Pacific Gas and Electric Company

CALIFORNIA PUBLIC UTILITIES COMMISION AND
OFFICE OF ENERGY INFRASTRUCTURE SAFETY

SAFETY BRIEFING

September 22, 2022

Topics for Discussion

1 Governance and Safety Monitoring
- Safety governance leadership
- Experience at the Board level

2 Key Safety Priorities and Performance
- Safety monitoring
- Operational performance
- Workforce safety

3 Wildfire Safety
- 2022 progress to date
- Ignition reductions
- EPSS update
- WMP revision notice updates
- Undergrounding progress, costs and benefits

4 Safety Culture
- Safety Culture Assessment updates
- Incorporating lessons learned

PG&E Speakers

Cheryl F. Campbell
Member, Boards of Directors of PG&E Corporation and Pacific Gas and Electric Company, and Chair, Safety and Nuclear Oversight Committee

Adam Wright
Executive Vice President, Operations and Chief Operating Officer

Sumeet Singh
Executive Vice President, Chief Risk Officer and Chief Safety Officer

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

Governance and Safety Monitoring

Governance

Safety governance is embedded at the highest levels of the company with direct involvement of the Board of Directors and Safety and Nuclear Oversight Committee (SNO).

Board of Directors

15 members

- ✓ Supports and approves the development of safety metrics tied to executive compensation
- ✓ Reviews annual performance

We have not altered our governance structure since successfully standing it up in 2021

SNO Committee

6 members

- ✓ Reviews safety, risk and operational performance and results of cause evaluations
- ✓ Provides feedback to PG&E management for action
- ✓ Oversees the Wildfire Mitigation Plan, including the Enhanced Powerline Safety Settings (EPSS) and Public Safety Power Shutoff (PSPS) programs
- ✓ Independent, with deep expertise in wildfire safety, prevention and mitigation, emergency response and management, workforce and public safety, natural gas systems, risk management, cyber security and nuclear safety

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Improving Safety Through Experience

The knowledge and experience of the 15 members of PG&E's Board of Directors improves and informs safety outcomes.

New for 2022

Our newest board member has extensive engineering, procurement, risk management, safety and environmental and construction expertise

Key experience areas include:

- ✓ Financial planning, performance and literacy
- ✓ Public policy
- ✓ Customer experience
- ✓ Workforce safety
- ✓ Community leadership
- ✓ Audit
- ✓ Technology and cybersecurity
- ✓ Leadership in energy and utility industry
- ✓ Engineering, procurement and construction
- ✓ Clean energy innovation and technology
- ✓ Climate change mitigation and resilience
- ✓ Natural gas transmission, distribution, operation and safety
- ✓ Utility operation and engineering
- ✓ Wildfire safety, preparedness, prevention, mitigation, response and recovery
- ✓ Nuclear generation safety
- ✓ Federal and state-wide emergency management

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Key Safety Priorities and Performance

Monitoring Safety Through Our PG&E Performance System

Operating reviews at all levels take place daily, weekly and monthly and allow us to quickly identify and address issues and barriers to getting the right work done safely and effectively.

Daily Operating Reviews (DORs)

LINE OF BUSINESS | CROSS-FUNCTIONAL | CUSTOMER CARE + REGIONAL

1,800+
DORs conducted each day

15-minute
operational reviews of key performance indicators

- Supervisor DORs
- Superintendent / Manager DORs
- Director DORs
- Cross-functional + Regional DOR
- VP DORs
- EVP Customer + Regional DOR
- EVP Ops and Engineering DOR
- EVP Cross-Functional DOR

Daily Company-Wide Safety Message and Dashboard | Visual Management

DAILY SAFETY MESSAGE

Safety Message

HEAT ILLNESS CASE: Yesterday, a two-man crew was performing a service replacement and while hand-digging, one coworker briefly lost consciousness and began vomiting. He regained consciousness and received medical care. REMINDERS: Seek shade or a cool place to take regular breaks, stay hydrated, and prevent symptoms of heat illness from worsening.

Covid-19 Update

Total Coworker Cases	New Coworker Cases	Total Contractor Cases	New Contractor Cases	* Active Outbreaks	* Active Quarantines	* Active Hospitalizations	* Covid-related Deaths
8938	31	705	8	5	0	0	14

COVID statistics on the day(s) following weekends and holidays will include all cases not yet reported.

SIF Actuals (Non-Fatal)

Period	Count	EOY Target	On-Track?
YTD 2022	3	<= 1	✗ *
EOY 2021	3	* 2 Fatalities	

DART Cases (Restricted Duty & LWD)

Year	YTD Count	YTD Rate	EOY Target	On-Track?	Rolling 12 Month Rate	Trend
2022	112	0.63	0.86	✓	0.77	↓
2021	175	0.98			1.17	

Recordables

Year	YTD Count	YTD Rate	Rolling 12 Month Rate
2022	274	1.54	1.71
2021	302	1.70	1.91

PMVIs (Minor & Serious)

Year	YTD Count	YTD Rate	EOY Target	On-Track?	Rolling 12 Month Rate	Trend
2022	227	2.36	2.61	✓	2.43	↓
2021	268	2.94			2.80	

50 Ops MVI-Free Days *

Year	YTD Count	YTD Target	On Track?
2022	8	12	⊗
2021	12	* Ops Only Between 8/1 - 12/31	

↑ Rate is higher than last year — Rate is the same as last year ↓ Rate is lower than last year ✗ Count/Rate is higher than Target ✓ Count/Rate is at or below Target ⊗ Off-Track for MVI-Free Days ✓ On-Track for MVI-Free Days

SIF = Serious Injury or Fatality | DART = Days Away, Restricted, Transferred | LWD = Lost Work Day | Recordable = Work related injury beyond first aid | [S]PMVI = [Serious] Preventable Motor Vehicle Incident | CW = Coworker

Region 1 = North Coast | Region 2 = North Valley and Sierra | Region 3 = Bay Area | Region 4 = South Bay and Central Coast | Region 5 = Central Valley

* Active Outbreaks, Active Quarantines, Active Hospitalizations, and Covid-related Deaths are represented for PG&E employees only

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Public Safety and Operational Performance

METRICS	2021 EOY	2022 7/31/22 YTD	CHANGE	PERFORMANCE
Electric 911 Emergency Response (within 60 minutes)	97.18%	98.48%	↑	1st DECILE
Total Dig-Ins Reduction Rate	0.98	1.06	↑	1st QUARTILE
Gas Customer Emergency Response	20.6 minutes	19.8 minutes	↓	1st QUARTILE
Large Overpressure Events	5	5	⇆	0% CHANGE VS. 2021
Average Speed of Answer - Emergencies	8 seconds	7 seconds	↓	12.5% IMPROVEMENT VS. 2021
Safe Dam Operating Capacity (SDOC)	99.75%	96.93%	↓	2.82% CHANGE VS. 2021[1]
DCPP Reliability and Safety Indicator	92.5	92.5	⇆	3rd QUARTILE (Due to 2021 Unit 2 shutdown for repairs, YTD performance is 92.5)
Wire-Down Events due to Equipment Failure Rate	2.550	2.429	↓	4.7% CHANGE VS. 2021

Change vs. 2021

↑ **Higher** ↓ **Lower** ⇆ **No Change**

Improvement **Reduction** **Neutral**

[1]SDOC YoY results not comparable due to significant methodology change. Under new methodology, SDOC is green to target

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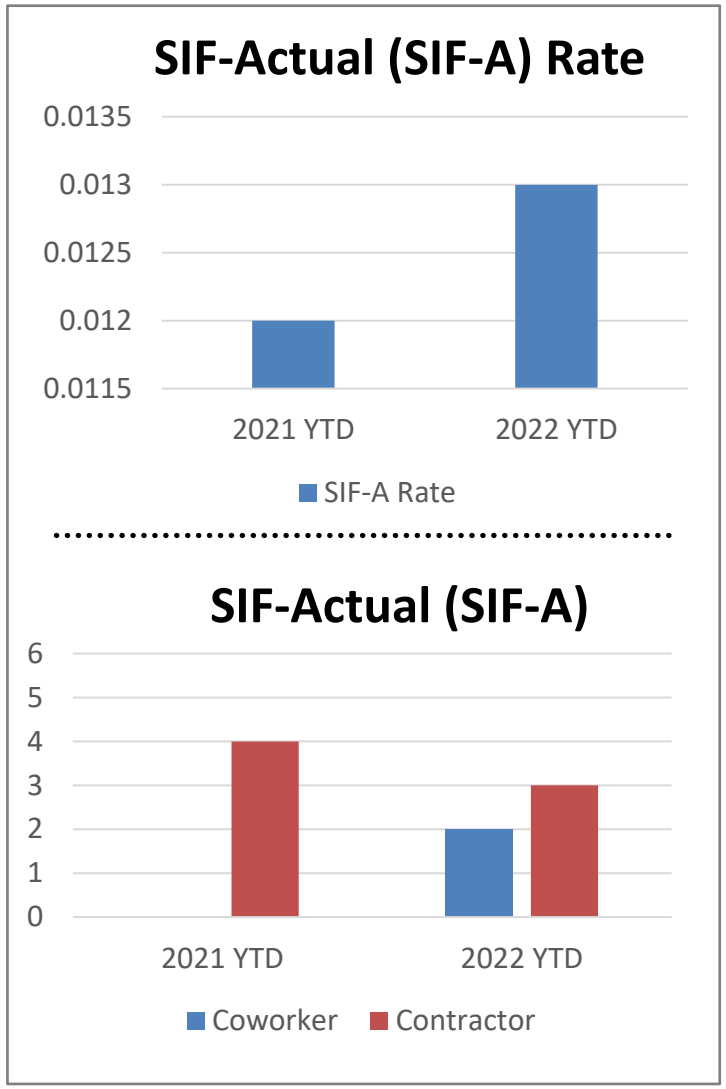
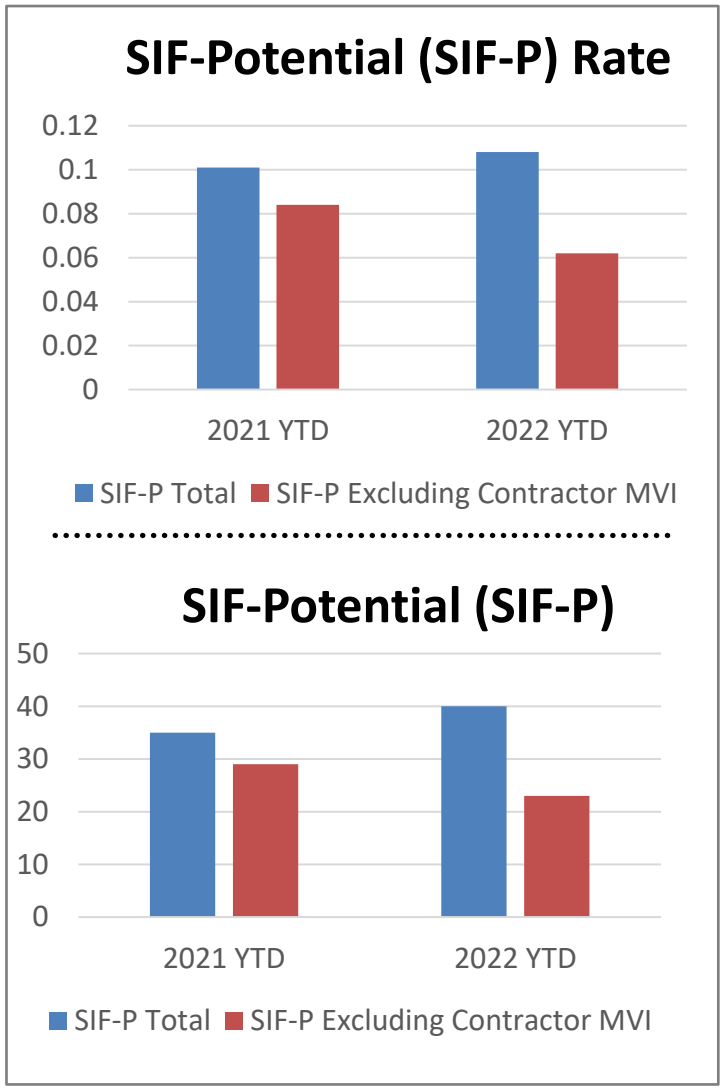
Workforce Safety

We are not satisfied with our SIF actual and potential performance and have more work to do.

We are focused on addressing the root causes and improving.

- **26% reduction** in SIF-P rate when excluding contractor motor vehicle incidents (MVI)*
- **7% increase** in coworker and contractor hours worked in 2022





*Contractor MVIs were not consistently included in SIF evaluations until 2022.

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Improving Our Safety Culture

We have transitioned to a primary focus on engineered controls and are driving additional efforts to improve workforce safety and enhance our culture.

Keys to Life

Ten principles to ensure the safety of our coworkers, our contractors and the public

Essential Controls

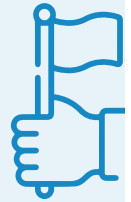
Technical safety standards all coworkers and contractors must adhere to while performing high-risk tasks

Skills and Knowledge

Assessing coworkers and contractors conducting the highest-risk work to ensure they have the skills and knowledge to work safely

Leadership Development Program

Building safety leadership skills and ensuring they are being demonstrated



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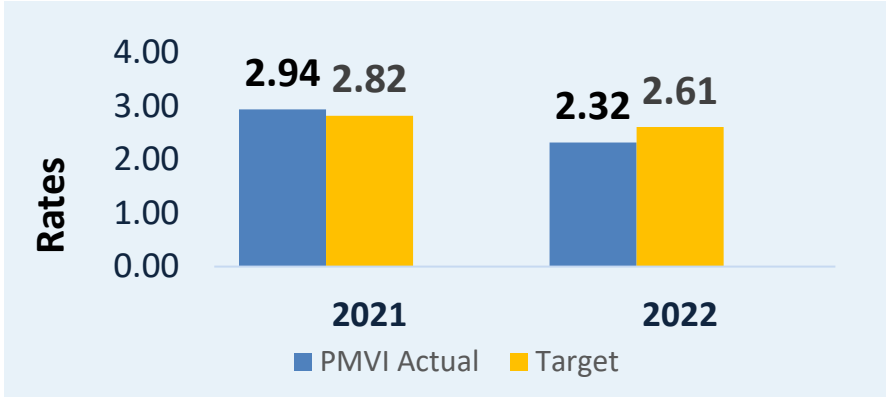
Safety Improvements

Safety actions have decreased preventable motor vehicle incidents, improved DART performance and increased our ability to identify and mitigate risk.

Preventable Motor Vehicle Incidents (PMVI)

▼ 21%
PMVI DECREASE

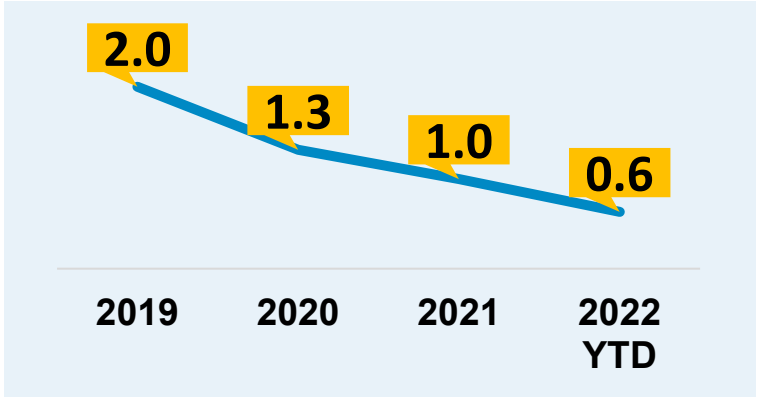
- ✓ Requiring contractors to complete rural driving safety training
- ✓ Utilizing certified trainers to provide refresher driving trainings
- ✓ Conducting a rollover common cause analysis



Days Away, Restricted or Transferred (DART)

▼ 68%
DART REDUCTION

- ✓ Using HUMANTECH technology to decrease the risk of injury



Before: Using a strap

Risk score: 41

After: Using new tool

Risk score: 17

Enhanced Risk-Modeling

- ✓ Using artificial intelligence to determine real-time risk exposure
- ✓ Helping us to deploy field safety personal and ensure safe work practices are being conducted

4.5 **times increase in high/life-threatening find rate**
Through pilot with our Vegetation Management Program

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Wildfire Safety

Progress on Wildfire Safety Efforts

	PROGRAM	COMPLETED THROUGH 2021	PLANNED IN 2022	COMPLETED IN 2022
Situational Awareness and Response	**Weather Stations** Better predicting and responding to severe weather threats	**1,313** Stations	**100** Stations	**67** Stations
	High-Definition Cameras Monitoring and responding to wildfires through increased visibility	**502** Cameras	**98** Cameras	**81** Cameras
Enhanced Powerline Safety Settings (EPSS)	**EPSS** Enhanced settings detect powerline faults and help prevent wildfires	**45%** HFRA Line Miles	**100%** HFRA Line Miles	**100%** HFRA Line Miles
Public Safety Power Shutoff (PSPS)	**Sectionalizing Devices and Transmission Switches** Separating the grid into smaller sections and narrowing PSPS scope	**1,209** Devices/Switches	**115** Devices/Switches	**130** Devices/Switches
	Temporary Distribution Microgrids Keeping customers energized during a Public Safety Power Shutoff	**8** Sites	**5** Sites	**13** Sites**
Wildfire Resilience Work	**Undergrounding Our Lines** Undergrounding powerlines to reduce wildfires caused by equipment	**120** Miles	**175** Miles	**88** Miles
	System Hardening Strengthening our electric system through overheard hardening, undergrounding and line removals	**741** Miles	**470** Miles	**342** Miles
	Enhanced Vegetation Management Addressing vegetation that poses a higher potential for wildfire risk	**6,359** Miles	**1,800** Miles	**1,276** Miles

Data is approximate and current as of 08/31/2022

*Planned for readiness by Oct. 1

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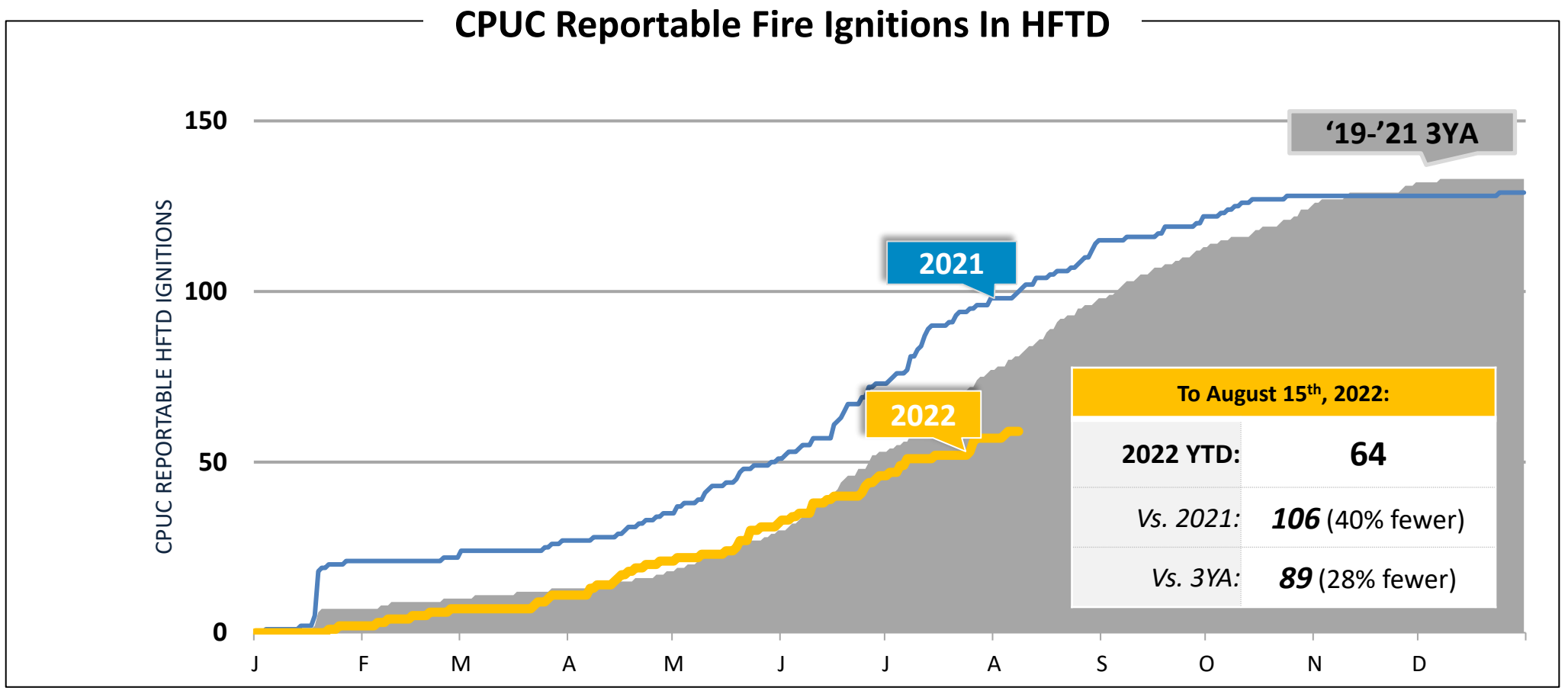
Reducing Ignitions

Our wildfire mitigation programs are reducing ignitions.



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Enhanced Powerline Safety Settings Year-To-Date Progress

Refined EPSS processes have led to shorter outages and a smaller impact than 2021.

CUSTOMERS PROTECTED **1.8M** Customers	**MILES PROTECTED** **100%** HFRA Miles	**CIRCUITS PROTECTED** **1,015** Circuits
AVG. OUTAGE LENGTH **~3 HRS** Average (55% better than 2021)	**CUSTOMERS ON AVG. IMPACTED PER OUTAGE** **~907** Customers	**UNIQUE CUSTOMERS IMPACTED** **622K** Customers

CUSTOMERS EXPERIENCING:

- 0 outages: **1.2M (66%)**
- 1 outage: **292K (16%)**
- 2-4 outages: **300K (16%)**
- 5 or more outages: **30K (2%)**

We are making operational improvements like adjusting device sensitivity and targeted vegetation management to improve reliability for customers

Data as of August 31, 2022

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Key 2022 WMP Revision Notice Responses

Focus of Grid Hardening Work

Increasing underground miles in top 20% of risk-ranked circuits

63%	90+%
in 2023	in 2024-2026

Addressing Asset Tag Backlog

Achieving residual risk from addressing asset tag backlog:

77%

residual risk reduction from open tags in HFRAs by 2025

Data is approximate and as of 9/8/2022.

Distribution-Level Ignitions

Reduced ignitions YTD in HFTD by:

28%	40%
vs. 3-year average	vs. 2021

Quality Assurance/ Control of Asset Inspections

Improvement vs. 2021

Distribution	Transmission
63%	**353%**
Pass Rates	**Pass Rates**
2021: **49%** / 2022: **79%**	2021: **18%** / 2022: **80%**

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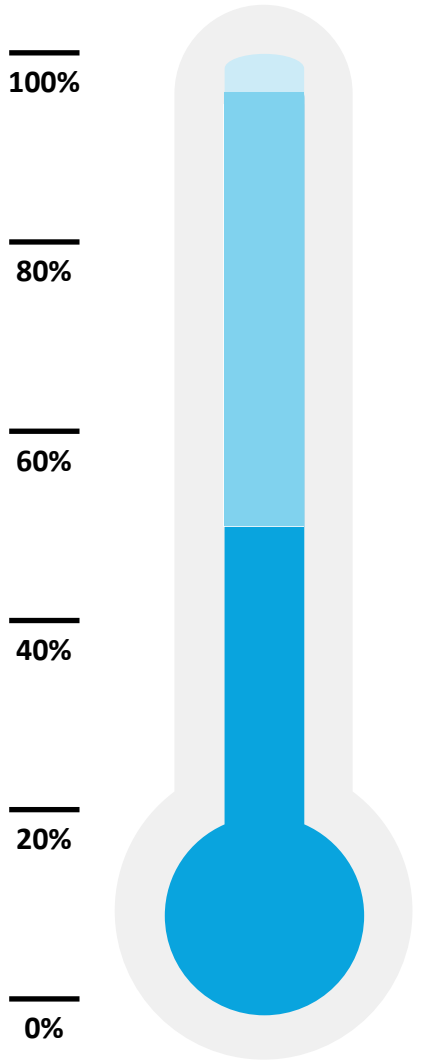
Undergrounding Program - Progress to Date

We are on track to underground at least **175 miles this year**, more than doubling the mileage that we completed last year.



5
MILES READY FOR CONSTRUCTION

105
MILES IN CONSTRUCTION

88
MILES COMPLETE
(50% of the 2022 goal)

Data is approximate and as of 08/14/22. Note the miles identified for 2022 exceed the 175-mile target to account for potential delays or changes due to scheduling, permitting, weather and other factors.

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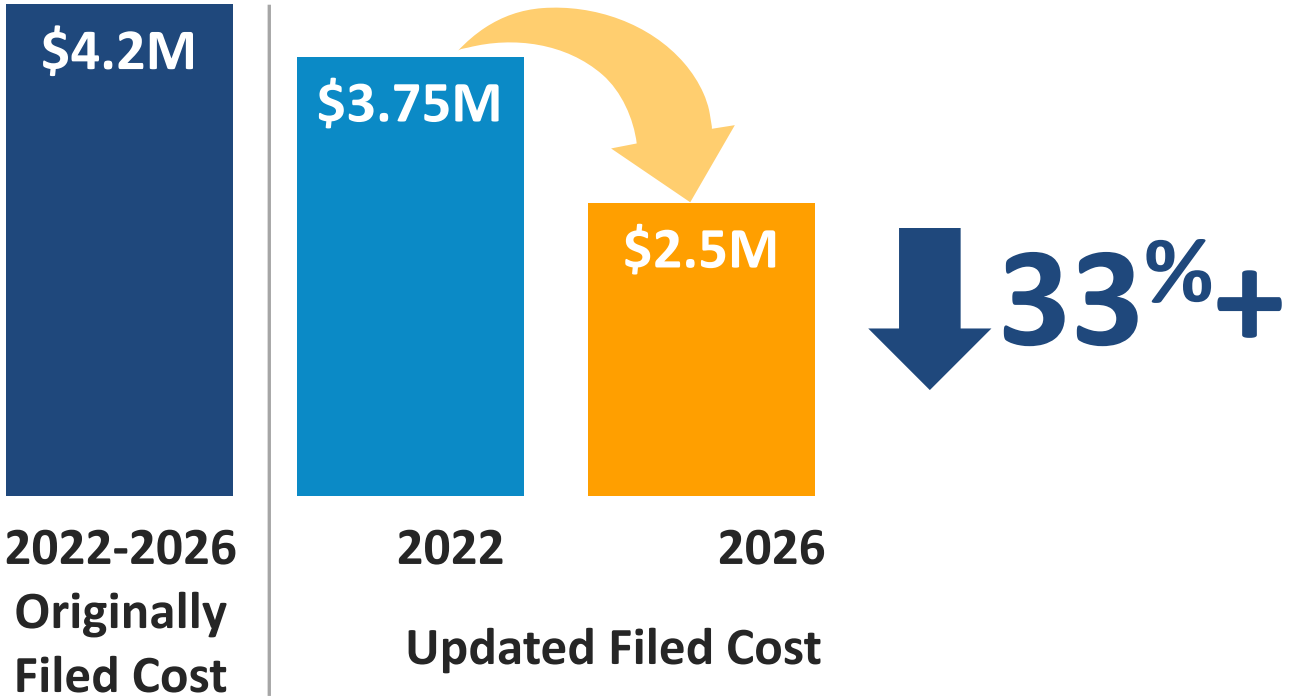
Reducing the Cost of Undergrounding

Undergrounding costs are expected to decrease as our scope ramps up.

Targeted Average Cost Per Mile



Unit Cost Reduction Strategies

- **Optimizing design and construction standards**
- **Deploying more efficient construction methods**
- **Strategically bundling and contracting work**
- **Improving soil management**
- **Growing the materials supply chain**

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Undergrounding is the Best Long-term Solution for Customers and Communities

Undergrounding Benefits:

- ✓ Greater wildfire risk reduction
- ✓ Reduces the need for safety outages
- ✓ Costs less than half
- ✓ Requires 50% fewer miles to be hardened

Undergrounding Plan | By The Numbers

70% **SUSTAINED HFTD RISK REDUCTION**

99% **RISK REDUCTION IN UNDERGROUNDED LOCATIONS** COMPARED TO **62%** REDUCTION FOR OVERHEAD HARDENING

$1.2B **EXPENSE REDUCTION IN EVM, EPSS AND OTHER O&M**

Impact on Homeowners' Insurance

Emerging Risks Group, Marsh Advisory

AN EXPECTED

$385.8M* **In annual premium savings** across homeowner policies in PG&E service areas post 10K undergrounding

*Controlling for expected housing value increase over the time period. Analysis was done using the analysis used industry-level losses

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Safety Culture

Progress on 2021 Safety Culture Assessment Recommendations

We are improving our safety culture based on recommendations from our assessment results.

Build Leadership Skills

- Leadership Development program
- Increased frequency of leaders in the field

Establish Governance Structure for 2025 Workforce Safety Strategy

- Combined safety and risk lines of business under Chief Safety and Risk Officer
- Safety progress and progress against plan reviewed with senior leadership team every week

Essential Controls

- Making progress on identifying and implementing required controls for high-risk tasks associated with Keys To Life

Improve Safety and Wildfire Information Flow and Tracking

- Deployed daily, weekly and monthly operating reviews
- Executed practical problem solving

Increase Assessment Engagement

- Providing work time for survey
- Implementing additional coworker communications and promotional events

Reduce Risk From Hostile Resident Interactions

- Assigning two full-time security personnel to crews, providing de-escalation training and improved tracking
- Reduced violent incidents in June to lowest amount YTD
- Successfully negotiated with previously hostile individuals to access 150+ properties

Refer to appendix slide 32 for detailed responses

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Incorporating Lessons Learned

Process Safety
- Focus on 5-year workforce strategy
- Keys to Life
- Essential controls

Safety Culture
- Leadership Development Program
- 5-year workforce strategy elements

Engineering Controls for Incident Investigations
- Developed and implementing quality measurement process for corrective actions

Ignition Investigations Process
- Stood up cross-functional team for review, containment and countermeasures

Residual Ignition Risk
- Leveraging innovative and existing technologies to address residual risk

Validating Contractor Skills
- Piloting knowledge skills assessment for vegetation management contractors

EPSS Enablement
- Expanded criteria and enablement based on 2021 lessons learned

Refer to appendix slide 33 for detailed actions

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Appendix

Protecting People, Assets and Facilities

Our Corporate Security team is making improvements to live our stand that everyone and everything is always safe.

Focusing on Key Priorities

Putting people first

- Enhancing employee awareness, training and field safety protocols
- Increasing focus on emergency response
- Further integrating with our regional service model

Proactive vs. Reactive Posture

- Standing up our Fusion Center and Insider Threat Program
- Implementing security defined protection levels
- Scaling up our Compliance Program

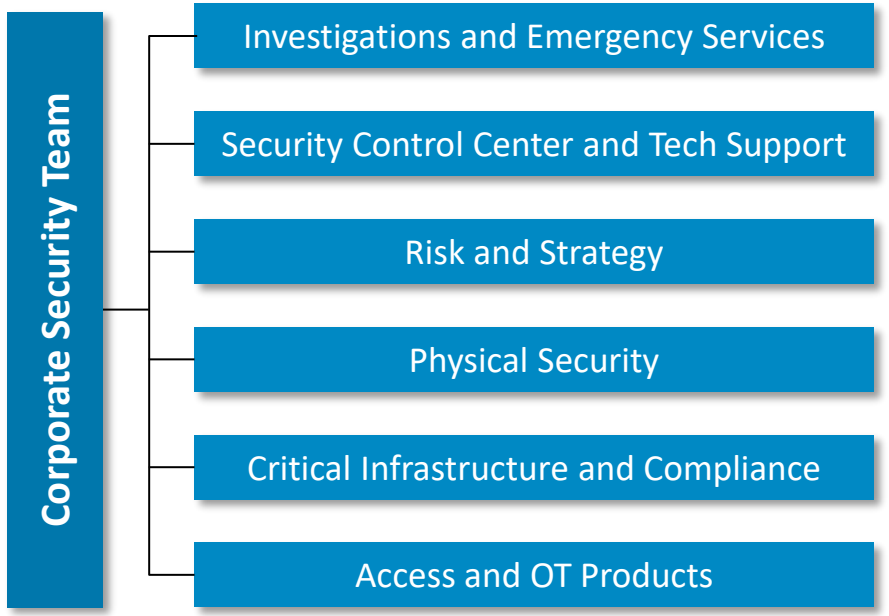
Pivoting to Technology

- Enhancing and modernizing our detection, transactional technology and Security Control Center

Reinforcing High-Risk Assets

- Ground-based radar
- Video analytics
- Pre-case concrete walls
- Gunshot detection
- Improved alarm monitoring
- Smart Key Program
- Specialized staff training
- Enhanced penetration testing

Enhancing Our Structure



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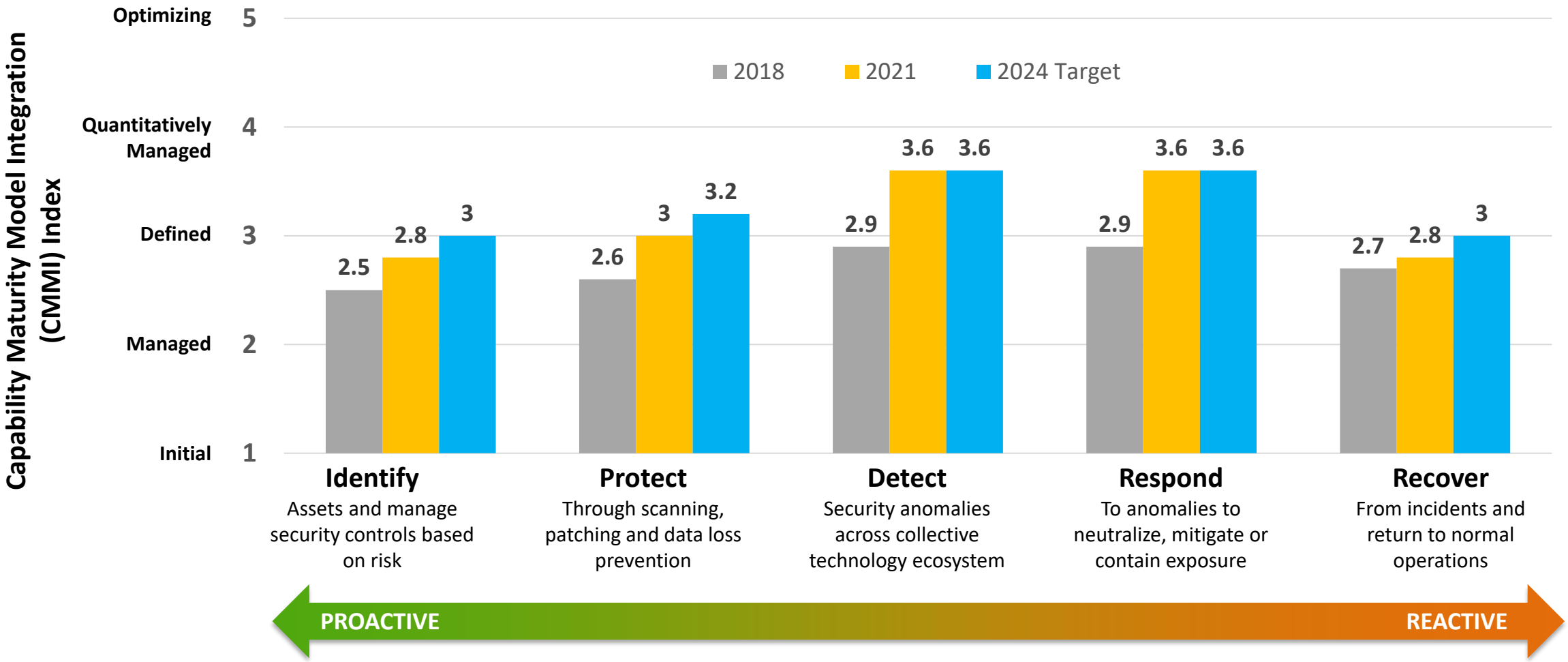
Improving Our Cybersecurity Program

Our cybersecurity team is making measurable changes in key metrics to drive increased security.



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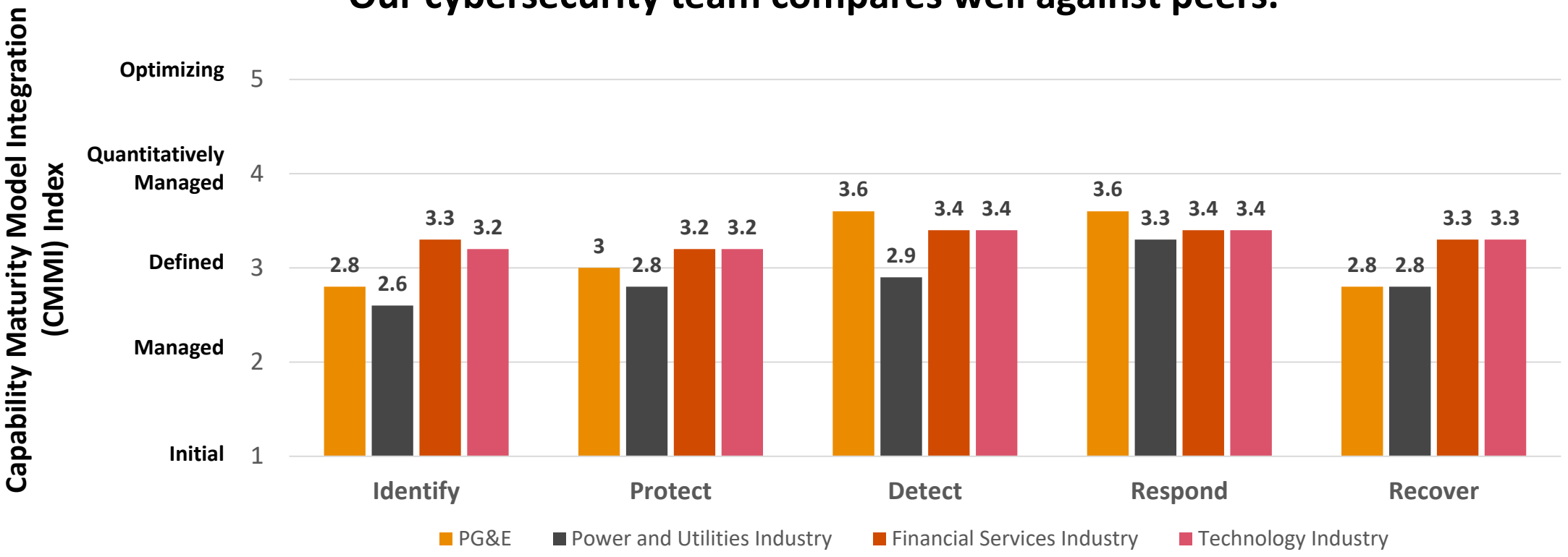
Cybersecurity Maturity Benchmarking

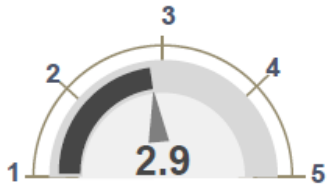
Our cybersecurity team compares well against peers.



Maturity Benchmarks

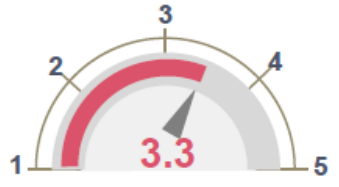
PG&E outperforms the utility average and aligns with financial services and technology industry averages

PG&E



Power & Utilities Industry Benchmark

Financial Services Industry Benchmark



Technology Industry Benchmark

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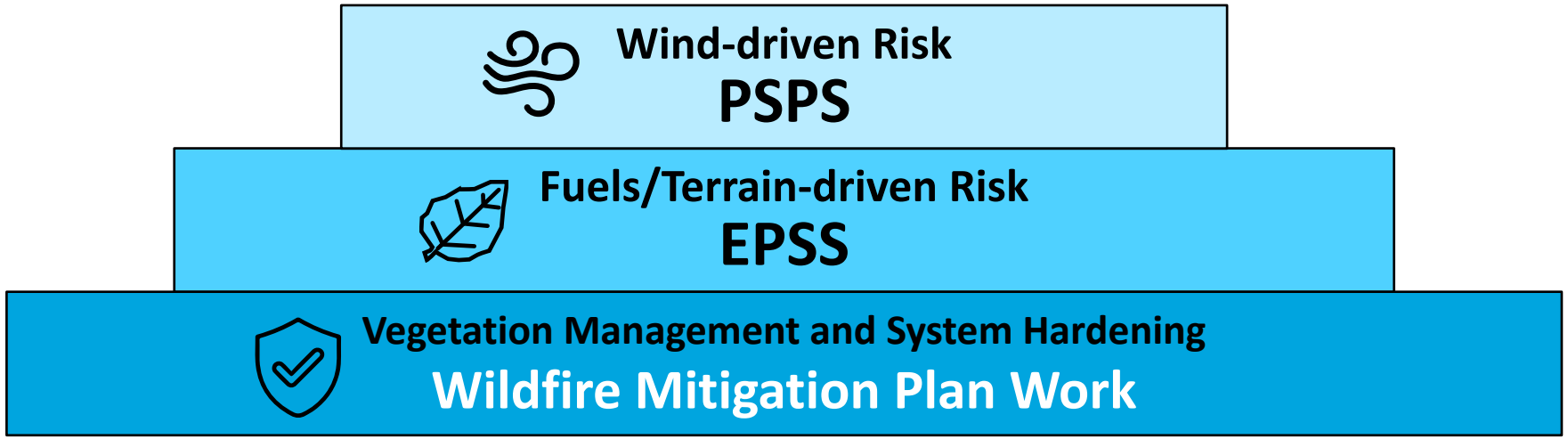
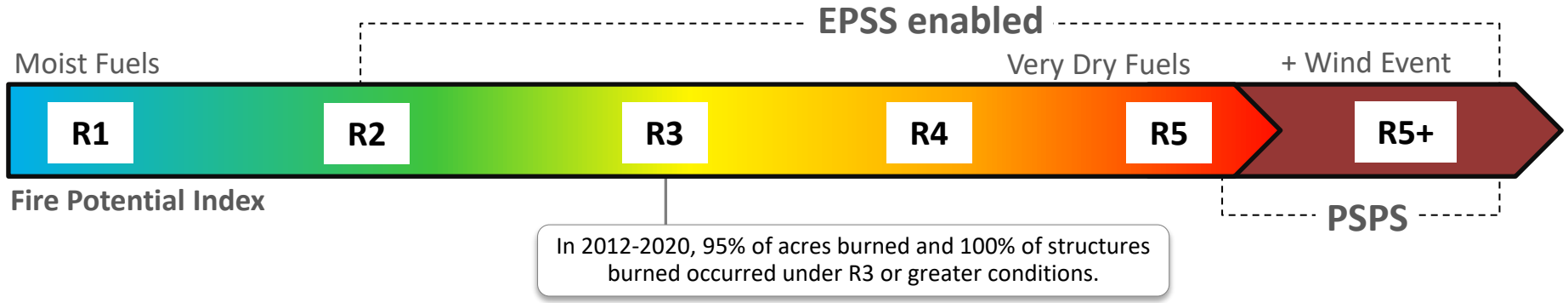
Sources: PwC's 2019 Digital Trust Insights (DTI) Survey and cybersecurity maturity assessments conducted by PwC between 2018 through January 2021.

An Adaptive, Systematic, Risk Mitigation Approach…

PG&E has continued to adapt to California's changing wildfire risk profile.



EPSS and PSPS address a significant portion of the wildfire risk



…Layers of Protection

SmartMeter Detection of Low/Very Low Current Faults

To help identify low and very low current faults in our system (which can “look like” a minor increase in load on a circuit), we are leveraging our SmartMeter network to determine when the lines serving a particular area may be experiencing these conditions and need to be de-energized for safety.

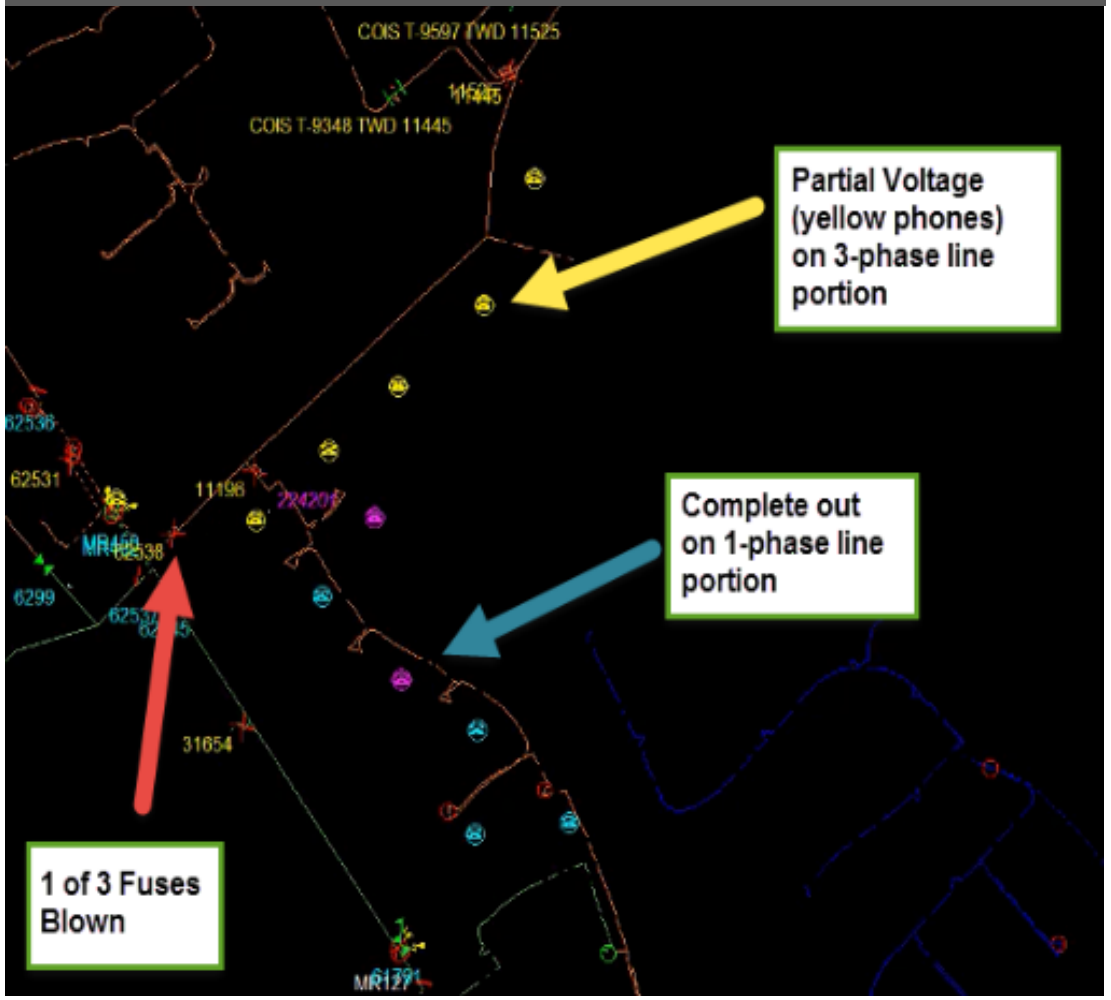
This is called a Partial Voltage Force Out.

We have enabled this capability on all EPSS devices in High Fire Risk Areas.

2022 YTD PV Force Outs Since 6/15/22	Identified Field Hazards
25 Outages	**9** Hazards

Data YTD through 9/5/22 as of 9/6/22.

EXAMPLE SMARTMETER VISUALIZATION



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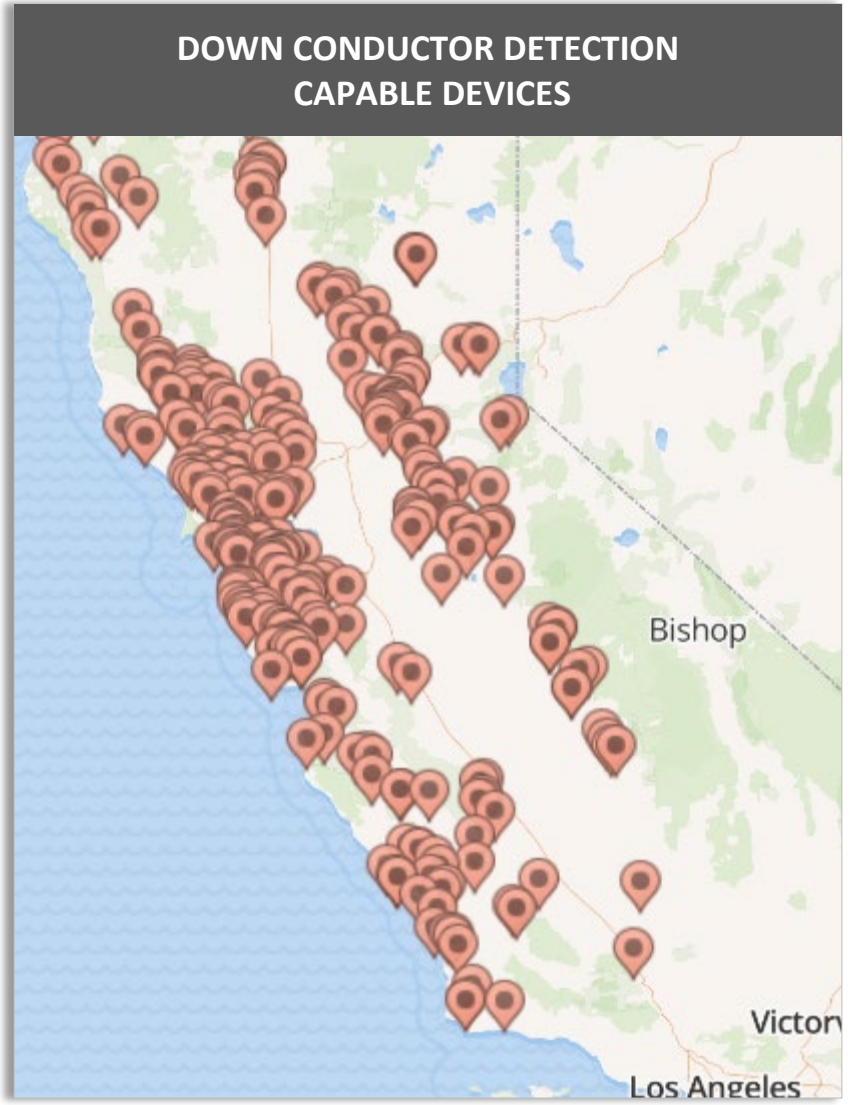
Down Conductor Technology

Another recent EPSS update includes piloting "Down Conductor Detection" on some reclosing devices across our system.

This feature:

- Uses a sophisticated analysis to determine when low and very low current faults are present (which "look like" high impedance faults).
- De-energizes reclosers immediately.
- Has already proven to be successful in detecting previously undetectable faults.

2022 Scope	YTD Complete
~330 Devices	229 Locations



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10k Undergrounding Plan Summary

Why Is Undergrounding The Best Mitigation?

- ✓ **Improves safety and reduces catastrophic fire risk:** Undergrounding provides a 99% reduction in expected wildfire liability.
- ✓ **Saves customers money and achieves a far better outcome:** Financial analysis shows that undergrounding is most cost-effective solution, equating to less customer spend than a risk-equivalent overhead program.
- ✓ **Ensures a more resilient and reliable grid:** Undergrounding can improve reliability by lessening the need for PSPS/EPSS. Buried power lines also are protected from common causes of outages, such as heavy winds and snow.
- ✓ **A one-time, permanent solution:** Unlike vegetation management—which must be done each year at cost and can mitigate but not eliminate risk—undergrounding is a one-time investment that dramatically reduces the risk of wildfires for decades.
- ✓ **Helps the Environment:** Avoiding wildfires would result in significant decrease in California emissions. In 2020, emissions from wildfires totaled more than any other economic sector except for transportation.

PG&E'S 10k Undergrounding Plan
By The Numbers

10,000	**Cumulative miles Undergrounded 2021-2031**
70%	**Sustained HFTD Risk Reduction by 2031**
$1.2B	**Expense reductions in EVM, EPSS, and other O&M 2022-2031**

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Gathering Feedback to Improve Our Safety Culture

We conduct a management safety self-assessment and a coworker assessment survey to gather feedback, lessons learned and areas for improvement.

Management Self-Assessment

- Conducted in partnership with OEIS and the National Safety Council
- Consists of 22 questions around the status of our safety culture, future status and justification for responses
- A summary plan is prepared to outline actions to achieve 2023 targets

Coworker Assessment Survey

- Provided to all coworkers and contractors
- We have made process and communications improvements to promote increased participation

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

Progress on 2021 Safety Culture Assessment Recommendations

Recommendation	Actions taken	Results
Build leadership skills and ensure regular demonstration	▪ Establishing a Leadership Development program ▪ Implemented Monday for leaders in the field	▪ Increased frequency of leaders in the field
Establish a governance structure to ensure effective implementation and tracking of the 2025 Workforce Safety Strategy	▪ Combined Safety and Risk lines of business under a single Chief Safety and Risk Officer ▪ Refreshed Workforce Safety Strategy to align with our Safety Excellence Management System ▪ Added components of the Workforce Safety Strategy to the 2022 Tactical Implementation Plan	▪ Establishing catch-back plans for off-track milestones
Execute the 2025 Workforce Safety Strategy with active leadership by senior executives	▪ Posting 2022 Tactical Implementation Plans in the Central Command Center and covering during the Safety Weekly Operating Review with the Senior Leadership Team	▪ Increased visibility in to progress against plan during weekly operating reviews
Leverage the new safety management system to improve the flow of information and track wildfire concerns	▪ Deployed operating reviews enterprise-wide ▪ Ensuring CAP is the mechanism to enter issues ▪ Executed Practical Problem Solving to improve communication of potential and actual serious injuries and fatalities enterprise-wide	▪ Sharing initial and final SIF communication enterprise-wide, detailing containment actions and countermeasures ▪ Including SIF incidents in safety message during daily operating reviews
Increase engagement on the safety culture assessment	▪ Sending communications plan two weeks in advance of survey start date ▪ Providing time during workday for coworkers to complete survey ▪ Hosting events in each region to promote survey participation ▪ Assigning PG&E liaison as the single point of contact for each contractor ▪ Sending communication through ISN as a direct message from PG&E with read receipts	▪ Hosted informational sessions for all supervisors and contractors involved in the assessment
Mitigate the risk posed by interactions with discontented members of the public	▪ Assigning two full-time corporate security personnel to wildfire response/vegetation management crews ▪ Providing de-escalation training and a video to coworkers in the field ▪ Assigning a full-time corporate security program manger to track and monitor hostile customer and external threats ▪ Inputting hostile customer information into multiple database systems for use by coworkers prior to accessing property of a potential hostile customer ▪ Responding to known hazard locations with field staff to de-escalate before an incident occurs, when necessary	▪ Reduction in customer to employee violent incidents in June compared to the YTD average ▪ Successfully negotiated with previously hostile customers to safely access over 150 properties between June and December of last year

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Incorporating Lessons Learned

We continue to take action to incorporate lessons learned from last year to improve our safety culture.

Major Themes and Lessons Learned	Actions Taken
Greater focus on process safety	▪ Added elements to the 5-year workforce strategy for Keys to Life and associated essential controls
Greater focus on culture	▪ Added elements to the 5-year workforce strategy for Safety Recognition and a broader Leadership Development Program
Outcome of incident investigations should focus on engineering controls	▪ Developed and implementing new metric to measure quality of corrective actions resulting from investigations
Need for robust ignition investigation process	▪ Assigned dedicated cross-functional team to review extent of condition, containment and countermeasures on an accelerated timeline
Need to address residual risk not captured by EPSS, PSPS and resiliency programs and high impedance faults not detected by EPSS	▪ Designed settings for our EPSS program and performed ignition testing through recreating actual field conditions with energized power lines ▪ Identified an opportunity to leverage over 550,000 Smart Meters throughout our high fire risk service area and used Partial Voltage detection to drive further risk reduction for low-current faults that may not be detected by EPSS ▪ Operationalizing down conductor detection via hardware technology and sensitive ground fault algorithms
Additional controls required to validate contractor skills to perform high-risk tasks	▪ Piloted Knowledge Skills Assessment for Vegetation Management contractors
EPSS enablement criteria has evolved based on lessons learned from our 2021 pilot program and recent ignition incidents across California in 2022	▪ Expanded our EPSS criteria to include R1 and R2 conditions in response to actual wildfire events that occurred in CA ▪ Enabling EPSS on all circuits in HFRAs during Summer and Fall when elevated fire risk is present except during select conditions of low fire risk potential

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