire Distribution Risk Model (WDRM) v4 Improvement Drivers

| | |
|---|---|
| Regulatory Guidance | ✓ Incorporate ingress, egress, and fire suppression attributes into the Wildfire Consequence (WFC) Model<br>✓ Evaluate an approach to incorporate community vulnerability attributes |
| Third-Party Review and Recommendations | ✓ Strengthen link between experts and models<br>✓ Improve the WFC model transparency and validity using 24-hour simulations<br>✓ Explore potential future WDRM use cases<br>✓ Coordinate model development roadmap with statewide wildfire planning<br>✓ Establish a data quality control process |
| Internal Subject Matter Experts | ✓ Implement "Risk per Line Mile for System Hardening" prioritization<br>✓ Improve vegetation model sensitivity to tree health and wind conditions<br>✓ Incorporate dry wind conditions into the WFC model |

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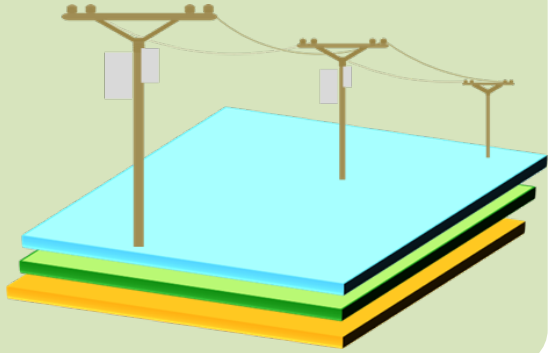
# Summary of Changes to Distribution Risk Model

Our next evolution of the WDRM adds new data and calculates equipment risk at the asset level to align more closely with work planning.

## 2023 – 2025 WMP

### Wildfire Distribution Risk Model v3

**Risk calculated and composited at 100m x 100m "pixel" level**



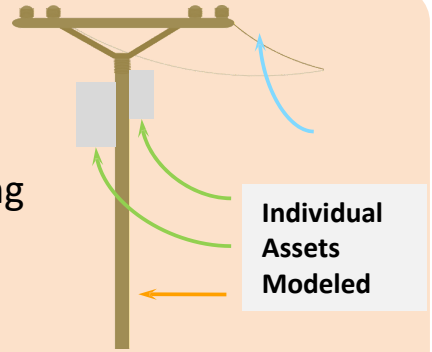
**Consequence modeling** incorporates eight-hour fire simulation

**Data included:**
GIS Vintage: Jan 2022
Previous risk events incorporated: 2015-2021

## 2026 – 2028 WMP

### Wildfire Distribution Risk Model v4

**Asset risk calculated at asset level**
Better aligns with work planning and asset inspections




**Improved consequence modeling** incorporates 24-hour fire modeling and suppression and egress

**Data updates:**
GIS Vintage: Jan 2023
Previous risk events incorporated: 2015-2022

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# Changes to Transmission Risk Model

Our next evolution of the Wildfire Transmission Risk Model (WTRM v2) receives similar benefits as the WDRM, like improved consequence modeling and updated data, to better assess risk on our system.

## Improvements over previous WMP

- The model accounts for asset age to determine fragility in the face of environmental and third-party hazards.
- Uses the improved Wildfire Consequence Model v4 that accounts for suppression and egress.
- WTRM v2 model uses Notifications as an indicator of asset health.

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# Detailed Asset Inspection Process

**Presented by:**
**Andrew Abranches**, Vice President, Wildfire Mitigation

# Prompt

**Describe the electrical corporation's detailed asset inspection process for transmission and distribution.**

- How are inspection intervals determined?
- How are findings integrated into operational decisions?

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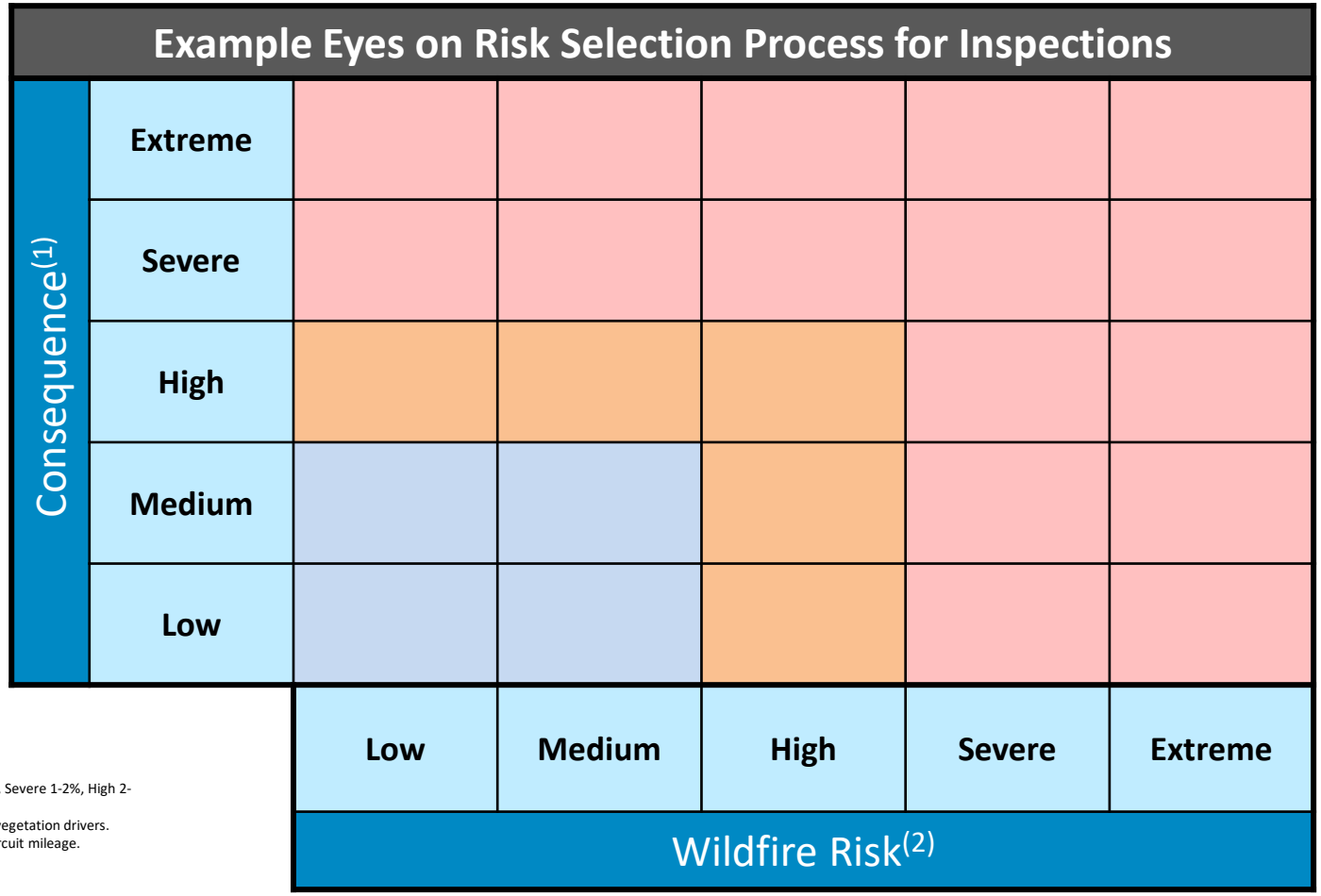
# Improving Wildfire Mitigation Through Inspection Prioritization

Through improvements to our wildfire risk models, we now consider both risk and consequence when determining where to prioritize work.

**This change improves our "eyes on risk"(3) compared to our 2023-2025 WMP.**

| | | | |
|---|---|---|---|
| Vegetation Management | Routine | Routine/Hazard | Routine/Hazard/ Remote Sensing(4) |
| Distribution Inspections | Tri-Annual | Bi-Annual | Annual |




**Note(s):**
(1) Groupings for both consequence and wildfire risk are based on the percentiles of circuit segments based on the following categories: Extreme 0-1%, Severe 1-2%, High 2-10%, Medium 10-20%, Low 20-100%.
(2) Wildfire risk is included because it allows for a correlation between wildfire risk and consequence, while also considering probability of ignition for vegetation drivers.
(3) "Eyes on risk" demonstrates the anticipated average "eyes on risk" value per year and may fluctuate per year depending on changes in overhead circuit mileage.
(4) Remote Sensing mileage is has not been determined, considerations applied to High Risk areas for demonstration purposes

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# Inspections

| | Transmission | Distribution |
|---|---|---|
| **Interval** | Detailed inspections every three years in HFTD guided by WTRM v2. | Detailed inspections every three years in HFTD guided by WDRM v4. |
| **What This Means** | Three-year inspection interval mirrors the conservative degradation estimate of identified non-emergency conditions. | Aerial inspections in between three-year detailed inspection cycles for areas of extreme, severe and high risk or consequence. |
| **Requirement** | California Public Utilities Commission (CPUC) General Order 95 requires Level 2 maintenance notifications to be completed at a max. duration of three years. | CPUC General Order 165 requires inspections to be completed at a five-year frequency. |
| **Operational Decisions** | Inspection findings inform decisions for what lines may be included in Public Safety Power Shutoffs. | High risk conditions addressed expeditiously. Lower-risk conditions are remediated through risk-prioritized mega-bundling. This allows PG&E to increase risk-spend efficiency in executing notifications that are identified through inspections. PSPS scoping also considers EC notifications. |

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# Identifying Mitigation Effectiveness and Opportunities

**Presented by:**
**Andrew Abranches**, Vice President, Wildfire Mitigation

# Prompt

**Describe the methodology the electrical corporation uses to determine and measure the effectiveness of wildfire mitigation initiatives/activities.**

- How is the combined effectiveness of initiatives/activities determined?

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# Layers of Protection Approach[(1)]


(1) Our layers of protection continue to evolve within the below categories.

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# Assessing Mitigation Effectiveness

Mitigation effectiveness is measured and assessed over time. We adapt our mitigation efforts based on evolving risk and data-driven analysis.

**As the length of time a mitigation has been in place increases, so does the amount of data to assess its effectiveness.**

**Expert Engineering Assessments** → **Simulation Modeling and Data Analysis** → **Observed Ignition, Outage, Damage Trends**

| Mitigation Approach | Consolidated Program Grouping | Effectiveness Methodology |
|---|---|---|
| System Hardening | System Hardening, Overhead and Underground | Based on expert engineering assessments and historic outage data |
| Vegetation | Vegetation Controls | Based on historic vegetation failures leading to an outage |
| | Vegetation Mitigation | Based on expert engineering assessments |
| Operational Mitigations | EPSS | Based on normalized ignitions with or without EPSS enablement |
| | PSPS | Based on historical lookback of fires > 1000 acres PSPS criteria would have detected and hazards and damages assessment |

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# Assessing Combined Effectiveness

Because we use a layers of protection approach, each span has multiple mitigations present.
In some instances, this makes it difficult to determine which mitigation prevented the ignition event.

As we assess locations where multiple mitigations are present, we look for ignitions, outages, and damages to then evaluate which mitigation was the key preventer.

## Easier to Assess Independent Effectiveness

- PSPS
- Undergrounding

## More Difficult to Assess Independent Effectiveness

- EPSS
- Vegetation Management
- Covered Conductor

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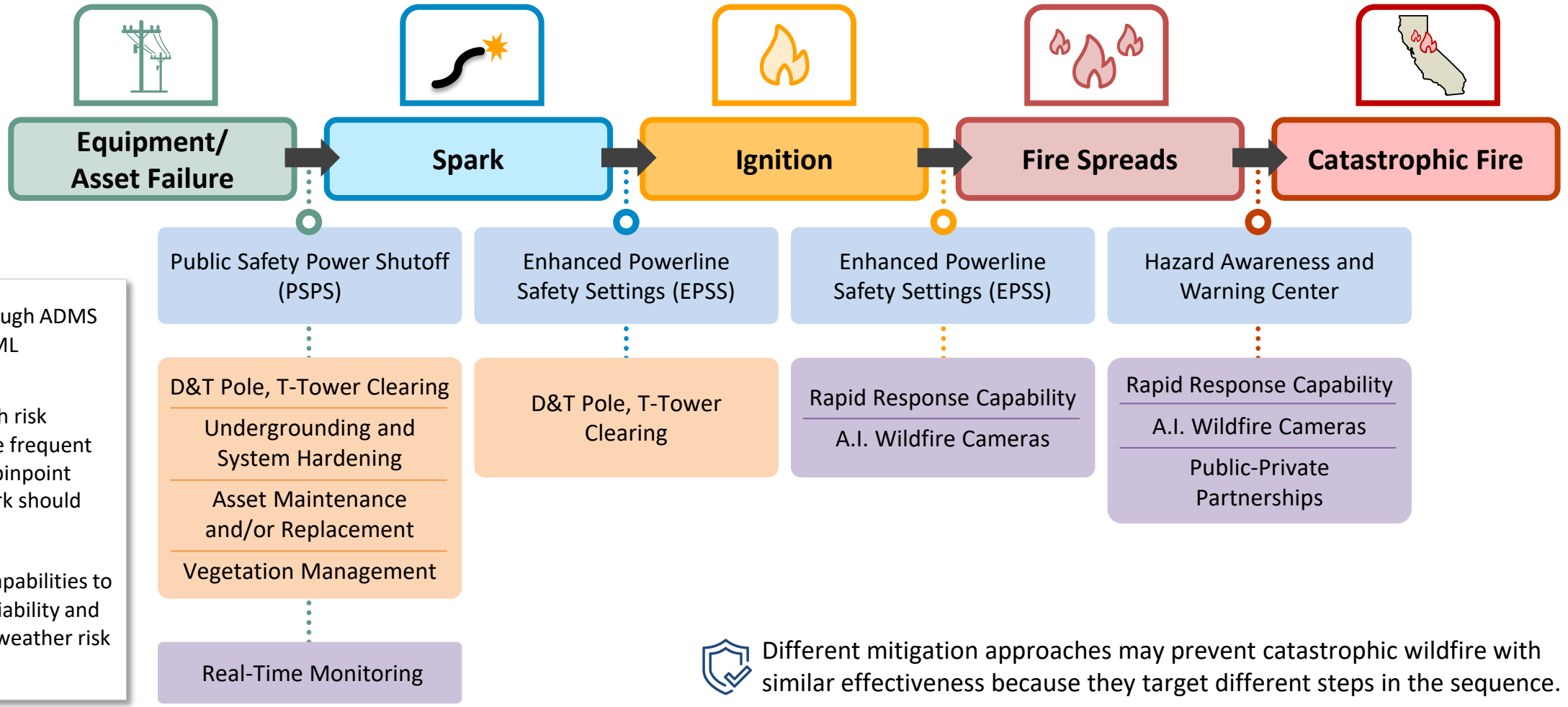
# Evolving Mitigations to Interrupt Wildfire Sequence

Utility-attributable fires follow a common sequence. Through our layers of protection approach, mitigations evolve via improvements, optimizations or building new capabilities.




**Improving** through ADMS automation, AI/ML

**Optimizing** with risk models and more frequent satellite data to pinpoint where/when work should take place

**Building** new capabilities to improve both reliability and reduce extreme weather risk

Different mitigation approaches may prevent catastrophic wildfire with similar effectiveness because they target different steps in the sequence.

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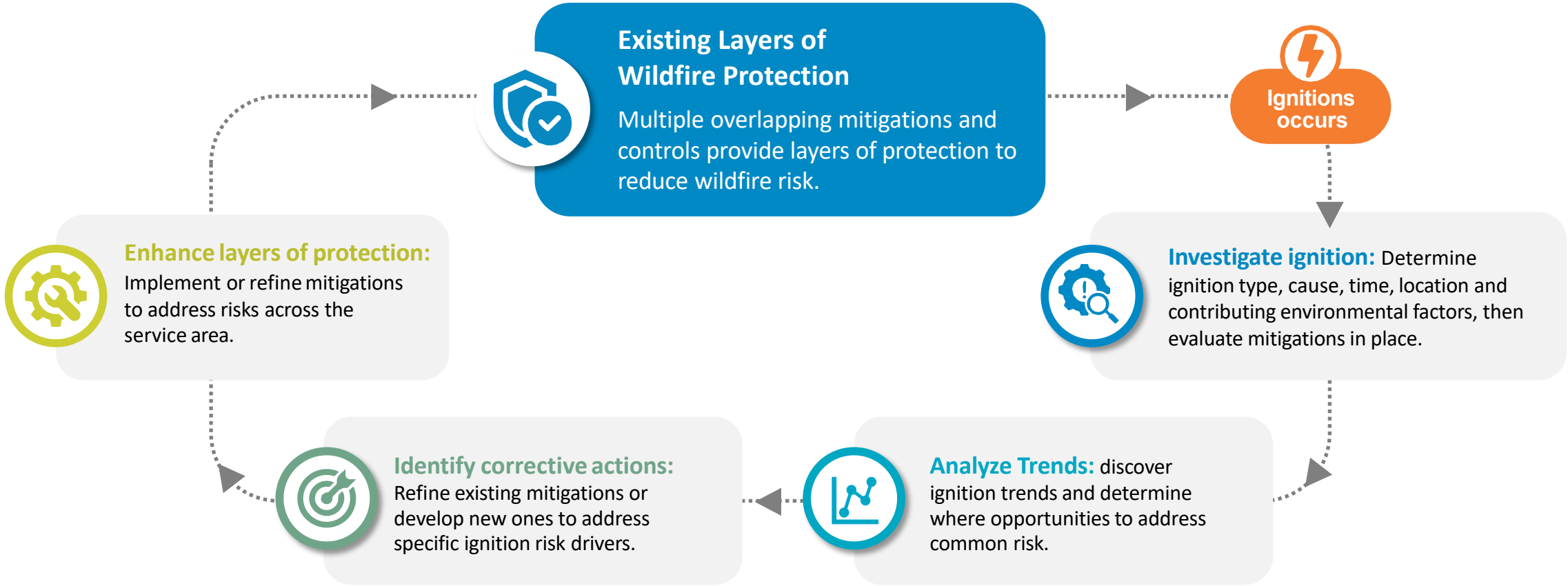
# Continuously Improving Our Layers of Protection

When an ignition occurs, our investigations help to determine cause, analyze trends and identify opportunities for key enhancements to our layers of wildfire protection.

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# Equipment Failure and Ignition Rates

**Presented by:**
**Michael Didyk,** Senior Manager, Asset Failure Analysis

# Prompt

**How does the electrical corporation monitor equipment failure and ignition rates?**

- How does data on equipment-specific risk inform the electrical corporation's prioritization of maintenance or changes to inspection practice?

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# Equipment Failure Monitoring Programs/Tools


**Strategic Asset Failure Evaluation (SAFE) Program**
- Transmission & Substation equipment caused outages

**Enhanced Ignition Analysis (EIA) Program**
- Equipment-caused ignitions in HFTD, and Transmission/Substation ignitions in non-HFTD

**Failure Analysis Tools**
- Palantir Foundry: Data aggregation platform
- AMCC: Asset Management Command Center
- REACCT: Repeat Electric Asset Compelling Condition Tool (Beta)

Regular monitoring of inspection find and asset failure rates

**Examples of asset failure investigation outcomes:**
- Revisions to standards/procedures
- Annual revision of Overhead Inspection Job Aid (TD-2305M-JA02)
- Inspection/monitoring workplans and strategies
- Validation of risk model revisions

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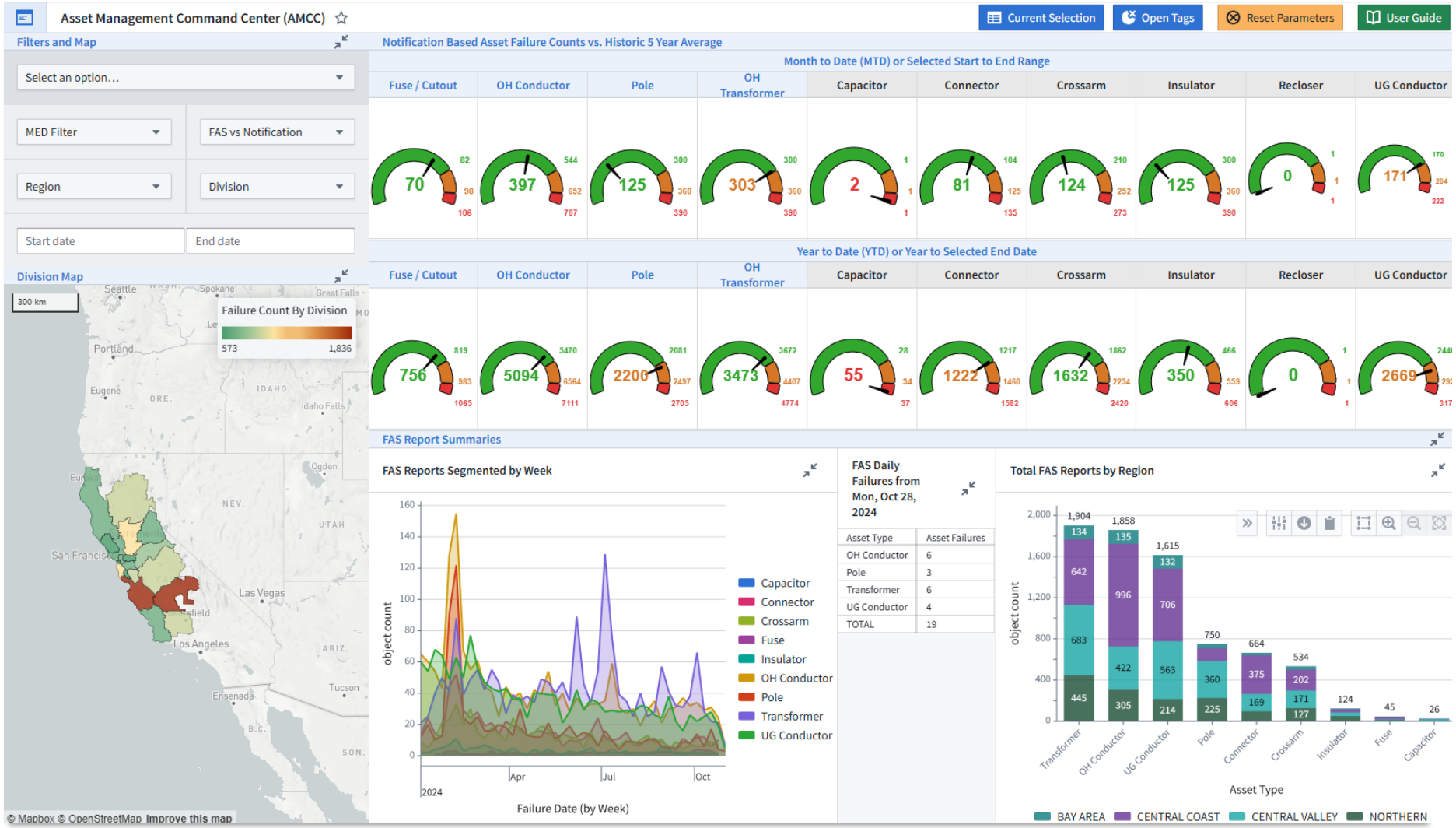
# Distribution Asset Failure Analysis Tool: Asset Management Command Center Dashboard

Speedometers compare the status with the rates over the preceding five years

- Green is < 1.0 ave
- Orange is 1.0-1.2x ave
- Red is >1.2x ave

Rates give an indication of where we may need to "double click" into, to investigate potential emerging issues.

Each asset type can be clicked into for specific trending(1) and analysis




(1) Trending quality can be limited due to number of data points or field participation rate in data collection

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# Asset Failure Analysis Tool(1): Repeat Electric Asset Compelling Condition Tool (REACCT)

Any repeated Distribution Electric Corrective (EC) work tag type can be trended to help evaluate failure history of a single asset or enterprise wide.

**Example:**

- Repeated Priority A tags on the same structure
- Cause is Equipment, Object is Conductor OR Connector failure
- Repeated within 1 year
- Initial event and repeat event caused a PGE Facility Ignition


(1) This tool is in beta, not referenced in WMP.

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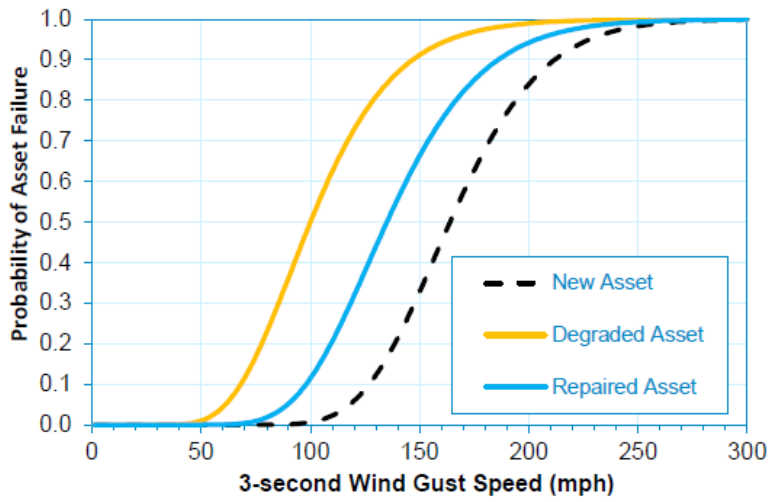
# Transmission Failure Framework

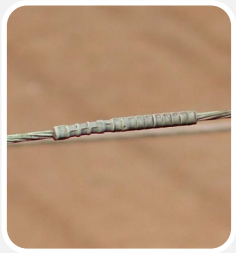
**The WTRM utilizes the fragility of individual assets to prioritize controls and mitigations for higher risk assets.**

- Data is captured on **critical components**
- Asset data, in conjunction with maintenance, performance and environmental data feed the **WTRM probability of failure**
- The WTRM also uses **consequence** to determine risk at an asset level, hazard level, or across the system.
- This **risk aims to informs mitigation response for each asset**.
- Validation and feedback loop through evaluation of in-service failures/ignitions improve modeling accuracy and precision




**Detailed Inspections (Aerial and/or Ground)**

**Maintenance Prioritization**



**Life Extension and Targeted Replacement**

- Splice Shunts (WMP Target GH-06)
- Conductor Segment Replacement (WMP Target GH-11)

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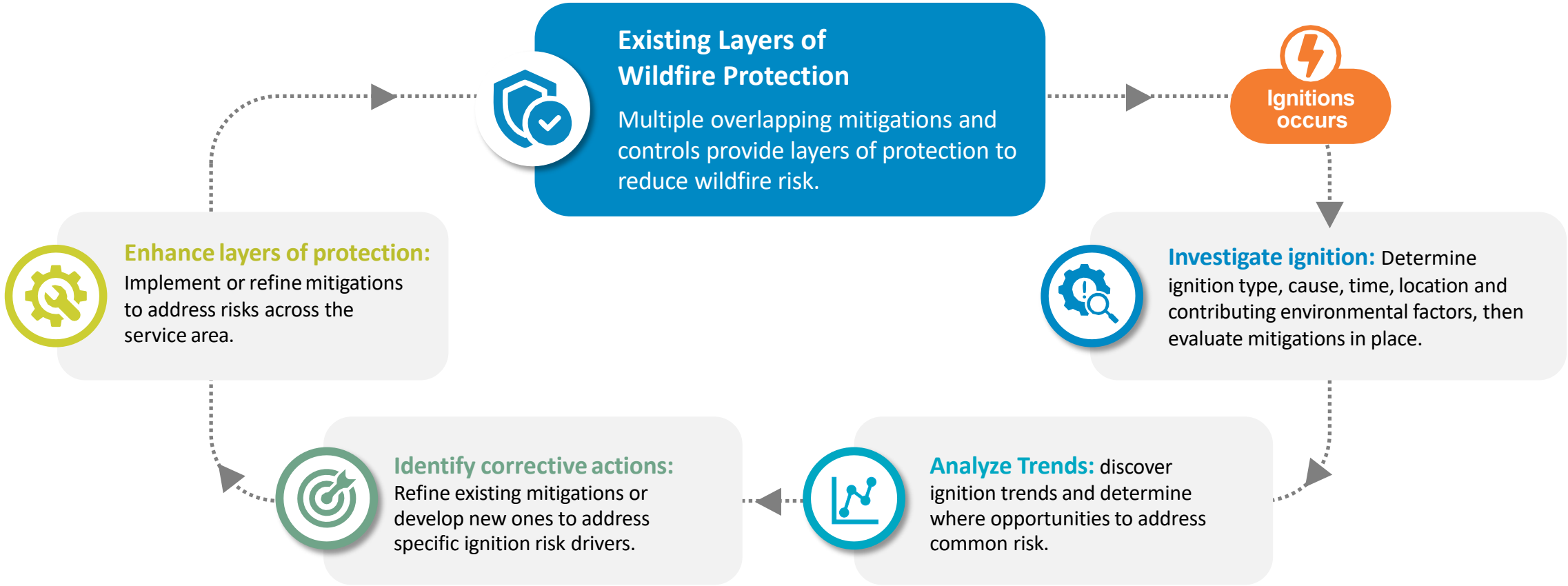
# Enhanced Ignition Analysis Program: Improving Mitigations through Ignition Tracking and Analysis

When an ignition occurs, our investigations help to determine cause, analyze trends and identify opportunities for key enhancements to our layers of wildfire protection.

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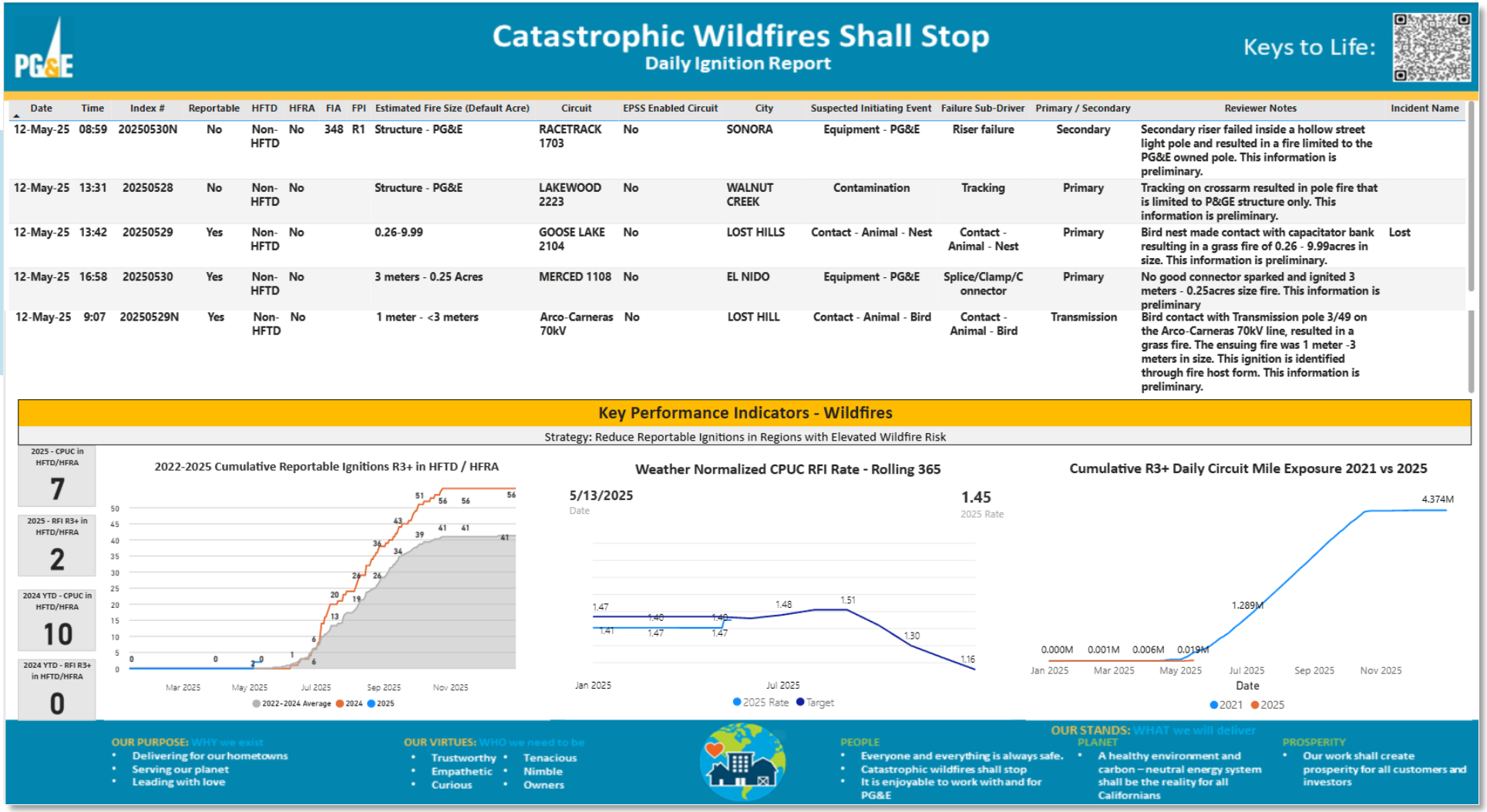
# Daily Ignition Summary & Wildfire Key Performance Indicator Email

All **PGE Facility Ignitions** are logged, tracked and emailed to stakeholders daily.

**PG&E Facility Ignition:** A rapid, exothermic reaction resulting in an ignition associated with utility electric facilities that results in a self-propagating fire, based on best available information at the time.

**Self-Propagating**: Remains on fire after de-energization.



## Catastrophic Wildfires Shall Stop

### Daily Ignition Report

Keys to Life:

| Date | Time | Index # | Reportable | HFTD | HFRA | FIA | FPI | Estimated Fire Size (Default Acre) | Circuit | EPSS Enabled Circuit | City | Suspected Initiating Event | Failure Sub-Driver | Primary / Secondary | Reviewer Notes | Incident Name |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 12-May-25 | 08:59 | 20250530N | No | Non-HFTD | No | 348 | R1 | Structure - PG&E | RACETRACK 1703 | No | SONORA | Equipment - PG&E | Riser failure | Secondary | Secondary riser failed inside a hollow street light pole and resulted in a fire limited to the PG&E owned pole. This information is preliminary. | |
| 12-May-25 | 13:31 | 20250528 | No | Non-HFTD | No | | | Structure - PG&E | LAKEWOOD 2223 | No | WALNUT CREEK | Contamination | Tracking | Primary | Tracking on crossarm resulted in pole fire that is limited to P&GE structure only. This information is preliminary. | |
| 12-May-25 | 13:42 | 20250529 | Yes | Non-HFTD | No | | | 0.26-9.99 | GOOSE LAKE 2104 | No | LOST HILLS | Contact - Animal - Nest | Contact - Animal - Nest | Primary | Bird nest made contact with capacitator bank resulting in a grass fire of 0.26 - 9.99acres in size. This information is preliminary. | Lost |
| 12-May-25 | 16:58 | 20250530 | Yes | Non-HFTD | No | | | 3 meters - 0.25 Acres | MERCED 1108 | No | EL NIDO | Equipment - PG&E | Splice/Clamp/Connector | Primary | No good connector sparked and ignited 3 meters - 0.25acres size fire. This information is preliminary | |
| 12-May-25 | 9:07 | 20250529N | Yes | Non-HFTD | No | | | 1 meter - <3 meters | Arco-Carneras 70kV | No | LOST HILL | Contact - Animal - Bird | Contact - Animal - Bird | Transmission | Bird contact with Transmission pole 3/49 on the Arco-Carneras 70kV line, resulted in a grass fire. The ensuing fire was 1 meter -3 meters in size. This ignition is identified through fire host form. This information is preliminary. | |

### Key Performance Indicators - Wildfires

Strategy: Reduce Reportable Ignitions in Regions with Elevated Wildfire Risk

2025 - CPUC in HFTD/HFRA: 7

2025 - RFI R3+ in HFTD/HFRA: 2

2024 YTD - CPUC in HFTD/HFRA: 10

2024 YTD - RFI R3+ in HFTD/HFRA: 0

2022-2025 Cumulative Reportable Ignitions R3+ in HFTD / HFRA

Mar 2025 · May 2025 · Jul 2025 · Sep 2025 · Nov 2025

2022-2024 Average · 2024 · 2025

Weather Normalized CPUC RFI Rate - Rolling 365

5/13/2025 Date · 1.45 2025 Rate

Jan 2025 · Jul 2025

2025 Rate · Target

Cumulative R3+ Daily Circuit Mile Exposure 2021 vs 2025

0.000M · 0.001M · 0.006M · 0.019M · 1.289M · 4.374M

Jan 2025 · Mar 2025 · May 2025 · Jul 2025 · Sep 2025 · Nov 2025

Date

2021 · 2025

**OUR PURPOSE:** WHY we exist
- Delivering for our hometowns
- Serving our planet
- Leading with love

**OUR VIRTUES:** WHO we need to be
- Trustworthy
- Empathetic
- Curious
- Tenacious
- Nimble
- Owners

**OUR STANDS:** WHAT we will deliver

PEOPLE
- Everyone and everything is always safe.
- Catastrophic wildfires shall stop
- It is enjoyable to work with and for PG&E

PLANET
- A healthy environment and carbon – neutral energy system shall be the reality for all Californians

PROSPERITY
- Our work shall create prosperity for all customers and investors

*Some of the measures included in this presentation are contemplated as additional precautionary measures intended to further reduce the risk of wildfires.*

# Q&A

# Thank You

# 10-MINUTE BREAK

Back at 10:50 am

# BVES PRESENTATION



Bear Valley
Electric Service, Inc.
A Subsidiary of American States Water Company

# BVES 2026-2028 WMP Workshop

Prompt 1: Alexis Ravnik, Electrical Distribution Systems Engineer

Prompt 2: Jared Hennen, Wildfire Mitigation & Reliability Engineer

Prompt 3: Paul Marconi, President, Treasurer, & Secretary

Prompt 4: Tom Chou, P.E., Utility Engineer and Wildfire Mitigation Supervisor

# Prompt 1

Bear Valley Electric Service, Inc.
A Subsidiary of American States Water Company

At a high level, explain the major changes in the electrical corporations' risk models since the 2023 – 2025 Base WMP.

- What were the drivers for these changes and how have they impacted the electrical corporation's wildfire mitigation strategies?

# Transition from NFDRS to FPI

Bear Valley Electric Service, Inc.
A Subsidiary of American States Water Company

- The National Fire Danger Rating System (NFDRS) forecast is a high-level, national-scale overview generated by the Federal Government
  - Entire BVES system in Predictive Service Area SC10
  - Single report per day
  - Sensitive to political issues, such as government shutdown
- Fire Potential Index (FPI) is a more granular dataset that is tailored to the BVES service territory
  - More spatial granularity over BVES service area allows for targeted wildfire prevention measures such as PSPS, improving efficiency and reliability
  - Reports are generated for every three hour window, allowing for more accurate estimates for work stoppages and customer notifications
  - Data are generated by Technosylva for BVES with >98% uptime

Bear Valley
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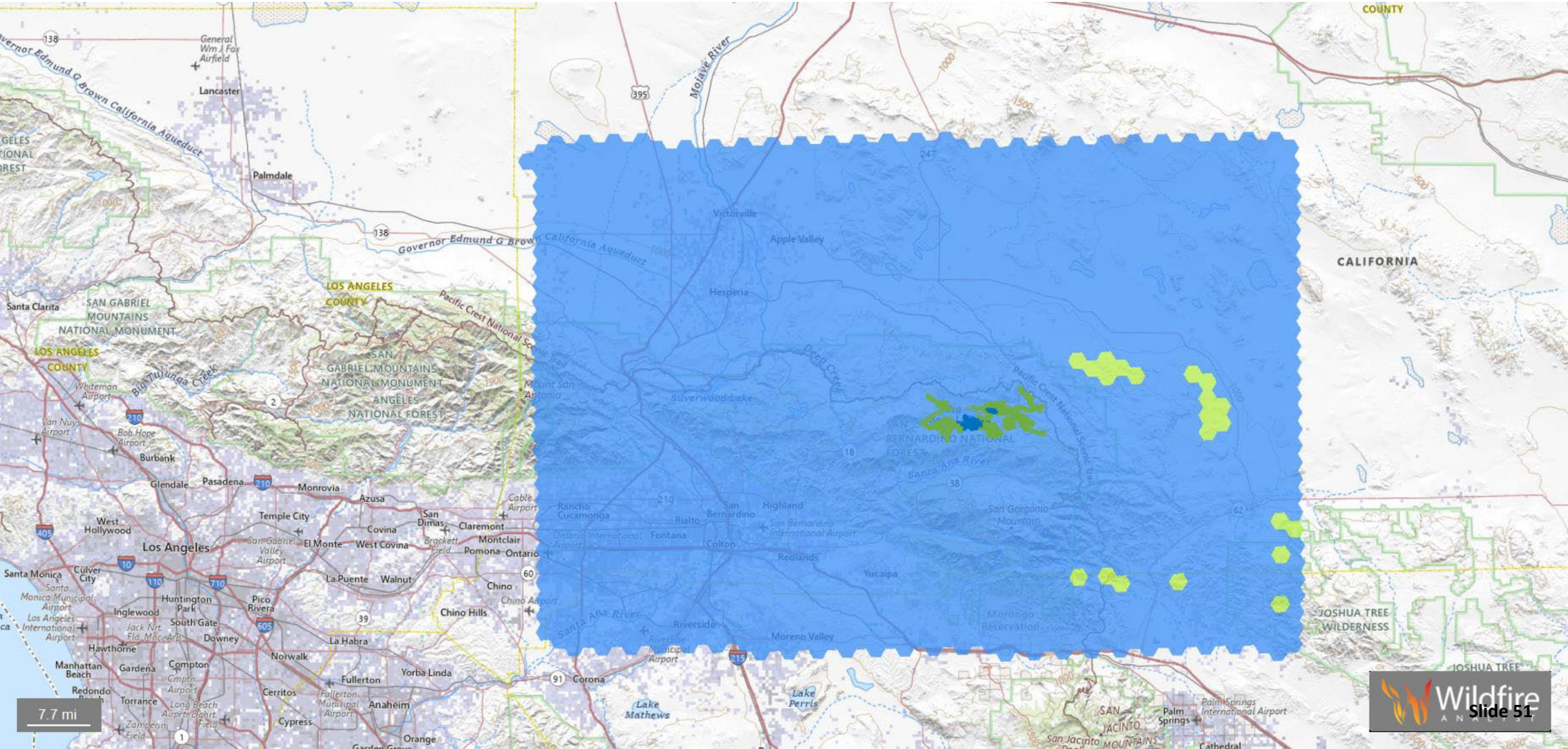

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# Implementation of Utility Risk Model

Bear Valley Electric Service, Inc.
A Subsidiary of American States Water Company

- Currently BVES utilizes a Fire Safety Circuit Matrix "living document" to assess risk
  - Prioritizes bare wire mileage as the sole risk driver
  - Consequence is determined based on SME review limited to fire risk, without reliability, financial, or environmental impacts
- As BVES has covered more and more of its overhead wire, additional risk drivers and deeper understanding of consequences are needed to assess circuit risk and plan additional wildfire mitigation
- BVES has contracted Direxyon Solutions to build a model of BVES assets
- Risk is calculated at the asset level in a uniform way, and can include additional risk drivers such as vegetation growth and asset degradation
  - Risk generated by combining fire likelihood, fire consequence, PSPS likelihood, PSPS consequence, and financial costs into a single Utility risk value
  - This tool easily allows for year-over-year simulations of risk to assess long term effects
  - Risk can be viewed at the asset level or combined to determine circuit-level risk values
- Outputs are reviewed by SMEs to determine long-term planning, and increased consistency of inputs improves predictive power of the model and makes SMEs' job easier

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Dashboards / (595) test1 - V1 / **Map**

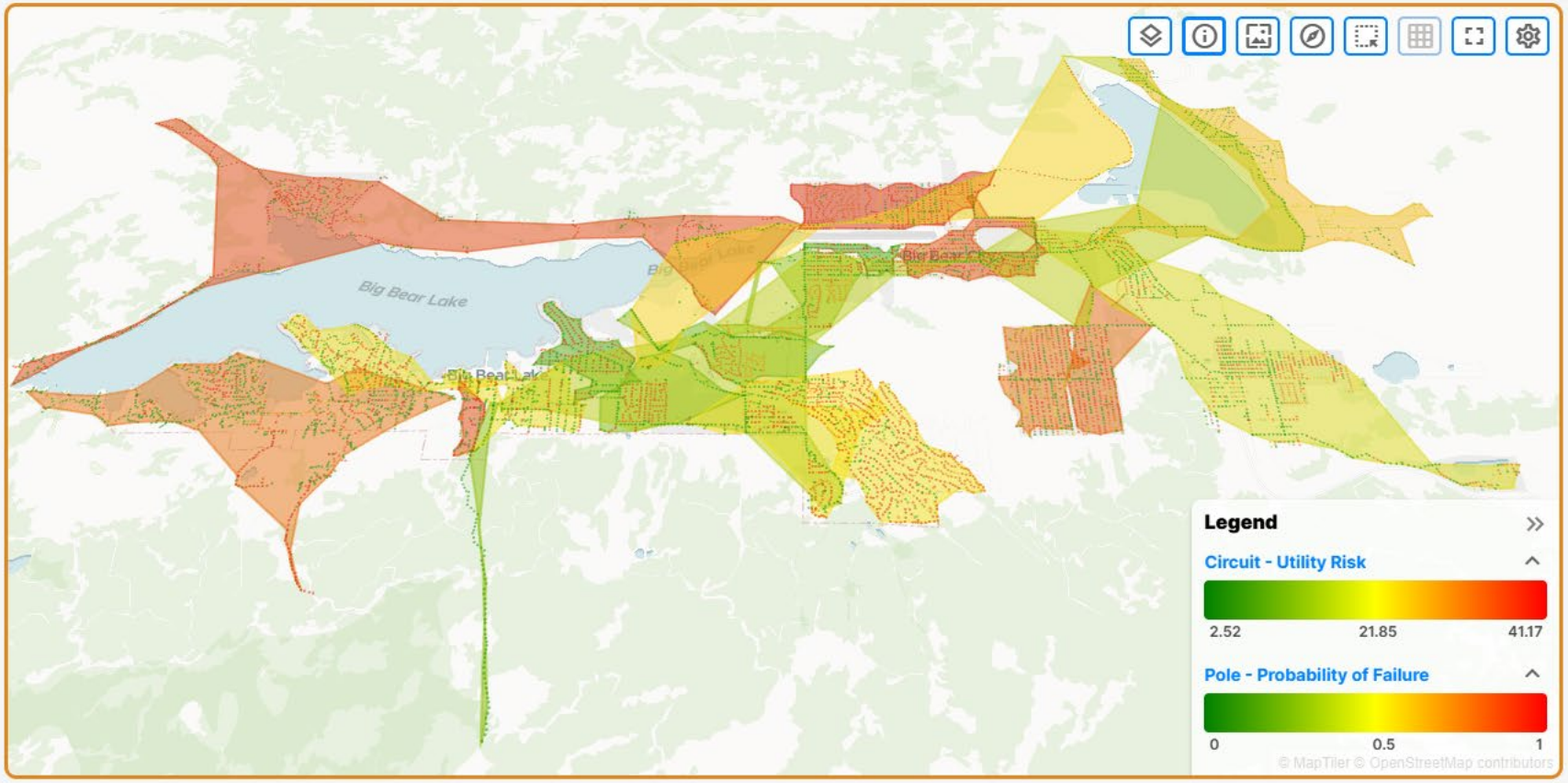
Map

**Summary**

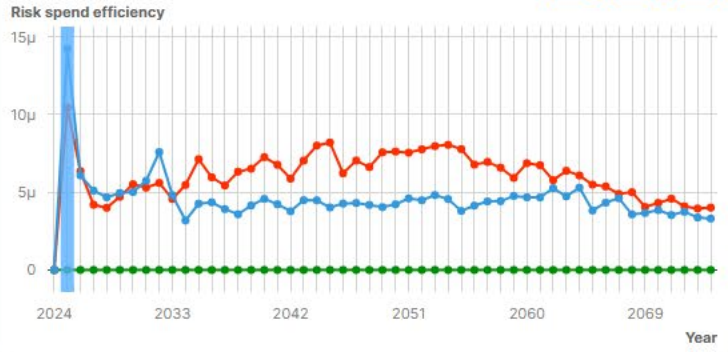
- (3434) (Important Final) Phase 2 - GO165 Minimum Requirements (Use Case 1) - Normal Weather Trend
- (3435) (Important Final) Phase 2 - Alternative Mitigation Strategy (Use Case 3) - Normal Weather Trend
- (3400) (Important Final) Phase 2 - Current BVES Strategy (Use Case 2) - Normal Weather Trend

**Filters**

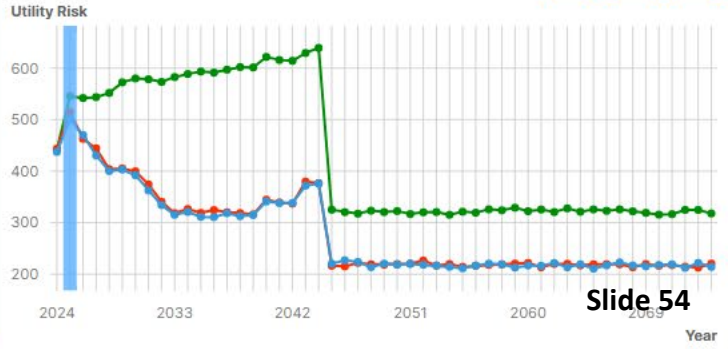
2025
2024 — 2074




**Risk spend efficiency Weighted by Circuit Length Mile ...**




**Sum: Utility Risk by Year**



Bear Valley
Electric Service, Inc.
A Subsidiary of American States Water Company

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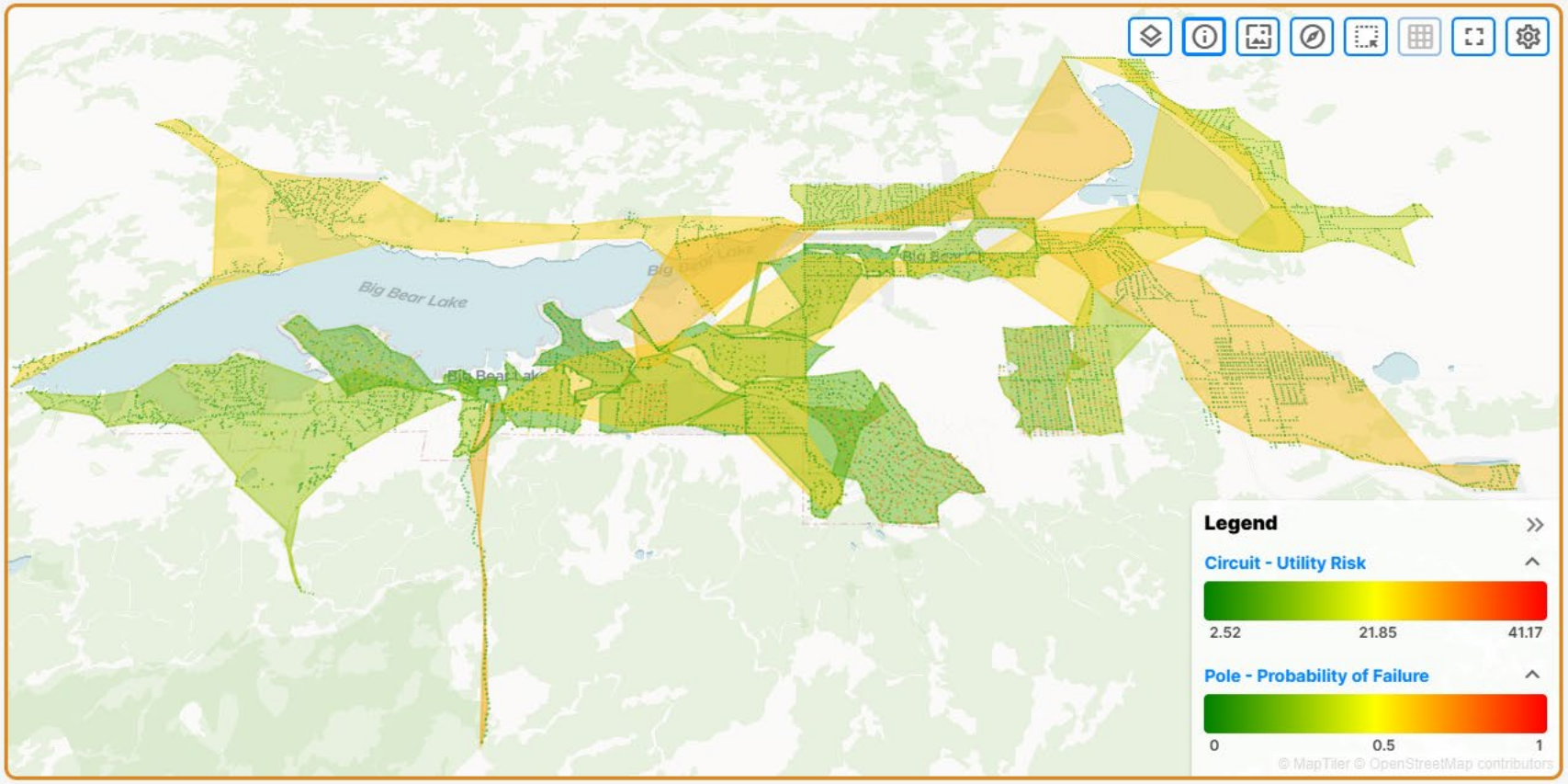
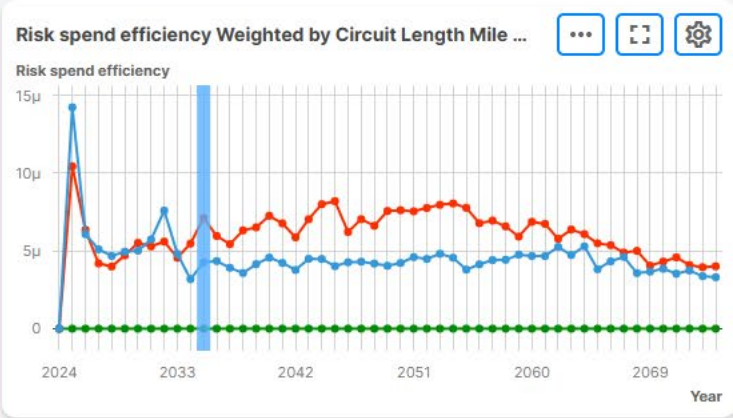
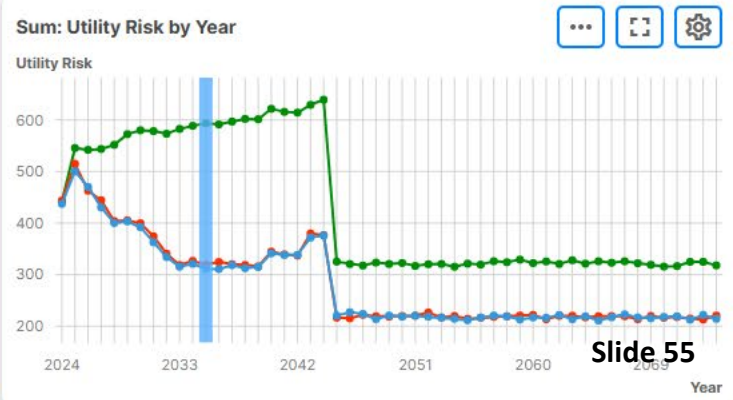
2024 — 2035 — 2074



Bear Valley Electric Service, Inc.
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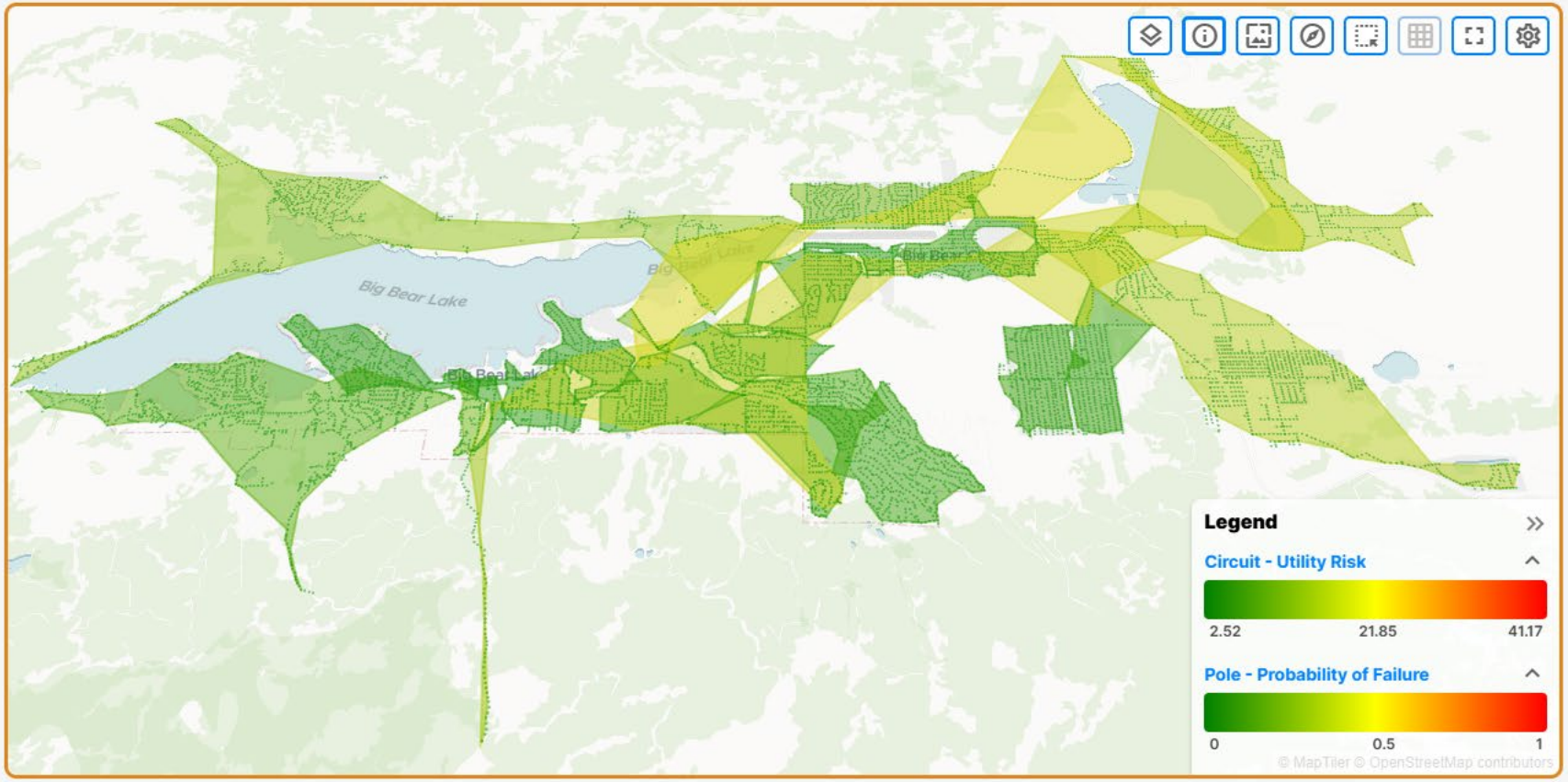
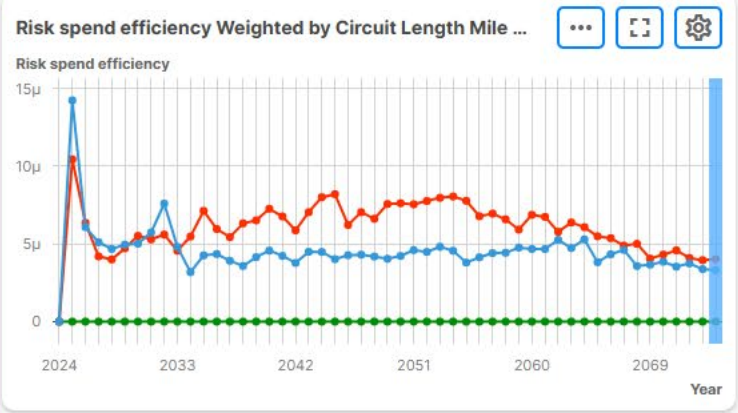
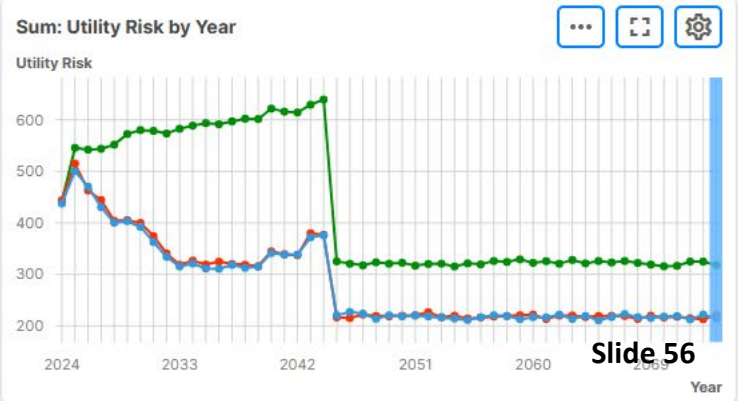
2024 — 2074 (2074) ▶



# Prompt 2

Bear Valley
Electric Service, Inc.
A Subsidiary of American States Water Company

Describe the electrical corporation's detailed asset inspection process for transmission and distribution.

- How are inspection intervals determined?
- How are findings integrated into operational decisions?

# Inspections

Bear Valley Electric Service, Inc.
A Subsidiary of American States Water Company

UAV HD Photography/ Videography Inspection

- Inspection identifies damage to assets and vegetation encroachments.
- Helps to identify issues not seen from the ground.
- Annual inspection of all primary poles.

UAV Thermography

- Identifies abnormal heat patterns on equipment.
- Annual inspection of all primary poles.

# Inspections

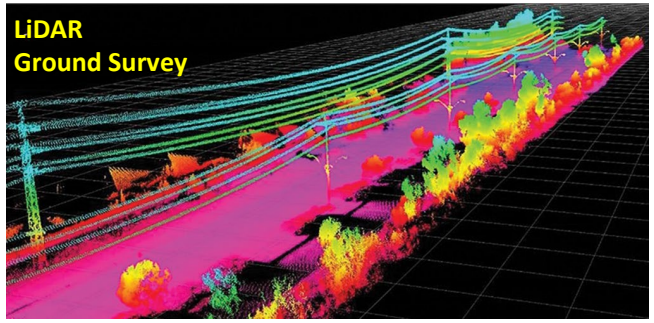
Bear Valley Electric Service, Inc.
A Subsidiary of American States Water Company

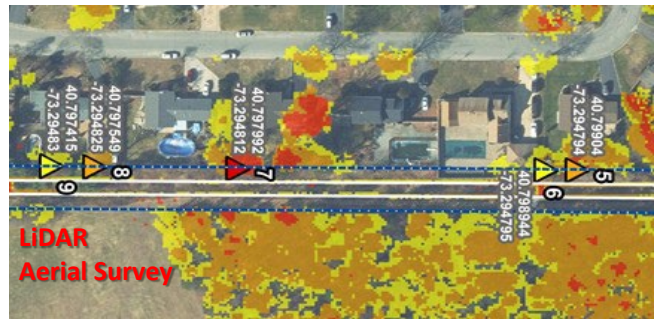
## GO-165 Detailed Inspections

- 5 year cycle of all assets.
- Risk based prioritization of high risk circuits.

## LiDAR Inspection

- Inspection identifies potential vegetation encroachments.
- Annual inspection of the entire territory.
- Uses a combination of vehicle mounted and drone mounted sensors.
- If trends are identified, routine vegetation management work may be altered for following year.



# Inspections

Bear Valley Electric Service, Inc.
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GO-165 Patrol Inspections

- Annual inspection of all overhead facilities.
- Risk based prioritization of high risk circuits.

3rd Party Ground patrol

- BVES contracts a 3rd Party to independently perform a second patrol of the entire overhead system annually (in excess of GO-165 requirements).

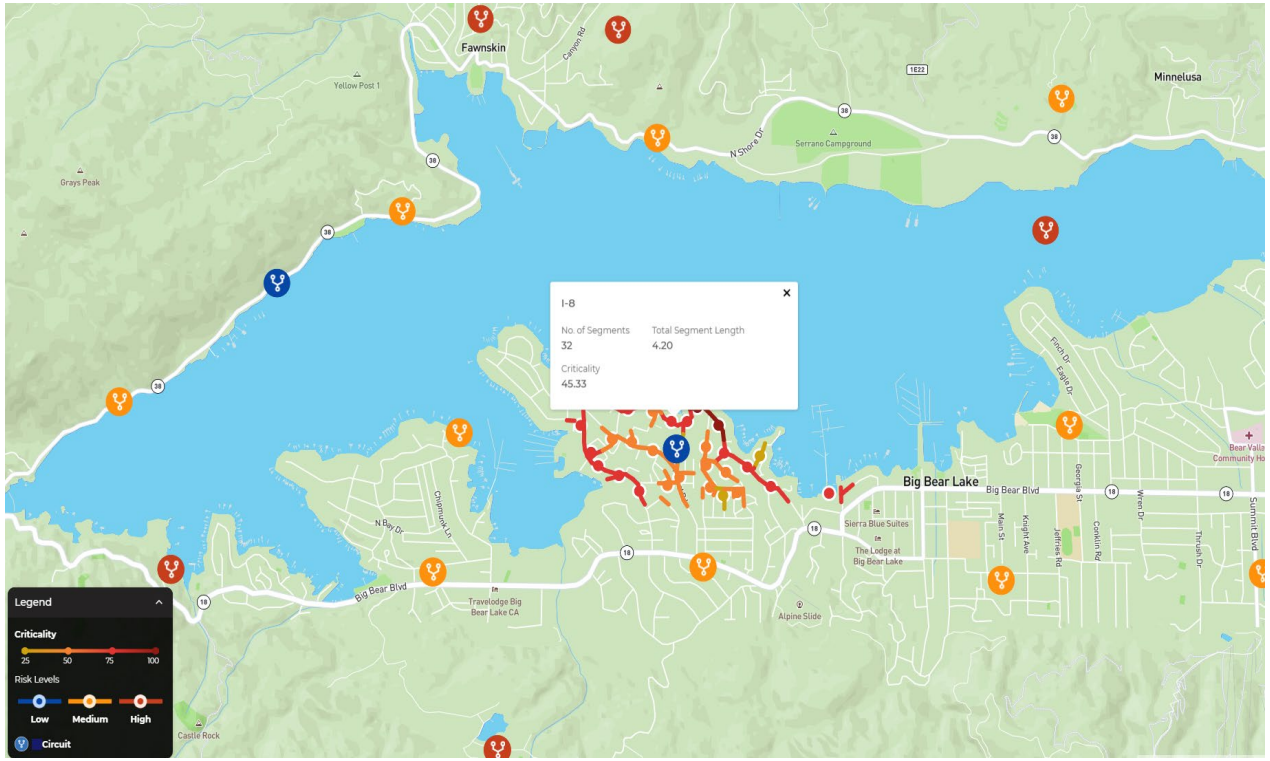
The patrols are valuable in having the sub-transmission and distribution system looked at for potential fire hazard conditions at least two times per year.

# Inspections

Bear Valley Electric Service, Inc.
A Subsidiary of American States Water Company

Satellite Imaging

- Inspection identifies grow in risk, fall in risk, and dead and dying trees.
- Annual inspection of all primary poles.
- Helps determine routine vegetation management work.



# Inspections

Bear Valley Electric Service, Inc.
A Subsidiary of American States Water Company

Intrusive Pole Inspection

- Inspect approximately 850 wood poles per year for internal rot.
- Scheduled in accordance with GO-165 requirements.
- Intrusive inspections involve movement of soil, taking samples for analysis, and using more sophisticated diagnostic tools beyond visual inspections of instrument reading.
- Bear Valley's intrusive pole inspection contractor utilizes the IML-RESI PowerDrill® to perform a non-destructive pole intrusive inspection.
- Inspection results are presented on a graph and are tied to an online inspection record, along with photos and GPS.

# Prompt 3

Bear Valley
Electric Service, Inc.
A Subsidiary of American States Water Company

Describe the methodology the electrical corporation uses to determine and measure the effectiveness of wildfire mitigation initiatives/activities.

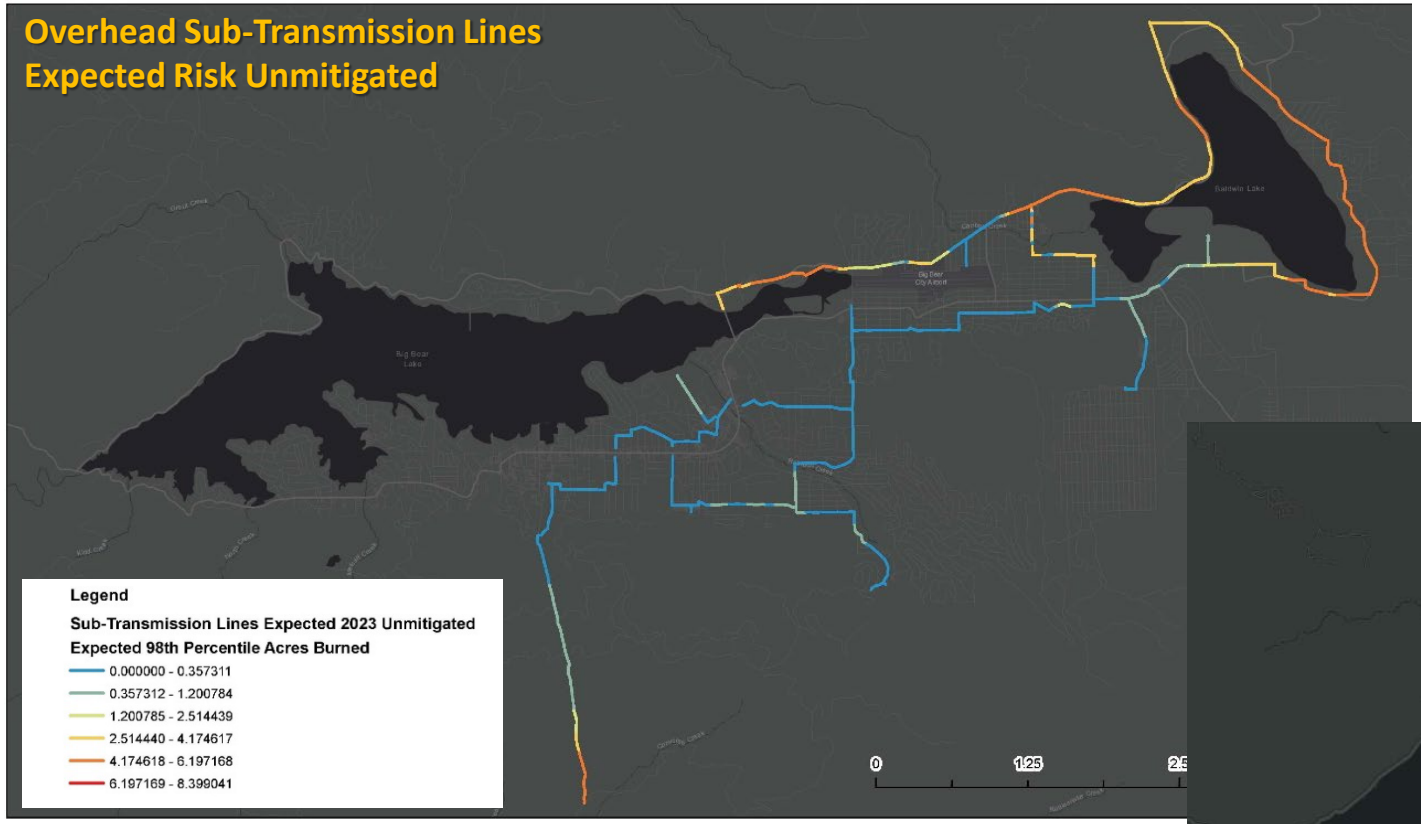
- How is the combined effectiveness of initiatives/activities determined?

# Bottomline Effectiveness

Bear Valley Electric Service, Inc.
A Subsidiary of American States Water Company

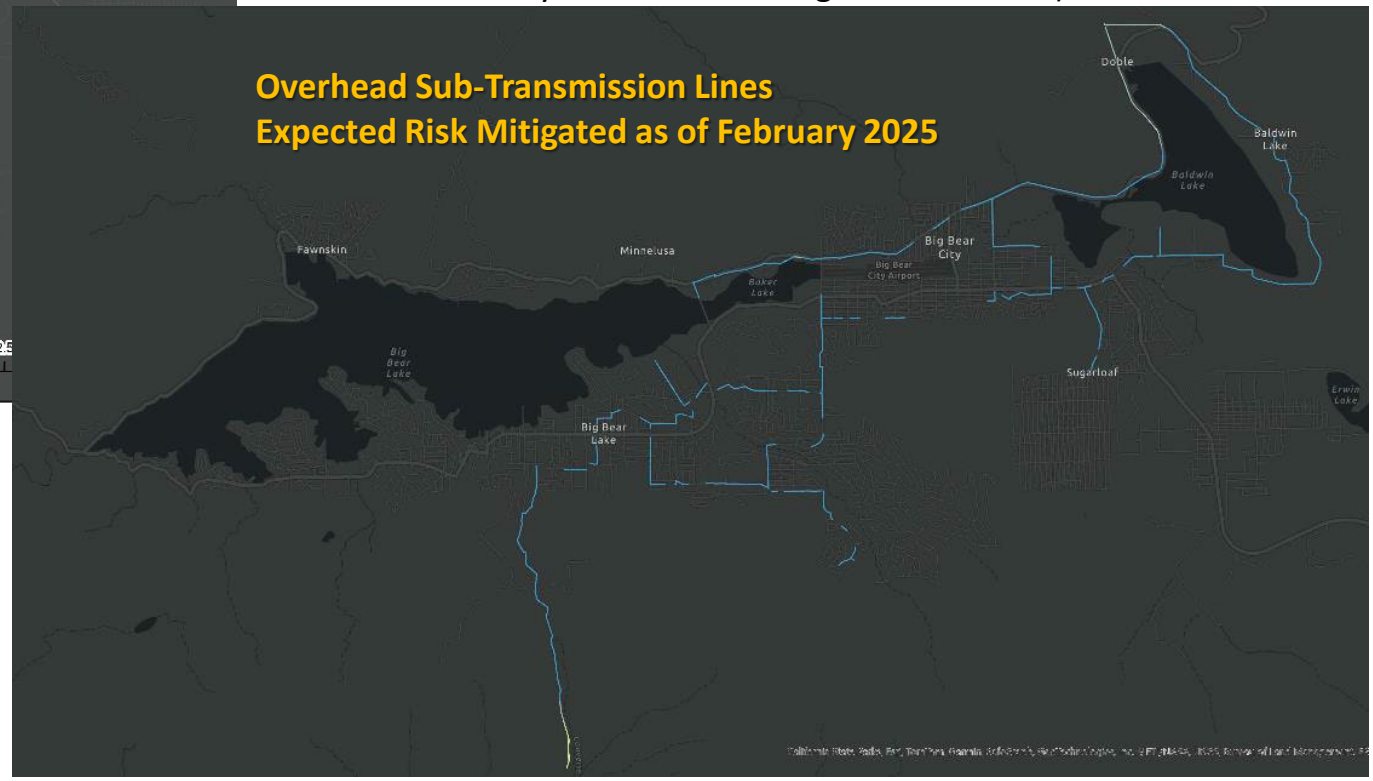
- Wildfires caused by the utility
  - None to date
- Ignitions
  - None in last 20 years
- PSPS events invoked
  - None to date

# Model Results – Sub-transmission




**Technosylva's FireSight** model integrates equipment failure and ignition probability data for assets with individual fire spread predictions to determine which assets are most likely to fail and cause an ignition.

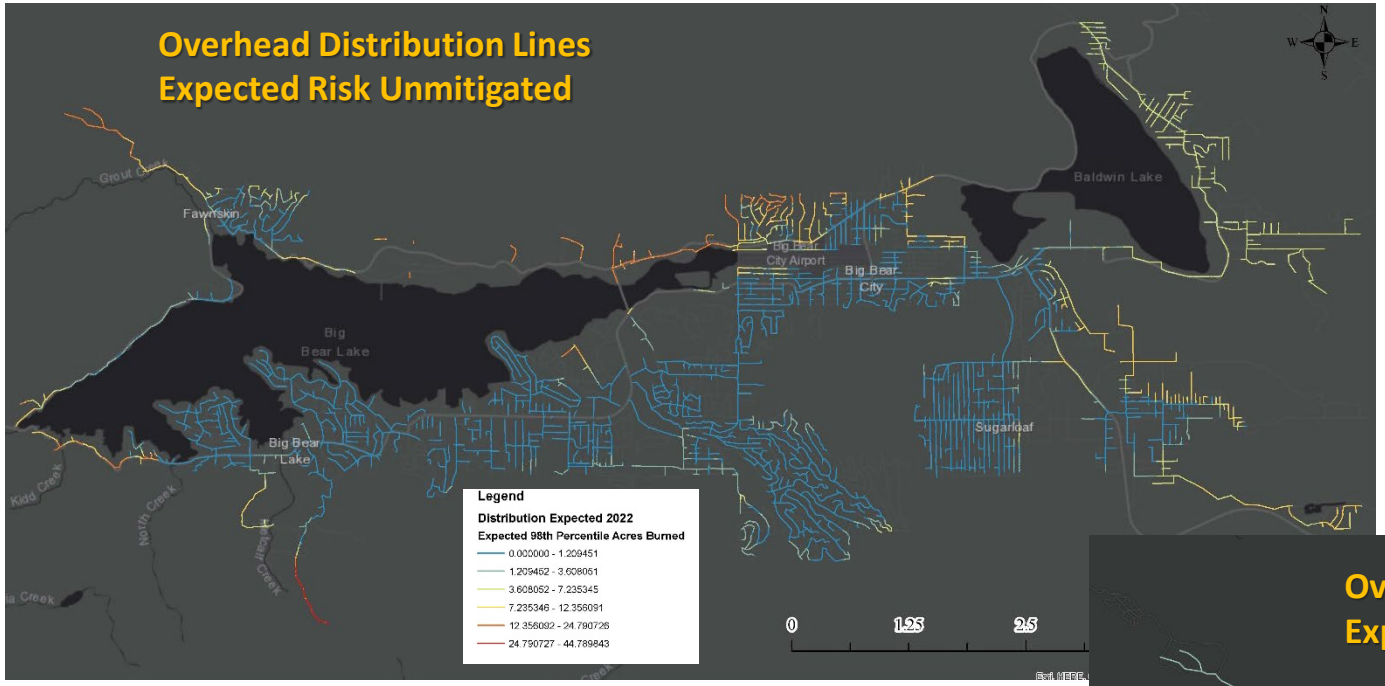
- Expected Risk is the combination of the probability of failure (asset failure), probability of ignition (ignition involving an asset) and conditional risk (determined from model simulations for all ignition points along the power lines, builds out consequences across worst case weather days for wildfire using historical data).

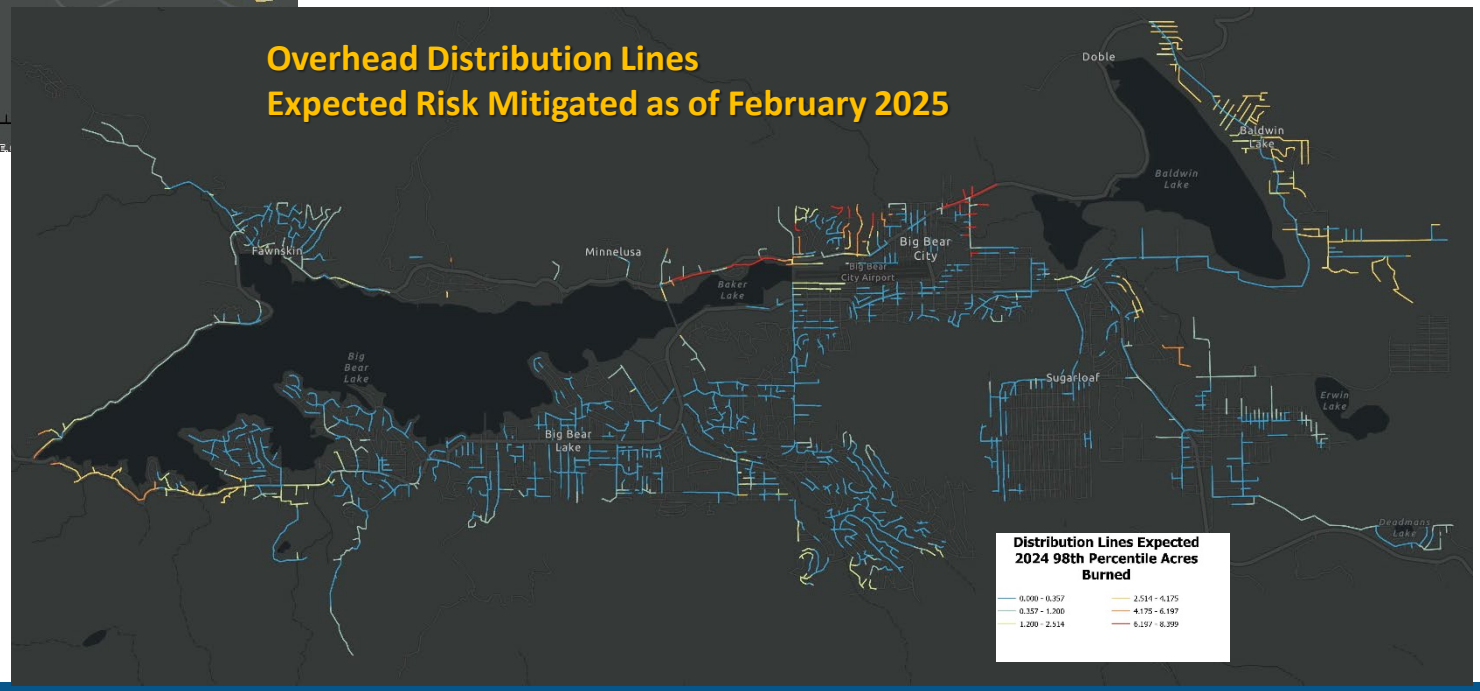



- **FireSight** model was implemented in February 2023.
- Model was run assuming no WMP grid hardening initiatives to establish a baseline (map above).
- Map to the right shows risk taking into account WMP grid hardening initiatives on the Sub-Transmission System as of February 2025.

# Model Results - Distribution

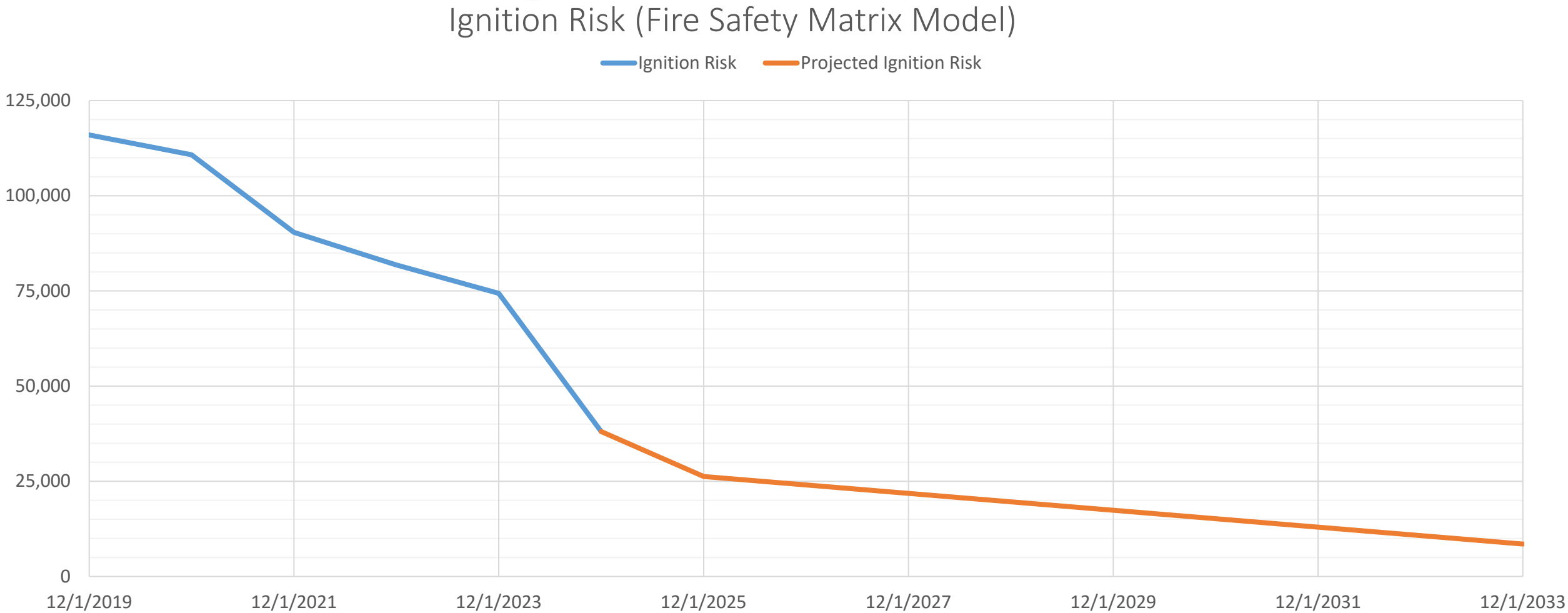
Bear Valley Electric Service, Inc.
A Subsidiary of American States Water Company



# Model Results: Ignition Risk Reduction Progress

Bear Valley Electric Service, Inc.
A Subsidiary of American States Water Company




Covered Conductor Project and Radford Line Replacement Project have significantly reduced ignition risk.

# Other Effectiveness Measures

Bear Valley Electric Service, Inc.
A Subsidiary of American States Water Company

- Customer and Stakeholder survey
- Independent Evaluator Report
- Evaluation of targets and Quarterly Data Report items
- Future analysis of contact events
  - Review contact events from 2015-2019 on moderate or higher risk days
  - Review contact events from 2020-present on moderate or higher risk days
- Collection of equipment failure rates

# Prompt 4

Bear Valley Electric Service, Inc.
A Subsidiary of American States Water Company

How does the electrical corporation monitor equipment failure and ignition rates?

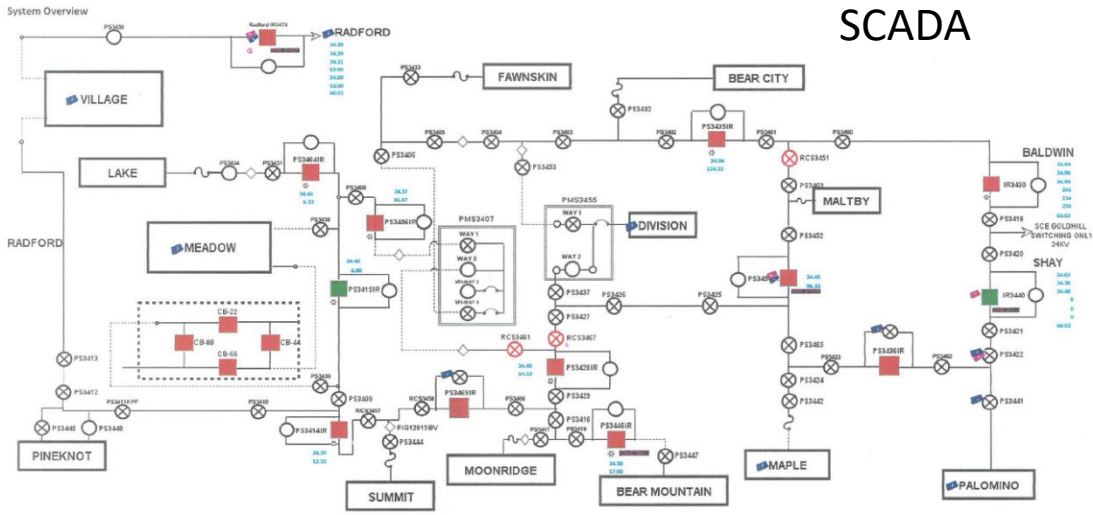
- How does data on equipment-specific risk inform the electrical corporation's prioritization of maintenance or changes to inspection practice?

# Monitoring Equipment Failure and Ignition Rates

Bear Valley Electric Service, Inc.
A Subsidiary of American States Water Company

- Grid Automation development in 2019-2022
- Supervisory Control and Data Acquisition (SCADA) established in 2022
- 2022-2028 WMP projects:
  - Substation Automation
  - Switch and Field Device Automation
  - Capacitor Bank Upgrade & Automation
  - Fuse Trip Saver Automation
  - Fault Indicator Automation
  - Substation Upgrade
  - Substation Testing

SCADA



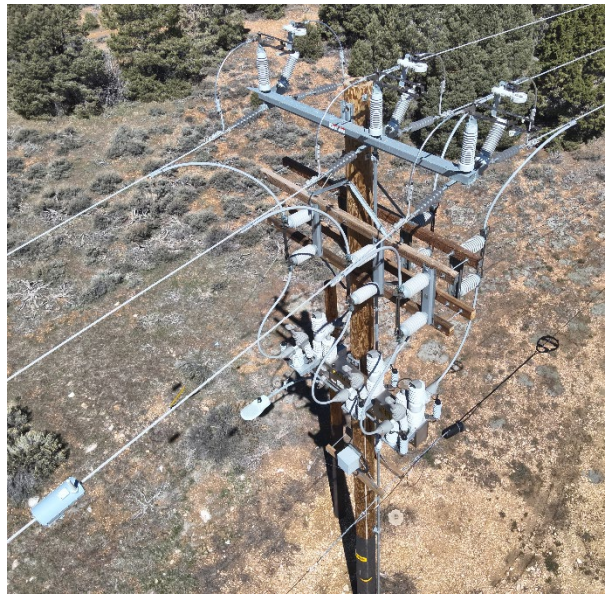

Cap Bank

# Monitoring Equipment Failure and Ignition Rates

Bear Valley Electric Service, Inc.
A Subsidiary of American States Water Company

- Inspection Programs:
  - Detailed
  - Patrol
  - UAV Thermography
  - UAV HD Photography/Videography
  - Substation Inspection
  - 3rd Party Ground Patrol
  - Intrusive Pole

Thermography

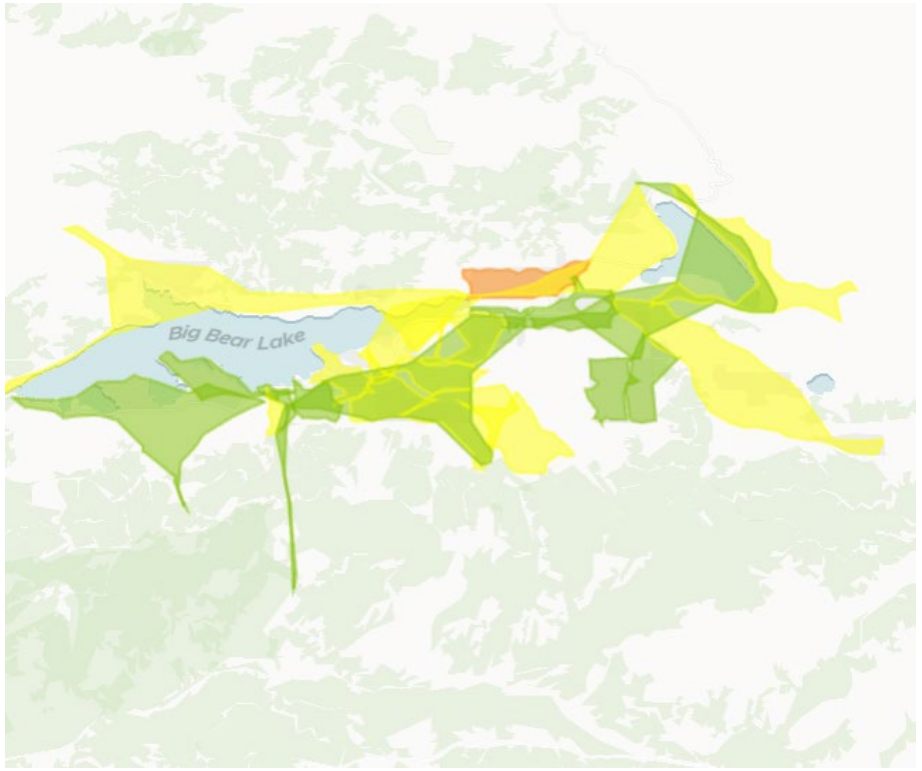


HD Photography

# Monitoring Equipment Failure and Ignition Rates

Bear Valley Electric Service, Inc.
A Subsidiary of American States Water Company

- DIREXYON Modeling
  - Mitigate risk
  - Decision making & strategize projects based on data-driven
    - ❑Equipment ignition
    - ❑Asset failure
    - ❑Fire risk
    - ❑Cost
    - ❑Vegetation growth
    - ❑PSPS risk



# Monitoring Equipment Failure and Ignition Rates

Bear Valley Electric Service, Inc.
A Subsidiary of American States Water Company

- Others Monitoring Methods
  - Outage log
  - CPUC ignition database

- Suggestion
  - Develop a joint equipment failure database


BVES
Q&A

# LUNCH BREAK

Back at 1:00 pm


SDG&E
PRESENTATION

# Wildfire Mitigation

## 2026-2028

SDGE™

# Agenda

- SDG&E Wildfire Risk Exposure
- 2024 General Rate Case
- Wildfire Mitigation Strategy
- Risk Assessment and Methodology
- Drivers & Changes in Risk Modeling
- Mitigation Effectiveness
- Wildfire Mitigation Programs
- Summary

# Wildfire Mitigation Strategy

Jonathan Woldemariam, Director - Wildfire Mitigation

SDGE™

# SDG&E Wildfire Risk Exposure

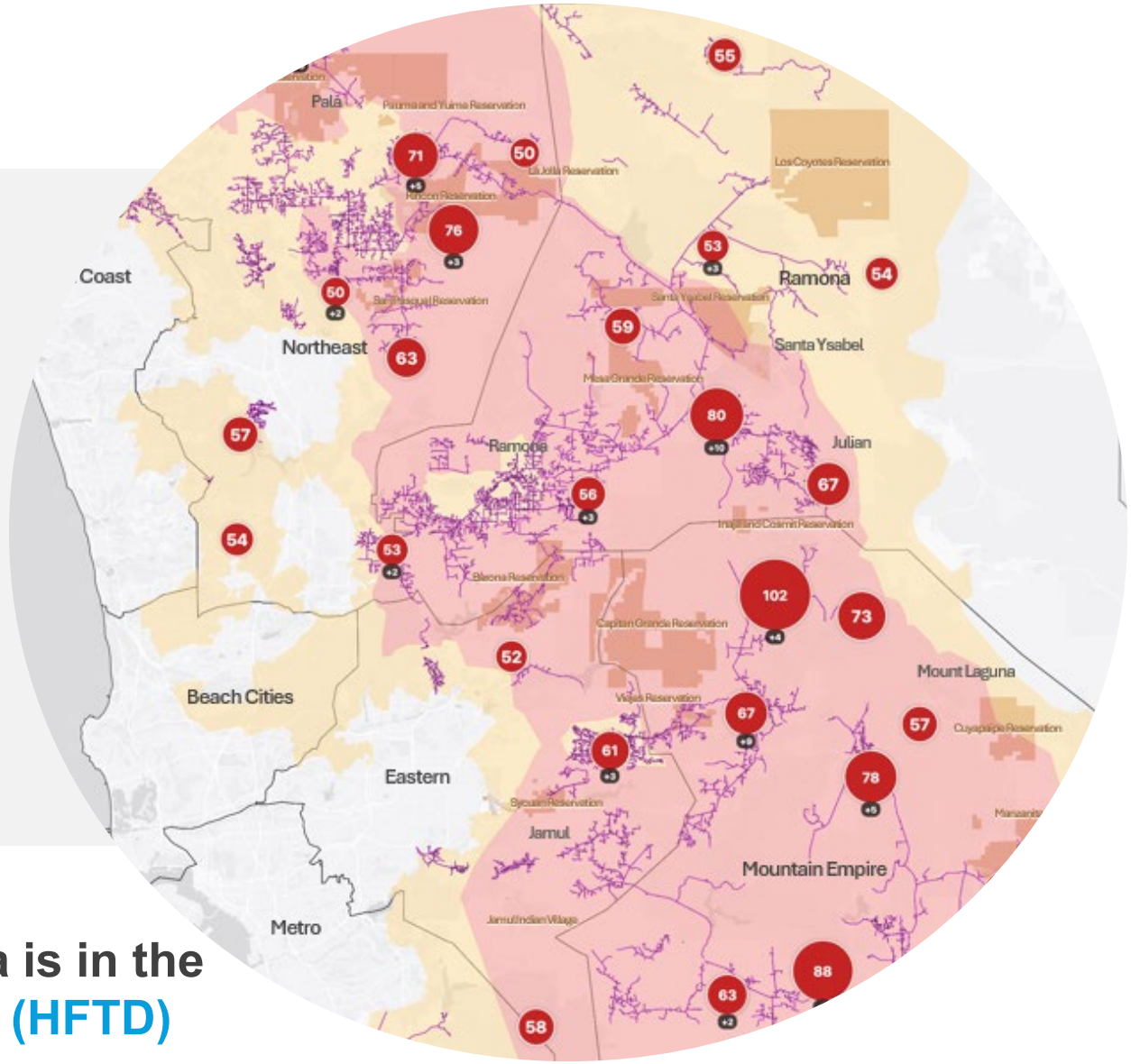
**1.5M** customer accounts

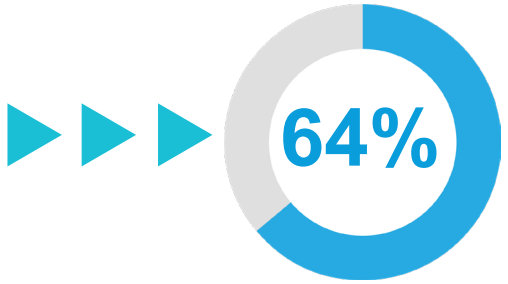
**3,364** miles of overhead lines in HFTD

**47%** underground infrastructure in HFTD

**223** weather stations

**51%** of inventory trees within HFTD




**of SDG&E's service area is in the High Fire Threat District (HFTD)**

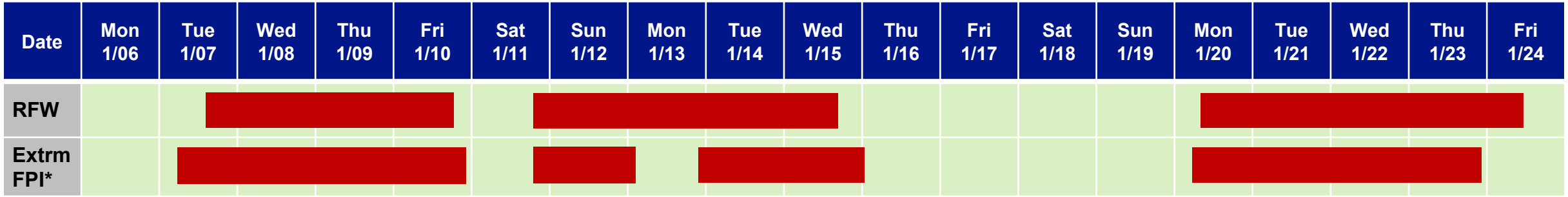
# 2026 - 2028 WMP - Our commitment to Wildfire Safety


## 2026-2028 Base Wildfire Mitigation Plan

- 17 Years without utility-related catastrophic wildfires
- San Diego County has a long-standing history of catastrophic wildfires and continues to have the highest wildfire risk
- Evolving strategy from managing wildfire and PSPS risk, to eliminate these risks as much as possible
- Advanced Risk-Informed Methodology & Life Cycle Cost Analysis

# January RFWs & PSPSs by the Numbers

## The driest start to the water year in San Diego's 174 history coupled with multiple high wind events resulted in extreme wildfire conditions on eleven separate days spread over 2½ weeks




### Extreme FPI Red Flag Warning High Wind Warning 1/07-1/08

- Top 20 Avg Gusts: 57 mph
- Wind Records: 13
- **Peak Gust: 71 mph**
- 99% Stations: 83
- PSPS Cust Scope: 65,475
- **PSPS Cust off: 7,267**
- CRCs Opened: 8

### Extreme FPI Red Flag Warning 1/09-1/10

- Top 20 Avg Gusts: 62 mph
- Wind Records: 3
- **Peak Gust: 85 mph**
- 99% Stations: 49
- PSPS Cust Scope : 74,652
- **PSPS Cust off: 10,274**
- CRCs Opened: 9

### Extreme FPI Red Flag Warning 1/11-1/12

- Top 20 Avg Gusts: 38 mph
- Wind Records: 0
- **Peak Gust: 52 mph**
- 99% Stations: 0
- PSPS Cust Scope : 4,561
- PSPS Cust off: **0**
- CRCs Opened: 0

### Extreme FPI Red Flag Warning 1/13-1/15

- Top 20 Avg Gusts: 55 mph
- Wind Records: 0
- **Peak Gust: 74 mph**
- 99% Stations: 24
- PSPS Cust Scope : 54,937
- **PSPS Cust off: 5,938**
- CRCs Opened: 4

### Extreme FPI Red Flag Warning High Wind Warning 1/20-1/21

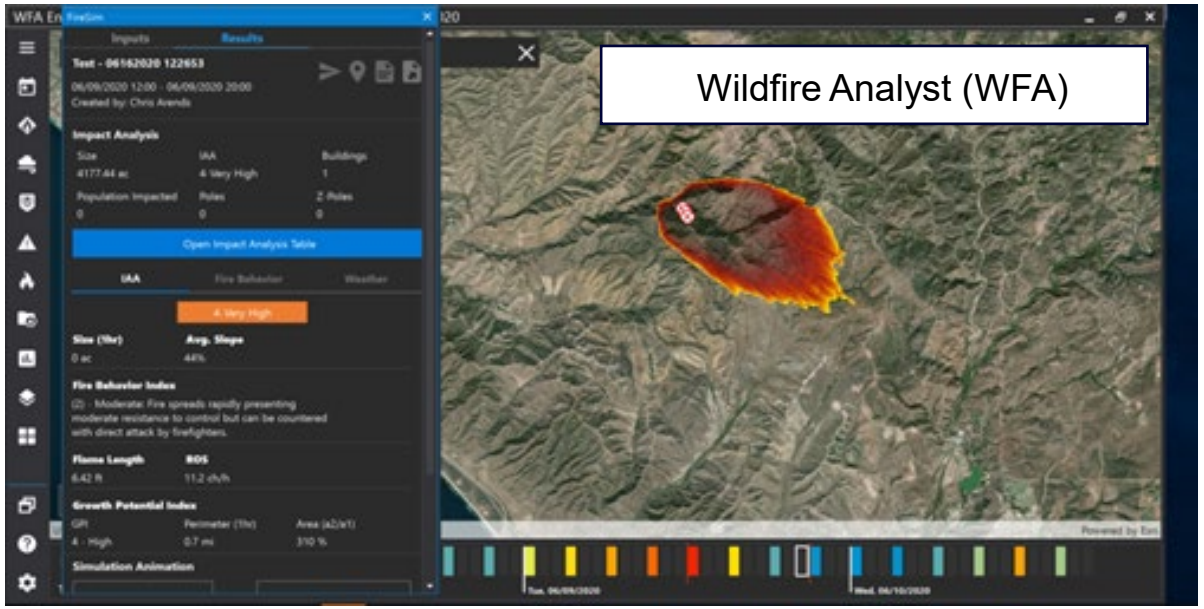
- Top 20 Avg Gusts: 70 mph
- Wind Records: 30
- **Peak Gust: 102 mph**
- 99% Stations: 116
- PSPS Cust Scope : 83,609
- **PSPS Cust off: 16,733**
- CRCs Opened: 10
- De-energized Transmission

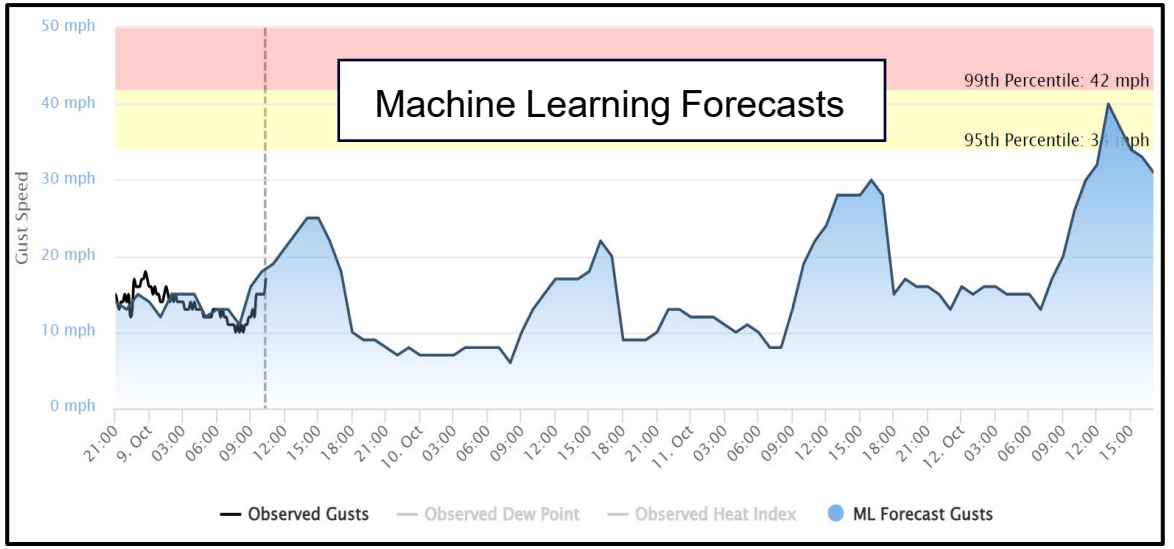
### Extreme FPI Red Flag Warning High Wind Warning 1/22-1/23

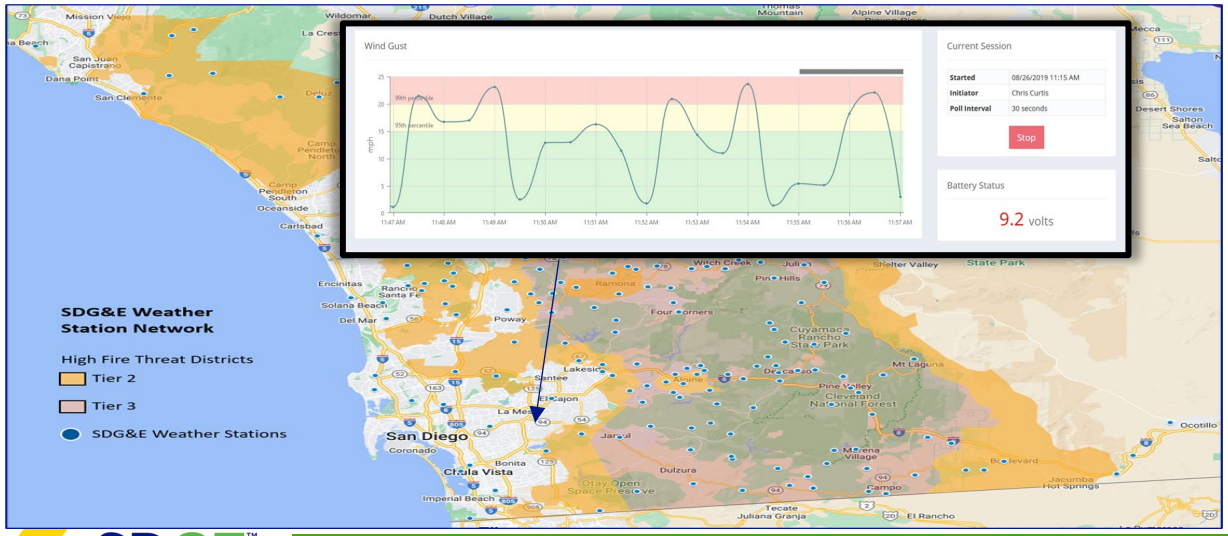
- Top 20 Avg Gusts: 69 mph
- Wind Records: 16
- **Peak Gust: 97 mph**
- 99% Stations: 127
- PSPS Cust Scope : 83,625
- **PSPS Cust off: 20,460**
- CRCs Opened: 12
- De-energized Transmission

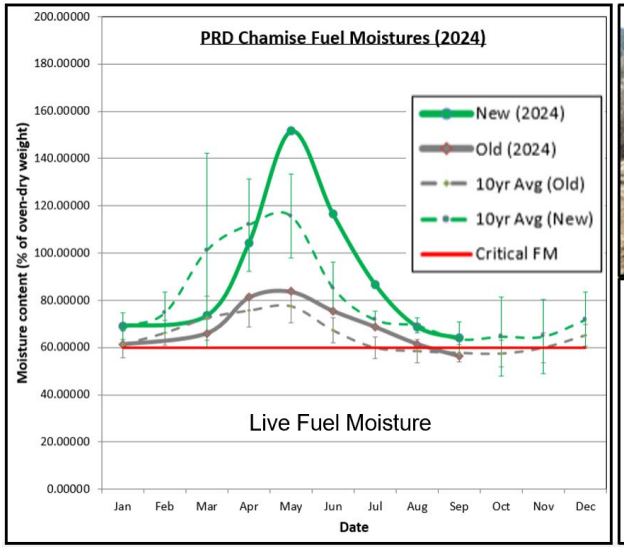
*FPI = Fire Potential Index

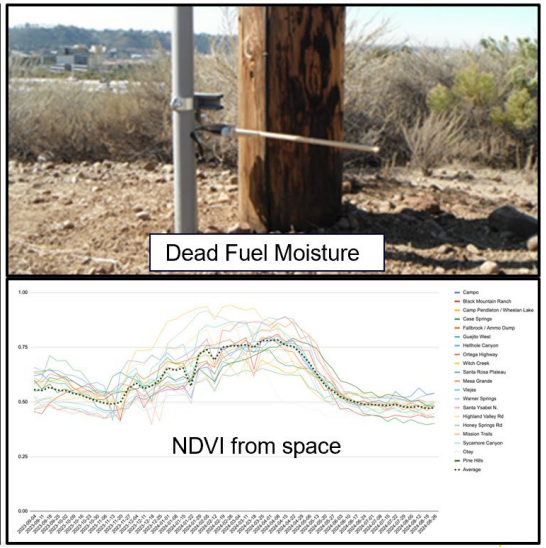
# Situational Awareness



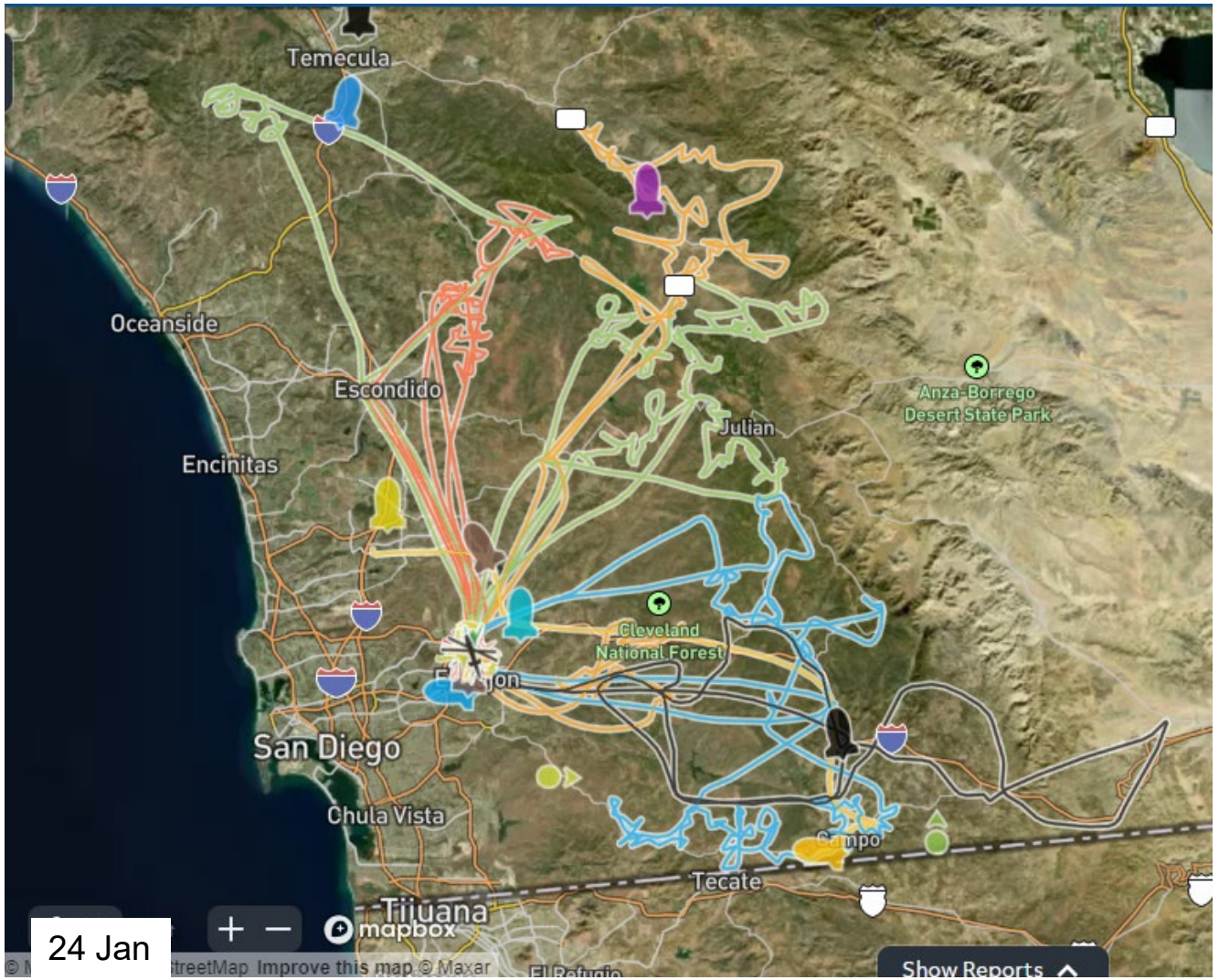



# Massive Mobilization

- ~350 separate SDG&E EOC responders this season devoting ~20,000 hours of support
- ~300 separate field personnel supported all stages of the event
- Five helicopters were mobilized in support of re-energization on multiple days. Final re-energization on January 24th:
  - ~140 helicopter flight hours
- 2 Blackhawk firefighting helicopters:
  - 36,200 gallons on 4 different fires
- >900 poles flown by drones in over 100 flights - 6 pilots available throughout event

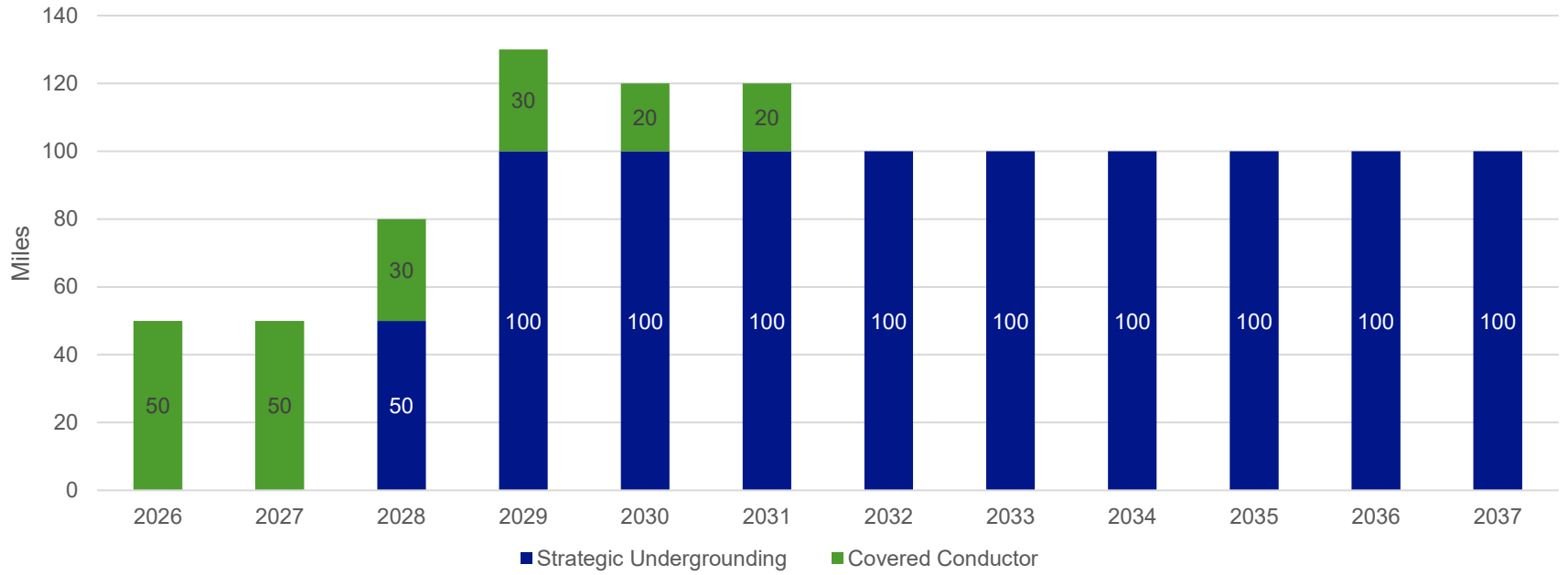
**Helicopter re-energization flights and drone flight locations**



# 2024 GRC Impact

| Initiative | 2026 | 2027 | 2028 |
|---|---|---|---|
| Strategic Undergrounding | 0 miles | 0 miles | 50 miles |
| Covered Conductor | 50 miles | 50 miles | 30 miles |
| Asset Replacements | -- | -- | -- |
| DCRI | -- | -- | -- |
| Microgrids | -- | -- | 1 |

- **Strategic Undergrounding and Combined Covered Conductor** program targets are direct result of GRC decision
- **Asset replacements** such as lightning arrestors, fuses, hotline clamps, and avian protection are integrated into Combined Covered Conductor
- **Microgrids and Distribution Communication Reliability Improvements** have been descoped due to reallocation of funds to higher priority initiatives




## Long Term Grid Hardening Strategy

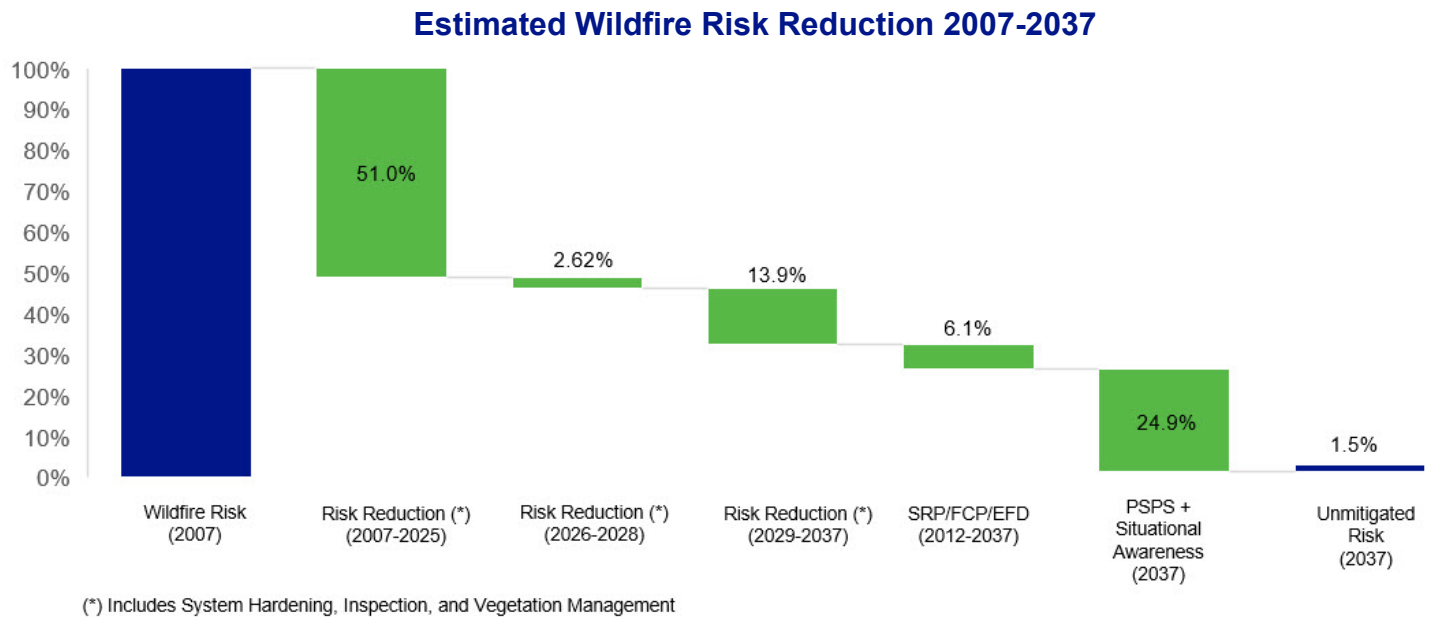
# Wildfire Mitigation Strategy

## Operational Approach

- PSPS
- Situational Awareness
- Sensitive Relay Profiles (SRP)
- Sensitive Ground Faults (SGF)
- Some of which require human intervention which potentially can introduce human error
- Does not eliminate risk on the system

## Sustained Approach

- Aims for a permanent and non-operationally dependent solution
- Strategic Underground and Covered Conductor
- Optimize investments by adding climate, social vulnerability, and risk aversion
- Minimize full life cycle costs not just initial costs



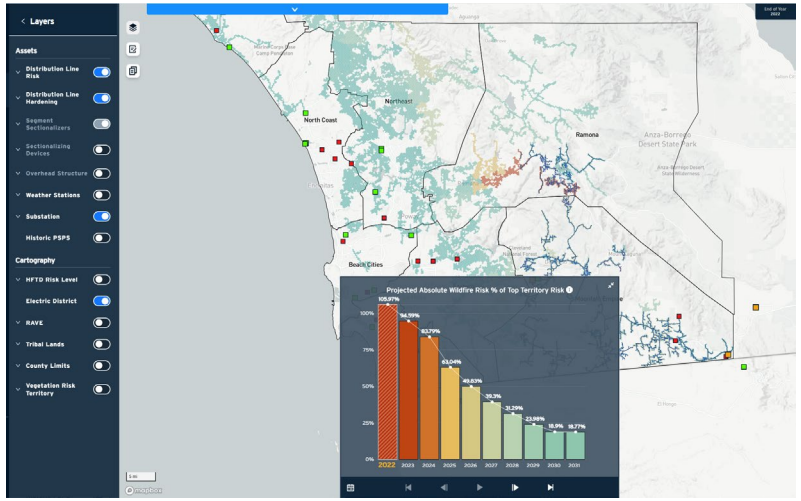
# Risk Assessment & Methodology

Joaquin Sebastian, Risk Analytics Manager

SDGE™

# Wildfire Next Generation System (WiNGS)

**WiNGS - Planning:** Shapes SDG&E's long-term hardening strategy to maximize the reduction of wildfire and PSPS risks



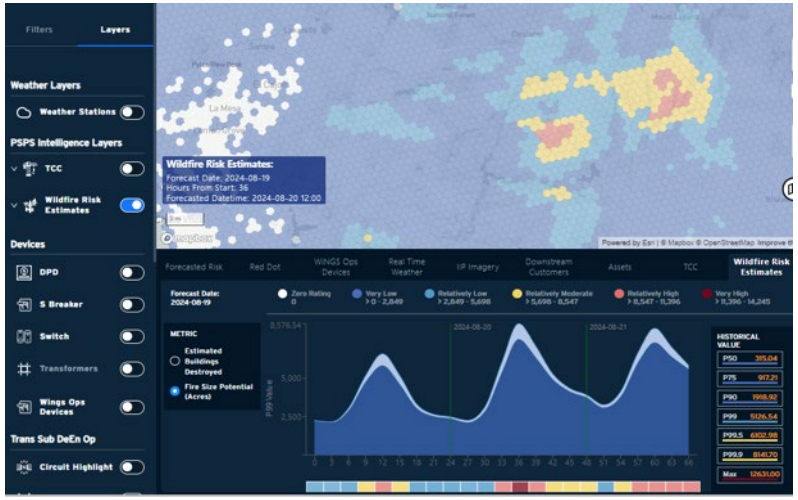

## WiNGS-Planning Model Overview

- Assesses Wildfire, PSPS, and PEDS impacts at the segment level
- Calculates baseline risk, projected risk reduction, and cost-benefit ratios for SUG and CCC across every feeder segment within SDG&E's service territory.

## Visualization Features

- Interactive map with circuit and segment risk insights
- Time-slider showing risk reduction from mitigations over time
- Portfolio tool to compare and adjust mitigation strategies

**WiNGS - Ops:** Supports real-time operational decision-making during extreme fire weather conditions



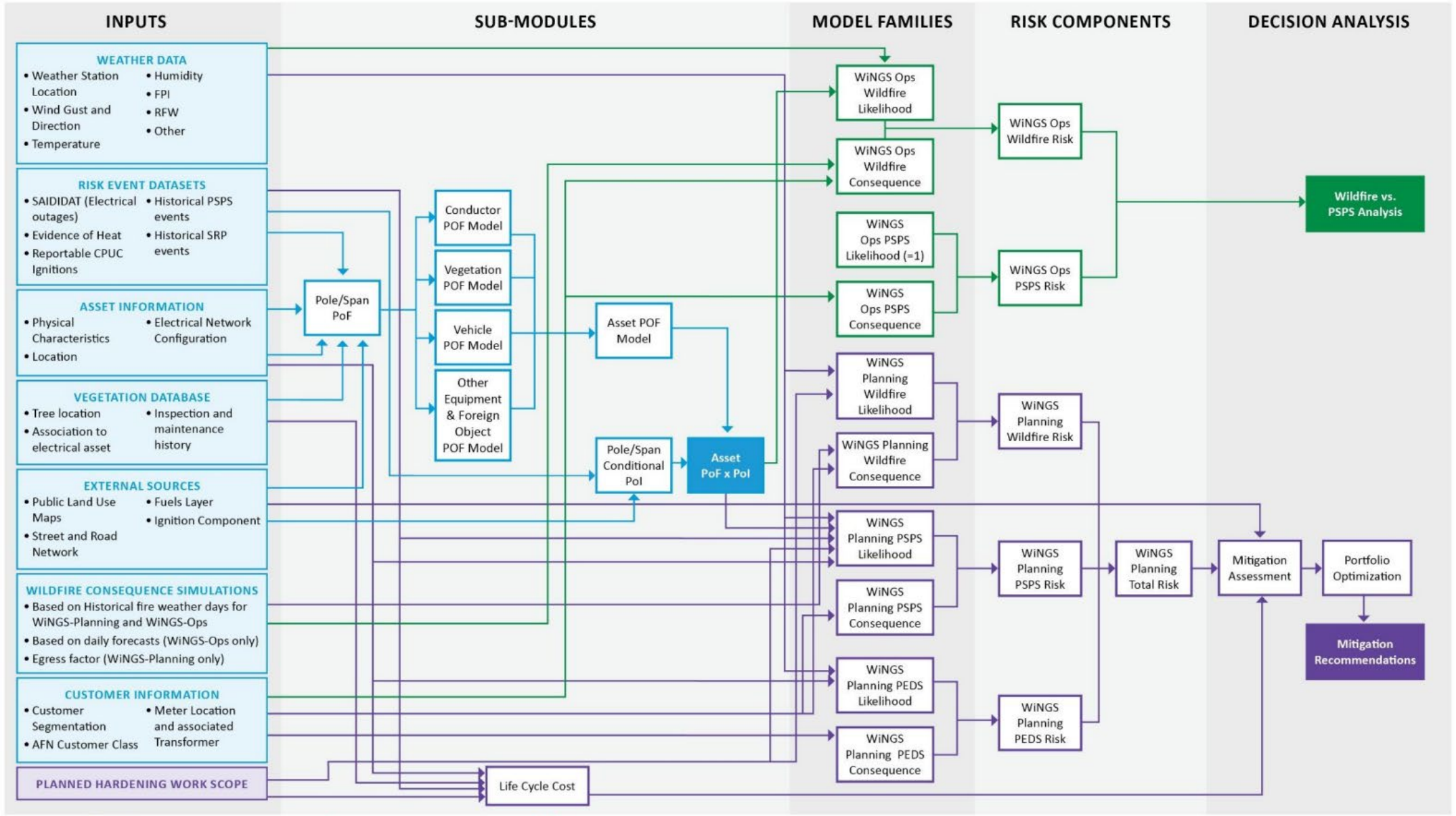

## WiNGS-Ops Model Overview

- Calculates wildfire and PSPS risk levels under extreme fire weather conditions
- Identifies and quantifies alert speed thresholds for TCC (Temporary Construction and Compliance) assets

## Visualization Features

- Real time weather station data associated with assets
- Interactive map with device hierarchy
- Downstream customer insights (including AFN & generator users)
- Hexagon Map view with daily wildfire risk forecasts

# WiNGS-Planning and WiNGS-Ops Integration



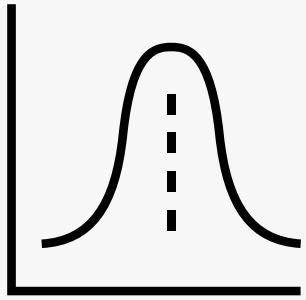

**LEGEND:** Purple: WiNGS Planning related only Green: WiNGS Ops related only Blue: Related to both WiNGS Ops & Planning

# Risk Based & Data Driven

## MODEL INPUTS

- Weather Data
- Vegetation Data
- Ignition Data
- Asset Information Systems
- Fire Simulations
- Customer Information Systems
- Work Scope Data
- Input Parameters
- Lifecycle Cost
- Risk Aversion

## MODEL OUTPUTS



**Wildfire, PSPS, PEDS**
Likelihood & Consequence

**Expected Value**

**Tail Risk**

## PROGRAM STRATEGY & PSPS DECISIONS

**Mitigation Prioritization**
WiNGS- Planning

**PSPS Implementation**
WiNGS- Ops

**Drives Risk-Based Programs**

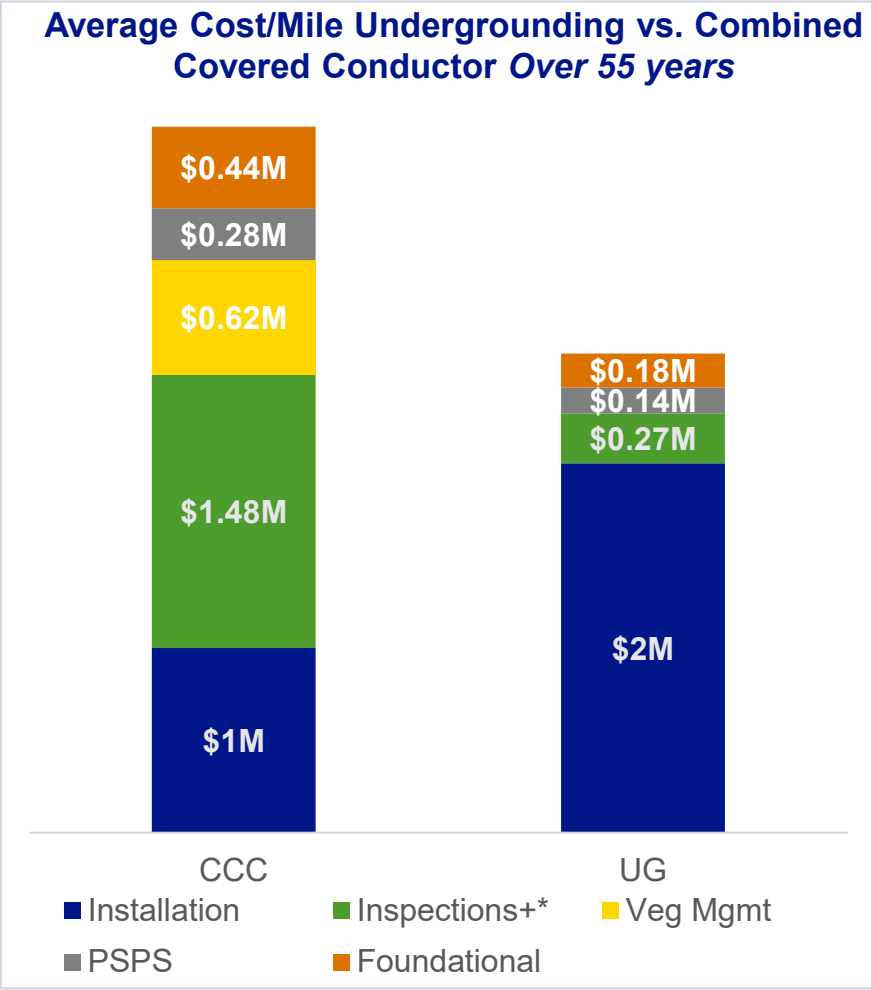
# Drivers & Changes in Risk Modeling

- Wildfire Mitigation 2026-2028 Guidelines
- Wildfire Mitigation Areas of Continued Improvements
- Risk Assessment Mitigation Phase (RAMP)
- Senate Bill 884 (Electrical Utility Undergrounding Plan)
- Maturity Model Survey
- Utility Risk Assessment Improvement Plan

| | |
|---|---|
| **Model Enhancements** | Aligns with Cost Benefit framework |
| | Probabilistic framework capturing Tail values |
| | WiNGS-Ops integration into WiNGS-Planning |
| | Incorporate PEDS risk |
| **Data Architecture** | Full territory expansion |
| | Span-level risk assessment |
| | Code Refactoring |
| | Increase traceability and auditability |
| **Model Validation** | Model documentation |
| | Formalized model validation and verification |
| | Third Party Independent Review |
| **Visualization Platform** | Improved performance and reliability |
| | Enhanced user experience |
| | Increased risk reporting sophistication and flexibility |

# Cost Benefit Framework

SDG&E utilizes the Cost-Benefit framework to quantify wildfire and PSPS risk baselines, risk reductions, and prioritize mitigations at the circuit segment level.




*Inspections+ include repair and replacement

**Total lifecycle costs includes installation and long-term operational expenses over 55 years**

**Lifecycle analysis shows undergrounding is more cost-effective than combined covered conductor**

**Undergrounding reduces/eliminates vegetation management, wood pole inspections, drone/overhead visual inspections, PSPS de-energization costs**

# Risk Assessment Future Improvements

## Risk Assessment Methodology

- Retrain models with new data
- Evaluate new model methodologies
- Implement climate change and population growth projections

## Expand Capabilities

- Evaluation of probabilities and uncertainties
- Perform sensitivity analysis
- Standardized model templates to facilitate validation and deployment in cloud services

## Risk Presentation

- Expand visualization platform with additional functionality
- Increase SME engagement

## Data Engineering Optimization

- Optimize model architecture and pipelines to reduce calculation times
- Track model error

# Mitigation Effectiveness

## Data-Driven Approach

- Electrical Outage Records
- Reportable and Non-Reportable Ignitions
- Asset attributes and location
- Weather conditions

## Individual and Combined Mitigation Analysis

- Calculate individual mitigation effectiveness per risk driver
- Recloser protocol effectiveness
- Impact of Sensitive Relay Settings
- Impact of Early Fault Detection (EFD) and Falling Conductor Protection (FCP)
- Calculate combined covered conductor mitigation effectiveness (Ex: CC + EFD + FCP)

## Ongoing Enhancements

- Factor in weather, fuel, and location data
- Improve FCP tracking and system traceability
- Continuously validating studies and updating results as findings occur

**Strategic Undergrounding consistently ranks highest in risk reduction**

# Wildfire Risk Drivers and Mitigation Activity Effectiveness

| | | Effectiveness | Equipment /facility failure or damage | Fault (Cause unknown) | Balloon Contact | Animal Contact | Vehicle Contact | Vegetation Contact | High Winds |
|---|---|---|---|---|---|---|---|---|---|
| Sustained | Strategic Undergrounding | 99% | | | | | | | |
| | Combined Covered Conductor | 58% | | | | | | | |
| Operational | Falling Conductor Protection | 16% | | | | | | | |
| | Asset Inspections | 29% | | | | | | | |
| | Traditional Hardening | 39% | | | | | | | |
| | Early Fault Detection | 8% | | | | | | | |
| | Vegetation Inspection | 4.95% | | | | | | | |

No | Yes | Partial

# Strategic Undergrounding Mitigation Effectiveness

| Overhead Distribution Ignition drivers | Total Number of Ignitions* [2019-2024] | SME SUG Effectiveness | Estimated Ignitions reduced by SUG |
|---|---|---|---|
| OH Equipment | 528 | 100% | 528 |
| UG Equipment | 31 | 95% | 29.45 |
| Vehicle Contact (Pole) | 16 | 100% | 16 |
| Vehicle Contact (Surface Structure) | 5 | 95% | 4.75 |
| OH to UG connection | 10 | 95% | 9.5 |
| All Other OH | 174 | 99% | 172.26 |
| Other UG Contact | 4 | 75% | 3 |
| Vegetation Contact | 58 | 95% | 55.1 |
| Animal Contact (UG) | 1 | 80% | 0.8 |
| **Total** | **827** | | **818.86** |

**CPUC Reportable & Non- Reportable Ignitions*

- Implementing Strategic Undergrounding eliminates all overhead risk events, ensuring a safer and more reliable infrastructure.
- Risks associated with the underground system are unlikely to cause wildfires due to its enclosed and protected nature
- Continued collaboration between Joint IOUs focuses on optimizing the effectiveness of strategic undergrounding initiatives.

$$Mitigation\ Effectivenes\ (\%) = \frac{\sum_{n=1}^{\infty}\left((\text{Number of Ignitions per Driver }) \times (Mitigation\ Effectiveness)\right)}{Total\ number\ of\ Ignitions}$$

$$\textbf{SUG Mitigation Effectiveness} = \frac{818.86}{827} = 99.02\%$$

# Combined Covered Conductor

| Distribution Risk Driver | CPUC Reportable Ignitions and Non-Reportable Ignitions | | | | | | | Avg. Risk Events per Year | 2024/2025 SME Risk Reduction | Estimated Ignitions reduced by CCC |
|---|---|---|---|---|---|---|---|---|---|---|
| | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | Total | | | |
| Animal Contact | 4 | 6 | 1 | 1 | 2 | 1 | 15 | 2.50 | 90% | 2.25 |
| Balloon Contact | 2 | 6 | 6 | 5 | 1 | 2 | 22 | 3.67 | 90% | 3.30 |
| Vehicle Contact | 4 | 6 | 2 | 1 | 1 | 2 | 16 | 2.67 | 90% | 2.40 |
| Vegetation Contact | 12 | 18 | 7 | 4 | 5 | 12 | 58 | 9.67 | 90% | 8.70 |
| Other contact | 3 | 7 | 6 | 12 | 4 | 13 | 45 | 7.50 | 50% | 3.75 |
| Conductor | 9 | 12 | 10 | 10 | 13 | 14 | 68 | 11.33 | 90% | 10.20 |
| Equipment-Non conductor | 81 | 65 | 49 | 52 | 59 | 42 | 348 | 58.00 | 39% | 22.62 |
| Other All | 42 | 31 | 27 | 27 | 20 | 27 | 174 | 29.00 | 10% | 2.90 |
| Undetermined | 4 | 6 | 5 | 2 | 1 | 2 | 20 | 3.33 | 70% | 2.33 |
| Total | 161 | 157 | 113 | 114 | 106 | 115 | 766 | 127.67 | --- | 58.45 |

$$\textbf{CC Mitigation Effectiveness} = \frac{58.45}{127.67} = \mathbf{45.78\%}$$

$$\textbf{Combined CC Mitigation Effectiveness} = 1 - [(1 - CC\ Efficacy) \times (1 - FCP\ Efficacy) \times (1 - EFD\ Efficacy)] = 1 - [(1 - 0.458) \times (1 - 0.08) \times (1 - 0.16)] = 0.581 \times 100 = \mathbf{58.1\%}$$

# Wildfire Mitigation Programs

Lena McMillin, Wildfire Mitigation Programs Manager

SDGE™

# Wildfire Mitigation By The Numbers 2026-2028

## SUSTAINED

### STRATEGIC UNDERGROUNDING

**50 miles**

Limited due to GRC Decision

### COMBINED COVERED CONDUCTOR

**130 miles**

Limited due to GRC Decision

## OPERATIONAL

### SYSTEM HARDENING

**39 miles**

Includes Distribution, Transmission and Distribution Underbuilt

### ASSET INSPECTIONS

**397K**

Includes Distribution, Transmission and Substation Inspections

### VEGETATION MANAGEMENT INSPECTIONS

**765K** Includes 100% of the HFTD

### PROTECTIVE EQUIPMENT AND DEVICE SETTINGS (PEDS)

**270 nodes**

Includes Advanced Protection and Early Fault Detection

### PSPS SECTIONALIZING ENHANCEMENTS

**18 switches**

Used to de-energize only sections of circuits that are experiencing extreme wind events

# Grid Hardening

## Traditional Hardening

**600+** **miles hardened** since 2013

**2026** **planned completion** of tier 2 and tier 3 HFTD

**39%** **effectiveness** of hardening against wildfires.

## Strategic Undergrounding

**~300** **miles** installed since 2020

**1200** **miles planned** by 2037
50 miles planned 2026-2028

**99%** **reduction in risk** against wildfires.

## Combined Covered Conductor

**~180** **miles** installed since 2020

**425** **miles planned** by 2037
130 miles planned 2026-2028

**58%** **reduction in risk** against wildfires

# Vegetation Management

## Detailed Inspections

Inspections completed since 2020

**2.5M**

Annual WMP 2026-2028 Target

**225K**

## Prune and Removal

Trees Pruned/Removed since 2020

**65K**

## Pole Clearing

Poles brushed since 2020

**179K**

Annual WMP 2026-2028 Target

**22K**

## Off-Cycle Patrol

Inspections completed since 2022

**>300**

Annual WMP 2026-2028 Target

**106 VMAs**

## Fuels Management

Poles cleared since 2020

**1,600**

Annual WMP 2026-2028 Target

**500**

## QA/QC

Inspections since 2023

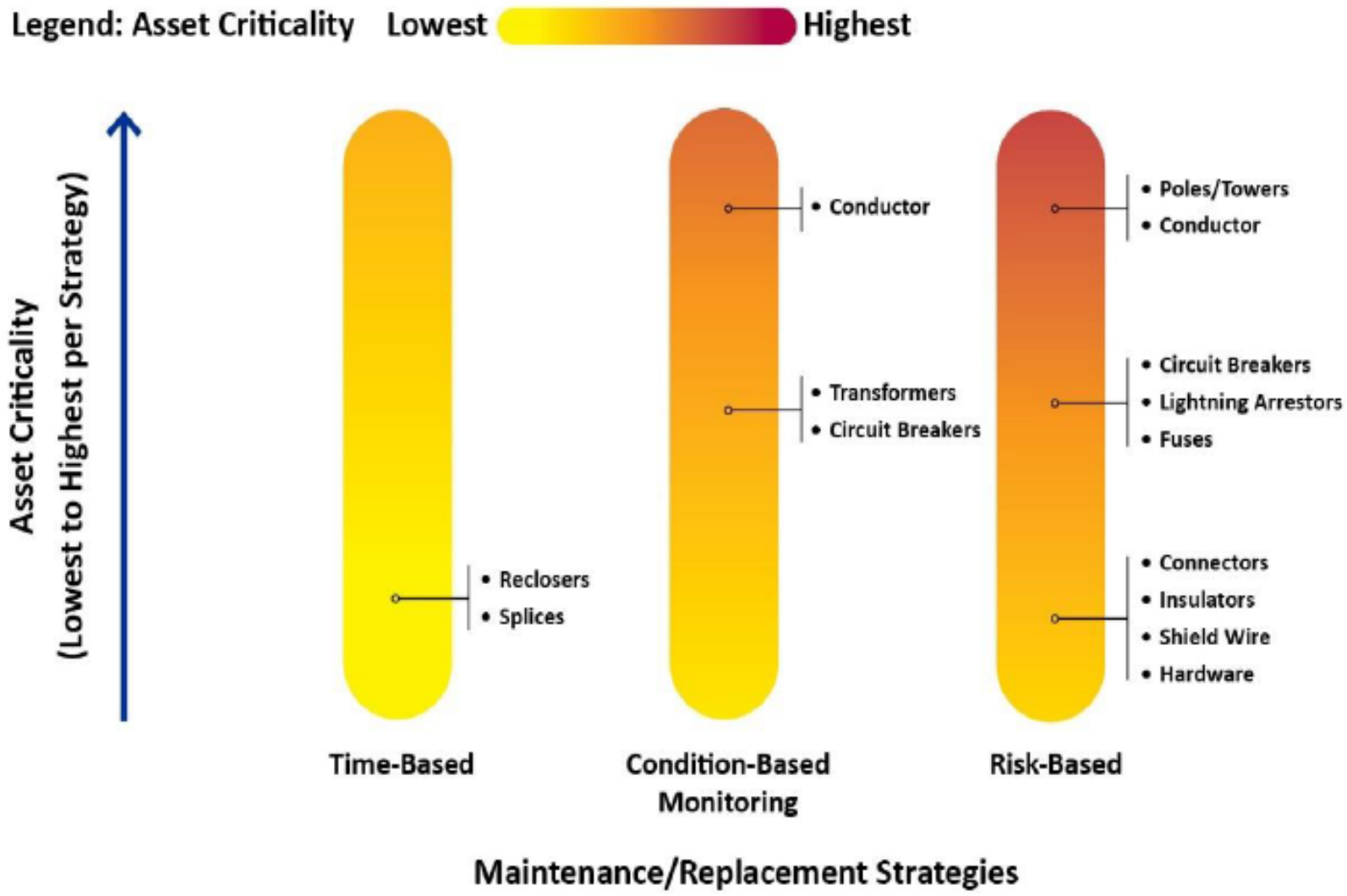
**212K**

Annual WMP 2026-2028 Targets:

- Detailed Inspections
- Prune/Removal
- Pole Clearing

**15%**

# Asset Criticality and Maintenance Strategies



# Asset Inspections – Scope & Intervals

*Inspections scope and intervals are determined by GO 95 and GO 165; RIDI and EFD are risk-informed programs that consider equipment-specific risk to prioritize inspections.*

| Type | Inspection | Frequency |
|---|---|---|
| Distribution | OH Detailed | 5 Years |
| | Wood Pole Intrusive | 10 Years |
| | OH Patrol | Annually |
| | Risk Informed Drone (RIDI) | Risk-Based |
| | Early Fault Detection (EFD) | Ad-Hoc |
| Transmission | OH Detailed | 3 Years |
| | Wood Pole Intrusive | 8 Years |
| | OH Patrol | Annually |
| | Infrared | Annually |

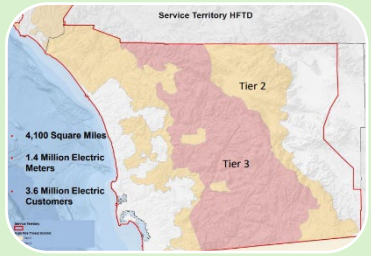
**Traditional Inspections**

Detailed OH & UG

OH & UG Patrols


Wood Pole Intrusive

**Enhanced Inspections**

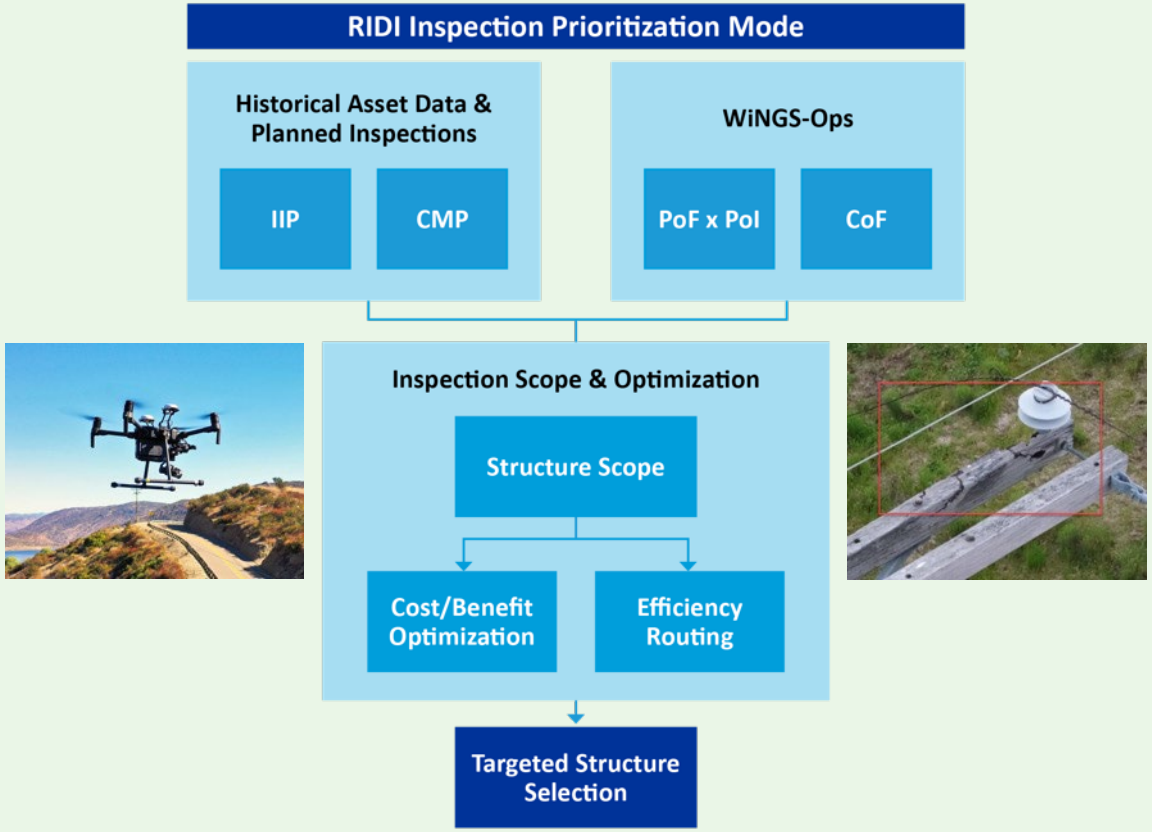



Early Fault Detection

RIDI

# Equipment-specific Risk-Informed Inspection and Maintenance

## Risk-Informed Drone Inspections (RIDI)




Utilizes risk models to determine scope of high-risk assets for inspection

## Early Fault Detection


Utilizes real-time monitoring to detect incipient faults on the system (radio frequency analysis and power quality sensors)

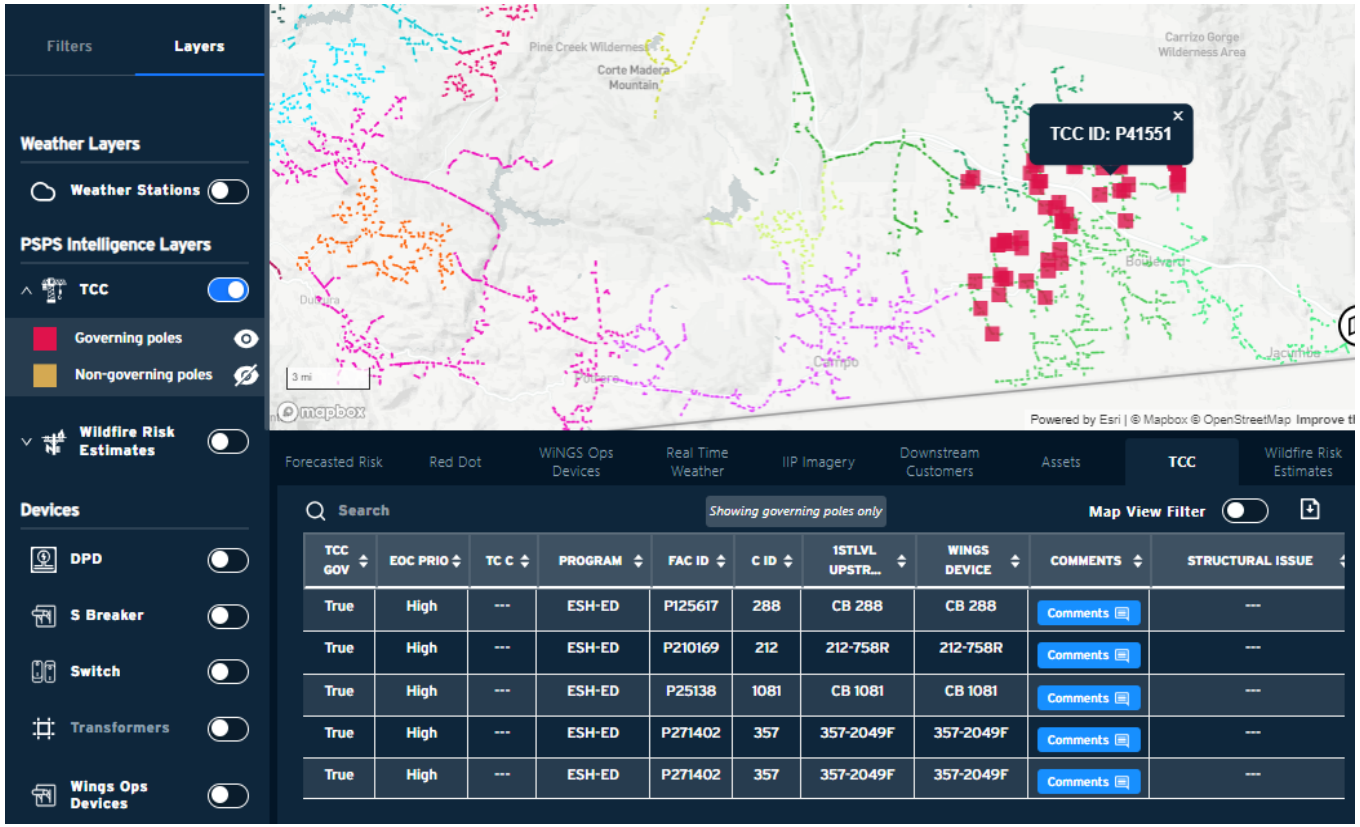
# PSPS Mitigation Strategies

**Objective**: Prevent ignitions during high-fire weather and minimize PSPS impact

| | |
|---|---|
| **Grid Hardening** | **Strategic Undergrounding Program**<br>**PSPS Sectionalizing Enhancement Program**<br>**Covered Conductor** |
| **Situational Awareness** | **216 weather stations with 30-second read capabilities** |
| **Risk Analytics** | **WiNGS-Ops for automated visibility and decision-making** |
| **Customer Resiliency** | **Standby Power Program**<br>**Customized Resiliency Assessments**<br>**Generator Assistance Program** |

# WiNGS-Ops | Temporary Construction & Compliance (TCC)

Utilization of the TCC layer in WiNGS-Ops allows for risk identification of problematic structures and prioritization of corrective work with greatest impact on reducing the scope of PSPS events.




**Map view of all TCC poles** with zoom capabilities along with quick reference of information per asset

Visibility to **all governing & non-governing poles**

**Filter option for all poles by governing and non-governing** within in SDGE territory

**IIP Imagery** for selected assets

**Relevant data per asset breakdown** upstream scada device, field comments, VRI impact, P95/P99, EOC priority & circuit ID

# Summary

## Updates to Risk Models

- Enhancements, architecture, validation, visualization

## Mitigation Effectiveness

- Data driven, individual and combined analysis, ongoing improvements

## Inspections and Findings

- Time-based and risk-informed inspections

## Equipment-specific Risk Prioritization of Maintenance

- TCC risk-informed prioritization considers wildfire *and* PSPS risk

# Questions

SDGE™

# THANK YOU


SCE
PRESENTATION

SOUTHERN CALIFORNIA EDISON®

# 2026-2028 WILDFIRE MITIGATION PLAN

Ray Fugere
Director, Asset & System Intelligence

## PROMPT #1 (15 minutes)

- At a high level, explain the major changes in the electrical corporations' risk models since the 2023-2025 Base WMP.
  - What were the drivers for these changes and how have they impacted the electrical corporation's wildfire risk mitigation strategies?

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# KEY CHANGES MADE TO CONSEQUENCE MODELING; ONLY ROUTINE UPDATES TO POI MODELS PERFORMED

## Updates to consequence modeling

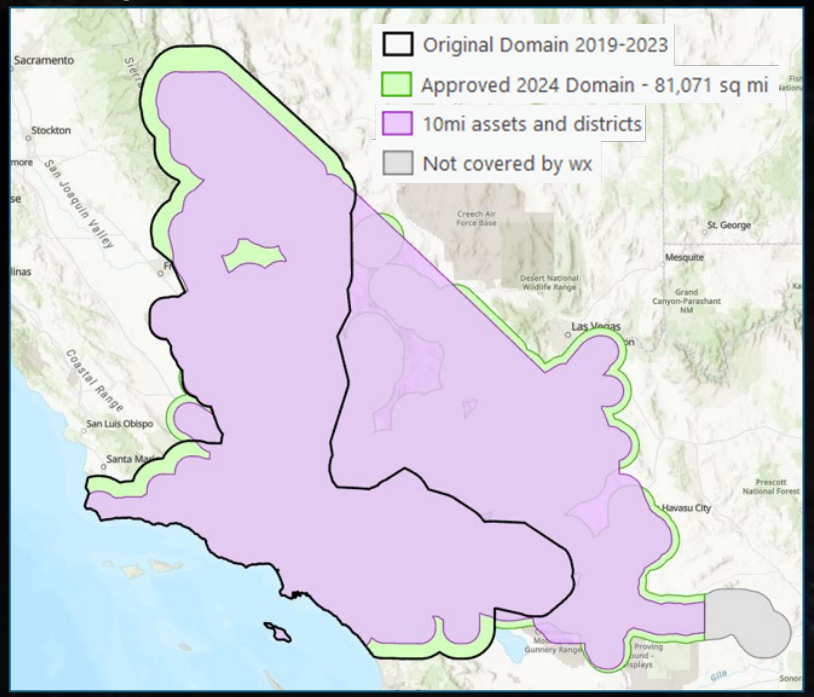
- Expansion of wildfire simulations to cover all of SCE's service area, plus 10-mile buffer
- New region-based Fire Climate Zone (FCZ) methodology aligns with SCE's Fire Behavior Matrix (FBM)
- Fire Weather Day (FWD) selection methodology was updated to be based on the relevance of fire weather conditions to discrete regions[1]
- Planned updates include, the integration of a Building Loss Factor (BLF),[2] a forward-looking climate change scenario,[3] as well as other potential CPUC requirements[4]

1. This methodology resulted in 2,706 weather days being selected out of a 41-year climatology. Note that not all-weather days are mutually exclusive. The same weather days could have been selected across multiple zones.
2. The BLF model is based on CalFire Damage Inspection Data and attempts to estimate the wildfire intensity impacts on structures.
3. CA Fifth Climate Assessment data, which is required by the CPUC for use in long term infrastructure planning, was not released with enough lead time to be included in this analysis.
4. SCE is awaiting a proposed decision in the Risk Informed Decision Making proceeding, which may result in significant changes in utility risk modeling requirements.

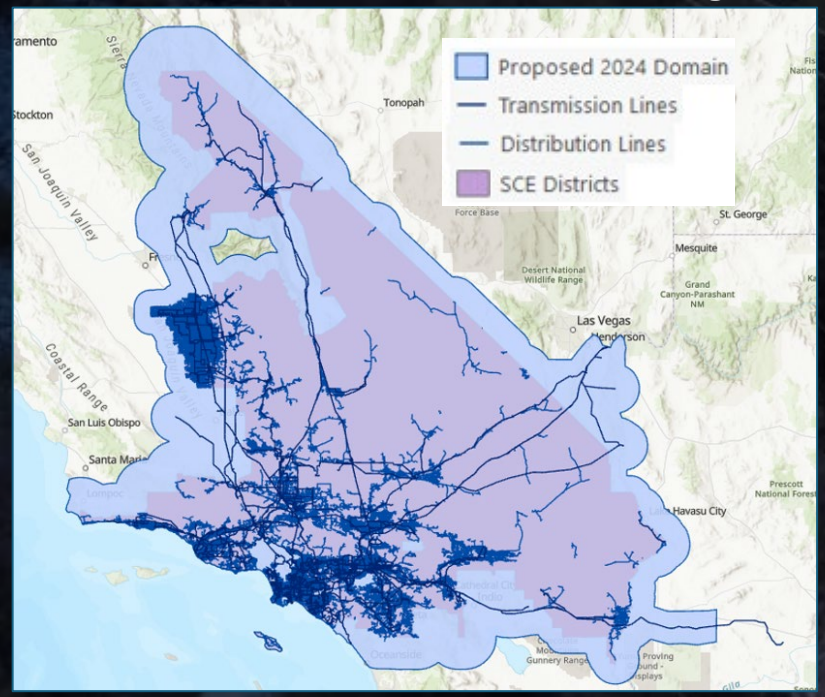
# EXPANSION OF WILDFIRE SIMULATIONS TO COVER ALL OF SCE'S SERVICE AREA

| Key changes to wildfire consequence risk modeling | Drivers for changes | Impact to wildfire risk mitigation strategy |
|---|---|---|
| Expansion of wildfire simulations to cover all of SCE's service area, plus 10-mile buffer | Allows SCE to develop a more holistic view of wildfire risk in non-HFRA locations | Provides a better understanding of wildfire risk in areas not in existing CPUC High Fire Threat Districts, including in adjacent states<br><br>Provides a more holistic view of wildfire to better prioritize activities |

**Comparison of 2019-2023 and 2024 Domain**




**SCE Assets and 2024 Domain Coverage**



# NEW ZONAL FIRE CLIMATE ZONE (FCZ) METHODOLOGY

| Key changes to wildfire consequence risk modeling | New Zonal Fire Climate Zone (FCZ) methodology aligns with SCE's Fire Behavior Matrix (FBM) |
|---|---|


Fire Climate Zones and Ignition Point Locations

| Drivers for changes | Impact to wildfire risk mitigation strategy |
|---|---|
| • Allows for better representation of fire weather scenarios in each region<br>• Allows for the transition to zonal Fire Weather Day (FWD) selection methodology, which is critical for understanding a full distribution of consequence values, as well as model uncertainty in discrete locations | • Facilitated the transition to quasi-probabilistic understanding of a range of consequences across a full distribution of potential fire weather events<br>• More accurate representation of fire weather, as well as resulting wildfire simulations, in each region of SCE's service area<br>• Better understanding of present day and potential future frequency of fire weather days (FireSight 8 (Climate)) in each region of SCE's service area |

# FIRE WEATHER DAY (FWD) SELECTION METHODOLOGY WAS UPDATED

| Key changes to wildfire consequence risk modeling | Drivers for changes | Impact to wildfire risk mitigation strategy |
|---|---|---|
| • Fire Weather Day (FWD) selection methodology was updated to be based off relevance to discrete regions[1]<br>• Previously 444 worst weather days across SCE service area | • Better represents critical fire weather for specific parts of its service area<br>• Aligns with a similar architecture being tested for its operational wildfire risk models<br>• Facilitates the integration of forward-looking Global Climate Models (GCMs)<br>• Allows SCE to demonstrate the results of extremely granular consequence distributions at every simulated ignition point<br>– Necessary for transitioning to quasi-probabilistic risk model as it will allow SCE to understand both the frequency of specific Fire Behavior Outcomes and associated consequences without losing the fidelity of granular ignition simulations | • FWDs represent a full of range of potential fire weather conditions present in specific regions of SCE's service area<br>• Selecting the appropriate FWD for each region of SCE's service area - rather than in aggregate across the entire service area - is important given the diversity of weather, terrain, slope, population density, fuels, and other conditions present in each of those locations |

1. This methodology resulted in 2,706 weather days being selected out of a 41-year climatology. Note that not all weather days are mutually exclusive. The same weather days could have been selected across multiple zones

**PROMPT #2 (15 minutes)**

- Describe the electrical corporation's detailed asset inspection process for transmission and distribution.
  - How are inspection intervals determined?
  - How are findings integrated into operational decisions?

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# ASSET INSPECTIONS USED AS NEAR-TERM MITIGATION IN HIGH FIRE RISK AREAS


## DISTRIBUTION INSPECTIONS

Distribution asset inspections in high fire risk areas include:

- Ground and Aerial Distribution High Fire Risk Informed Inspections (IN-1.1)
- Distribution Infrared Scanning (IN-3)

## TRANSMISSION INSPECTIONS

Transmission asset inspections in high fire risk areas include:

- Ground and Aerial Transmission High Fire Risk Informed Inspections (IN-1.2)
- Transmission Infrared and Corona Scanning Inspections (IN-4)

# INTERVALS OF DETAILED HIGH FIRE RISK INFORMED INSPECTIONS FOR DISTRIBUTION & TRANSMISSION

## DISTRIBUTION INSPECTIONS – GROUND & AERIAL

Distribution structures prioritized based on **probability of ignition** and **consequences**

SCE's Integrated Wildfire Mitigation Strategy Risk Framework, with latest risk modeling, used to determine **inspection scope frequency**

Detailed inspections in high fire risk areas performed at least **once every 3 years,** which exceeds GO 165 requirements of once every 5 years

Structures in Severe Risk Areas and Areas of Concern inspected **annually**

Structures in High Consequence Area inspected **annually** or at least **once** every 3 years

Structures in Other HFRA inspected **once every 3 years**

## TRANSMISSION INSPECTIONS – GROUND & AERIAL

Transmission structures prioritized based on **probability of ignition** and **consequences**

SCE's Integrated Wildfire Mitigation Strategy Risk Framework, with latest risk modeling, used to determine **inspection scope frequency**

Detailed inspections in high fire risk areas performed at least **once every 3 years**

Structures in Severe Risk Areas and Areas of Concern inspected **annually**

Structures in High Consequence Area inspected **annually** or at least **once** every 3 years

Structures in Other HFRA inspected **once every 3 years**

# INTEGRATION OF ASSET INSPECTION FINDINGS INTO OPERATIONAL DECISIONS

**Informed by Asset Inspections**

| PSPS risk & operational decisions | Asset health | Risk prioritization of notifications | Remediations in Areas of Concern (AOC) | Findings inform Fire Incident Preliminary Analysis (FIPA) |
|---|---|---|---|---|
| PSPS wind speed thresholds are in part informed based upon inspection findings (pending remediations) | Probability of ignition models incorporate the useful life of assets and in part determine frequency of inspections | Risk-informed decision prioritizes notifications and activities based on severity and potential impact<br><br>High-risk conditions prioritized for immediate remediation, lower-risk conditions scheduled for later remediation | Pending remediations from inspections are reviewed and structures are prioritized for maintenance to reduce in season wildfire risk | Continuous improvement of inspection, remediation processes based on FIPA<br><br>Refines strategies for mitigating wildfire risks, enhancing inspections effectiveness |

# DISTRIBUTION HIGH FIRE RISK-INFORMED (HFRI) INSPECTIONS – GROUND AND AERIAL (IN-1.1)

Examples of findings from aerial inspections

Examples of findings from ground inspections

SCE conducts **more frequent and ignition-focused risk inspections** in HFRA beyond GO 165 requirements to identify equipment or structure degradation that occurs between compliance cycles and could lead to a potential ignition risk.

Since 2019, SCE supplemented ground-based inspections with aerial inspections. Ground inspections detect conditions difficult to identify via aerial inspections, such as the state of guy anchors or damaged structures like wood poles and guy stub poles.

Since 2023, SCE has been conducting single-visit 360 inspections for distribution assets combining ground and aerial checks.

# TRANSMISSION HIGH FIRE RISK-INFORMED (HFRI) INSPECTIONS – GROUND AND AERIAL (IN-1.2)

Examples of findings from aerial transmission inspections

SCE performs detailed inspections of SCE's overhead transmission electric system in compliance with regulatory requirements **including GO 165, NERC and WECC rules and regulations, and the CAISO Transmission Control Agreement**.

To identify transmission equipment or structure degradation that occurs between compliance cycles due to natural wear and tear or emergent events such as weather or third-party caused damages that could lead to a potential ignition risk, SCE has **implemented more frequent and ignition-focused HFRI** on transmission equipment and structures in HFRA.

Ground-based inspections are supplemented with aerial inspections. Aerial inspections are typically performed at the same locations as ground inspections and in combination provide a 360-degree view to detect equipment/structure conditions that can be difficult to identify via ground inspections. SCE conducts the 360-degree view detailed inspection for its structures in HFRA regardless of scope driver (i.e. risk or compliance).

## PROMPT #3 (15 minutes)

- Describe the methodology the electrical corporation uses to determine and measure the effectiveness of wildfire mitigation initiatives/activities.
  - How is the combined effectiveness of initiatives/activities determined?

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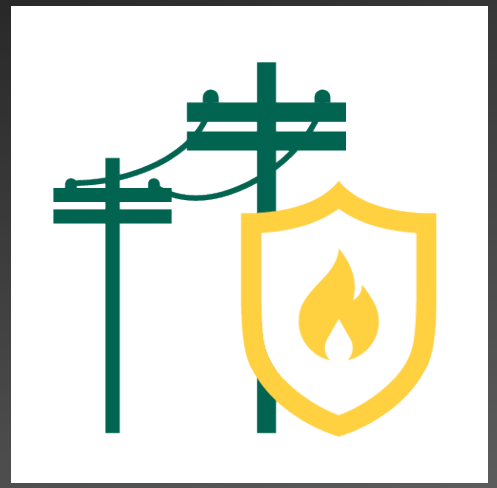
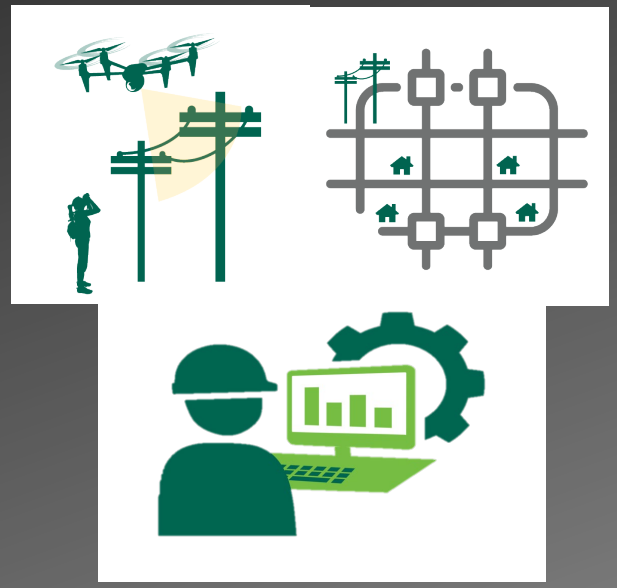
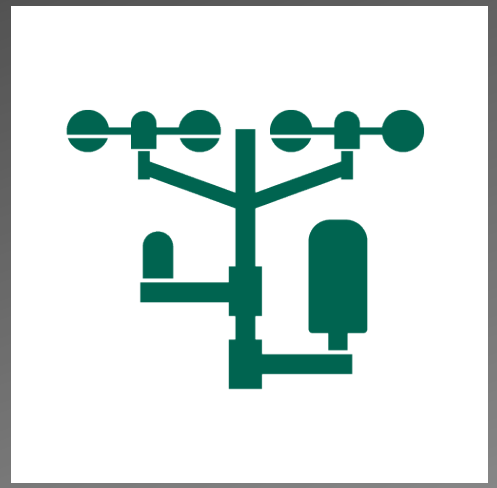
# WILDFIRE MITIGATION ACTIVITY RISK FRAMEWORK



**Risk identified through Multi Attribute Risk Score (MARS) methodology**

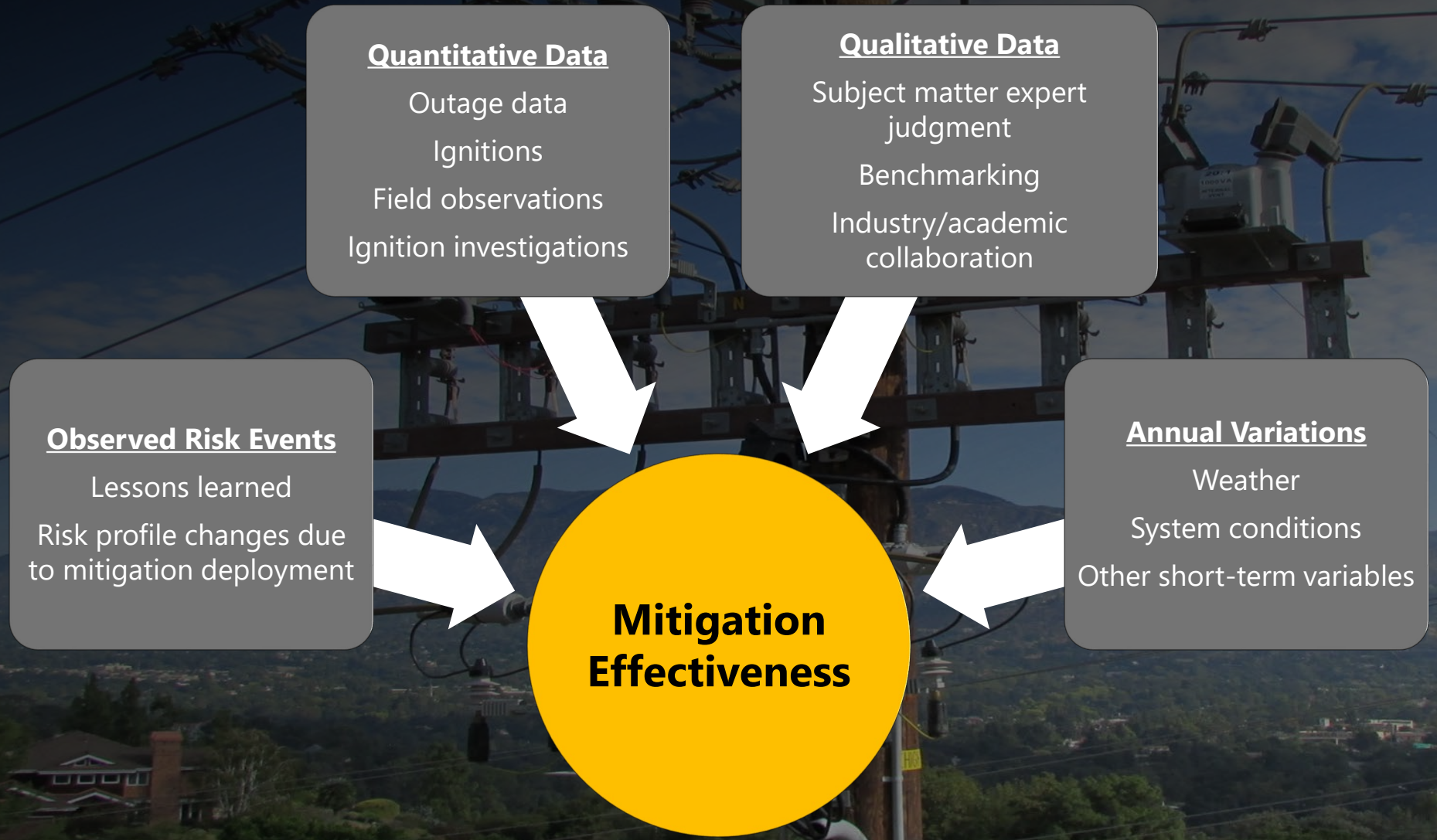


**Risk segmented through Integrated Wildfire Mitigation Strategy (IWMS)**



**Mitigation effectiveness and prioritization driven by MARS and IWMS risk framework**

# EFFECTIVENESS OF WILDFIRE MITIGATION ACTIVITIES



# COMBINED EFFECTIVENESS OF MITIGATION ACTIVITIES

- As multiple mitigations are deployed, the underlying risk profile changes over time which makes it challenging to isolate and empirically measure effects of individual mitigations
- Individual mitigation effectiveness is calculated against relevant risk sub-drivers
- Weighting factors are calculated by comparing either:
  - Activity-relevant risk sub-drivers against all relevant risk sub-drivers
  - Activity-relevant consequence components against the consequence component across all risk drivers
- Activity effectiveness is defined as the sum of risk sub-driver weighting factors multiplied by the individual mitigation effectiveness values across all risk sub-drivers
- Effectiveness calculations for ignition frequency, PSPS consequence, and wildfire consequence are calculated separately, since they are construed differently and measure different risks; therefore, they are not summed together

## PROMPT #4 (15 minutes)

- How does the electrical corporation monitor equipment failure and ignition rates
  - How does data on equipment-specific risk inform the electrical corporation's prioritization of maintenance or changes to inspection practice?

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# MONITORING EQUIPMENT FAILURE & IGNITION RATE

**SCE's Fire Incident Preliminary Analysis (FIPA)** provides root cause analysis and engineering reviews of CPUC reportable ignitions and identifies the drivers that may have caused these ignitions.

**CPUC Reporting Criteria**

- SCE electrons involved with ignition
- SCE awareness of ignition
- Fire spreads 1 linear meter from ignition point

**FIPA performs engineering review of CPUC reportable events**

- Data collection through engineering reviews
  - Desktop analysis (reports review and troublemen interviews)
  - Field visits
  - Lab testing
- Analysis of ignition causes for areas of improvement
- Trending and correlations to get ahead of the next big issue
- Inform mitigation discussion and implementation
- Trending and correlations for identifying mitigation success

# FIPA MONITORS, REVIEWS DATA TO ASSESS WILDFIRE MITIGATION PROGRAM PERFORMANCE

- FIPA monitors and reviews data, such as outages and wire downs, to assess the performance of wildfire mitigation programs and to identify opportunities to enhance these programs
- SCE monitors data derived from FIPA process and other data sources to ensure SCE's programs are performing as desired
- SCE periodically supplements FIPA process by reviewing fault data, repair notifications, wire downs and other fault data not captured in FIPA process to evaluate if grid monitoring mitigations are operating as intended

# FIPA IMPACT ON MAINTENANCE AND INSPECTION PRACTICES

## EXAMPLES OF FIPA CONTRIBUTIONS TO KEY WILDFIRE MITIGATION PROGRAMS

Launched aerial inspection program

Updates to asset inspection survey questions

Updates to design criteria for 66kV transmission structures

Pilot for vegetation management related to secondary conductor

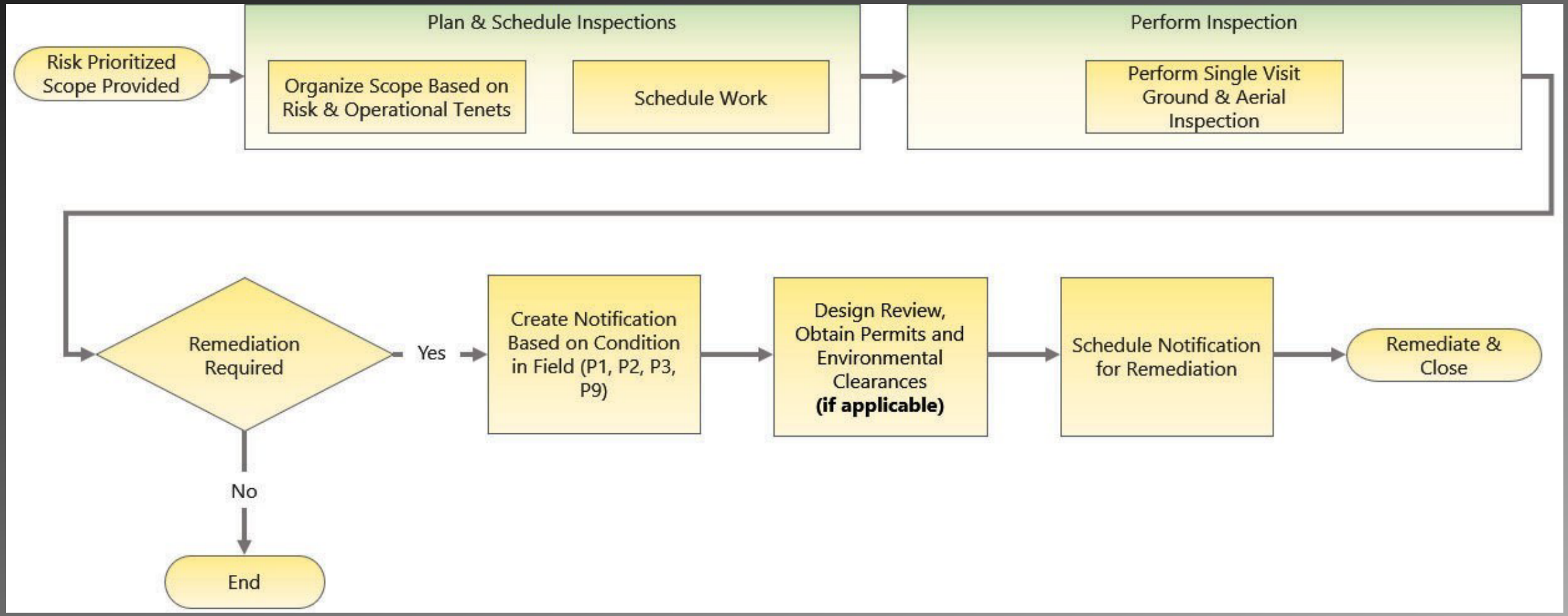
# APPENDIX

# INTEGRATED WILDFIRE MITIGATION STRATEGY

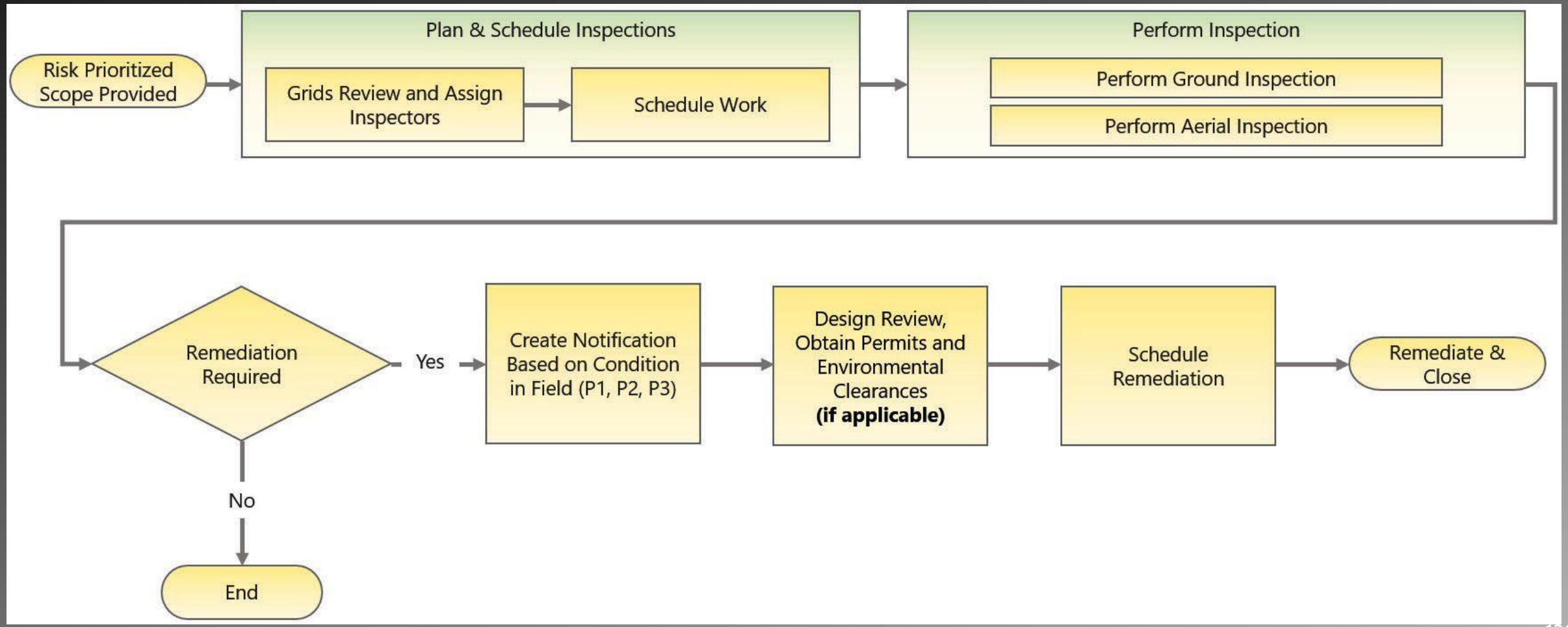
SCE's refined integrated wildfire mitigation strategy considers wildfire risk drivers and PSPS risk at circuit segments and mitigations that cost effectively addresses those risk drivers. We continue to prioritize hardening our riskiest areas first.

| | Risk Designation | Risk Criteria | Mitigation Selection |
|---|---|---|---|
| **Total High Fire Risk Area (HFRA) Overhead Distribution Segments** | **Severe Risk Areas** | Fire risk egress constrained locations, extreme high wind areas, and extreme consequence areas | Pursue undergrounding unless covered conductor already installed or specific terrain not practical for undergrounding and necessitates feasible alternative mitigations |
| | **High Consequence Segments** | Locations that meet 300-acre consequence threshold at 8 hours or at risk of Public Safety Power Shutoff (PSPS) | Pursue covered conductor plus other mitigations such as asset inspections, vegetation management, and fast curve settings |
| | **Other HFRA Segments** | Locations that are not in a Severe Risk Area and do not meet High Consequence criteria | Naturally replace retired or damaged bare wire with covered conductor per high fire risk area standard; continue mitigations such as asset inspections, vegetation management, and fast-curve settings |

# DISTRIBUTION DETAILED INSPECTIONS AND REMEDIATIONS WORKFLOW



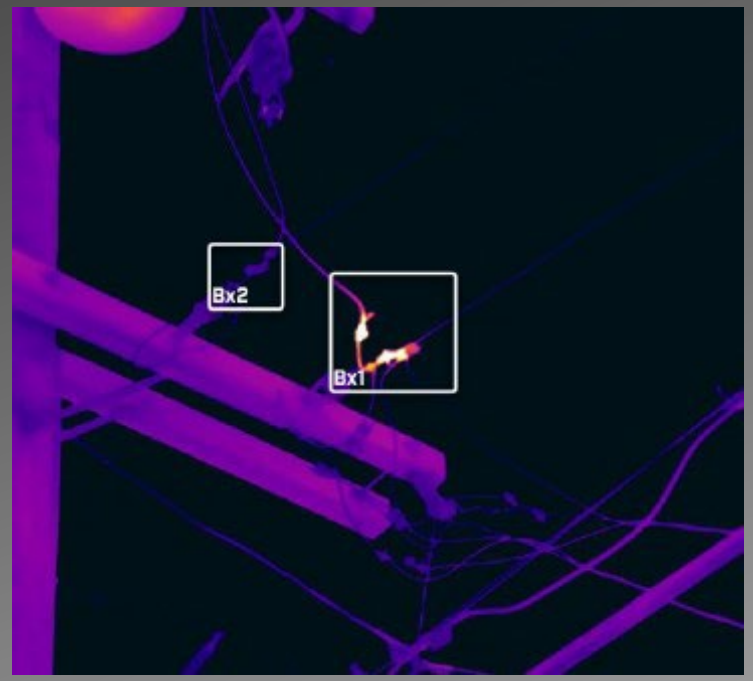
# TRANSMISSION DETAILED INSPECTIONS AND REMEDIATIONS WORKFLOW



# DISTRIBUTION INFRARED SCANNING (IN-3)

Standard/Visual Imagery

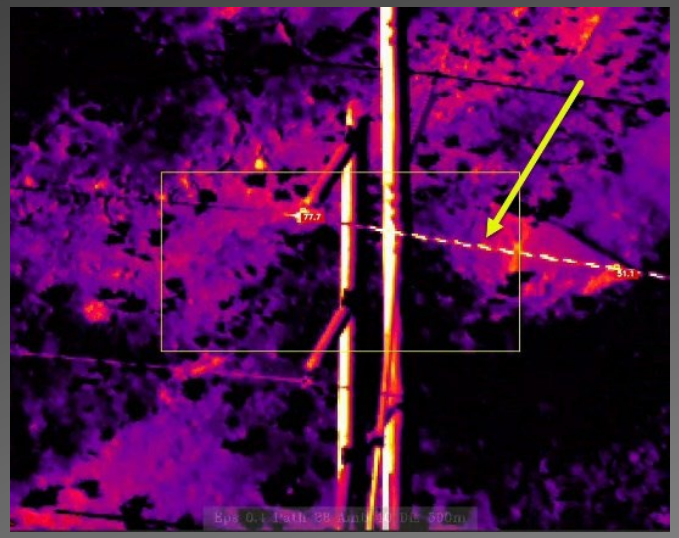
Thermal/Infrared Imagery



# TRANSMISSION INFRARED AND CORONA SCANNING (IN-4)

Standard/Visual Imagery

Thermal/Infrared Imagery



Corona Scan


SCE
Q&A

# 10-MINUTE BREAK

Back at 3:25 pm

# OPEN QUESTION AND ANSWER SESSION

# NEXT STEPS: PUBLIC PARTICIPATION (1/3)

Submit your comments to the 2026-2028-Base-WMPs docket by 5pm on the following dates:

- PG&E: May 23, 2025
- BVES: May 30, 2025
- SDG&E: June 13, 2025
- SCE: June 27, 2025

# NEXT STEPS: PUBLIC PARTICIPATION (2/3)

- Docket **2026-2028-Base-WMPs** is your primary source of information: https://efiling.energysafety.ca.gov/EFiling/DocketInformation.aspx?docketnumber=2026-2028-Base-WMPs

- Data Request responses can be found on each electrical corporation's website, with summaries available on the **2026-2028-Base-WMP-DRs** docket: https://efiling.energysafety.ca.gov/EFiling/DocketInformation.aspx?docketnumber=2026-2028%20Base%20WMP%20DRs

# NEXT STEPS: PUBLIC PARTICIPATION (3/3)

- Share your feedback on the workshop – including structure, topics, or timing.
    - Email suggestions to Danielle.Dooley@energysafety.ca.gov

- Material from today's workshop will be posted to the 2026-2028-Base-WMPs docket by Friday, May 23: https://efiling.energysafety.ca.gov/EFiling/DocketInformation.aspx?docketnumber=2026-2028-Base-WMPs

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