PACIFIC GAS AND ELECTRIC COMPANY
2023-2025 WILDFIRE MITIGATION PLAN
EXECUTIVE SUMMARY

1. Executive Summary

In the opening section of the WMP, the electrical corporation must provide an executive summary that is no longer than 10 pages.

The electrical corporation must provide a brief overview of its progress in achieving the goals, objectives, and targets specified in the previous WMP submissions. The overview must discuss areas of success, areas for improvement, and any major lessons learned.

The electrical corporation must summarize the primary goal, plan objectives, and framework for the development of the WMP for the 3-year cycle. The electrical corporation may use a combination of brief narratives and bulleted lists.

Introduction

Our stand is that catastrophic wildfires shall stop. In 2022, Pacific Gas and Electric Company (PG&E) continued to reduce wildfire ignition risk through our 2022 Wildfire Mitigation Plan (WMP) initiatives, such as Enhanced Powerline Safety Settings (EPSS) and undergrounding. We also reduced the customer impacts of programs such as EPSS. Our 2023 WMP builds on the work we have done to reduce wildfire risk by incorporating more mitigation work that targets the highest risk -informed areas of our system using existing mitigations measures and innovative technologies. Our plan also includes more community engagement opportunities that will facilitate reducing community impacts from mitigation work and safety outages.

Over the last several years, we have developed an integrated strategy to manage and reduce ignition risk. First, we have deployed a suite of Comprehensive Monitoring and Data Collection programs, such as wildfire cameras and asset inspections designed to provide insight into changing environmental hazards around our assets. These programs provide continuous monitoring capability that we use to decide what mitigations to deploy and where and when to deploy them.

Second, our integrated strategy also includes Operational Mitigations—like EPSS and Downed Conductor Detection—that provide on-going risk reduction and influence how we manage the environment around the electric grid. Operational mitigations also include initiatives we undertake to support customers before, during, and after wildfire events.

Third, we are deploying System Resilience mitigations such as our 10,000-mile distribution undergrounding program and our transmission line removal work to reduce ignition risk by changing how our grid is constructed and operated.

Finally, in addition to our mitigation initiatives, we regularly engage with our customers and communities to address issues related to wildfire preparation, ongoing safety work, and other public safety and preparedness issues.

Our strategies and programs are working. As we explain more below, in 2022, we significantly reduced California Public Utilities Commission (CPUC)-reportable ignitions in the High Fire Threat Districts (HFTD) and High Fire Risk Areas (HFRA) throughout our service area. We plan to continue these efforts in 2023 through EPSS, our undergrounding program, integrating more sophisticated risk-informed decision making into our risk management and mitigation planning, addressing vegetation risk on a more efficient, risk-informed basis, and ensuring that our public safety partners and customers are well prepared for Public Safety Power Shutoff (PSPS) events.

Our 2023 WMP reflects feedback from stakeholders including our customers, public safety partners, the Office of Energy Infrastructure Safety (Energy Safety), the CPUC, the Independent Safety Monitor, the Governor's Operational Observer, Community-Based Organizations, and the communities they serve, tribal governments, municipalities, and other engaged stakeholders.

Reducing Ignitions in the HFTD and HFRA

In 2022, our expanded EPSS Program significantly increased customer protection from wildfire ignitions. After launching as a pilot in 2021, the 2022 EPSS Program expanded substantially, protecting customers served by more than 44,000-line miles, including all high fire-risk areas.

The 2022 EPSS Program resulted in fewer CPUC-reportable ignitions and a reduction in acres impacted. We saw a **68 percent reduction** in reportable ignitions on primary distribution conductor when enabled, weather normalized, and a **99 percent reduction** in acres impacted compared to a 2018-2020 3-year average. Moreover, the average duration of an EPSS outage in 2022 was **56 percent less** than the average duration in 2021. In addition to EPSS, we are implementing other mitigations that we expect to result in reduced ignitions in HFTD and HFRA areas. For example, we are continuing to remove non-exempt equipment and expulsion fuses, installing additional covered conductor, installing system automation devices such as fuse savers, deploying remote grids, and installing break-away connectors. As we implement these mitigation measures in 2023, we expect to maintain the 2022 reductions in CPUC-reportable ignitions and to further reduce wildfire risk.

Aggressively Reducing Wildfire Risk in the HFTD and HFRA Through Undergrounding

In July 2021, we announced our multi-year 10,000-mile undergrounding program. Since that time, we have been putting in place the processes, tools, and team we need to execute this ambitious program. We saw the benefits of this effort in 2022 when we undergrounded approximately 180 miles, approximately **146 percent more** than the 73 miles undergrounded in 2021.

We will continue to build on this progress during the WMP cycle by undergrounding 2,100 miles of distribution lines in the HFTD from 2023 to 2026, effectively eliminating the ignition risk for overhead lines in those areas.

In this WMP, we are reducing the number of 2023-2026 undergrounding miles we had forecasted in the 2022 WMP. The current multi-year plan is consistent with our commitment to efficiently implement undergrounding. The reduced pace will decrease costs in the program's initial years and balance PG&E's planned work scope with meaningful risk reduction in the highest wildfire risk areas.

Between 2023 and 2026, **87 percent** of PG&E's undergrounding work is planned for the top 20 percent of risk-ranked circuit segments, as identified by our risk models.

Integrating More Sophisticated Risk-Informed Decision-Making into Our Risk Management and Mitigation Planning

In 2022, we updated our Wildfire Distribution Risk Model (WDRM) to WDRM version 3 (WDRM v3) and introduced version 1 of our Wildfire Transmission Risk Model (WTRM).

Our updated WDRM provides predictions of the where, why, and how much wildfire risk occurs during a typical wildfire season. The WDRM v3 quantifies risk for additional risk drivers compared to the previous version (WDRM version 2) and incorporates several improvements. The WDRM v3:

- Expands the machine learning to predict ignitions in the HFTD;
- Differentiates risk by location and/or individual assets so that we can prioritize higher-risk areas;
- Helps us understand the factors contributing to risk by modeling relationships among risk, environmental characteristics, and asset characteristics;
- Improves the consequence portion of the model; and
- Estimates where specific mitigations are likely to be most effective.

The 2023 WMP reflects the benefits of our improved risk modeling. We are using the outputs from the WDRM v3 to inform our risk-prioritized workplans for system hardening, Vegetation Management (VM) work, inspections, and maintenance activities. In addition, we are using the WTRM to inform our risk-prioritized workplans for certain types of inspections. In this way, we target work and programs that will provide the greatest risk reduction for our customers.

Addressing Vegetation Risk More Efficiently Through New Risk-Informed Mitigation Initiatives

In 2023, we are restructuring our VM Program based on a risk-informed approach. Recent data and analysis demonstrate that the Enhanced Vegetation Management (EVM) Program risk reduction is less than EPSS and additional Operational Mitigations such as Partial Voltage Detection capabilities. As a result, we transitioned the EVM Program to three new risk-informed VM programs.

- Focused Tree Inspections: We developed specific areas of focus (referred to as Areas of Concern (AOC)), primarily in the HFRA, where we will concentrate our efforts to inspect and address high-risk locations, such as those that have experienced higher volumes of vegetation damage during PSPS events, outages, and/or ignitions.

- VM for Operational Mitigations: This program is intended to help reduce outages and potential ignitions using a risk informed, targeted plan to mitigate potential vegetation contacts based on historic vegetation caused outages on EPSS-enabled circuits. We will initially focus on mitigating potential vegetation contacts in circuit protection zones that have experienced vegetation caused outages. Scope of work will be developed by using EPSS and historical outage data and vegetation failure from the WDRM v3 risk model. Vegetation outage extent of condition inspections conducted on EPSS-enabled devices may generate additional tree work.

- Tree Removal Inventory: This is a long-term program intended to systematically work down trees that were previously identified through EVM inspections. We will develop annual risk-ranked work plans and mitigate the highest risk-ranked areas first and will continue monitor the condition of these trees through our established inspection programs.

Preparing for and Improving Our Response to PSPS Events

In 2022, we successfully executed annual PSPS drills and Full-Scale Exercise (FSE) with our external partners. During the FSE, we simulated a PSPS event to test our PSPS processes and tools, and to train our emergency response team members who are responsible for responding to a PSPS event. As we explain in more detail in Section 10, we are using the lessons learned from the FSE to further improve our PSPS Program.

1.1 Summary of the 2020-2022 WMP Cycle

Consistent with California Law, we made substantial progress during the 2020-2022 WMP cycle constructing, maintaining, and operating our electrical lines and equipment in a manner to minimize the risk of catastrophic wildfires. Significant achievements include:

- Improving the models that we rely on to risk-inform our mitigation portfolio;

- Increasing our situational awareness;

- Adapting to changing climate conditions with new programs and mitigations;

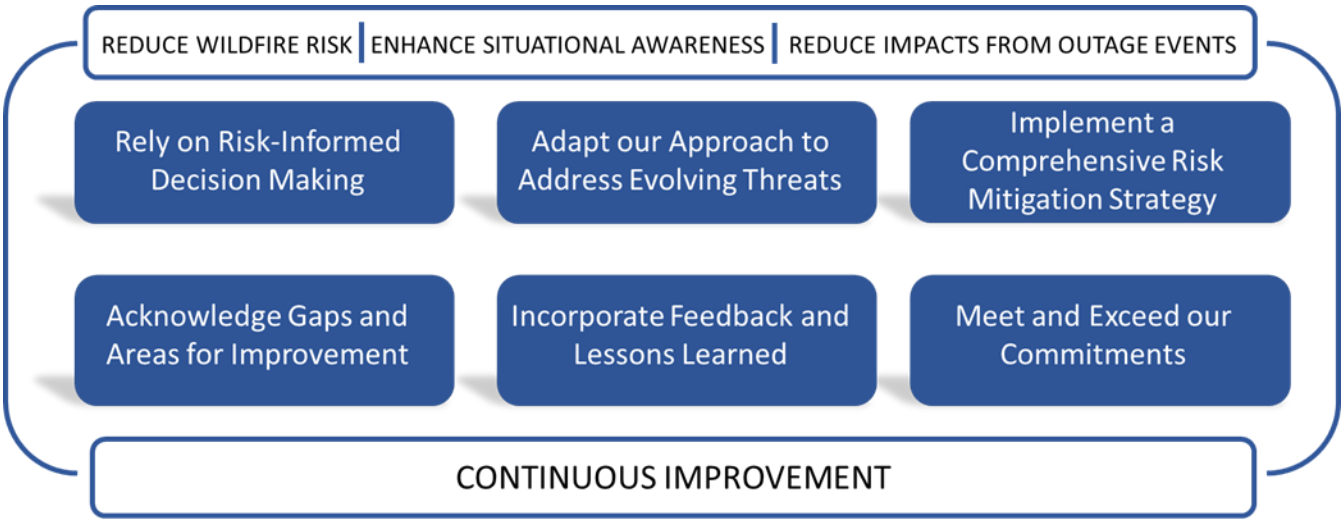
- Implementing mitigation measures that reduced the potential for a wildfire ignition;

- Adopting EPSS throughout our HFTD and HFRA areas and improving response times to outages; and

- Improving reliability and customer and community impacts by significantly reducing the scope of PSPS outages.

Even with the progress we have made, we know that have more work to do. Figure PG&E-1.1-1 summarizes our 2020-2022 WMP objectives and the components of our risk mitigation strategy

FIGURE PG&E-1.1-1:
PG&E'S 2020-2022 WMP OVERALL OBJECTIVES AND RISK MITIGATION STRATEGY COMPONENTS



Below, we describe each of the components of our 2020-2022 WMP strategy.

Rely on Risk-Informed Decision Making

During the 2020-2022 WMP cycle, we significantly advanced our risk modeling capabilities for informing work plans and mitigation initiative selections. Starting in 2019 with the WDRM version 1 (v1) we derived ignition probability from outage and ignition data using a logistical regression model. Wildfire consequence predictions came from fire modeling software. The WDRM v1 supported mitigation work conducted from 2019 to 2021.

WDRM (v2) took a significant step forward by using more advanced modeling, examining more sub-drivers with regards to ignitions, and using PG&E's Multi-Attribute Value Function to predict wildfire consequences. WDRM v2 also used more sophisticated algorithms, machine learning, and physics-based fire simulation outputs mapped into fire size/severity tranches to quantify wildfire consequence. WDRM v2 supported emergent mitigation work in 2021 and 2022 planned work.

WDRM v3 made improvements based on discussions with Energy Safety and review and feedback from internal and external experts. WDRM v3 uses more-advanced

machine-learning modeling techniques, incorporates improved and updated data, adds predictions of wildfire risk reduction when mitigating various sources of risk, and expands to understand additional ignition sources and sub-drivers. WDRM v3 also includes “causal pathways” to ignitions, allowing for the nature of these causes to inform the type of model structure and relevant covariates. The WDRM v3 supports 2023 emergent work and our 2024-2026 planned work.

In 2022, we expanded our risk modeling capabilities by also introducing our first WTRM.

Adapt our Approach to Address Evolving Threats

We continually evaluate our wildfire mitigation approach to adapt to evolving wildfire threats. Since submitting our 2020 WMP, we have introduced new mitigations to better address and mitigate ignition risk and retired others that were no longer as effective.

In 2019, PSPS was our best response to protect the public when weather or other circumstances threatened our ability to provide electricity safely. However, while extremely effective at reducing wildfire risk, PSPS outages are disruptive. In 2020, we implemented PSPS impact initiatives such as transmission and distribution line sectionalizing and improved granularity in meteorological guidance tools. In 2021, we targeted mitigations to those locations that were most likely to be impacted by PSPS. The total customers impacted decreased by approximately **67 percent** from 2019 to 2021 and the total customer minutes of interruption decreased by approximately **97 percent** during this period.

As another example of our adaptive approach, in 2021, we implemented an EPSS pilot program that resulted in a significant reduction in ignitions. Given the success of the pilot, we fully operationalized the program in 2022. We made more than 44,000-line miles—including all high fire-risk areas—EPSS-capable, and we saw a dramatic **36 percent** reduction in CPUC-reportable ignitions in the HFTD, compared to the 2018-2020 3-year average. At the same time, average outage times and the number of customers affected per outage fell significantly from 2021.

Implement a Comprehensive Mitigation Strategy

Throughout the 2020-2022 WMP cycle, we presented a comprehensive mitigation strategy focused on addressing the greatest threats to both our system and our customers. We have relied on our increasingly sophisticated risk-modeling and tools to identify the locations where specific failures can lead to ignitions that have the highest consequences. Leveraging our risk analysis and governance processes, we developed a balanced portfolio of mitigation initiatives designed to address key risk drivers in the highest risk locations.

We also implemented programs such as undergrounding, system hardening, EVM, PSPS, and EPSS. Along with these foundational programs we built out our mitigation portfolio to improve our situational awareness capabilities, developed risk-based distribution, transmission, and substation inspection and maintenance programs. We also introduced new programs based on innovative technologies such as Supervisory

Control and Data Acquisition (SCADA)-enabled automated sectionalizing devices and SmartMeter™ Partial Voltage Detection.

Acknowledge Gaps and Areas for Improvement

In 2020, we acknowledged shortcomings in several programs where improvement was needed. The feedback we received from Energy Safety and other stakeholders was helpful in shaping our 2021 WMP.

In 2021, we submitted notices to the CPUC regarding self-identified issues. These notices included gaps for enhanced inspections of hydroelectric substations, enhanced inspections for electric distribution poles, and accounting for the number of weather stations and high-definition cameras. We addressed these self-identified issues by instituting corrective action programs, implementing better controls, strengthening our asset registry, and instituting standardized counting procedures.

In 2022, we developed a plan to address our maintenance tag backlog for transmission and distribution facilities in the HFTD and HFRA areas. We are focused on completing the ignition-risk tags in the HFRA and HFTD areas and bundling other open notifications to efficiently address our gap in maintenance tag resolution.

Incorporate Feedback and Lessons Learned

Our WMPs incorporate feedback and lessons learned from the prior year. For example, in 2020, we recognized EVM was not aligned with our risk prioritization model. While not intentional, it reflected gaps in our processes. In 2021, we improved our process by updating our risk model, targeting EVM on the highest risk circuit segments, and implementing new governance procedures overseen by our Wildfire Risk Governance Steering Committee. In 2022, we completed 99.5 percent of our EVM work in the 20 percent highest risk-ranked circuits in the HFTD.

The lessons learned in 2021 involved three key themes: continued safety focus; coordination and knowledge sharing; and refining focus areas to our most effective core programs. We incorporated these lessons learned into our 2022 WMP.

Meet and Exceed our Commitments

Our 2020 WMP included 134 initiatives meant to reduce wildfire ignition potential, fire spread, and the impact of PSPS events. By the end of the year, we had successfully met over 90 percent of the initiative targets.[1] Despite the significant progress made during 2020, Energy Safety issued a Draft Annual Report on Compliance (ARC) for our

[1] The methodology for this calculation is discussed in PG&E's Comments on the Draft Annual Report on Compliance Regarding the 2020 Wildfire Mitigation Plan (Dec. 7, 2022), Docket #2020-ARC.

2020 WMP which found that PG&E did not substantially comply with the plan.[2] On December 27, 2022, we responded to Energy Safety that we strongly disagreed with this finding and urged that the Draft ARC be revised to indicate that PG&E substantially complied with the 2020 WMP.[3]

Our 2021 WMP included 53 commitments focused on wildfire mitigation activities such as risk modeling, system hardening, EVM, PSPS, and situational awareness. We completed all the commitments by year end 2021 and exceeded unit targets in several cases.

We identified 54 targets in our 2022 WMP and met or exceeded 52 of them. The two targets we did not meet in 2022 were associated with open distribution maintenance tags and VM quality audits and reviews. While we were unable to close out as many lower risk E tags as anticipated, this was a result of emerging higher-risk A and B tags that were given priority. For VM, we completed all necessary audits and reviews contemplated in our target, but not all audits and reviews met the target of 95 percent Acceptable Quality Level. This occurred in part because the target was set in July at the request of Energy Safety after many of the audits and reviews had been performed. We are incorporating lessons learned from these two missed targets in our 2023 WMP.

Table PG&E-1.1-1, presented in Appendix F due to space limitations, lists the 42 quantitative targets that carried through the 2020-2022 WMP cycle and our progress against them.

1.2 Summary of the 2023-2025 Base WMP

Our primary goals for the 2023-2025 Base WMP are to:

- Construct, maintain, and operate our electrical lines and equipment in a manner that will minimize the risk of catastrophic wildfire posed by them;
- Thoroughly assess our wildfire risk, develop a comprehensive strategy to reduce ignitions, and ensure the reliability of the electric systems;
- Implement mitigations designed to minimize the likelihood of catastrophic wildfires; and
- Implement programs to limit customer disruption from our wildfire mitigation efforts.

PG&E's objectives over the 2023-2025 WMP cycle are to use risk-informed decision-making to minimize ignition risk and outage impacts. We have developed a balanced portfolio of mitigations centered around comprehensive monitoring and data

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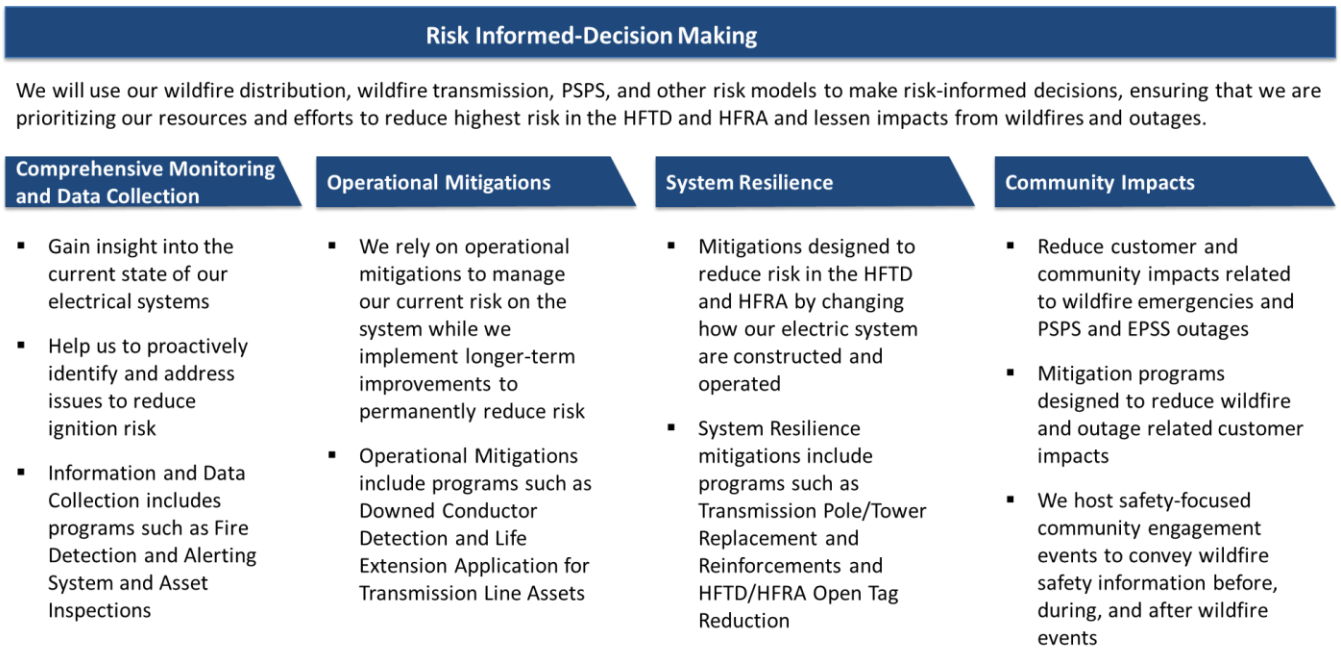
2 Draft Annual Report on Compliance for PG&E 2020 Wildfire Mitigation Plan (Dec. 5, 2022), Docket #2020-ARC.

3 PG&E's Comments on the Draft Annual Report on Compliance Regarding the 2020 Wildfire Mitigation Plan (Dec. 7, 2022), Docket #2020-ARC.

collection, operational mitigations, and system resilience that work together to reduce wildfire risk and strengthen the resiliency of our electric distribution and transmission systems.

Figure PG&E-1.2-1 below shows our general WMP objectives and the framework for how we developed our plan within that framework.

FIGURE PG&E-1.2-1:
PG&E'S 2023-2025 WMP FRAMEWORK AND OBJECTIVES



Using this framework, we have identified 62 initiative targets and objectives that we will track throughout the year and report on quarterly and annually. In selecting these targets, we have chosen to focus on initiatives that will have the most significant impact on reducing wildfire risk and decreasing customer impacts from wildfire safety-related outages. We have completed certain programs and removed some less impactful targets from the 2023 WMP. As a result, the number of targets in the 2023 WMP is less than the number of targets in our 2022 WMP. We are confident that the work we will perform from 2023-2025 represents the right balance of mitigations to address the evolving wildfire risk.

Our 2023 WMP provides detailed tables describing each target in the sections prescribed by Energy Safety. In addition to the targets, we also have objectives associated with many of our mitigations. We highlight key objectives aligned to our framework below.

Risk-Informed Decision Making

Our Risk Methodology and Assessment Improvement Plan activities described in Section 6.7 incorporate important new data into the WDRM that will better represent items such as wildfire risk to vulnerable communities and the ability of a community to safely evacuate from an active wildfire.

Comprehensive Monitoring and Data Collection

In Section 8.3, we discuss our Situational Awareness and Forecasting objective to enable Artificial Intelligence (AI) processing of Wildfire Camera Data to provide automated wildfire notifications in the internal PG&E monitoring tool (Wildfire Incident Viewer – WIV). Early detection of new ignitions can help reduce the overall impact of the ignition through increased awareness and more rapid response.

In Section 8.1.3, we describe our plan to increase retention for trained and qualified inspectors. Our plan focuses on increasing and sustaining a consistent, year-over-year internal workforce that builds on existing experience and mentors new employees for asset inspections.

Operational Mitigations

We will identify VM AOCs that will be primarily focused on HFRA as discussed in Section 8.2.3.4. A collaborative, cross-functional team will evaluate the service territory with electric overhead assets and create a system-wide map that includes VM AOCs. Starting in 2023 we will stand up a pilot program AOC in HFRA, barring external factors.

System Resilience Mitigations

Grid Design, Operations and Maintenance initiatives include system resilience programs such as Undergrounding and System Hardening. Key objectives include incorporating the findings from the joint utility covered conductor effectiveness study into maintenance and inspection standards. We discuss the covered conductor effectiveness study in ACI PG&E-22-11.

Community Impacts

In Section 8.4 we describe our Emergency Preparedness Plan objectives that include additional emergency training and exercises, coordinating emergency and disaster preparedness plans with external stakeholders, and participating in benchmarking for major outages. We will coordinate a variety of community engagement meetings in the five regions we serve. We describe these outreach efforts in Section 8.5.

2023 Wildfire Mitigation Maturity Survey

As described above, PG&E has and will continue to make progress in mitigating wildfire and ignition risk. We continue to support using, and refining, a wildfire mitigation capability maturity model to measure this progress. The maturity model helps us identify and share best practices and continually improve our approach to mitigate the risk of utility-caused wildfires.

This year's maturity model survey is significantly different from the previous survey, and thus the scores from this year cannot reasonably be compared to scores from prior years. Further, with this year's maturity model including questions that are not always relevant to utility operations, expectations that may be operationally impractical, and a new minimum scoring methodology, the scores do not accurately capture all of our actual and expected maturity, especially as to reducing wildfire risk.

We have made significant advancements in executing our wildfire mitigation plans and are seeing the benefits described throughout this WMP. The initiatives included in this WMP will further reduce wildfire risk and limit disruption from wildfire mitigation efforts for the benefit of our customers and communities throughout California.