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**PACIFIC GAS AND ELECTRIC COMPANY  
QUARTERLY REPORT ON 2020 WILDFIRE MITIGATION PLAN  
FOR FOURTH QUARTER 2020  
FEBRUARY 5, 2021**

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**CONDITION GUIDANCE-9**  
**INSUFFICIENT DISCUSSION OF PILOT PROGRAMS**

**Deficiency:** Electrical corporations do not describe how they will evaluate and expand the use of successfully piloted technology or which piloted technology has proven ineffective. To ensure pilots that are successful result in expansion, if warranted and justified with quantitative data, electrical corporations must evaluate each pilot or demonstration and describe how it will expand use of successful pilots.

**Condition:** *In its quarterly report, each electrical corporation shall detail:*

- i. All pilot programs or demonstrations identified in its Wildfire Mitigation Plan (WMP);*
- ii. Status of the pilot, including where pilots have been initiated and whether the pilot is progressing toward broader adoption;*
- iii. Results of the pilot, including quantitative performance metrics and quantitative risk reduction benefits;*
- iv. How the electrical corporation remedies ignitions or faults revealed during the pilot on a schedule that promptly mitigates the risk of such ignition or fault, and incorporates such mitigation into its operational practices; and*
- v. A proposal for how to expand use of the technology if it reduces ignition risk materially.*

The first two quarterly reports that PG&E filed in response to Condition Guidance-9 reported on the projects included in Section 5.1.D, New or Emerging Technologies, of Pacific Gas and Electric Company's (PG&E) 2020 WMP. Concurrent with this Third Quarterly Report, PG&E is submitting its 2021 WMP update. Thus, this Third Quarterly Report addresses the new or emerging technology projects in the 2021 WMP update, in the renumbered Section 7.1.D, New or Emerging Technologies.

As noted in the 2021 WMP update, the following projects included in the New or Emerging Technology section of PG&E's 2020 WMP have been removed from the New or Emerging Technology section of the 2021 WMP. The first four projects below are either now in production or in the process of entering production and continue to be included in other sections of the 2021 WMP. The last project has completed and is not planned to be taken to production. They are:

- 5.1.D.3.1 Wildfire Spread Models. The wildfire spread model is now in production with over 70 million virtual fires simulated by the technology each day every 200m along PG&E's overhead assets in the High Fire Threat Districts (HFTD).
- 5.1.D.3.2 Satellite Fire Detection. The data and workflows of this project are now in production and are providing detection of potential wildfire conditions to inform operational

response. In addition, PG&E also sends automated email fire alerts to various partners and has developed a public facing web page where these detections are available.

- 5.1.D.3.3 Weather Model and Fire Potential Index (FPI) - Model Expansions. The 2 km model pipeline of weather, fuels, Outage Producing Wind Model, and FPI are now in production in the external cloud environment. These models and tools inform daily fire danger risk, Public Safety Power Shutoff (PSPS) decision-making frameworks, and outage potentials which can be modeled through PG&E's Storm Outage Prediction Project Model.
- 5.1.D.3.19 Electric Program Investment Charge (EPIC) 2.34: Predictive Risk Identification with Radio Frequency Added to Line Sensors (Distribution Fault Anticipation (DFA) Technology). The technology demonstration project was completed. For more information on how this project is continuing into production and wider deployment, see Section 7.3.2.2.3 DFA Technology and Early Fault Detection.
- 5.1.D.3.11 Ultrasonic Technology (UT). This project was removed because UT defect detection was found to be unreliable at this time. Additional project details from the last project quarterly report prior to removal can be found in the Second Quarterly Report for Condition Guidance-9.

For the 2021 WMP update and starting with this quarterly report, PG&E has newly included the EPIC 3.41: Drone Enablement and Operational Use and EPIC 3.43: Momentary Outage Information projects.

As an improvement over prior quarterly reports, PG&E has moved all of the project reporting for this quarterly report into this document directly and will continue to improve the reporting according to Action PGE-18 (Class B) in Section 5.1.7 of the *Wildfire Safety Division Evaluation of Pacific Gas and Electric Company's First Quarterly Report* dated January 8, 2021.

Specifically, PG&E will be updating the (iii).C: Quantitative Performance Metrics and (iii).D: Quantitative Risk Reduction Benefits fields for each project listed herein in the supplemental filing to the 2021 WMP update to be filed no later than February 26, 2021 as well as in the quarterly reports following this one.

In accordance with Condition Guidance-9, the project information is provided in the following standardized format arranged according to the five Condition Items noted in that deficiency, with expansion by PG&E into multiple targeted, detailed responses:

**Condition Item (i): All pilot programs or demonstrations identified in WMP.**

The projects are summarized in the table above and the following is the template for the detailed reporting that is provided for each project, below.

<i>Information Type</i>	<i>Description</i>
(i).A: Project Type	Either New Technology (Commercially Available Offering) or Emerging (Pre-commercial) Technology according to the definition provided in Section 7.1.D.1 above.
(i).B: Additional References in the 2021 WMP Update	Other sections where this project is also significantly detailed within the 2021 WMP update.
(i).C: Section in the 2020 WMP	If applicable, the section number of this project in the New or Emerging Technologies section of the 2020 WMP.
(i).D: Project Objective and Summary	A summary of the project, including its wildfire mitigation-related objective and an indication of whether the project is progressing toward broader adoption, if known. For many new or emerging technology projects, it is not clear until late in the project lifecycle whether the results indicate that the technology is appropriate to be broadly adopted.
(i).E: Utility Wildfire Mitigation Maturity Model (UWMMM) Categories & Capabilities Potentially Impacted	PG&E is providing one or more UWMMM Categories and Capabilities potentially impacted, where anticipated. Due to the nature of new and emerging technology project developments, these potential Categories and Capabilities are subject to change.

**Condition Item (ii): Status of the pilot, including where pilots have been initiated and whether the pilot is progressing toward broader adoption.**

<i>Information Type</i>	<i>Description</i>																
(ii).A: Project Phase	<p>The project phase is reported according to the following definitions:</p> <table border="1" data-bbox="553 331 1464 1388"> <thead> <tr> <th data-bbox="553 331 805 382">Project Phase</th> <th data-bbox="805 331 1464 382">Definition</th> </tr> </thead> <tbody> <tr> <td data-bbox="553 382 805 537">Initiation</td> <td data-bbox="805 382 1464 537">Project purpose and benefits defined Initial scope, schedule, budget Sponsor, stakeholders, project team defined</td> </tr> <tr> <td data-bbox="553 537 805 726">Planning</td> <td data-bbox="805 537 1464 726">Business case including refined scope, schedule, budget and approvals Benchmarking for non-duplication, lessons learned, and industry best practices</td> </tr> <tr> <td data-bbox="553 726 805 842">Design/ Engineering</td> <td data-bbox="805 726 1464 842">Detailed design, technical requirements, coordination Contracting</td> </tr> <tr> <td data-bbox="553 842 805 995">Staging</td> <td data-bbox="805 842 1464 995">Review and confirmation of project alignment with purpose, benefits, scope, budget, schedule Key success factors defined</td> </tr> <tr> <td data-bbox="553 995 805 1092">Build/Test</td> <td data-bbox="805 995 1464 1092">Build, test and demonstration Evaluation to defined metrics</td> </tr> <tr> <td data-bbox="553 1092 805 1281">Closeout</td> <td data-bbox="805 1092 1464 1281">Path to production revised Lessons learned documented Decommissioning completed Final report</td> </tr> <tr> <td data-bbox="553 1281 805 1388">Continuous Improvement</td> <td data-bbox="805 1281 1464 1388">Optional phase that some projects progress to when there is project-related continuous improvement activity post Closeout.</td> </tr> </tbody> </table>	Project Phase	Definition	Initiation	Project purpose and benefits defined Initial scope, schedule, budget Sponsor, stakeholders, project team defined	Planning	Business case including refined scope, schedule, budget and approvals Benchmarking for non-duplication, lessons learned, and industry best practices	Design/ Engineering	Detailed design, technical requirements, coordination Contracting	Staging	Review and confirmation of project alignment with purpose, benefits, scope, budget, schedule Key success factors defined	Build/Test	Build, test and demonstration Evaluation to defined metrics	Closeout	Path to production revised Lessons learned documented Decommissioning completed Final report	Continuous Improvement	Optional phase that some projects progress to when there is project-related continuous improvement activity post Closeout.
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(ii).B: Project Status	<p>A summary of the current state of the project, with activity indicative of whether the project is progressing toward broader adoption. For many new or emerging technology projects, it is not clear until late in the project lifecycle whether the results indicate that the technology is appropriate to be broadly adopted.</p>																
(ii).C: Project Location	<p>For field-based projects the general location is provided. For software or analytics-only projects, the area the project applies to is provided, such as to HFTD or systemwide.</p>																

<b>Condition Item (iii): Results of the pilot, including quantitative performance metrics and quantitative risk reduction benefits.</b>	
<i>Information Type</i>	<i>Description</i>
(iii).A: Results to Date	Results of pilot projects are provided through Q4 2020. Project results for prior quarters are included, either labeled by quarter or as Prior Results that may extend to the origin of the project. Results for pilot projects in phases preceding the Closeout phase, as defined in (ii).A, are preliminary and subject to change.
(iii).B: Lessons Learned	Lessons learned for pilot projects are technological learnings, findings, and key takeaways to inform a path to production. Lessons learned can also be barriers, issues, risk, or obstacles that if not solved could jeopardize the path to production. Lessons learned provided for projects in phases preceding the Closeout phase, as defined in (ii).A, are preliminary and subject to change.
(iii).C: Quantitative Performance Metrics	<p>Per Action PGE-18 (Class B) in Section 5.1.7 of the <i>Wildfire Safety Division Evaluation of Pacific Gas and Electric Company's First Quarterly Report</i> dated January 8, 2021, PG&amp;E will be updating this field in the supplemental filing to the 2021 WMP update to be filed no later than February 26, 2021.</p> <p>Quantitative performance metrics are provided, as they are known, and used in the evaluation of a technology including for whether a technology is effective and progressing toward broader adoption. PG&amp;E acknowledges the need for, and value of, establishing quantitative performance metrics at the beginning of a project, and is continuing to improve these quantitative performance metrics for all of the projects included in this section.</p>
(iii).D: Quantitative Risk Reduction Benefits	<p>Per Action PGE-18 (Class B) in Section 5.1.7 of the <i>Wildfire Safety Division Evaluation of Pacific Gas and Electric Company's First Quarterly Report</i> dated January 8, 2021, PG&amp;E will be updating this field in the supplemental filing to the 2021 WMP update to be filed no later than February 26, 2021.</p> <p>Quantitative risk reduction benefits that may result from adoption of the technology are provided, as they become better understood. Especially for the pre-commercial technology projects that are a part of this new or emerging technology portfolio, there is inherent uncertainty in the assumptions and estimates that are developed to create the quantitative risk reduction benefit. PG&amp;E acknowledges the need for, and value of, establishing anticipated quantitative risk reduction benefits at the beginning of a project, and is continuing to improve these quantitative risk reduction benefits for all of the projects included in this section.</p>



<b>Condition Item (iv): How the electrical corporation remedies ignitions or faults revealed during the pilot on a schedule that promptly mitigates the risk of such ignition or fault and incorporates such mitigation into its operational practices.</b>	
<i>Information Type</i>	<i>Description</i>
(iv).A: Ignition or Fault Risk Reduction Project Findings That Inform Current Operational Practices	If the project, in any phase, identifies a potential ignition or fault risk condition (e.g., an in-field asset condition or configuration issue, or a vegetation issue), the potential condition is reported and validated against current PG&E preventive and corrective maintenance guidelines and treated in accordance. In addition, a general statement of such activity is provided in this response.
(iv).B: Methods to Incorporate Project Findings Into Operational Practices	Typically, methods to incorporate ignition or fault risk mitigation findings into operational practices are revealed toward the end of the projects as part of the lessons learned and other recommendations in the Closeout documentation. However, if PG&E identifies such risk mitigation methods to inform proposed changes to operational practices, including prior to the conclusion of the project, they will be included in this response.
<b>Condition Item (v): A proposal for how to expand use of the technology if it reduces ignition risk materially.</b>	
<i>Information Type</i>	<i>Description</i>
(v).A: 'End Product' at 'Full Deployment' and Location	For this response PG&E is providing the anticipated use of the technology, including anticipated locations, should the technology be proven to be successful and subsequently put into production. Given that the projects are in varying phases of development and precommercial technologies are inherently uncertain, this response is based upon our current understanding of the technology and its applicability to PG&E operations, and subject to change. Early stage projects may not have a clear strategy for the 'end product' at 'full deployment', while others such as those in the Continuous Improvement phase may have already been deployed.

Forward-looking statements, including but not limited to project next steps, expected results, and potential quantitative risk reduction benefits, are subject to change due to the evolving nature of technology and drivers of system and public safety risk. The following project reports are provided to comply with Condition Guidance-9 and for this report are identical to the project reports included in Section 7.1.D of PG&E's 2021 WMP update filed on the same day.

7.1.D.3.1 SmartMeter™ Partial Voltage Detection

(i).A: Project Type	Emerging (Pre-commercial) Technology
(i).B: Additional References in the 2021 WMP	This project is described in Section 7.3.2.2.2: Situational awareness and forecasting - SmartMeter Partial Voltage Detection (Formerly Known as Enhanced Wires Down Detection)
(i).C: 2020 WMP Section	5.1.D.3.4
(i).D: Project Objective and Summary	<p>PG&amp;E's EPIC 1.14: Next Generation SmartMeter Telecom Network Functionalities project demonstrated that the SmartMeter Telecommunications Network can support a variety of both present and future smart grid applications and devices, including using multiple types of outage reporting data from the SmartMeter network to better identify and differentiate wire down type outages and share information with distribution management systems (DMS) more effectively. The SmartMeter Partial Voltage Detection (formerly known as Enhanced Wires Down Detection) project builds on this work to assess the ability to use SmartMeter technology to locate and identify partial voltage conditions to enable faster response to grid issues.</p> <p>A partial voltage condition can indicate the occurrence of a potentially hazardous distribution grid condition, including hazards that can contribute to wildfire risk. PG&amp;E has enabled Single-Phase SmartMeters to send real-time alarms to the DMS under partial voltage conditions (25-75 percent of nominal voltage). Prior to implementation, SmartMeters electric meters could only provide real-time alarms for the outage state. For Three-Wire distribution systems, the partial voltage condition indicates one phase feeding the transformer has low voltage or no voltage. This enhanced situational awareness can help detect and locate the area boundaries between meters encountering normal voltage and those encountering partial voltage. This allows operators to detect and locate partial voltage line sections more quickly to enable faster response to potential wires down, open jumpers, or loss of phase(s) due to unengaged fuse operation. Phase 1 partial voltage detection technology has proven successful on 3-Wire distribution systems where transformers are connected line-to-line, and loss of phase results in a partial voltage condition whereby the communication card can detect and then send alerts to the DMS during the event. Phase 1 of this project completed in 2019 included implementation on 4.5 million single phase SmartMeter electric meters covering 25,597 line miles of Tier 2 and Tier 3 HFTD areas. Phase 2 of this project is underway. It applies to ~365 thousand 3-phase SmartMeter electric meters and relies upon the implementation of firmware detection of partial voltage conditions. The Phase 2 technology is intended to alert on partial voltage conditions on 4-Wire systems where transformers are connected line-to-neutral.</p>
(i).E: UWMMM Categories & Capabilities Potentially Impacted	F. Grid operations and protocols: 27. Protective equipment and device settings
(ii).A: Project Phase	Phase 1: Closeout (~4.5 million single-phase meters have been in production since 2019). Phase 2: Design/Engineering (~365 thousand three-phase meters in scope).
(ii).B: Project Status	Phase 1 is in production and has been deployed to ~4.5 million meters. Phase 2 is in a development phase with the intent of deployment to 365 thousand meters in Tier 2 and Tier 3 HFTDs by the end of Q2 2021, though this deployment intent is at risk due to a vendor product issue that is currently being assessed.

(ii).C: Project Location	Phase 1: Tier 2 & 3 HFTDs were initially targeted; now deployed system-wide. Phase 2: Targeting system-wide deployments.
(iii).A: Results to Date	Q3 2020/Q4 2020 Phase 2 Project Results: –Meter firmware vendor contract finalized. –Design of DMS data presentation for operator use. –SmartMeter firmware functionality testing complete. –SmartMeter firmware deployment planning complete.
(iii).B: Lessons Learned	–In Phase 1, it was discovered that some abnormal SmartMeter electric meter conditions (e.g., failed power supply) can produce false positive partial voltage alerts. PG&E had to address these false positives by applying filtering strategies to prevent presentation to operators through the DMS.
(iii).C: Quantitative Performance Metrics	Per Action PGE-18 (Class B) in Section 5.1.7 of the <i>Wildfire Safety Division Evaluation of Pacific Gas and Electric Company's First Quarterly Report</i> dated January 8, 2021, PG&E will be updating this field in the supplemental filing to the 2021 WMP update to be filed no later than February 26, 2021. –Ability to detect open jumpers, partial operation of ungangled fuses, and wire down events (proven for 3-Wire systems in Phase 1; to be validated for 4-Wire systems in Phase 2). –Ability to incorporate partial voltage detection functionality into the DMS and operational processes.
(iii).D: Quantitative Risk Reduction Benefits	Per Action PGE-18 (Class B) in Section 5.1.7 of the <i>Wildfire Safety Division Evaluation of Pacific Gas and Electric Company's First Quarterly Report</i> dated January 8, 2021, PG&E will be updating this field in the supplemental filing to the 2021 WMP update to be filed no later than February 26, 2021. –Improved visibility to distribution operators and dispatchers through DMS and Outage Management Tool (OMT) of situations where there is a possible partial voltage and/or wire down condition. –Improved locational identification of partial voltage outages to the DMS and OMT, and ultimately enabling more timely resolution of these issues, which can result in lower risk of wildfire ignition and/or spread.
(iv).A: Ignition or Fault Risk Reduction Project Findings That Inform Current Operational Practices	Phase 1 –Currently in production. Phase 2 –None at this time.
(iv).B: Methods to Incorporate Project Findings Into Operational Practices	The methodology is to display filtered partial voltage alerts on transformers in DMS maps, which allows operators to be alerted of partial voltage conditions and visualize the boundaries between full voltage, partial voltage and complete outage sections of the distribution system. Integration into the OMT will summarize SmartMeter partial voltage alert counts in an informational table presentation for current outages. The enhanced situational awareness can help operators detect and locate partial voltage line sections more quickly to enable faster response to potential wires down, open jumpers, or loss of phase(s) due to ungangled fuse operation.
(v).A: 'End Product' at 'Full Deployment' and Location	The end product is that the partial voltage detection firmware will be deployed to all compatible PG&E SmartMeter electric meters system-wide, with system optimization completed, and functionality integrated into the DMS and OMT, as described in (iv).B above.

### 7.1.D.3.2 Line Sensor Devices

(i).A: Project Type	New Technology (Commercially Available Offering)
(i).B: Additional References in the 2021 WMP	Section 7.3.2.2.5: Situational Awareness & Forecasting – Line Sensor Devices
(i).C: 2020 WMP Section	5.1.D.3.5
(i).D: Project Objective and Summary	Line Sensors are primary conductor-mounted devices that continuously measure current in real-time and report events as they occur, and in some cases the current waveform of grid disturbances. These line sensors are next-generation fault indicators with additional functionality and communication capabilities. Line Sensor technology can reduce wildfire risk and improve public safety by continuous monitoring of the grid, performing analytics on captured line disturbance data, identifying potential hazards, and when necessary dispatching field operations to proactively patrol, maintain, and repair discovered field conditions or assets on the verge of failure.
(i).E: UWMMM Categories & Capabilities Potentially Impacted	F. Grid operations and protocols: 27. Protective equipment and device settings
(ii).A: Project Phase	Build/Test
(ii).B: Project Status	Line sensors have been deployed on 60 feeders covering a total of 4,898 circuit miles in Tier 2 & 3 HFTDs. On a daily basis, the data from these sensors are being used to investigate the source of unknown cause outages.
(ii).C: Project Location	Tier 2 & 3 HFTD in the North Bay, Sonoma, North Valley, Humboldt, Yosemite, and Sierra divisions.
(iii).A: Results to Date	Q3 2020/Q4 2020 –Developed line risk evaluations based on line sensor and other data for select HFTD circuits to calculate location of potential issues. Informed field operations for further inspection/assessment/maintenance. –Continued device deployment to circuits in HFTDs in the Humboldt, Stockton, Yosemite, and Sierra divisions. –Improved analytics methods and automation.
(iii).B: Lessons Learned	–When combined with other data sources, line sensor devices contribute valuable data to enable proactive condition detection. –Inputs from other sensors and systems as well as analytics are required to improve accuracy and results.
(iii).C: Quantitative Performance Metrics	Per Action PGE-18 (Class B) in Section 5.1.7 of the <i>Wildfire Safety Division Evaluation of Pacific Gas and Electric Company's First Quarterly Report</i> dated January 8, 2021, PG&E will be updating this field in the supplemental filing to the 2021 WMP update to be filed no later than February 26, 2021. –Effectiveness in detecting incipient faults with a low level of false positives.

(iii).D: Quantitative Risk Reduction Benefits	<p>Per Action PGE-18 (Class B) in Section 5.1.7 of the <i>Wildfire Safety Division Evaluation of Pacific Gas and Electric Company's First Quarterly Report</i> dated January 8, 2021, PG&amp;E will be updating this field in the supplemental filing to the 2021 WMP update to be filed no later than February 26, 2021.</p> <p>Line sensors are being used to identify unresolved outage sources such as suspected momentary vegetation contact or other outages that generate momentary or sustained outages where a problem is not found during patrol. By using the line sensor data, we can use the improved locational information and fault type to generate more specific investigation patrol information. By addressing these outage types more proactively, we can resolve many of the conditions prior to fire season and high fire threat days.</p>
(iv).A: Ignition or Fault Risk Reduction Project Findings That Inform Current Operational Practices	<p>When a suspected high-risk condition is found by the Line Sensor Device team, the local restoration team is alerted and dispatched to patrol and rectify the situation as needed.</p>
(iv).B: Methods to Incorporate Project Findings Into Operational Practices	<p>PG&amp;E is using data provided by line sensor technologies to bolster asset health and performance through a three-step process: (i) Collecting line sensor data attributes on disturbances to create a database of disturbance signatures for disturbance evaluations; (ii) Detecting disturbance information from Tier 2 and Tier 3 HFTDs and matching the captured disturbance data against the signature database to determine if a distribution line risk is likely to materialize as a hazard; (iii) Matching line sensor data attributes on line risks in a manner in which they can be evaluated in the distribution network model software to estimate the location of the line risk for proactive field patrol, inspection, and repair, if necessary, before failure to reduce risk and improve system safety.</p>
(v).A: 'End Product' at 'Full Deployment' and Location	<p>This product is one component of a set of grid sensor technologies (as described in 7.3.2.2 Continuous Monitoring Sensors) that, as a set, are optimized to support and complement each other. This product would be deployed to circuits in Tier 2 &amp; 3 HFTDs and would be integrated into Distribution Control Center (DCC), Maintenance, and Field Operations functions to support faster fault identification (including location data) for proactive maintenance prior to high fire risk periods.</p>

7.1.D.3.3 EPIC 3.15: Proactive Wires Down Mitigation Demonstration Project (Rapid Earth Fault Current Limiter (REFCL))

(i).A: Project Type	Emerging (Pre-commercial) Technology
(i).B: Additional References in the 2021 WMP	7.3.3.17.4
(i).C: 2020 WMP Section	5.1.D.3.6
(i).D: Project Objective and Summary	<p>The EPIC 3.15 Proactive Wires Down Mitigation demonstration project seeks the ability to automatically and rapidly reduce the flow of current and risk of ignition in single phase to ground faults through the use of REFCL. REFCL works by moving the neutral line to the faulted phase during a fault, which significantly reduces the energy available for the fault. This significantly lowers the energy for single line to ground faults by reducing the potential for arcing and fire ignitions, as well as better detection of high impedance faults and wire-on-ground conditions. REFCL technology is applicable to three-wire unit-grounded circuits, which make up the majority of PG&amp;E's distribution circuits within HFTDs.</p>

(i).E: UWMMM Categories & Capabilities Potentially Impacted	C. Grid design and system hardening: 14. Risk-based grid hardening and cost efficiency 15. Grid design and asset innovation
(ii).A: Project Phase	Design/Engineering
(ii).B: Project Status	All of the REFCL system equipment has been installed and initially tested. Further commissioning of the system is ongoing (as of late January) and a comprehensive testing program will begin in March 2021, with the project completed by July 2021. Based on feedback from Australian utilities who have leveraged this technology, ongoing observation and adjustment of various system parameters may be needed to “fine-tune” the REFCL system going forward. Evaluation of additional substations for suitability of REFCL installations has begun but is pending results and learnings of the Calistoga pilot project before design or field work starts on additional sites.
(ii).C: Project Location	Substation in a Tier 3 HFTD in the North Bay.
(iii).A: Results to Date	Q4 2020 –Completed substation construction and all the distribution field installations in Q4 2020.
(iii).B: Lessons Learned	<p>–The Ground Fault Neutralizer (GFN) adds on another layer of system protection with greater sensitivity to ground faults than traditional system protection schemes commonly used in the United States of America which utilize solid grounding. In digital simulation testing, the GFN showed the capability to detect high impedance ground faults upwards of 16 thousand ohms, which is in the typical range for vegetation contact faults. The GFN also shows promise of detecting reverse earth faults resulting from specific wires-down situations, which are especially challenging to detect and pose a public safety risk.</p> <p>–A key lesson learned is the need for balancing the line to ground capacitance of each phase on the distribution circuits where a GFN is deployed. A detailed review was performed in the project and it highlighted the need for capacitive balance units to have precise control over the balancing and achieve the greatest fault sensitivity. Group tapping for line voltage regulators was also determined to be required, so a new multiphase regulator controller was tested and verified for this function.</p>
(iii).C: Quantitative Performance Metrics	<p>Per Action PGE-18 (Class B) in Section 5.1.7 of the <i>Wildfire Safety Division Evaluation of Pacific Gas and Electric Company’s First Quarterly Report</i> dated January 8, 2021, PG&amp;E will be updating this field in the supplemental filing to the 2021 WMP update to be filed no later than February 26, 2021.</p> <ul style="list-style-type: none"> <li>–Performance as compared to fault response time performance standards</li> <li>–Faulted conductor voltage &lt; 1,900 volt (V) within 85 milliseconds (ms)</li> <li>–Faulted conductor voltage &lt; 750 V within 500 ms</li> <li>–Faulted conductor voltage &lt; 250 V within 2,000 ms</li> <li>–Identifying faulted circuit</li> </ul>
(iii).D: Quantitative Risk Reduction Benefits	<p>Per Action PGE-18 (Class B) in Section 5.1.7 of the <i>Wildfire Safety Division Evaluation of Pacific Gas and Electric Company’s First Quarterly Report</i> dated January 8, 2021, PG&amp;E will be updating this field in the supplemental filing to the 2021 WMP update to be filed no later than February 26, 2021.</p> <p>REFCL may be able to reduce the likelihood of ignitions for certain types of single line to ground faults. This reduction in ignition likelihood would reduce the wildfire risks for those lines that have REFCL installed.</p>

(iv).A: Ignition or Fault Risk Reduction Project Findings That Inform Current Operational Practices	<p>The GFN will be operational in the North Bay substation to add another layer of system protection to the two connected distribution circuits. If a ground fault is detected, the GFN will autonomously mitigate the fault current and identify which circuit the fault is on. Pre-defined criteria will determine how the fault is cleared, whether through recloser tripping or cutover to solid grounding depending on ambient conditions.</p> <p>The plan for additional production implementations of the technology is in development.</p>
(iv).B: Methods to Incorporate Project Findings Into Operational Practices	<p>A Substation Earth Fault Management relay interface controller is currently in development and is needed to integrate the GFN into operational practices and the Supervisory Control and Data Acquisition (SCADA) system. Operators will have visibility into the status of the GFN and make control decisions if a fault is detected.</p> <p>Training sessions with operations personnel are being scheduled showing how the REFCL technology works and the associated controls.</p>
(v).A: 'End Product' at 'Full Deployment' and Location	<ul style="list-style-type: none"> <li>–The end product is that the REFCL system would be deployed to substations in Tier 2 and 3 HFTDs, including substation components (arc suppression coil, GFN control cabinet, residual current compensator, and potentially upgraded Current Transformers (CT) and relays) and field work (capacitive balancing, upgraded line reclosers, and upgrades to regulators, capacitor banks, and insulation levels as needed).</li> <li>–Capacitive planning incorporated into annual distribution planning cycle.</li> <li>–Capacitive operational analysis incorporated into planning and analysis of planned and unplanned outages.</li> <li>–Annual training for field personnel who would interact with the system, distribution operations, and distribution engineering.</li> <li>–Annual testing of circuit and REFCL system to check reliability/sensitivity of REFCL system operations and insulation tests to detect equipment that is overly stressed and likely to fail during REFCL operation.</li> </ul>

#### 7.1.D.3.4 Distribution, Transmission, and Substation: Fire Action Schemes and Technology (DTS-FAST)

Note: Due to the sensitive nature of the experimental, proprietary technology, PG&E is unable to disclose extensive details about the DTS-FAST pilot project in public filings. Upon request, PG&E can provide further information under confidentiality protections.

(i).A: Project Type	Emerging (Pre-commercial) Technology
(i).B: Additional References in the 2021 WMP	8.1
(i).C: 2020 WMP Section	5.1.D.3.7

(i).D: Project Objective and Summary	DTS-FAST is an internal PG&E development and is currently in pilot phase. This technology pilot aims to use fraction-of-a-second technologies to detect objects approaching energized power lines and respond quickly to shut off power before object impact. PG&E is implementing a pilot to engineer, construct, install and monitor a new technology on a PG&E transmission circuit to assess the technology's efficacy at mitigating PG&E's wildfire and safety risks. Next steps and potential operationalization of this technology is dependent on an assessment of pilot findings.
(i).E: UWMMM Categories & Capabilities Potentially Impacted	C. Grid design and system hardening: 12. Grid design for minimizing ignition risk 15. Grid design and asset innovation
(ii).A: Project Phase	Build/Test
(ii).B: Project Status	Pilot construction on a 115 Kilovolt (kV) transmission circuit is 70 percent completed.
(ii).C: Project Location	Proof of concept completed at San Ramon, CA. Pilot being constructed on a 115kV transmission circuit.
(iii).A: Results to Date	Q3 2020/Q4 2020 –Engineering and construction details completed for pilot on 115kV transmission circuit.
(iii).B: Lessons Learned	–Proof of concept model was tested and retested to confirm the technology, as designed, would meet the detection, speed and signal confirmation requirements for subsequent testing through a pilot.
(iii).C: Quantitative Performance Metrics	Per Action PGE-18 (Class B) in Section 5.1.7 of the <i>Wildfire Safety Division Evaluation of Pacific Gas and Electric Company's First Quarterly Report</i> dated January 8, 2021, PG&E will be updating this field in the supplemental filing to the 2021 WMP update to be filed no later than February 26, 2021.  –Ability to provide real-time signals from field demonstrating detection and/or non-detection. –All equipment with DTS-FAST must withstand harsh environmental conditions and remain operable. –Displays representing field conditions must accurately reflect equipment-health conditions between the field and points monitored. –The location and type of equipment failure must be detected at high level of accuracy. –Visual cameras must work under high voltage and high EMF conditions. - DTS-FAST must detect failure conditions in scope for project.
(iii).D: Quantitative Risk Reduction Benefits	Per Action PGE-18 (Class B) in Section 5.1.7 of the <i>Wildfire Safety Division Evaluation of Pacific Gas and Electric Company's First Quarterly Report</i> dated January 8, 2021, PG&E will be updating this field in the supplemental filing to the 2021 WMP update to be filed no later than February 26, 2021.  Wildfire risk reduction benefits, as described in (i).D above, are dependent upon assessment of pilot findings.
(iv).A: Ignition or Fault Risk Reduction Project Findings That Inform Current Operational Practices	–Assess optimal locations for technology implementation. –Engage technology vendors for hardware needs. –Secure resourcing required for targeted implementation, including mitigation strategy for potential coronavirus (COVID-19) impacts.
(iv).B: Methods to Incorporate Project Findings Into Operational Practices	–Leverage pilot findings for operational implementation. –Monitor new installations and assess success criteria to ensure technology is working optimally. –Assess impacts on asset inspections enabled through real time sensor data. –Assess impacts on ability to reduce PSPS events and expedite restoration times.



(v).A: 'End Product' at 'Full Deployment' and Location	Full deployment plans will be dependent on findings of pilot. If successful, PG&E will consider a targeted approach to post-pilot implementation to help ensure high impact areas are first addressed, taking into account risk-based and feasibility assessments.
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### 7.1.D.3.5 Remote Grid

(i).A: Project Type	New Technology (Commercially Available Offering)
(i).B: Additional References in the 2021 WMP	7.3.3.17.5
(i).C: 2020 WMP Section	5.1.D.3.8
(i).D: Project Objective and Summary	<p>A "Remote Grid" is a new concept for utility service using standalone, decentralized energy sources and utility infrastructure for continuous, permanent energy delivery in lieu of traditional wires to small loads in remote locations at the edges of the distribution system. In many circumstances, the feeders serving these remote locations traverse through HFTDs areas. If these long feeders were removed and the customers served from a local and decentralized energy source, the resulting reduction in overhead lines could reduce fire ignition risk as an alternative to or in conjunction with system hardening. In addition to reducing wildfire risk, Remote Grid could be a cost-effective solution against expense and capital costs for the rebuild of fire-damaged infrastructure or for HFTD hardening infrastructure jobs to meet new HFTD build standards.</p> <p>PG&amp;E's Remote Grid Initiative will validate and develop Remote Grid solutions as standard offerings such that they can be considered alongside or as an alternative to other service arrangements and/or wildfire risk mitigation activities such as system hardening. The findings of other pilot or demonstration projects, including EPIC 3.03: Advanced Distribution Energy Resource Management System (DERMS), which looks to develop increased situational awareness and control capabilities of Distributed Energy Resource (DER), will help to support the deployment of remote grid configurations.</p>
(i).E: UWMMM Categories & Capabilities Potentially Impacted	<p>C. Grid design and system hardening:</p> <ul style="list-style-type: none"> <li>12. Grid design for minimizing ignition risk</li> <li>13. Grid design for resiliency and minimizing PSPS</li> <li>14. Risk-based grid hardening and cost efficiency</li> </ul>
(ii).A: Project Phase	Build/Test
(ii).B: Project Status	The projects are advancing through scoping, assessment, contracting, design, and permitting activities, building understanding of the many aspects required for a successful Remote Grid. The three leading projects (some comprising five remote grid sites) are in the permitting and construction stages. Initial projects have been delayed due to unforeseen permitting delays due to presence of threatened species. Additional sites under consideration are undergoing detailed feasibility assessment to address constructability and customer acceptance before down selecting to a complete set of initial projects.

(ii).C: Project Location	Three initial remote grid projects (some comprising multiple remote grid sites) are in Mariposa and San Luis Obispo counties. Additional projects in HFTDs in El Dorado, Madera, Fresno, Tulare, Santa Barbara, Yuba, and Sierra counties are currently being assessed.
(iii).A: Results to Date	<p>Q2 2020</p> <ul style="list-style-type: none"> <li>–Completed field site visits to identify additional projects to pursue for concept validation.</li> <li>–Completed first broad Request for Proposals (RFP) solicitation which was received by more than 20 technology integration and construction vendors, delivering initial validation of commercial availability.</li> </ul> <p>Q3 2020</p> <ul style="list-style-type: none"> <li>–Developed and awarded major update of contract, including updated technical specification.</li> <li>–Documented detailed protocol to identify and evaluate potential projects.</li> </ul> <p>Q4 2020</p> <ul style="list-style-type: none"> <li>–Negotiated &amp; executed a turnkey Purchase and Sale Agreement and a 10-year full-wrap Maintenance Agreement, forming a reusable template for future Standalone Power System procurements.</li> <li>–Drafted terms of service into a form of Supplemental Provisions to the Electric Rules, as a tariffed form agreement.</li> <li>–The majority of customers engaged to date have voiced positive initial interest in pursuit of service conversion from overhead line to a Remote Grid.</li> <li>–Filed the proposed form of Supplemental Provisions Agreement with the California Public Utilities Commission (CPUC) in Advice 6017-E<sup>1</sup> on December 15, 2020.</li> <li>–Benchmarking with other utilities shows a point of validation in the advanced program now operational under Horizon Power in Western Australia. In California, Liberty Utilities has procured its first Standalone Power System for a similar application.</li> </ul>
(iii).B: Lessons Learned	<ul style="list-style-type: none"> <li>–PG&amp;E identified the technology combination of Solar Photovoltaic (PV) Generation and Battery Energy Storage with supplemental Propane Generators as the most cost effective, reliable, and cleanest solution for initial Remote Grid sites.</li> <li>–PG&amp;E found there was sufficient initial vendor interest and availability to engage in contracting to deploy systems with specifications and terms responsive to PG&amp;E's requirements.</li> <li>–A number of site-specific conditions can reduce individual project feasibility or delay implementation. Examples include: customer acceptance, physical space constraints, shading and other constructability related considerations such as grading and geological conditions, permitting challenges such as presence of threatened species, cultural heritage, or adjacency to scenic highway.</li> </ul>

<sup>1</sup> See Advice 6017-E “Remote Grid Standalone Power System Supplemental Provisions Agreement” [https://www.pge.com/tariffs/assets/pdf/adviceletter/ELEC\\_6017-E.pdf](https://www.pge.com/tariffs/assets/pdf/adviceletter/ELEC_6017-E.pdf).

<p>(iii).C: Quantitative Performance Metrics</p>	<p>Per Action PGE-18 (Class B) in Section 5.1.7 of the <i>Wildfire Safety Division Evaluation of Pacific Gas and Electric Company's First Quarterly Report</i> dated January 8, 2021, PG&amp;E will be updating this field in the supplemental filing to the 2021 WMP update to be filed no later than February 26, 2021.</p> <p>The project success criterion is the establishment of proof that a complete Remote Grid system can be installed and operated at an economically viable price point while meeting safety, performance, and reliability requirements.</p> <p>Potential metrics include:</p> <ul style="list-style-type: none"> <li>–Cost of deployed stand-alone power system and forecasted future expense compared to the cost of other wildfire risk mitigations considered (e.g., undergrounding, overhead hardening).</li> <li>–Number of overhead line miles removed.</li> <li>–Stand-alone power system reliability (i.e., uptime).</li> <li>–Carbon dioxide Emissions from Standalone Power Systems</li> <li>–Project cycle time duration (deployment speed from start to finish).</li> </ul>
<p>(iii).D: Quantitative Risk Reduction Benefits</p>	<p>Per Action PGE-18 (Class B) in Section 5.1.7 of the <i>Wildfire Safety Division Evaluation of Pacific Gas and Electric Company's First Quarterly Report</i> dated January 8, 2021, PG&amp;E will be updating this field in the supplemental filing to the 2021 WMP update to be filed no later than February 26, 2021.</p> <p>The anticipated benefit of Remote Grid is to reduce the wildfire ignition risks related to overhead distribution infrastructure. Remote Grid may be able to cost-effectively substitute for other options in an eventual volume of locations which could make a meaningful impact to the overall cost and risk reduction of the larger System Hardening portfolio. The more cost effective the solution turns out to be, the more locations it may reach, and the greater the benefit to the combined portfolio.</p>
<p>(iv).A: Ignition or Fault Risk Reduction Project Findings That Inform Current Operational Practices</p>	<p>The initial projects under way in 2020 are positioned as fully featured, long-term asset deployments with performance and reliability targets that will result in these projects eliminating segments of overhead line exposure. When these projects go online, an immediate ignition risk reduction can be realized upon de-energization of the infrastructure they replace.</p>
<p>(iv).B: Methods to Incorporate Project Findings Into Operational Practices</p>	<p>Standardization of to-be-proven Remote Grid site assessment and deployment processes, technical specifications, vendor contract templates, identification of qualified providers, and operational protocols (e.g., outage detection and response coordination) are needed to enable more rapid deployment of potential future Remote Grids. Further validation of the actual costs and lead time to deliver utility-grade performance and reliability will enable understanding of how widespread the benefits of this approach may be, relative to the occurrence of the requisite grid topology existing on the PG&amp;E distribution system today. For instance, it is more likely that a Remote Grid would be appropriate at the end of an overhead distribution feeder with small numbers of customers.</p>
<p>(v).A: 'End Product' at 'Full Deployment' and Location</p>	<p>If this project is determined to be successful, the Remote Grid concept would be developed as a standard service offering and considered alongside other risk mitigations, such as overhead hardening and undergrounding, and deployed wherever it is cost effective and feasible. Possible appropriate deployment locations would be at the ends of overhead distribution feeders that serve small numbers of customers in HFTDs.</p>

7.1.D.3.6 EPIC 3.11: Multi-Use Microgrid

(i).A: Project Type	Emerging (Pre-commercial) Technology
(i).B: Additional References in the 2021 WMP	
(i).C: 2020 WMP Section	5.1.D.3.9
(i).D: Project Objective and Summary	The EPIC 3.11: Multi-Use Microgrid demonstration project develops and tests the technology, processes, and business models needed to deploy and operate multi-customer microgrids that are integrating third party-owned renewable energy generation assets to power the microgrid on a section of PG&E’s distribution system. This includes the design and development of control specifications and SCADA integrations to maintain visibility and operational control of the microgrid in grid-connected and islanded modes. The findings of this project will help support microgrid growth to further resiliency and enhanced customer choice.
(i).E: UWMMM Categories & Capabilities Potentially Impacted	C. Grid design and system hardening: 13. Grid design for resiliency and minimizing PSPS
(ii).A: Project Phase	Build/Test
(ii).B: Project Status	Functional design specification for the microgrid controller and the end to end integration network architecture and security approach have been finalized. Operational decisions for the microgrid including for communication and hardware fail-safes were evaluated in order to prepare the microgrid for integration at the DCC. This specification along with the completed Concept of Operations (CONOP) documentation is now being used to complete PG&E’s advanced microgrid testbed. This pilot is progressing towards broader adoption, including creating standards and tariffs that would be needed to enable PG&E to partner with third parties (such as communities) and deploy microgrids.
(ii).C: Project Location	McKinleyville (Humboldt County). The project, the Redwood Coast Airport Microgrid, serves the Arcata-Eureka Airport business community incorporating 18 PG&E and Redwood Coast Energy Authority customers, including critical facilities such as the airport and a United States Coast Guard station.

(iii).A: Results to Date	<p>Prior Results</p> <ul style="list-style-type: none"> <li>–Provided key feedback to microgrid controller manufacturers to inform the development of the Functional Design Specification document</li> <li>–Developed guideline questions for future microgrid controller testing beyond this project in order to support standardization.</li> </ul> <p>Q3 2020</p> <ul style="list-style-type: none"> <li>–Started SCADA design (in progress)</li> <li>–Refined Functional Design Specification.</li> <li>–Completed communication and hardware fail-safes decisions</li> </ul> <p>Q4 2020</p> <ul style="list-style-type: none"> <li>–Configuration of information points list and human-machine interface</li> <li>–Controller Test Plan aligned with third-party manufacturer</li> <li>–Utilized lessons learned from this project to publish a Community Microgrid Technical Best Practices Guide</li> </ul>
(iii).B: Lessons Learned	<ul style="list-style-type: none"> <li>–In order to ensure reliability and mitigate customer power loss, circuits should be designed to allow microgrid mode transitions to be seamless.</li> <li>–Verify prior to system design that preferred communication systems, such as the Field Area Network (FAN), are available</li> <li>–Ensure clear designation and separation of stakeholder responsibilities, particularly between the utility and the microgrid generation owner/operator.</li> <li>–Defining if microgrid will be allowed to operate under certain fail-safe conditions requires strong operator buy-in and participatory planning. The process used for this project can serve as a useful guide for future microgrid deployment.</li> <li>–Because each microgrid configuration is unique it may not be possible to fully standardize and streamline processes and technology to be applicable for all microgrids. Future frameworks will need to be flexible to accommodate unique project needs.</li> <li>–Future project economics will likely differ significantly from the EPIC-funded Redwood Coast Airport Microgrid project and could be a major barrier to future scalability of multi-customer microgrids.</li> </ul>
(iii).C: Quantitative Performance Metrics	<p>Per Action PGE-18 (Class B) in Section 5.1.7 of the <i>Wildfire Safety Division Evaluation of Pacific Gas and Electric Company's First Quarterly Report</i> dated January 8, 2021, PG&amp;E will be updating this field in the supplemental filing to the 2021 WMP update to be filed no later than February 26, 2021.</p> <p>The pilot and broader deployment success criteria are:</p> <ul style="list-style-type: none"> <li>–Successful operation of the project's multi-customer microgrid (the Redwood Coast Airport Microgrid) to satisfy community demand for enhanced resilience including seamless transitions between normal grid-connected and islanded modes of operation.</li> <li>–Validation that this multi-use microgrid model is replicable, scalable, and can inform the design of other multi-customer microgrids.</li> </ul>
(iii).D: Quantitative Risk Reduction Benefits	<p>Per Action PGE-18 (Class B) in Section 5.1.7 of the <i>Wildfire Safety Division Evaluation of Pacific Gas and Electric Company's First Quarterly Report</i> dated January 8, 2021, PG&amp;E will be updating this field in the supplemental filing to the 2021 WMP update to be filed no later than February 26, 2021.</p> <p>This project's wildfire risk reduction benefit is related to its replicability of future microgrids in HFTDs. The processes, standards, and tariffs developed and tested out in this project will directly inform the development of other microgrid supporting programs such as the Community Microgrid Enablement Program. Overall, Microgrids reduce the impact of PSPS by providing power to safe-to-energize regions during wildfire threats.</p>

(iv).A: Ignition or Fault Risk Reduction Project Findings That Inform Current Operational Practices	–Controller testing in PG&E’s Microgrid Test Bed is being designed to be replicable and scalable to a wide range of microgrid controllers. This will facilitate the deployment of control schemes for future microgrid sites.
(iv).B: Methods to Incorporate Project Findings Into Operational Practices	–This project is designing the microgrid to be visible and controllable from the PG&E control center. Its operational guidebook will be the basis for integrating future microgrids of this kind into the control center operations. –A microgrid operating agreement is being developed and will form the basis of similar agreements for future community microgrids.
(v).A: ‘End Product’ at ‘Full Deployment’ and Location	Full deployment for this project is a permanent and in-field microgrid at Arcata-Eureka Airport, with visibility and control from PG&E control center. The formalization and documentation of a repeatable process will enable a streamlined approach to deploying additional Multi-Use Microgrids as appropriate in HFTDs.

7.1.D.3.7 Enhanced Asset Inspections—Drone/Artificial Intelligence (AI) (Sherlock Suite)

(i).A: Project Type	New Technology (Not Widely Commercialized)
(i).B: Additional References in the 2021 WMP	
(i).C: 2020 WMP Section	5.1.D.3.10
(i).D: Project Objective and Summary	<p>In 2019, PG&amp;E collected more than 2.5 million high-resolution images (up to 100 megapixel) of our Electric Transmission assets through drones, helicopters, and other means of data capture as part of our enhanced inspection program (Wildfire Safety Inspection Program), and has collected an additional 2.5 million images in 2020 as a part of the aerial inspection program. This imagery, when labeled appropriately, can be used to train computer vision models to identify specific components, and in some cases, evaluate the condition of those components. To address this, PG&amp;E is developing an application, Sherlock, to bolster its data visualization capabilities.</p> <p>Sherlock is a web application that allows inspectors to view photographs of assets along with associated data. Sherlock allows for remote access to data captured through drone/helicopter images and enables a review of said data to ensure that only corrected data is viewed by inspectors, reducing the time from flight to inspection. In addition, inspectors can markup issues within the inspection profile of the application, which generates the necessary documentation from the application itself, ensuring auditability and data quality. This documentation provides PG&amp;E with increased data management, reporting, and audit capabilities.</p> <p>The markups from Sherlock feed into computer vision models. Computer vision models are being trained to classify photos, identify asset components, and search for potential issues in an automated fashion. Models within the inspection flow are currently being used to flag select images (e.g., overview, right of way, asset tag) for inspectors. Inspectors can label data and provide feedback on the predictions which improves the models over time while reducing the inspection time and increasing inspection quality. Further, building and improving these models provides opportunities to use computer vision to flag images for review before humans see them, for prioritizing assets/lines for inspection, for identifying asset inventory, and as inputs to models that predict future asset failure.</p>

(i).E: UWMMM Categories & Capabilities Potentially Impacted	<p>D. Asset management and inspections:</p> <p>16. Asset inventory and condition assessments  18. Asset inspection effectiveness  20. Quality Assurance (QA)/Quality Control (QC) for asset management</p>
(ii).A: Project Phase	Build/Test
(ii).B: Project Status	<p>The Sherlock Suite now includes six different profiles for different types of users across the aerial inspection program, in addition to a number of object detection and image classification models. Four AI models are currently in production, classifying images of “standard items” to reduce overall inspection time. Additionally, seven manual processes have been completely automated since the beginning of this project, and the teams are working to further automate manual steps so that inspectors can focus on looking for potential issues on assets.</p>
(ii).C: Project Location	Systemwide Applications
(iii).A: Results to Date	<p>Q2 2020  The following items were delivered:  –Remote image load (cloud to cloud).  –Image QA capabilities.  –Near real-time tracking of remote inspections within Sherlock.  –Created a model to classify images of the top of a structure.  –Improved data pipeline, and improved application security.  –C-hook detection capabilities.</p> <p>Q3 2020  –Ability to view completed inspections and potential emergency tags in the post-Inspection quality check profile.  –Line level reporting and prioritization.  –Standardization of items predictions (level 1 automation).  –Development of multi component detection capabilities.  –Development of bird nest detection.  –Development of C-hook wear classification.</p> <p>Q4 2020  –Ability for post inspection QC with automated tracking within Sherlock  –Inspection form built within Sherlock, writing to system of record directly  –Bird nests flagged for inspectors using AI  –Ability to add new AI models to detect potential failures to the inspector profile  –Ability to run AI models at scale against millions of images in a cost-effective manner  –Ability for pre-inspection QA to occur within Sherlock  –Development of insulator detection, damaged cross-arm detection AI models</p>
(iii).B: Lessons Learned	<p>Research shows that introducing AI can affect behavior. For example, introducing automation, if not done carefully, can lead to human error due to fatigue or complacency. We are consistently measuring behavior to ensure safety of the inspection processes. As a result of this learning, we are starting our AI deployments with standard items, such as images of asset tags, overview image, access path, etc. before deploying failure detection models into production.</p>

(iii).C: Quantitative Performance Metrics	<p>Per Action PGE-18 (Class B) in Section 5.1.7 of the <i>Wildfire Safety Division Evaluation of Pacific Gas and Electric Company's First Quarterly Report</i> dated January 8, 2021, PG&amp;E will be updating this field in the supplemental filing to the 2021 WMP update to be filed no later than February 26, 2021.</p> <p>–Reduction in time from imagery capture to inspection – started tracking in Q2 2020  –Reduction to imagery inspection times (cumulative) – tracking since 2019  –Upgrade/downgrade rate improvements (inspection quality) – anticipated by Q1 2021</p>
(iii).D: Quantitative Risk Reduction Benefits	<p>Per Action PGE-18 (Class B) in Section 5.1.7 of the <i>Wildfire Safety Division Evaluation of Pacific Gas and Electric Company's First Quarterly Report</i> dated January 8, 2021, PG&amp;E will be updating this field in the supplemental filing to the 2021 WMP update to be filed no later than February 26, 2021.</p> <p>Wildfire risk reduction benefits are anticipated though are not proven at this time.</p>
(iv).A: Ignition or Fault Risk Reduction Project Findings That Inform Current Operational Practices	<p>This technology is already in use by remote inspectors. Models within the inspection flow are currently being used to flag select images (e.g., overview, right of way, asset tag) for inspectors, to help focus inspection efforts on potential ignition risks.</p>
(iv).B: Methods to Incorporate Project Findings Into Operational Practices	<p>See reporting input (iv).A.</p>
(v).A: 'End Product' at 'Full Deployment' and Location	<p>Sherlock is in production and being used by different user groups across the transmission aerial inspection process. We continue to release new features on a regular basis. Future state developments include additional remote inspection processes for transmission, distribution, and substation. Potential capabilities to further enable inspectors, supervisors include: (i) data and imagery quality checks and assurance, (ii) data and imagery QA, and (iii) AI enabled search functionalities. Advanced deployments of computer vision models could allow auto-filling inspection forms, automatic flagging of asset issues, and flagging of image quality issues. Additionally, instrumentation to measure inspection quality throughout the process, as well as writing back to source systems (e.g., SAP, Geographic Information System (GIS)), may be considered.</p>

7.1.D.3.8 Below Ground Inspection of Steel Structures (Steel Transmission Structure Corrosion Assessment and Mitigation Pilot)

(i).A: Project Type	New Technology (Commercially Available Offering)
(i).B: Additional References in the 2021 WMP	7.3.4.10
(i).C: 2020 WMP Section	5.1.D.3.12



(i).D: Project Objective and Summary	PG&E is implementing a pilot that will regularly inspect steel assets below groundline to detect steel corrosion and concrete degradation that may compromise structural integrity, with the goal of reducing risk of steel assets in the transmission steel structures. To inspect below ground, the foundations/footings of steel towers and poles are excavated and evaluated for structural integrity, including measuring steel member material section loss and collecting environmental and soil data (soil resistivity, pH, structure to soil potential/direct current (DC) voltage, reduction-oxidation reaction). Repairs and mitigations would then be prioritized, based on the field evaluations and soil samples, in combination with other evaluations of tower/structure and overhead assets.
(i).E: UWMMM Categories & Capabilities Potentially Impacted	D. Asset management and inspections: 16. Asset inventory and condition assessments
(ii).A: Project Phase	Planning
(ii).B: Project Status	We continue to evaluate potential contractors prior to finalizing contracts.
(ii).C: Project Location	Approximately 1000 locations throughout the PG&E service territory, including in HFTDs, are planned.
(iii).A: Results to Date	<p>Prior Results</p> <ul style="list-style-type: none"> <li>–Data analysis and project definition.</li> <li>–Structure selection and reaching out to contractors.</li> <li>–Designing the Field Experimentation through a selection of measurements that will provide PG&amp;E the answers sought.</li> </ul> <p>Q3 2020/Q4 2020</p> <ul style="list-style-type: none"> <li>–Project scope finalized</li> <li>–Structures for testing identified</li> <li>–Field operations processes and methods for project implementation documented.</li> </ul>
(iii).B: Lessons Learned	None to date.
(iii).C: Quantitative Performance Metrics	<p>Per Action PGE-18 (Class B) in Section 5.1.7 of the <i>Wildfire Safety Division Evaluation of Pacific Gas and Electric Company's First Quarterly Report</i> dated January 8, 2021, PG&amp;E will be updating this field in the supplemental filing to the 2021 WMP update to be filed no later than February 26, 2021.</p> <ul style="list-style-type: none"> <li>–We anticipate the following performance metrics:</li> <li>–Assessing ~1000 transmission structure footings.</li> <li>–Documentation of data inputs including soil resistivity, depth of water table, drainage conditions - to contribute to asset health assessment.</li> <li>–Ability to apply analytics from data collected for insights to inform cathodic protection preventative maintenance programs</li> <li>–Ability to apply advanced analytics to the data will improve risk assessment of structures.</li> <li>–Post project closeout, comparison of below ground corrosion with above ground conditions to evaluate for potential correlations.</li> </ul>

(iii).D: Quantitative Risk Reduction Benefits	<p>Per Action PGE-18 (Class B) in Section 5.1.7 of the <i>Wildfire Safety Division Evaluation of Pacific Gas and Electric Company's First Quarterly Report</i> dated January 8, 2021, PG&amp;E will be updating this field in the supplemental filing to the 2021 WMP update to be filed no later than February 26, 2021.</p> <p>This pilot aims to provide data as to the Asset Health of the below ground foundation of selected steel structures. The knowledge gathered will help the Asset Management and Civil Engineering teams identify required intervention (repair/replace recommendation) and provide a measure of structural design performance over the asset's service life to reduce the risk of structure failure and reduce the probability of an associated wires-down event that could cause wildfire ignition.</p>
(iv).A: Ignition or Fault Risk Reduction Project Findings That Inform Current Operational Practices	<p>If the project proves successful, it will provide high quality data inputs that can be used to inform asset maintenance decision-making. PG&amp;E will assess findings and identify next steps based on findings of the project, including an assessment of the accuracy of estimating below ground corrosion based on above ground conditions.</p>
(iv).B: Methods to Incorporate Project Findings Into Operational Practices	<ul style="list-style-type: none"> <li>–Data can be integrated into asset management data models to help prioritize asset maintenance practices based on risk assessments.</li> <li>–Depending on findings of below ground corrosion conditions, PG&amp;E may consider deploying cathodic protection to better protect from corrosion impacts. The pilot would help dictate where cathodic protection would be most impactful.</li> </ul>
(v).A: 'End Product' at 'Full Deployment' and Location	<ul style="list-style-type: none"> <li>–Broader implementation of below ground inspection of steel structures</li> <li>–Data integrated into asset management data models to help prioritize asset maintenance practices based on risk assessments</li> <li>–Depending on findings of below ground corrosion conditions, PG&amp;E may consider deploying cathodic protection to better protect from corrosion impact.</li> </ul>

#### 7.1.D.3.9 EPIC 3.41 – Drone Enablement

(i).A: Project Type	New Technology (Not Widely Commercialized)
(i).B: Additional References in the 2021 WMP	
(i).C: 2020 WMP Section	<p>This project was mentioned at the end of Section 5.1.D.3 New or Emerging Technologies – Project Summaries as a project that PG&amp;E may pursue within EPIC.</p>
(i).D: Project Objective and Summary	<p>This project proposes to test the following two hypotheses:</p> <ol style="list-style-type: none"> <li>1. Transmission Line &amp; Substation Inspections: Automated and Beyond Visual Line of Sight (BVLOS) drone flight operations can offer a more accurate, safe and more efficient alternative to Transmission Line &amp; Substation asset inspection than today's manual drone operations.</li> <li>2. Distribution Alert Verification: Automated and BVLOS drone operations can provide a fast, safe and effective solution for field-validating the range of alerts that will be produced through the predictive sensors that are planned to be deployed across the distribution system.</li> </ol>

(i).E: UWMMM Categories & Capabilities Potentially Impacted	D. Asset management and inspections: 16. Asset Inventory and condition assessments 17. Asset inspection cycle 18. Asset inspection effectiveness 19. Asset maintenance and repair
(ii).A: Project Phase	Design/Engineer
(ii).B: Project Status	The project was officially launched in August 2020. The internal project team has been staffed, and the team has partnered with an external expert of drone technology and the Federal Aviation Administration (FAA) regulatory requirements and process to provide critical support during the Design/Engineering phase of the project. The team has developed a preliminary project plan and has begun to document the details of each planned use case. These use cases will be translated into a CONOPs document and then translated into technical requirements for the upcoming RFP to identify a drone vendor partner. The team has also begun preliminary coordination with the FAA.
(ii).C: Project Location	Project location is to be determined (TBD). The team is actively working with the consultant on site selection parameters that will both support the project's objectives and meet FAA requirements for BVLOS operations.
(iii).A: Results to Date	Q3 2020 –Business Plan approved  Q4 2020 –Expert drone consultant onboarded –Project schedule established –Use case questionnaire form completed (transmission, substation & distribution) for CONOPs development –Slide deck for discussion with FAA drafted –Initial RFP invitee list drafted
(iii).B: Lessons Learned	None to date.

<p>(iii).C: Quantitative Performance Metrics</p>	<p>Per Action PGE-18 (Class B) in Section 5.1.7 of the <i>Wildfire Safety Division Evaluation of Pacific Gas and Electric Company's First Quarterly Report</i> dated January 8, 2021, PG&amp;E will be updating this field in the supplemental filing to the 2021 WMP update to be filed no later than February 26, 2021.</p> <p>Transmission &amp; Substation Inspections:</p> <ul style="list-style-type: none"> <li>-Number of automated flight plan proposals approved</li> <li>-Number of automated flights conducted within Visual Line of Sight (VLOS)</li> <li>-Number of automated flights conducted BVLOS</li> <li>-Percent reduction in time of automated inspection compared to equivalent manual inspection</li> <li>-Quality of data captured compared to data captured manually</li> <li>-Number of automated drone operations with flight issues/violations</li> <li>-Number of automated drone operations without flight issues/violations</li> <li>-Maximum uninterrupted drone flight time for drones equipped with in-flight battery recharging subsystem</li> <li>-Maximum non-stop flying range for drones equipped with in-flight battery recharging subsystem</li> </ul> <p>Distribution Alert Verification:</p> <ul style="list-style-type: none"> <li>-Number of automated flight plan proposals approved</li> <li>-Number of automated flights conducted within VLOS</li> <li>-Number of automated flights conducted BVLOS</li> <li>-Percent reduction in time of automated alert verification compared to equivalent physical employee verification</li> <li>-Number of field validations that find asset issues requiring remediation</li> <li>-Maximum uninterrupted drone flight time for drones equipped with in-flight battery recharging subsystem</li> <li>-Maximum non-stop flying range for drones equipped with in-flight battery recharging subsystem</li> </ul> <p>Relevant CPUC-approved metrics:</p> <ul style="list-style-type: none"> <li>-Maintain/Reduce operations and maintenance costs</li> <li>-Criteria air pollution emission reductions</li> <li>-Public safety improvement and hazard exposure reduction</li> <li>-Utility worker safety improvement and hazard exposure reduction</li> </ul>
<p>(iii).D: Quantitative Risk Reduction Benefits</p>	<p>Per Action PGE-18 (Class B) in Section 5.1.7 of the <i>Wildfire Safety Division Evaluation of Pacific Gas and Electric Company's First Quarterly Report</i> dated January 8, 2021, PG&amp;E will be updating this field in the supplemental filing to the 2021 WMP update to be filed no later than February 26, 2021.</p> <p>Using automated drone dispatch and data capture to investigate alerts generated by sensors in the distribution system has the potential to improve the efficiency and effectiveness of proactive asset health monitoring in HFTDs.</p>
<p>(iv).A: Ignition or Fault Risk Reduction Project Findings That Inform Current Operational Practices</p>	<p>TBD</p>
<p>(iv).B: Methods to Incorporate Project Findings Into Operational Practices</p>	<p>TBD</p>

(v).A: 'End Product' at 'Full Deployment' and Location	<p>1. Transmission &amp; Substation Inspections: Scaled up version of the solution at the end of the EPIC project to extend to the broader set of Transmission lines and substations in HFTDs. Ability to collect imagery data utilizing an autonomous unmanned aerial vehicle (UAV) for detailed inspections on all assets within scope.</p> <p>2. Distribution Alert Verification: Scaled up version of the solution at the end of the EPIC project to extend to the broader set of distribution assets in HFTDs. Improved integration between sensor alert system and drone system, with automated sharing of geospatially referenced alerts. Command and control application to monitor and track health and status of the fleet of drones and suggest which drone to deploy for inspection or field validation based on location, range, charge level, weather and other relevant factors. Potentially also a consolidated physical mission control center within a DCC for operational management and situational awareness of the fleet of drones. Interfaces between the drone system and additional field sensor alert systems would be created (beyond the specific field sensors being used in this project; for instance, some combination of sensors from the Line Sensor, Enhanced Fault Detection, or DFA projects).</p>
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7.1.D.3.10 Mobile Light Detection and Ranging (LiDAR) for Vegetation Management (VM)

(i).A: Project Type	New Technology (Commercially Available Offering)
(i).B: Additional References in the 2021 WMP	7.3.5.7
(i).C: 2020 WMP Section	5.1.D.3.13 (In the 2020 WMP, titled as "Mobile LiDAR for Distribution Inspections")
(i).D: Project Objective and Summary	This project seeks to validate that high-resolution data captured with vehicle and backpack-mounted LiDAR and imagery units can help reduce fire risk and improve compliance of PG&E's VM process. The 2020 Pilot focused on one 84-mile circuit to evaluate the benefits and risk spend efficiency of LiDAR to the Planning, Pre-Inspection, Work Verification, and Documentation phases of the end-to-end VM radial clearing process.
(i).E: UWMMM Categories & Capabilities Potentially Impacted	<p>E. VM and inspections:</p> <p>22. Vegetation inspection cycle</p> <p>23. Vegetation inspection effectiveness</p> <p>24. Vegetation grow-in mitigation</p> <p>26. QA/QC for VM</p>
(ii).A: Project Phase	<p>2019 Pilot: Closeout</p> <p>2020 Pilot: Closeout</p> <p>2021 Pilot: Planning</p>
(ii).B: Project Status	<p>Q4 2020: Closeout of 2020 Pilot</p> <p>Preparations are underway for an enhanced Mobile LIDAR collection effort in 2021.</p>
(ii).C: Project Location	<p>2019 Pilot: ~18 thousand miles driven in Tier 2 &amp; 3 HFTDs.</p> <p>2020 Pilot: 84 driven miles along a circuit in Placer and Nevada counties.</p> <p>2021 Pilot: TBD</p>

(iii).A: Results to Date	<p>Prior Results –See (iii).B Lessons Learned below.</p> <p>Q3 2020/Q4 2020 –Collected and analyzed Pre- and Post-Work measurements. –Performed field check of preliminary 2019 radial clearing results, and assigning toward remediation when appropriate. –Determined the percent of circuits measurable from a road with sufficient quality in Tier 2 &amp; 3 HFTDs.</p>
(iii).B: Lessons Learned	<p>From the 2019 Pilot PG&amp;E learned that Mobile LiDAR is capable of measuring radial clearances and clearances to sky, and: –Initiated operationalization of results into VM processes. –Derived cost and data analysis cycle time performance measures for both vehicle and backpack-mounted sensors.</p> <p>In addition, PG&amp;E has learned: –To reduce false positives, point cloud analysis teams need an accurate inventory of primary conductor assets (e.g., the teams need to be able to exclude secondary conductors and telecommunications cables). –Mobile LiDAR can help improve asset locational data accuracy. –Field teams could benefit from integrated access to geospatial data in their mobile applications. –No public receptivity issues found with the car-based mobile LiDAR inspections. –Post-work scan results can support work verification and cycle time planning.</p> <p>From the 2020 Pilot, PG&amp;E learned that the LiDAR data acquisition and processing can occur within 27 days, a period sufficient for VM operational workflow cycle times.</p>
(iii).C: Quantitative Performance Metrics	<p>Per Action PGE-18 (Class B) in Section 5.1.7 of the <i>Wildfire Safety Division Evaluation of Pacific Gas and Electric Company's First Quarterly Report</i> dated January 8, 2021, PG&amp;E will be updating this field in the supplemental filing to the 2021 WMP update to be filed no later than February 26, 2021.</p> <p>–Demonstration of the efficacy of Mobile LiDAR measured by comparing false positive and false negative percentages of the radial clearances obtained from analyzing the LiDAR point clouds. –Scan analysis cycle time</p>
(iii).D: Quantitative Risk Reduction Benefits	<p>Per Action PGE-18 (Class B) in Section 5.1.7 of the <i>Wildfire Safety Division Evaluation of Pacific Gas and Electric Company's First Quarterly Report</i> dated January 8, 2021, PG&amp;E will be updating this field in the supplemental filing to the 2021 WMP update to be filed no later than February 26, 2021.</p> <p>Mobile LiDAR provides a systematic way to identify radial clearance issues and potential grow-ins along road adjacent lines during the moment of data capture. This can create baseline observations for work verification to identify remaining clearance issues that may become grow-ins before the next cycle. Mobile LiDAR cannot identify hazard trees or replace the current inspection operations.</p>
(iv).A: Ignition or Fault Risk Reduction Project Findings That Inform Current Operational Practices	<p>When the Mobile LiDAR inspections process identifies a radial clearance issue in a region selected for scanning, the local VM field operations team is informed and provided the data. Local operations will then consider the finding in context of their operations and then mitigate the identified clearance issue within the requisite timeframe.</p>
(iv).B: Methods to Incorporate Project Findings Into Operational Practices	<p>We will evaluate the stepwise integration of the methods described in (iv).A into VM operational workflows for road-side distribution corridors in HFTDs.</p>

(v).A: 'End Product' at 'Full Deployment' and Location	The potential end product is the integration of Mobile LiDAR data outputs into select phases of the VM radial clearing process in HFTD for road-side distribution corridors. Potential VM processes impacted include work verification and documentation.
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7.1.D.3.11 EPIC 3.13: Transformer Monitoring via FAN

(i).A: Project Type	Emerging (Pre-commercial) Technology
(i).B: Additional References in the 2021 WMP	
(i).C: 2020 WMP Section	5.1.D.3.14
(i).D: Project Objective and Summary	As service transformers reach the end of their usable life or overload, they begin to heat up, leading to potential safety and asset risks. Currently, identification of transformer temperature change and potential associated risks poses challenges and requires regular checks from PG&E field teams. The EPIC 3.13: Transformer Monitoring via FAN demonstration project aims to increase the visibility of transformer health through the design and build of an overhead service transformer temperature sensor, a Temperature Alarm Device (TAD), supplemented by analytical models that analyze temperature data. The project will test the hypothesis that monitoring the external temperature of the tank of an overhead transformer can help in predicting and preventing imminent failure that could pose a wildfire ignition risk as well as impact safety and resiliency.
(i).E: UWMMM Categories & Capabilities Potentially Impacted	C. Grid design and system hardening: 12. Grid design for minimizing ignition risk D. Asset management and inspections: 19. Asset Maintenance and Repair G. Data governance: 33. Data collection and curation
(ii).A: Project Phase	Planning
(ii).B: Project Status	The team is evaluating TAD costs provided by vendors, obtaining site licenses to access vendors' servers to obtain TAD data, and preparing to compare data from the two TAD vendors.
(ii).C: Project Location	Initial planned locations are in the San Jose area.
(iii).A: Results to Date	Q3 2020 –Business plan approved for project implementation. –RFP executed for external TAD vendor involvement. –Construction contract executed. Q4 2020 –Business plan approved for project implementation. –External TAD vendors selected for demonstration project
(iii).B: Lessons Learned	None to date.

(iii).C: Quantitative Performance Metrics	Per Action PGE-18 (Class B) in Section 5.1.7 of the <i>Wildfire Safety Division Evaluation of Pacific Gas and Electric Company's First Quarterly Report</i> dated January 8, 2021, PG&E will be updating this field in the supplemental filing to the 2021 WMP update to be filed no later than February 26, 2021.  Project is in the planning phase therefore performance metrics are not known.
(iii).D: Quantitative Risk Reduction Benefits	Per Action PGE-18 (Class B) in Section 5.1.7 of the <i>Wildfire Safety Division Evaluation of Pacific Gas and Electric Company's First Quarterly Report</i> dated January 8, 2021, PG&E will be updating this field in the supplemental filing to the 2021 WMP update to be filed no later than February 26, 2021.  If the project hypothesis is proven, the wildfire risk reduction benefit would be the prediction and prevention of imminent failure of an overhead transformer that could pose a wildfire ignition risk as well as impact safety and resiliency.
(iv).A: Ignition or Fault Risk Reduction Project Findings That Inform Current Operational Practices	If the TAD effectively helps in the detection of imminent failure of overhead transformers, PG&E will be able to proactively replace transformers by dispatching field crews, thereby preventing failure, potential ignition risks, and associated outages.
(iv).B: Methods to Incorporate Project Findings Into Operational Practices	If the TAD technology is proven to be effective, (i) the communication system used by the TADs would need to be operationalized, (ii) the data would need to be integrated with our production databases, and (iii) the data would need to be combined with other data streams in an enterprise data analytics platform to provide a more holistic understanding of asset health.
(v).A: 'End Product' at 'Full Deployment' and Location	TADs would be installed on existing overhead transformers, prioritized first in Tier 3 HFTDs followed by Tier 2 HFTDs. Deployment in other locations will be subject to available funding.

#### 7.1.D.3.12 EPIC 3.20: Maintenance Analytics

(i).A: Project Type	Emerging (Pre-commercial) Technology
(i).B: Additional References in the 2021 WMP	
(i).C: 2020 WMP Section	5.1.D.3.15
(i).D: Project Objective and Summary	The EPIC 3.20: Data Analytics for Predictive Maintenance project aims to develop analytical models using machine learning based on existing PG&E data sets (including SmartMeter electric meter connectivity, geolocational assets, and weather data) to predict electric distribution equipment failures so that corrective action can be taken before failure occurs. The project's current focus is on distribution transformers.
(i).E: UWMMM Categories & Capabilities Potentially Impacted	D. Asset management and inspections: 19. Asset maintenance and repair
(ii).A: Project Phase	Build/Test



(ii).B: Project Status	In Q4 2020 the team completed the first phase of the project which was focused on exploring voltage failures and anomalies while working with the Power Quality group. In coordination with the Asset Health and Performance Center, the second phase of the project is focused on ignition risks and catastrophic failures associated with failing equipment such as overloaded or near-failure transformers, stressed or near-failure cables, or primary side loose neutrals as well as from vegetation contact or other intermittent faults with overhead equipment.
(ii).C: Project Location	Algorithm testing and verification is ongoing throughout the PG&E service territory.
(iii).A: Results to Date	<p>Q2 2020</p> <ul style="list-style-type: none"> <li>-Added heuristic to identify fuse failures.</li> <li>-The best prediction model had 87 percent precision when making predictions on a set of 300 failures.</li> </ul> <p>Q3 2020</p> <ul style="list-style-type: none"> <li>-Field validation of predicted failing transformers (in progress)</li> <li>-Through iterative development, the best model has improved and now has 98 percent precision for predicted failures.</li> </ul> <p>Q4 2020</p> <ul style="list-style-type: none"> <li>-Failure model minimum viable product is in progress</li> <li>-Submitted change request to expand scope. The expansion of scope will hone project focus on identifying transformer failures with high ignition risk and identifying grid event behavior which may indicate vegetation contact or other faults on overhead equipment. Distribution transformers are among the assets whose failures pose the highest ignition risk.</li> </ul>
(iii).B: Lessons Learned	-Occurrences of poor data quality must be addressed to ensure prediction accuracy.
(iii).C: Quantitative Performance Metrics	<p>Per Action PGE-18 (Class B) in Section 5.1.7 of the <i>Wildfire Safety Division Evaluation of Pacific Gas and Electric Company's First Quarterly Report</i> dated January 8, 2021, PG&amp;E will be updating this field in the supplemental filing to the 2021 WMP update to be filed no later than February 26, 2021.</p> <ul style="list-style-type: none"> <li>-Accuracy in the prediction of transformer failures</li> <li>-Ability to supplement or automate the manual inspection process for transformer failures (degree to which the project automates or supplements the existing process)</li> </ul>
(iii).D: Quantitative Risk Reduction Benefits	<p>Per Action PGE-18 (Class B) in Section 5.1.7 of the <i>Wildfire Safety Division Evaluation of Pacific Gas and Electric Company's First Quarterly Report</i> dated January 8, 2021, PG&amp;E will be updating this field in the supplemental filing to the 2021 WMP update to be filed no later than February 26, 2021.</p> <p>Distribution transformers are one of the assets that pose the highest wildfire risk. The second phase of EPIC 3.20 will prioritize exploring overloading transformer failure and catastrophic failures to mitigate wildfire risk. The anticipated risk reduction benefits would be decreasing the frequency of wildfires caused by these failures.</p>
(iv).A: Ignition or Fault Risk Reduction Project Findings That Inform Current Operational Practices	If the model predicts a failed or failing asset, a troubleman could be alerted based on model findings and dispatched to inspect the asset and perform maintenance or replace the asset as needed.

(iv).B: Methods to Incorporate Project Findings Into Operational Practices	The EPIC 3.20 analytics model will be integrated into the Asset Health and Performance Center asset monitoring workflow by using machine learning and automating the troubleshooting process of signal anomalies. When a failure is predicted, the asset will be flagged for review. Depending on findings of the review, PG&E may dispatch crews to inspect perform maintenance on, or replace the asset as needed.
(v).A: 'End Product' at 'Full Deployment' and Location	The end product will be an analytical model fully integrated into the Asset Health and Performance Center's distribution grid monitoring and analytics platform. This would include integration of workflows to proactively address and track outcomes from issues identified by the analytic model. The model will enable informed decisions made by the Power Quality and Asset Health & Performance teams through the entire service territory.

7.1.D.3.13 EPIC 3.32: System Harmonics for Power Quality Investigation

(i).A: Project Type	Emerging (Pre-commercial) Technology
(i).B: Additional References in the 2021 WMP	
(i).C: 2020 WMP Section	5.1.D.3.16
(i).D: Project Objective and Summary	The EPIC 3.32: System Harmonics for Power Quality Investigation demonstration project explores the use of next generation metering technology harmonics data to help automate the detection, investigation, and resolution of harmonics issues. Excessive harmonics have been shown to reduce utility equipment life, can cause premature equipment failure due to the potential to overheat, and can interfere with the operation of protection devices. Harmonics data from next generation metering technology can enable power quality engineers to monitor harmonics levels on the circuits and proactively address harmonics issues before they create a negative impact on PG&E and customers' equipment, mitigating the chances of equipment failure to have adverse effects or safety impacts.
(i).E: UWMMM Categories & Capabilities Potentially Impacted	C. Grid design and system hardening: 12. Grid design for minimizing ignition risk 14. Risk-based grid hardening and cost efficiency
(ii).A: Project Phase	Design/Engineering
(ii).B: Project Status	Team has issued a Purchase Order (PO) to meter hardware vendor. Expected lead time for the meters is 12-16 weeks. Team plans to identify meter locations and install meters in Q1 2021.
(ii).C: Project Location	Three phase commercial/industrial customer locations with a high number of DER/Solar PV and agriculture customers in the Central Valley region.
(iii).A: Results to Date	Q3 2020 –Finalized field installation plan including meter installation locations. –Completed RFP and selected meter hardware that met the requirements to provide the necessary harmonics data  Q4 2020 –Issued PO to meter hardware vendor. –Kick-off project with Information Technology (IT).

(iii).B: Lessons Learned	Meter procurement took longer than expected due to contractual issues between the vendor and PG&E legal teams. We should connect the vendor legal team and PG&E teams together sooner next time. PG&E awarded the contract to the vendor's distributor instead.
(iii).C: Quantitative Performance Metrics	<p>Per Action PGE-18 (Class B) in Section 5.1.7 of the <i>Wildfire Safety Division Evaluation of Pacific Gas and Electric Company's First Quarterly Report</i> dated January 8, 2021, PG&amp;E will be updating this field in the supplemental filing to the 2021 WMP update to be filed no later than February 26, 2021.</p> <p>CPUC-approved EPIC performance metrics are potential areas for measurement of success:</p> <ul style="list-style-type: none"> <li>–Reductions in outage numbers, frequency, and duration.</li> <li>–Reduction in number of customer voltage complaints related to harmonics issues.</li> <li>–Increased use of cost-effective digital information and control technology to improve reliability, security, and efficiency of the electric grid.</li> <li>–Reduction in truck roll out to install additional portable monitors.</li> <li>–Reduction in turnaround time for resolving customer voltage complaints related to harmonics issues.</li> <li>–Reduction in downtime for customer equipment, which currently may be weeks or months.</li> </ul>
(iii).D: Quantitative Risk Reduction Benefits	<p>Per Action PGE-18 (Class B) in Section 5.1.7 of the <i>Wildfire Safety Division Evaluation of Pacific Gas and Electric Company's First Quarterly Report</i> dated January 8, 2021, PG&amp;E will be updating this field in the supplemental filing to the 2021 WMP update to be filed no later than February 26, 2021.</p> <p>Anticipated wildfire risk reduction benefits are described as part of answer (iv).A.</p>
(iv).A: Ignition or Fault Risk Reduction Project Findings That Inform Current Operational Practices	<p>The plan is to validate locations with high levels of harmonics and determine if there is a harmonics-associated ignition risk to the transformers, cap banks, and fuses in the location.</p> <p>If a suspected ignition risk is found, the plan is to take action using existing operational processes.</p>
(iv).B: Methods to Incorporate Project Findings Into Operational Practices	The plan is to use next generation metering technology to monitor and collect harmonics data on our electric distribution system for operationalizing harmonics-associated risk reductions.
(v).A: 'End Product' at 'Full Deployment' and Location	The end product is an analytics tool with the ability to monitor for, and enable proactive mitigation of, harmonics-related issues at approximately 3,000 large commercial customers throughout the service territory.

#### 7.1.D.3.14 Sensor IQ

(i).A: Project Type	New Technology (Commercially Available Offering)
(i).B: Additional References in the 2021 WMP	7.3.2.2.4
(i).C: 2020 WMP Section	5.1.D.3.17

(i).D: Project Objective and Summary	<p>Sensor IQ is a SmartMeter software application that enables SmartMeter electric meters to collect data at a higher frequency and deliver alarms such as high/low voltage outside configurable thresholds without disruption to normal billing data collection. This pilot enables and collects high frequency SmartMeter data; analytics using this data will only be performed through other projects. PG&amp;E has a license to pilot Sensor IQ through October 2021 and will collect voltage, current, and power factor data every five minutes from meters included in this pilot.</p> <p>The purpose of this Sensor IQ project is to collect the needed data to be analyzed through other exploratory use cases to evaluate if the high frequency data supports 1) improved meter phase identification, as this information is needed by the EPIC 3.15: Proactive Wires Down Mitigation Demonstration Project (REFCL) which requires feeder phasing to determine the line-earth capacitive imbalance; and 2) EPIC 3.43: Momentary Outage Information, which seeks to use near real time meter data, including the data provided through Sensor IQ, to develop algorithms that can potentially identify the sources of momentary outages or other anomalies to create predictive maintenance strategies and processes; 3) other predictive grid monitoring and maintenance approaches for potential wildfire risk reduction methods through incipient fault detection as well as improvement of the ability to find faults in wires-down analytics.</p>
(i).E: UWMMM Categories & Capabilities Potentially Impacted	<p>C. Grid design and system hardening:</p> <p>12. Grid design for minimizing ignition risk 14. Risk-based grid hardening and cost efficiency</p>
(ii).A: Project Phase	Build/Test
(ii).B: Project Status	Project is in process of development, deployment and validation with the plan of full deployment to ~500K meters in Tier 2 & Tier 3 HFTDs by the end of 2021.
(ii).C: Project Location	~500 thousand SmartMeter electric meters located in Tier 2 & Tier 3 HFTDs.
(iii).A: Results to Date	<p>Q3 2020/Q4 2020</p> <p>–Data collection profiles, alarm thresholds and configurations have been developed for various meter types.</p> <p>–Sensor IQ has been deployed in the meter test environment to validate developed Data Collection Profiles.</p>
(iii).B: Lessons Learned	<p>–High frequency SmartMeter data alone was not enough to detect issues accurately. Analytics support is necessary to make the data provided by this project useful. Therefore, PG&amp;E plans to direct this project’s data, when available, into the EPIC 3.20: Maintenance Analytics, and EPIC 3.43: Momentary Outage Information projects to use their analytical components for meters in Tier 2 &amp; 3 HFTDs. See the EPIC 3.20 and 3.43 project descriptions in this report for more information.</p>

(iii).C: Quantitative Performance Metrics	<p>Per Action PGE-18 (Class B) in Section 5.1.7 of the <i>Wildfire Safety Division Evaluation of Pacific Gas and Electric Company's First Quarterly Report</i> dated January 8, 2021, PG&amp;E will be updating this field in the supplemental filing to the 2021 WMP update to be filed no later than February 26, 2021.</p> <p>–The ability to reliably collect high frequency data and events on meters which can be used for detecting unexpected conditions or improving analytical models. Example metrics are provided under item (iii).D: Quantitative Risk Reduction Benefits.</p>
(iii).D: Quantitative Risk Reduction Benefits	<p>Per Action PGE-18 (Class B) in Section 5.1.7 of the <i>Wildfire Safety Division Evaluation of Pacific Gas and Electric Company's First Quarterly Report</i> dated January 8, 2021, PG&amp;E will be updating this field in the supplemental filing to the 2021 WMP update to be filed no later than February 26, 2021.</p> <p>Sensor IQ is foundational in collecting the data that could be used with advanced analytics to uncover incipient conditions detectable by our existing population of SmartMeter electric meters. The analytics of the high frequency SmartMeter events and alarms may provide early warning of degrading distribution conditions that are not detectable by other existing sensors. These early detected conditions will permit the prompt and proactive correction of conditions prior to fire season or high fire threat days.</p>
(iv).A: Ignition or Fault Risk Reduction Project Findings That Inform Current Operational Practices	<p>If this project is found to benefit early identification of wildfire risks, the analytics developed in companion projects can be automated and integrated into existing preventative monitoring schemes.</p>
(iv).B: Methods to Incorporate Project Findings Into Operational Practices	<p>Automate the ingestion of Sensor IQ data into a data platform and apply analytical methods to assess events for indications of incipient conditions. Integrate data and analytics into existing or newly developed workflows for detection and resolution of incipient grid conditions that could create wildfire risk. Move the project to a production IT environment. The software contract for this pilot would be extended for deployment and converted to a full license.</p>
(v).A: 'End Product' at 'Full Deployment' and Location	<p>If effective, this product would be deployed in all circuits in Tier 2 &amp; 3 HFTDs and integrated into standard distribution operation functions. It could also be extended to systemwide deployment to all compatible SmartMeter electric meters with an additional per-meter software license.</p>

7.1.D.3.15 EPIC 3.43: Momentary Outage Information

(i).A: Project Type	Emerging (Pre-commercial) Technology
(i).B: Additional References in the 2021 WMP	7.3.2.2.4
(i).C: 2020 WMP Section	N/A
(i).D: Project Objective and Summary	<p>PG&amp;E has deployed over 5 million SmartMeters that provide alarm traps related to the meter’s health and status during abnormal system conditions, such as outages, broad detection of sag and swell events, voltage deviations, intermittent power “blinks”, or other anomalies as reported by the SmartMeter technology.</p> <p>This project proposes to leverage SmartMeter data through Sensor IQ as described in Section 7.1.D.15 above on about 500 thousand meters for more granular and real-time data streams that include high frequency voltage, current, power factor, and temperature, and real time notifications voltage variations or temperature alarms that can be used to develop algorithms that can potentially identify the sources of momentary outages/voltage excursions to create predictive maintenance strategies and processes. An objective is to determine if advanced metering infrastructure (AMI) momentary events (“blinks”) and trap alarms correlate and can be used to identify specific equipment shortcomings such as transformer failure, cracked insulator, loose neutrals, and/or vegetation contact, thereby leading to preventative maintenance practices that could also help reduce wildfire ignition risk.</p> <p>A second initiative is underway to add field insight from two additional sources of information: a new generation smart meter/grid edge sensor, and a behind-the-meter electrical condition detection sensor. The use of a new generation of meter potentially offers measurement and analysis of various primary and secondary issues including but not necessarily limited to loose neutrals, failing service transformers, failing splices, and vegetation contact, while the behind-the-meter electrical condition detection sensor provides an independent view of similar potential issues, but from the customer side of the meter.</p>
(i).E: UWMMM Categories & Capabilities Potentially Impacted	<p>D. Asset management and inspections</p> <p>16. Asset inventory and condition assessments</p>
(ii).A: Project Phase	Design/Engineer
(ii).B: Project Status	<p>The first part of the project is waiting for deployment of Sensor IQ to commence data collection and analytic development.</p> <p>The second part of the project, related to the new generation meter and behind-the-meter electrical condition detection sensor, is being initiated. Vendors have been selected and contract negotiations are expected to complete in Q1 2021.</p>
(ii).C: Project Location	<p>The Sensor IQ-based analysis is applicable to the entire PG&amp;E electric distribution service territory served by SmartMeters but is now focused on meters in Tier 2 &amp; Tier 3 HFTDs.</p> <p>The new generation meter and behind-the-meter electrical condition detection sensor are being piloted in a few Tier 2 &amp; Tier 3 HFTDs.</p>

(iii).A: Results to Date	<p>Q4 2020</p> <p>For the first part of the project:</p> <ul style="list-style-type: none"> <li>-Defined data points and data frequency requirements to perform analytics work to potentially identify equipment failures for enhanced preventative maintenance practices that focus on replacement before failure.</li> <li>-Developed IT framework (solutions blueprint) to ingest and provide data for analytics work.</li> </ul> <p>For the second part of the project:</p> <ul style="list-style-type: none"> <li>-Vendors and installation locations have been selected.</li> <li>-Two additional potentially useful data sources have been identified: new generation SmartMeter technology, and in-home electrical fire sensing. Analysis of project scope and cost changes to accommodate these data sources has been initiated.</li> </ul>
(iii).B: Lessons Learned	None to date
(iii).C: Quantitative Performance Metrics	<p>Per Action PGE-18 (Class B) in Section 5.1.7 of the <i>Wildfire Safety Division Evaluation of Pacific Gas and Electric Company's First Quarterly Report</i> dated January 8, 2021, PG&amp;E will be updating this field in the supplemental filing to the 2021 WMP update to be filed no later than February 26, 2021.</p> <p>Performance will be initially measured based on the progress the development team can demonstrate towards validating or invalidating the project's hypothesis. The initial performance metrics are:</p> <ul style="list-style-type: none"> <li>Number of asset failure use cases for which models are developed and tested</li> <li>Number of failure models for which predictive models are developed and tested</li> <li>Area Under the Precision/Recall Curve (AUC) for each Model developed (if appropriate)</li> <li>Top AUC achieved for each asset type (if appropriate)</li> <li>Net operational cost benefit assessment for the best model developed for each use case</li> <li>Number of field verification exercises completed</li> <li>Time required to ingest new data, update model (if appropriate), run model, and have insights ingested into business processes</li> </ul> <p>If a successful approach is developed, additional metrics focused on comparing the performance of current processes to the performance of the new analytical approach will be used.</p>
(iii).D: Quantitative Risk Reduction Benefits	<p>Per Action PGE-18 (Class B) in Section 5.1.7 of the <i>Wildfire Safety Division Evaluation of Pacific Gas and Electric Company's First Quarterly Report</i> dated January 8, 2021, PG&amp;E will be updating this field in the supplemental filing to the 2021 WMP update to be filed no later than February 26, 2021.</p> <p>Wildfire risk reduction benefits are anticipated as described in the second paragraph of answer (i).D.</p>
(iv).A: Ignition or Fault Risk Reduction Project Findings That Inform Current Operational Practices	None to date.

<p>(iv).B: Methods to Incorporate Project Findings Into Operational Practices</p>	<p>For the first part of the project:</p> <p>If the predictive models using Sensor IQ data are found to be successful, the next phase of development would be to move the analytical model to full production. Operational actions potentially include more precisely targeted PSPS events, more precisely targeted VM, optimized truck rolls, or temporarily reconfiguring distribution system topology. Additionally, improved maintenance planning and optimized capital allocations are likely benefits of more precisely understanding equipment condition.</p> <p>For the second part of the project:</p> <p>If the technologies (the new generation meter and the behind-the-meter electrical condition detection sensor) are found to be successful in identifying incipient issues the more effective version will be assessed for larger deployment.</p>
<p>(v).A: 'End Product' at 'Full Deployment' and Location</p>	<p>If the first part of the project is more successful in its predictions, full deployment would include Sensor IQ aggregation/analysis on SmartMeters in Tier 2 &amp; Tier 3 HFTDs and/or on select SmartMeters throughout the system, to be determined. If the second part of the project is more successful in its predictions, select or all SmartMeters would need to be upgraded to the new generation, or the behind-the-meter electrical condition detection sensor would need to be installed in select or all customer premises.</p> <p>Regardless of which part of the project is deployed, it would also include:</p> <p>Verified predictive analytics developed through application of data analytics platform toolsets and methods;</p> <p>Multiple algorithms for determining equipment failure or underperformance risk in key categories (transformers, cabling, insulators, etc.);</p> <p>Integration of data streams and alerts into operational tools; and</p> <p>Ongoing tuning of algorithms and analytics using data analytics platform capabilities.</p>



7.1.D.3.16 Wind Loading Assessments

(i).A: Project Type	Emerging (Pre-commercial) Technology
(i).B: Additional References in the 2021 WMP	7.3.3.13
(i).C: 2020 WMP Section	5.1.D.3.18
(i).D: Project Objective and Summary	Excessive wind loads on PG&E's distribution poles may cause asset failure that in turn increases wildfire ignition risk. This project will reduce risk by providing asset intelligence to identify locations that require corrective actions driven by pole safety factors or limitations for wind speeds. The project will leverage existing LiDAR data from VM efforts to geo-correct pole locations. Objectives of this project include a greater understanding of failure modes, establishment of a common repository of data gathered, and effectively updating workflows of key asset systems to align with new data strategies. Wind loading segmentation will be performed to identify the wind loading of each asset on a support structure with the objective of integrating findings into risk models.
(i).E: UWMMM Categories & Capabilities Potentially Impacted	A. Risk assessment and mapping 2. Ignition risk estimation D. Asset management and inspections 16. Asset inventory and condition assessments
(ii).A: Project Phase	Build/Test
(ii).B: Project Status	–Deployed the Wind Loading Assessment application to an initial group of 62 Distribution estimators
(ii).C: Project Location	PG&E service territory (PG&E owned distribution poles)

(iii).A: Results to Date	<p>Q4 2020</p> <ul style="list-style-type: none"> <li>–Upgraded the foundational modeling software to handle “tree poles” and crossarm framing automation.</li> <li>–Implemented a Citrix version of Wind Loading that allowed PG&amp;E to switch to a less expensive third party Desk Top Review (pole loading review) vendor.</li> <li>–Consolidated all Distribution wind loading data onto a PG&amp;E platform.</li> <li>–Completed the initial deployment stage of the project, with 62 (of 800) Distribution estimators using the new application.</li> </ul>
(iii).B: Lessons Learned	<ul style="list-style-type: none"> <li>–Data integration into external cloud environment has the potential to provide significant benefit by enabling greater data access and data sharing capabilities with external partners.</li> <li>–Data sharing through the external environment requires new methods for cybersecurity when sharing data externally.</li> <li>–LiDAR holds potential in enabling PG&amp;E to geo-correct pole configurations and arrangements in an automated fashion, which will be further explored through this project.</li> </ul>
(iii).C: Quantitative Performance Metrics	<p>Per Action PGE-18 (Class B) in Section 5.1.7 of the <i>Wildfire Safety Division Evaluation of Pacific Gas and Electric Company’s First Quarterly Report</i> dated January 8, 2021, PG&amp;E will be updating this field in the supplemental filing to the 2021 WMP update to be filed no later than February 26, 2021.</p> <ul style="list-style-type: none"> <li>–Ability to perform pole geo-correction based on LiDAR data.</li> <li>–Integration of data into external cloud environment for greater data accessibility.</li> <li>–Accuracy of data for pole loading calculations.</li> </ul>
(iii).D: Quantitative Risk Reduction Benefits	<p>Per Action PGE-18 (Class B) in Section 5.1.7 of the <i>Wildfire Safety Division Evaluation of Pacific Gas and Electric Company’s First Quarterly Report</i> dated January 8, 2021, PG&amp;E will be updating this field in the supplemental filing to the 2021 WMP update to be filed no later than February 26, 2021.</p> <p>The anticipated wildfire risk reduction benefit is reduction of asset failures and associated wildfire risk due to excessive wind loads on PG&amp;E’s distribution poles and lines.</p>
(iv).A: Ignition or Fault Risk Reduction Project Findings That Inform Current Operational Practices	<ul style="list-style-type: none"> <li>–Integrate data provided through wind loading assessment for failure mode insights to inform manual inspection cycles (integration would occur through a separate project).</li> <li>–Pole geo-corrections will assist field crews in identifying correct pole locations in the field.</li> </ul>
(iv).B: Methods to Incorporate Project Findings Into Operational Practices	<ul style="list-style-type: none"> <li>–Data provided through this project can provide insights for proactive asset management practices (e.g., integrate results into distribution risk model).</li> </ul>
(v).A: ‘End Product’ at ‘Full Deployment’ and Location	<ul style="list-style-type: none"> <li>–Wind loading segmentation analysis will be performed to identify the wind loading of each asset, e.g., a conductor, on a support structure and integrate findings into appropriate systems. This will provide asset intelligence to identify locations that require corrective actions driven by pole safety factors or limitations for wind speeds, or to assess the safety factor of distribution poles as part of the preparation to exit a PSPS event. In addition, geo-corrections to pole locations can be determined based on LiDAR data.</li> </ul>

7.1.D.3.17 EPIC 3.03: Advanced DERMS

(i).A: Project Type	Emerging (Pre-commercial) Technology
(i).B: Additional References in the 2021 WMP	
(i).C: 2020 WMP Section	5.1.D.3.20
(i).D: Project Objective and Summary	<p>The EPIC 3.03: Advanced DERMS demonstration project seeks to design, procure, and deploy a prototype enterprise DERMS providing foundational operational capabilities which will support situational intelligence and broader wildfire mitigation efforts including remote grids, microgrids, and other Distribution Investment Deferral Framework opportunities (i.e., Non Wires Alternatives).</p> <p>This project includes the development of a cost-effective solution for providing advanced situational awareness and control capabilities for operators to manage DER, dispatch DER registration data requests and monitor smart inverter-based DERs. As part of the effort to lower the cost of telemetry for interconnected DER assets, PG&amp;E is engaging with vendors that would eventually produce PG&amp;E-certified site gateways. Additionally, the project is engaging with potential DER aggregator partners to evaluate feasibility of integrating with the PG&amp;E DER headend server as an alternative to the site gateway approach.</p> <p>Anticipated benefits of this project once deployed at scale include: (1) increased situational awareness of DER grid impacts which could allow for greater operational flexibility to safely reconfigure the grid during PSPS; (2) decreased time to de-energize remote grid locations by utilizing the remote disconnect feature of DERMS for remote grids during PSPS events; and (3) potential reduction in the number of customers impacted from PSPS events through microgrid technologies. We note that this project's technology is foundational; actual reduction is dependent on broader microgrid implementations.</p>
(i).E: UWMMM Categories & Capabilities Potentially Impacted	<p>C. Grid Design and System Hardening:</p> <p>12. Grid design for minimizing ignition risk</p> <p>13. Grid design for resiliency and minimizing PSPS</p>
(ii).A: Project Phase	Build/Test
(ii).B: Project Status	<p>–Factory acceptance testing for the gateway device to be installed at the first pilot site at Blue Lake Rancheria (BLR) has been completed. Installation of headend server at PG&amp;E has been completed. - Installation of the gateway device at the pilot site is scheduled for early 2021. The field deployment has experienced delays because the pilot site is involved in COVID-19 response with the recent surge in cases.</p> <p>–Third-party site gateway vendors have begun interoperability testing with the headend server.</p>
(ii).C: Project Location	BLR, Blue Lake, CA (Humboldt County). The BLR is a 100 acre tribal reservation and State-designated Disadvantaged Community (DAC).

(iii).A: Results to Date	<p>–Completed design and installation of an Institute of Electrical and Electronics Engineers (IEEE) 2030.5 DER Headend Server (common smart inverter profile (CSIP) certification pending)</p> <p>–Initial gateway buildout at the BLR site to test telemetry and control (in progress).</p> <p>–To build a market for remote site gateway devices for DER developers, PG&amp;E selected two vendors for development of additional third-party remote site gateways meeting PG&amp;E standards and requirements. This also set up a pathway for future vendors to develop their own remote site gateways.</p>
(iii).B: Lessons Learned	<p>–Technology ecosystem for DER integration utilizing the IEEE 2030.5 protocol is still rapidly evolving and is not yet “plug and play.” Further interoperability testing and industry collaboration is required.</p> <p>–Technology architectures for integrating critical operational systems with 3<sup>rd</sup> party owned devices needs multiple levels of cybersecurity.</p>
(iii).C: Quantitative Performance Metrics	<p>Per Action PGE-18 (Class B) in Section 5.1.7 of the <i>Wildfire Safety Division Evaluation of Pacific Gas and Electric Company’s First Quarterly Report</i> dated January 8, 2021, PG&amp;E will be updating this field in the supplemental filing to the 2021 WMP update to be filed no later than February 26, 2021.</p> <p>–Proven ability of telemetry and control of DERs through a communications link with at least two DER sites and/or DER aggregators.</p> <p>–Cost effectiveness meet or exceed CPUC telemetry requirements at each site or aggregator.</p> <p>–Increased visibility of DERs on the grid and their utilization for microgrids, remote grids, and PG&amp;E Control Centers.</p> <p>–Integration with other grid advancement programs and systems to enable scaled up deployment after EPIC project completion.</p>
(iii).D: Quantitative Risk Reduction Benefits	<p>Per Action PGE-18 (Class B) in Section 5.1.7 of the <i>Wildfire Safety Division Evaluation of Pacific Gas and Electric Company’s First Quarterly Report</i> dated January 8, 2021, PG&amp;E will be updating this field in the supplemental filing to the 2021 WMP update to be filed no later than February 26, 2021.</p> <p>Again, we note that this project’s technology once deployed at scale will provide foundational capabilities for visibility and control rather than direct wildfire risk reduction benefits.</p> <p>Anticipated wildfire risk reduction benefits are described as part of answer (i).D.</p>
(iv).A: Ignition or Fault Risk Reduction Project Findings That Inform Current Operational Practices	<p>This project will demonstrate capabilities to:</p> <p>–Enhance situational awareness and DER control capabilities for distribution operators to support grid needs as part of wildfire mitigation related initiatives.</p> <p>–Enable PG&amp;E to dispatch registration data requests to verify compliance of Smart Inverters with Rule 21 curve settings and monitor Smart Inverter-based DERs to maintain safe and reliable grid operations during PSPS and normal grid conditions.</p>
(iv).B: Methods to Incorporate Project Findings Into Operational Practices	<p>The DERMS would be integrated into the distribution system operators’ systems and processes as described in (iv).A. The project team is also coordinating with the Advanced Distribution Management System (ADMS) team (see Section 7.1.D.3.18 below) for future integration to optimize DER utilization and system-wide grid services.</p>
(v).A: ‘End Product’ at ‘Full Deployment’ and Location	<p>The end product is a fully integrated enterprise DER Headend that can scale to accommodate the growth of managed DERs over time. The headend server will be located at PG&amp;E and the remote site gateways will be located at customer DER sites.</p>

7.1.D.3.18 ADMS

(i).A: Project Type	New Technology (Commercially Available Offering)
(i).B: Additional References in the 2021 WMP	8.1
(i).C: 2020 WMP Section	5.1.D.3.21
(i).D: Project Objective and Summary	<p>PG&amp;E is undertaking the first component of a multi-year effort to implement an ADMS which will, when fully deployed, integrate into a single platform several of the current mission critical DCC applications (Distribution Supervisory, Control and Data Acquisition (D-SCADA) software, Demand Management System (DMS), and Outage Management System (OMS)) that are currently spread across multiple platforms. The ADMS will become part of the core distribution operations technology tools that enable the visibility, control, forecasting, and analysis of a more dynamic grid.</p> <p>ADMS impacts grid resiliency through: (i) facilitation of DER integration; (ii) switching operation enablement during PSPS events by providing more timely and accurate data to operators; (iii) identification of devices within fire areas to allow operators to disable reclosing relays when weather and conditions pose significant risk to the system.</p>
(i).E: UWMMM Categories & Capabilities Potentially Impacted	<p>F. Grid operations and protocols</p> <p>27. Protective equipment and device settings</p> <p>28. Incorporating ignition risk factors in grid control</p>
(ii).A: Project Phase	Multiple (phase varies with functionality considered)
(ii).B: Project Status	Software is under development.
(ii).C: Project Location	Applicable to the entire PG&E electric distribution service territory
(iii).A: Results to Date	<p>Q3 2020/Q4 2020</p> <p>–Performing software build for wildfire mitigation functionality</p>
(iii).B: Lessons Learned	–None to date
(iii).C: Quantitative Performance Metrics	<p>Per Action PGE-18 (Class B) in Section 5.1.7 of the <i>Wildfire Safety Division Evaluation of Pacific Gas and Electric Company's First Quarterly Report</i> dated January 8, 2021, PG&amp;E will be updating this field in the supplemental filing to the 2021 WMP update to be filed no later than February 26, 2021.</p> <p>–ADMS ability to identify automatic reclosing devices (e.g., Line Reclosers, Trip Savers, Fuse Savers) within fire areas and present the potentially impacted areas to operators for verification (to inform reclosing relay disablement)</p> <p>–Improvement of the situational awareness of operators through compilation of switching operation data sources into a single platform.</p>
(iii).D: Quantitative Risk Reduction Benefits	<p>Per Action PGE-18 (Class B) in Section 5.1.7 of the <i>Wildfire Safety Division Evaluation of Pacific Gas and Electric Company's First Quarterly Report</i> dated January 8, 2021, PG&amp;E will be updating this field in the supplemental filing to the 2021 WMP update to be filed no later than February 26, 2021.</p> <p>Wildfire risk reduction benefits are anticipated as described in the second paragraph of answer (i).D.</p>

<p>(iv).A: Ignition or Fault Risk Reduction Project Findings That Inform Current Operational Practices</p>	<p>–PG&amp;E is taking a phased approach to ADMS implementation to ensure that foundational capabilities are first established.  –Operator training simulator is planned for SCADA system and reclosing relay capabilities will help train operators on ADMS functionality to ensure timely adoption of ADMS platform.</p>
<p>(iv).B: Methods to Incorporate Project Findings Into Operational Practices</p>	<p>ADMS is a platform used for distribution operations. Operators will require training on the system and former systems will need to be sunset in a methodical manner that minimizes disruption to ongoing operations. Change management practices focused on people, process, and technology will be employed to ensure value streams from ADMS implementation are captured.</p>
<p>(v).A: 'End Product' at 'Full Deployment' and Location</p>	<p>Multi-year ADMS deployment will integrate several mission critical DCC applications that are currently spread across multiple platforms. This technology will enable the visibility, control, forecasting and analysis required from a more dynamic grid.   When fully deployed, the ADMS platform will bring the capabilities of today's D-SCADA software, DMS, and OMS into a single platform. Integrating these systems into a single, more efficient platform will reduce the potential for operator error, improve cybersecurity risk controls, and enable PG&amp;E to run a new suite of advanced applications that enhance current capabilities associated with safety and resiliency, while responding to future needs associated with the growth of DERs and complexities from wildfire risk.</p>

**CONDITION GUIDANCE-10**  
**DATA ISSUES – GENERAL**

**Deficiency:** Although the availability of data, including GIS data, provides unprecedented insight into utility infrastructure and operations, inconsistencies and gaps in the data present a number of challenges and hurdles. As it relates to GIS data, electrical corporation submissions often had inconsistent file formats and naming conventions, contained little to no metadata, were incomplete or missing many data attributes and utilized varying schema.

These deficiencies rendered cross utility comparisons impossible without substantive, resource and time-consuming manipulation of the data. Additional data challenges included varying interpretations of WMP Guideline data requirements, leading to inconsistency of data submitted.

***Condition: Electrical corporations shall ensure that all future data submissions to the Wildfire Safety Division (WSD) adhere to the forthcoming data taxonomy and schema currently being developed by the WSD. Additionally, each electrical corporation shall file a quarterly report detailing:***

- i. Locations where grid hardening, VM, and asset inspections were completed over the prior reporting period, clearly identifying each initiative and supported with GIS data;***
- ii. The type of hardening, VM and asset inspection work done, and the number of circuit miles covered, supported with GIS data;***
- iii. The analysis that led it to target that specific area and hardening, VM or asset inspection initiative; and***
- iv. Hardening, VM, and asset inspection work scheduled for the following reporting period, with the detail in (i) – (iii).***

## **Introduction**

In our 2019 and 2020 WMPs, electrical corporations were requested to provide various GIS data with limited guidance or standardization, which required interpretation to address. PG&E appreciates WSD's effort to refine its guidance and provide standardization through the Draft WSD GIS Data Reporting Requirements and Schema released on August 5, 2020 (Draft GIS Data Standard). Condition Guidance-10 addresses one feature dataset (3.5: Initiatives) of the six total feature datasets included in WSD's Draft GIS Data Standard.



Consistent with prior quarterly reports, as directed through the WMP August workshops, PG&E is submitting alongside the initiatives data required by Condition Guidance-10 a GIS data “Status Report” and additional Data Submission in alignment with the Draft GIS Data Standard. PG&E’s submissions of the requested Status Report and Data Submission (collectively referred to as “GIS Data Standard Submission”) are not fully complete as we do not have all the data requested or in the format requested. This is consistent with what the WSD noted on page 5, Section 2.8 of the Draft GIS Data Standard:

Realistically, the WSD understands that electrical corporations are at different stages of their data journeys and employ differing business practices, which may impact certain electrical corporations’ abilities to fully comply with the requirements in this document. The WSD looks forward to working collaboratively with electrical corporations and other stakeholders to determine appropriate and feasible submission schedules for regular reporting of GIS data.

A full quality validation of all data being provided in the submission was not possible and there may be incorrect data in some of the datasets. Additionally, some of the inputs in the submission report reflect preliminary estimates. For example, Planned Initiative data reflects forecasts that are subject to change based on operational developments. In addition, for data not provided in the current submission, the Status Report inputs for “Estimated Delivery Timeframe” represent conceptual approximations that have significant dependencies, including but not limited to procedural and technological developments, which could impact timeframes for delivery.

PG&E’s existing data and system architecture were developed over decades to address specific operational uses and lack integration capability and a cohesive data schema. This presents significant challenges to accessing and aligning data to meet WSD’s Draft GIS Data Standard. The various data requested exist across disparate systems and in the current state require significant time and resources to manually align data sets to data schemas provide by WSD and extract the data. Many of these same resources are currently involved in core operations work, including wildfire and storm response and PSPS readiness and activation. Provided the compressed timelines for this submission, there was insufficient time and resource availability to perform a comprehensive quality check of data and the associated Status Report included in this submission. For reference, select data in this submission was requested through December 31, 2020 – and due to CPUC by February 5, 2021, providing only ~5 weeks

to collect, curate, transform, perform antivirus scanning, and submit the data in file geodatabase (FGDB) format.

PG&E delivered its First Quarterly Submission on September 9, 2020. This submission included data in the FGDB format for 15 of 38 feature classes and 4 of 15 related tables. Data for another 4 feature classes and 2 related tables was submitted in tabular format as an appendix file.

In PG&E's Second Quarterly Submission, delivered on December 9, 2020, PG&E instituted multiple measures to improve the quantity and quality of its submission. PG&E focused on increasing the number of Feature Classes and data attributes included in the FGDB submission while providing a more comprehensive Status Report to describe the FGDB data elements. To meet the first objective, PG&E implemented data collection processes for this new reporting requirement to enable more efficient data collection, curation, and organization and invested significant time in mapping the WSD GIS Schema to PG&E's internal GIS schema for 3.1 (Asset Point) and 3.2 (Asset Line).

In late December 2020, WSD released a Quality Control (QC) Report on PG&E's First Quarterly Submission, detailing "findings on completeness and quality of GIS data submitted by PG&E on September 9, 2020." Prior to receiving the QC Report on PG&E's First Quarterly Submission, PG&E had already delivered its Second Quarterly Submission, which addressed various QC Report findings from its First Quarterly Submission. PG&E appreciates WSD's thorough QC Report and is taking actions to address findings on a prioritized basis, as detailed in the Guidance-10 table below.

In this Third Quarterly Report, PG&E is expanding the mapping of the WSD GIS Schema to PG&E's internal SAP schema for feature dataset 3.1 (Asset Point) and 3.2 (Asset Line). This mapping was performed on an expedited basis. Provided the time constraints for this submission (detailed earlier in this section), it was not feasible to integrate this data, which requires manual consolidation and curation across the SAP and GIS systems. However, the data mapping provides a foundation for incremental data inputs into future quarterly submissions. It also provides a baseline to assess the level of effort required to automate portions of the quarterly and annual GIS Data Schema reports. Automation will require significant inputs and resources to address, including but not limited to: (i) coordination across Asset Owners, Subject Matter Experts (SME), and technical resources; (ii) architectural changes; and (iii) technology implementation. In addition, PG&E enhanced the quality for this Third Quarterly Report

relative to former submissions by addressing prioritized findings from WSD's QC Report, as detailed in the Guidance-10 Table below. For example, PG&E increased the specificity of its Status Report and enhanced its accuracy relative to the FGDB submission. Additionally, efforts were made to develop a Metadata baseline entry. A series of workshops was held to add detail to both the Data Inventory and Metadata. While PG&E aims to integrate WSD's QC Report findings into future submissions, some findings were not feasible to address between receiving the QC Report and initiating 2021 Q1 submission activities. PG&E plans to further assess methods to address these findings in the period between the Q1 and Q2 2021 submission periods. PG&E aims to continuously improve its submissions, both quantitatively and qualitatively.

Guidance-10 Table: WSD QC Report Findings (Q3 2020 Submission)			
Finding	Description	Status	Notes
<b>2.2.1 Reporting Accuracy (Partial Completion)</b>	<b>Data attributes not 100 percent complete should be marked 'Partial'</b> "Reporting did not adhere to the guidance provided by the WSD on how to complete the spreadsheets"	Addressed	PG&E has updated internal processes to label any data attributes <100% complete as 'Partial'. In the 2021 Q1 submission PG&E applied this protocol.
<b>2.2.1 Reporting Accuracy (Appendix files)</b>	<b>Data Inventory inconsistent with FGDB content</b> "There were inaccurate status statements in the Excel tracking document that indicated data were provided when they were not."	Addressed	For the 2020 Q3 submission, PG&E submitted 'appendix' file attachments for several Feature Classes and indicated that such Feature Classes were included in the submission. In the Q1 2021 submission, PG&E only labeled data fields 'Complete' if they were included in the FGDB with 100 percent data attributes.
<b>2.2.1 Reporting Accuracy (Modified Inventory Reporting)</b>	<b>Data inventories were duplicated to provide additional reporting information</b> "PG&E modified the conventions of the provided data tracking spreadsheet tables by sometimes breaking down reporting into multiple responses for the same tables. This involved creating more than one set of the provided tracking columns."	Addressed	This finding is addressed in the 2021 Q1 submission through the consolidation of Status Report templates that were broken out for the 2020 Q3 submission.
<b>2.2.2 Data Absence and Timeframe Explanations</b>	<b>Generic explanations for data absence repeatedly used</b> "Responses that are vague are not acceptable. Highly detailed field-specific responses are not expected for all fields, but general repeated responses that are more specific than "Further assessment required" would be an improvement."	Improvements in progress	Workshops were held with SMEs to add detail and specificity to Availability Explanation, Data Procurement Action, and Timeframe entries where feasible. Developing more detailed entries requires assessment of potential people, process, & technology solutions, the change management associated with altering data and system architecture originally built with an operational focus, and cross-team dependencies. While progress was made, PG&E acknowledges that there is still room to address this finding.
<b>2.2.3 Confidentiality Assessments</b>	<b>Confidentiality explanations were generic</b> "[Confidentiality] explanations were sometimes vague, but their inclusion was appreciated." The confidentiality declaration document ("DRU-2914B_Confidentiality Declaration.pdf") covers some general categories of data... but does not specifically address the submitted GIS data."	Improvements in progress	PG&E refined its confidentiality explanations in the 2020 Q4 submission.

**Guidance-10 Table: WSD QC Report Findings (Q3 2020 Submission) (Continued)**

Finding	Description	Status	Notes
<b>2.3 Overall Schema and Requirement Adherence</b>	<b>Values were input in an incorrect format</b> A. "Values were input that were in a completely incorrect format B. Values were sometimes all capitalized or had inconsistent capitalization when they were required to all have sentence style capitalization. C. Domain values provided by the WSD were not always used."	Improvements in progress	This finding is being reviewed by SME teams to identify and address the root cause. However, there was limited time to act on this finding while preparing the Q1 submission.
<b>2.3 Overall Schema and Requirement Adherence</b>	<b>All data not submitted as one geodatabase</b> "Contrary to WSD guidance, PG&E did not submit all data in one geodatabase. ...All future quarterly GIS data submission from PG&E must be in a single geodatabase per WSD directions, and there must not be multiple versions of the same data in a single submission."	Addressed	WSD finding addressed in the 2020 Q4 submission by submitting a single, consolidated FGDB.
<b>2.4 Related Table Issues</b>	<b>Initiative Asset Log table missing from submission</b> "A major related table problem is the absence of the required 'Initiative Asset Log' table. Without 'Initiative Asset Log' data, the value of all initiative data provided is significantly diminished and is unacceptable... The 'Initiative Asset Log' table must be provided in future submissions."	Open	This finding is being reviewed by SME teams, however, there was limited time to act on this finding while preparing the Q1 submission. PG&E's existing data and system architecture were built with an operational focus and differs from the data schemas provided through WSD's Draft GIS Data Standard. The various data requested exist across disparate systems and in the current state require significant time and resources to manually pull and align data sets to data schemas provide by WSD. Further exploration into sustainable technology solutions is in progress.
<b>2.4.2 VM Inspection</b>	<b>Data not in one-to-many relationship</b> "For vegetation management inspection data, the "Vegetation Management Inspection Log" related table was supposed to have a one-to-many relationship with the "Vegetation Management Inspection Point" and "Vegetation Management Inspection Line" feature classes."	Open	This finding is being reviewed by SME teams, however, there was limited time to act on this finding while preparing the Q1 submission. PG&E's existing data and system architecture were built with an operational focus and differs from the data schemas provided through WSD's Draft GIS Data Standard. The various data requested exist across disparate systems and in the current state require significant time and resources to manually pull and align data sets to data schemas provide by WSD. Further exploration into sustainable technology solutions is in progress.
<b>2.4.3 VM Project</b>	<b>Data not in one-to-many relationship</b> "Vegetation management project data was meant to have a one-to-many relationship."	Open	This finding is being reviewed by SME teams, however, there was limited time to act on this finding while preparing the Q1 submission. PG&E's existing data and system architecture were built with an operational focus and differs from the data schemas provided through WSD's Draft GIS Data Standard. The various data requested exist across disparate systems and in the current state require significant time and resources to manually pull and align data sets to data schemas provide by WSD. Further exploration into sustainable technology solutions is in progress.

Guidance-10 Table: WSD QC Report Findings (Q3 2020 Submission) (Continued)

Finding	Description	Status	Notes
<b>2.4.4 Asset Inspection</b>	<b>Data not in one-to-many relationship</b> “Asset Inspection data was meant to have a one-to-many relationship.”	Open	This finding is being reviewed by SME teams, however, there was limited time to act on this finding while preparing the Q1 submission. PG&E’s existing data and system architecture were built with an operational focus and differs from the data schemas provided through WSD’s Draft GIS Data Standard. The various data requested exist across disparate systems and in the current state require significant time and resources to manually pull and align data sets to data schemas provide by WSD. Further exploration into sustainable technology solutions is in progress.
<b>2.5 Submission Procedure Adherence</b>	<b>Empty Feature Classes were not removed prior to submission</b> “Feature classes or tables that are completely empty, need to be deleted. Only submit feature classes and tables that have data.”	Addressed	This finding is addressed in the 2021 Q1 submission .
<b>2.5 Submission Procedure Adherence</b>	<b>Data were not initially submitted to the correct location</b> “The data were not initially submitted to the correct location”	Addressed	This finding was addressed in the 2020 Q4 submission .
<b>2.6 Metadata</b>	<b>Metadata not included in submission</b> A. “Field definitions are among the higher priority metadata that were absent.” B. “Describe the methodology for how the data were developed.”	Improvements in progress	This finding was reviewed by SME teams, PG&E developed a baseline for Metadata inputs, and included portions of the Metadata in the 2021 Q1 submission. In addition, select Metadata information is also included in the Status Report.
<b>2.7 Data Absent in 9/9/20 Submission but Present in Previous Submissions</b>	<b>Data omitted, but provided in other data requests</b> “WSD provided a table showing data that was previously provided, but absent in this submission.”	Improvements in progress	Though data may have been provided in other data requests, it may have not been required in a similarly prescriptive which introduces significant complexity necessitating procedural and/or technology solutions. PG&E substantially increased its submission rate since the first quarterly report (2020 Q3).
<b>2.8 Photos</b>	<b>Photos and photo-related data not included in submission</b> “PG&E did not submit any photo log data or photos, but photos are a requirement and expected in future submissions.”	Open	This finding is being reviewed by SME teams, however, there was limited time to act on this finding while preparing the Q1 submission. The IT architecture was built for operational purposes and is not aligned with WSD’s GIS Data Schema. Assessments to address this finding and exploration of potential sustainable solutions will progress through Q2 2021.

For data not currently collected or not architected per WSD's required schema, PG&E is currently exploring the feasibility and resource requirements to collect, transform, and ultimately submit these data. These assessments are accomplished through workshops with cross functional teams (Asset Owners, SMEs, GIS Analysts) and will assess the feasibility and prioritization of future potential improvements. Updates to individual data field availability can be found through PG&E's Status Report. PG&E would appreciate the opportunity to share these findings with WSD to drive potential refinements to the Draft GIS Data Standards going forward.

PG&E has made significant effort to quantitatively and qualitatively improve its quarterly submission and will continue to seek ways to enhance future submissions. Enhancement opportunities will largely require more involved operational and technological changes, including a significant level of resources required to collect, curate, and organize the Data Standard submissions on a recurring basis, while simultaneously advancing our data maturity. PG&E looks forward to continued conversation and collaboration with the WSD and other stakeholders on the Draft GIS Data Standard.

#### **Response to Subpart i, ii, iv**

The data in response to Subparts, i, ii, and iv has been provided in GDB files and an accompanying Status Report, that have been uploaded to the CPUC via Kiteworks as part of PG&E's third quarterly GIS Data Standard submission. A stand-alone FGDB file and Status Report were not uploaded separately for Guidance-10, as the data and information in these files would overlap with what is being submitted for the GIS Data Standard submission. "Prior reporting period" data for Subpart i covers the fourth quarter of 2020 (the months of October, November, and December) and "following reporting period data" for Subpart iv covers the first quarter of 2021 (the months of January, February, March). These data submissions followed the Draft WSD GIS Data Standard to the best of PG&E's ability. As was noted in our Comments on WSD Staff Proposals and Workshops, PG&E is advancing its maturity with regard to data management and technology, related business processes, and subject matter expertise in this space to improve its reporting capability. However, PG&E's data systems have evolved organically over decades, which has created challenges in accessing and mapping all of the data to the WSD data schema or accessing some data for reporting purposes. Those limitations directly impact our ability to compile all identified data

fields. PG&E's focus for this Third Quarterly Report was on improving the submission relative to the first and second quarterly submissions, respectively. In addition, PG&E further built out its inventory of information regarding all GIS data fields through the Status Report, and responded to a variety of the WSD findings which focused on PG&E's first quarterly submission. That inventory provides some of the metadata related to the GIS fields submitted in response to this condition, Guidance-10, as well.

As it relates to the asset inspection data, please note that PG&E's submission only included inspections that were associated with valid equipment records. Because PG&E's electric infrastructure is a dynamic collection of assets, equipment is regularly replaced and deactivated at which time the GIS feature for that asset is removed. Some population of inspections are associated with equipment that has subsequently been removed from the GIS system. Those inspection records have, therefore, been removed from this data submission as well.

### **Response to Subpart (iii)**

#### **Asset Inspections**

PG&E described its Asset Management and Inspections programs in Section 7.3.4 of our 2021 WMP.

Preventive maintenance tasks such as enhanced inspections of overhead assets are a key means for PG&E to proactively identify potential failure modes that could lead to ignition if not resolved timely. Through a combination of ground inspection, intrusive wood pole testing, aerial inspections, infrared (IR) assessments, and patrols, PG&E seeks to identify conditions that require repair or replacement of assets prior to failing. Previously, PG&E utilized a time-driven cycle to prescribe patrol and inspection activities to transmission circuits or distribution plat maps. Since 2019, PG&E has undertaken efforts to develop risk-informed models that prioritize preventive asset patrol and inspection activity cycles aligned with the risk of wildfire ignition, including increasing the frequency of such preventive tasks in HFTD Tiers 2 and 3. Similarly, the evaluation and finalization of corrective findings by a Centralized Inspection Review Team was established for distribution, transmission, and substation inspection programs in 2019 and continues as a core component of the patrol and inspection program.



For 2020 through 2022, PG&E considers enhanced detailed inspections of overhead assets, which exceed the minimum requirements of General Order (GO) 165 to include the following tasks:

- Distribution: digitized capture of detailed visual inspection via checklists and photographic documentation from a ground vantage point.
- Transmission: digitized capture of detailed visual inspection via checklists and photographic documentation, both from ground position and by aerial vantage, are coupled to complete an enhanced inspection cycle.
- Transmission (500 kV): this examination also includes structural integrity assessment of tower structures via climbing inspection.

The supplemental (enhanced) substation inspections carried on in addition to the baseline GO 174 inspections include digitized capture of detailed visual inspection via checklists and photographic documentation, both from ground vantage and by aerial means, coupled to complete an enhanced inspection. Supplemental enhanced substation inspections also include an IR inspection.

Enhanced inspections, meaning the use of digital checklists, documentation of asset features, capture of standard imagery, and centralized inspection review of findings, as well as work quality monitoring, have been applied systemwide for overhead transmission and distribution (T&D) assets as of 2020 detailed inspection cycles. This includes ground, climbing, and aerial inspection collection methods in transmission and distribution, whether in HFTD or otherwise. Corrective findings from patrol inspections, IR inspections, and other emergent inspection methods are also subjected to centralized inspection review, but those patrol and inspection methods have not yet shifted to use the electronic documentation approach and remain largely paper based in their documentation.

Although the approach to digital data capture for enhanced inspections in HFTD and non-HFTD areas is the same, the frequency of inspections and specific checklist content may be different. For 2020 through 2022, PG&E intends to complete enhanced detailed inspections of overhead electric assets in HFTD areas at the following recurrence interval:

- HFTD Tier 3 annually; and
- HFTD Tier 2 every three years.

Aerial inspections of overhead transmission assets in the following recurrence interval:

- HFTD Tier 3 annually; and
- HFTD Tier 2 every three years.

Climbing inspections of 500kV transmission tower structures in the following recurrence interval:

- HFTD Tier 3 annually; and
- HFTD Tier 2 every three years.

Patrol inspections (patrols) of overhead assets of T&D in the following recurrence interval:

- HFTD Tier 2 on years when enhanced detailed inspections are not scheduled (e.g., two of every three years).

IR patrols of overhead assets of transmission, and substation in the following recurrence interval:

- HFTD Tier 3 annually; and
- HFTD Tier 2 every three years.

IR patrols of overhead assets of distribution in the following recurrence interval:

- HFTD Tier 3 1/3 annually for three years; and
- HFTD Tier 2 1/3 annually for three years.

Supplemental Ground and Aerial Inspections of Substation assets in the following recurrence interval:

- HFTD Tier 3 annually; and
- HFTD Tier 2 every three years.

Intrusive wood pole inspections of overhead wood poles in the following recurrence interval:

- Within 15 years of wood pole installation date, and every ten years thereafter.

Aside from locations with access constraints, PG&E plans to complete these enhanced inspections in HFTD Tiers 2 and 3 locations before July 31, 2021.

## **Grid Hardening**

### ***System Hardening – Distribution***

PG&E described its system hardening program in Section 7.3.3.17 of our 2021 WMP. System hardening work is performed in compliance with TD-9001B-009 Rev 2.

For 2021, PG&E has switched over from REAX to Technosylva, which has been adopted as our Wildfire Consequence Model. The Wildfire Consequence Model was incorporated into PG&E's 2021 Wildfire Distribution Risk Model (see further explanation

in Section 4.5.1 of the 2021 WMP). This change and other associated improvements in our modeling, data, and understanding of fire risk, has led to a shift in thinking about where to target system hardening resources. PG&E's 2021 Wildfire Distribution Risk Model resulted in a significant pivot for PG&E in the targeting of where work would be directed to continue to harden the highest wildfire risk miles.

As noted in Section 7.3.3.17 of the 2021 WMP, the highest wildfire risk miles are separated into three categories:

1. The top 20 percent of circuit segments as defined by PG&E's 2021 Wildfire Distribution Risk Model for System Hardening
2. Fire rebuild miles
3. PSPS mitigation miles

PG&E also considers secondary risks as part of the System Hardening efforts such as PSPS impacts, egress/ingress routes to support fire department response times and public safety, past fire history and effects on available fuels, current system condition, environmental risks to reconstruction activities, and general accessibility considerations to enhance employee safety.

PG&E is targeting 180 miles for System hardening in 2021. It is required that 80 percent of these miles be highest risk miles and 10 percent must be undergrounded over the three-year period from 2021-2023. While this target of 180 miles does represent a drop from the 2020 mileage target, this is as a result of the previously referenced improvement in modeling and significant pivot in targeting. PG&E needed to align its System Hardening projects with the results of the 2021 Wildfire Distribution Risk Model. This target for 2021 is still aggressive because the cycle time for a system hardening project generally exceeds 12 months. Given the implementation of the new model, 60 percent of the 2021 plan is still in scoping phase, which creates an execution risk because the projects are behind where they would normally be for construction in 2021.

### ***Emergency Strategic Fire Rebuild – Covered Conductor Installation***

If a distribution line requires a fire rebuild in response to a fire event; and Remote Grid/Customer Buy Out, line removal, or undergrounding strategies are not feasible; overhead hardening is utilized. Once the overhead hardening alternative is identified as the appropriate solution, we look to relocate the circuit if possible. This is typically the

case for distribution primary conductor that runs through rural, heavily wooded, or inaccessible terrain that could be relocated to a road or more accessible location. For primary distribution overhead conductor in Tier 2/3 HFTD areas where >4 spans require full reconstruction or large sections of intermittent damage are present, overhead hardening is done in place in compliance with TD-9001B-009. In 2020, approximately 202 miles of overhead hardening were completed as part of the Emergency Strategic Fire Rebuild.

### ***Capacitor Maintenance and Replacement***

PG&E described its Capacitor Maintenance and Replacement Program in Section 7.3.3.1 of our 2021 WMP. Capacitors are placed on the distribution system based on engineering capacity studies that target low voltage areas where installing capacitors can improve low voltage conditions. Once installed, PG&E's capacitor maintenance, inspections, and replacements are governed by Utility Procedure: TD-2302P-05. This utility procedure classifies maintenance tasks for electric overhead and underground equipment, including capacitor banks, fault indicators, interrupters, reclosers, voltage regulators, SCADA and Primary Distribution Alarm and Control controls, sectionalizers, streetlights, and sump pumps.

Individually, capacitor banks in the distribution system, both overhead and pad-mounted, are tested and inspected annually. The visual part of the inspection includes verifying conditions on the bushings, switches, capacitor tanks, cut-outs, fuses, control cabinets. Within the control cabinet, PG&E further visually inspects the controller, controller box socket and rack to make sure it is properly grounded, as well as inspecting the potential and CTs.

Annual testing entails recording a clamp-on ammeter reading on the primary jumper on each phase of the bank while the capacitor bank is energized. These values are compared to standard expected ranges based on the tank size and circuit voltage. If recorded values exceed the normal ranges, further inspection is required to determine the possibility of a failed capacitor unit or a bad connection. This comprehensive annual testing validates the proper operation and wildfire safety of capacitors deployed in PG&E's system.

Annual capacitor maintenance is performed on all distribution capacitors regardless of geography or other factors. As noted above, the actual location of capacitors is determined based on system conditions. Planning engineers perform capacity reviews

generally targeting capacitor for areas with known low voltage conditions such as long rural circuits or areas with high inductive loads due to large air conditioning or industrial power usage. The testing usually starts in the first quarter and is completed by April 1. PG&E annually tests and inspects approximately 11,400 capacitors, approximately 10 percent of which require corrective action in any given year based on inspection results. All repairs or replacements are required to be completed by June 1 before peak summer conditions increase electric load. PG&E plans to continue this annual inspection and testing approach going forward.

### ***Distribution Segmentation***

PG&E described its distribution line sectionalizing program in Section 7.3.3.8.1 of our 2021 WMP. PG&E's plan is to enhance its distribution segmentation strategies including: (a) adding automated sectionalizing devices; (b) circuit reconfiguration/pre-PSPS Event switching; and (c) additional system hardening to support PSPS switching.

Distribution sectionalizing device installations have been focused on all circuits that traverse into HFTD areas. PG&E plans to incorporate learnings from past events and focus efforts primarily on counties and specific areas that are repeatedly impacted by PSPS. This includes (but is not limited to) Butte, Yuba, Sonoma, Napa, Nevada, and El Dorado counties. PG&E installed 603 SCADA commissioned distribution sectionalizing devices by September 1, 2020. In 2021, PG&E plans to install at least 250 more distribution sectionalizing devices integrating learnings from 2020 PSPS events, 10-year historical look-back of previous severe weather events, and feedback from county leaders and critical customers.

## **Vegetation Management and Inspection Programs**

PG&E describes its Vegetation Management and Inspection programs in Section 7.3.5 of the 2021 WMP. PG&E's Distribution VM program has been designed and implemented to ensure safe and reliable operation of distribution facilities and to prevent foreseeable vegetation outages. In addition, the Distribution VM program is designed to monitor compliance with state and federal laws and regulations including GO 95, Rule 35, California Public Resource Code (PRC) Sections 4292 and 4293, and PG&E's 2021 WMP. PG&E accomplishes these goals through the following programs.

### ***Enhanced Vegetation Management (EVM)***

EVM program prioritization starting in 2021 is based on the Vegetation Risk Model (See Section 4.5.1 of the 2021 WMP), which is a risk-informed model that allows us to prioritize our work at the Circuit Segment or Circuit Protection Zone (CPZ). CPZs are the smallest non-overlapping sections of the distribution grid that can be de-energized.

The EVM Program is a multi-year program that performs risk-based, scheduled patrols on overhead primary distribution facilities. EVM patrols occur on specific line sections, based on risk, within Tier 2 and Tier 3 of the CPUC-designated HFTDs. In HFTD areas, PG&E's Routine VM meets regulations requiring 4 feet radial clearance around overhead distribution lines. The EVM program is much more expansive and aggressive and includes the following:

- Radial Clearances: Exceeding the 4-foot minimum clearance requirement by ensuring vegetation requiring work is trimmed to the CPUC recommended 12-foot clearance at time of trim and in some cases, trimming beyond 12 feet depending on tree growth rates, among other factors. Trimming to the CPUC recommended 12-foot clearance ensures compliance with GO 95, Rule 35.
- Overhang Trimming: Removing overhanging branches and limbs four feet out from the lines and up to the sky around electric power lines to further reduce the possibility of wildfire ignitions and/or downed wires and outages due to vegetation-conductor contact.
- Assessing Trees with the Potential to Strike: Evaluating all trees in HFTDs tall enough to strike electrical lines or equipment and, based on that assessment, trimming or removing trees that pose a potential safety risk, including dead and dying trees.

At this time, PG&E is forecasting to work on approximately 1,800 circuit miles and mitigate approximately 190,000 trees in 2021, for the EVM program.

In 2020 PG&E exceeded our EVM goal of inspecting 1,800 miles, and approximately 160,000 trees were worked.

### ***Routine VM***

The Routine VM program performs scheduled inspections on all overhead primary and secondary distribution facilities to maintain radial clearance between vegetation and conductors by identifying trees that will encroach within the minimum distance requirements required by law or PG&E procedures, dead, dying and declining trees.

The VM Second Patrol program, (also known as a Catastrophic Event Memorandum Account (CEMA) Patrol), performs scheduled mid-cycle patrols approximately six months before or after the routine patrol on all overhead primary and secondary distribution facilities to maintain radial clearance between vegetation and conductors by identifying trees that will encroach within the minimum distance requirements required by law or PG&E procedures and by identifying dead, dying, and declining trees that have the potential to strike the conductors. Second patrols occur primarily within HFTDs.

In 2020, PG&E trimmed approximately 1.5 million trees (including 2019 carry-over) in Routine VM. PG&E identified approximately 68,000 CEMA trees and trimmed approximately 65,000 trees (including 2019 carry-over). In 2021, the plan for Routine VM includes approximately 1.3 million trees and the Second Patrol plan includes approximately 25,000 trees.

### ***Vegetation Control (Pole Clearing)***

PG&E performs removal of vegetation around T&D poles and towers, in accordance with PRC Section 4292, to maintain a firebreak of at least 10 feet in radius (out from the pole) up to 8 feet up from the ground. These requirements apply in the SRAs during designated fire season and such designation is a priority in performing this defensible space activity. PRC 4292, which applies to State Responsibility Area (SRA) and United States Forest Service lands, determines the geospatial application pole clearing requirements. In 2020, all poles identified as subject to PRC Section 4292 were cleared and maintained for the duration of declared fire season. The 2021 plan includes approximately 101,000 poles.

**CONDITION PG&E-11**  
**INCLUDING ADDITIONAL RELEVANT REPORTS**



**Deficiency:** In Section 5.2.A of its WMP, PG&E identifies several internal reports it generates for its leadership and Board of Directors (a weekly dashboard, status and tracking reports that provide leadership and the Board visibility into the different elements of the WMP). PG&E also makes reports to the federal monitor in its federal criminal probation case before District Judge William Alsup.

**Condition:** *In its quarterly reports, PG&E shall append the following:*

***i. All internal reports provided to its Executive Officers and/or Board of Directors, as described in Section 5.2A of its 2020 WMP, during the previous quarter. In its first quarterly report, PG&E shall also produce all internal reports or other documents provided to its Executive Officers and/or Board of Directors related to its electric grid from January 1, 2018 to the present; and***

Per Resolution WSD-011, Attachment 3, page 6, for the purposes of this response, the “previous quarter” is defined as October 1, 2020 to December 31, 2020. PG&E is submitting all internal reports provided to its Executive Officers and/or Board of Directors, as described in Section 5.2A of our 2020 WMP, in the previous quarter. Please note that the responsive documentation excludes documents provided to the Executive Officers and/or Board of Directors under attorney client or attorney work product privileges. Please see attachment 2020WMP\_ClassB\_PGE-11\_Atch01 for those documents.

***ii. All reports or other documents related to its electric grid provided to the federal monitor in the previous quarter. In its first quarterly report, PG&E shall also produce all reports or other documents related to its electric grid provided to the federal monitor from January 1, 2018 to the present.***

PG&E is enclosing all reports or other documents related to our electric grid provided to the Federal Monitor from the previous quarter—please see attachment: 2020WMP\_ClassB\_PGE-11\_Atch01 for those documents.

The materials provided in the previous quarter to our Federal Monitor include the listed dashboards below. These reports allow the Monitor team to assess progress on an ongoing basis to ensure PG&E complies with probation requirements and metrics set forth in the WMP. Any Excel documents provided include only the visible tabs provided to the Federal Monitor. The origination dates of reports to the Monitor vary due to these items being discussed at different stages of the Monitor’s assessment of PG&E.

## **Federal Monitor Dashboards**

- Community Wildfire Safety Program (CWSP) Weekly Dashboard;
- Weather Station and Camera Progress;
- EVM Progress Dashboard;
- Monitor Report Tracker;
- Weekly Electric Distribution Director deck;
- Expense and Capital Spending Report;
- Ignition Tracker;
- System inspections progress;
- Aerial inspection progress;
- Maintenance and Construction (M&C) Work Progress; and
- System Hardening progress.

The Federal Monitor team also receives additional reports and dashboards related to other areas of electric operations which include but are not limited to safety, compliance and ethics, and contractor trainings. These materials are not provided in this response as they do not directly impact the electric grid.

**CONDITION PG&E-22**  
**SOME OF PG&E'S VM INSPECTORS MAY LACK PROPER**  
**CERTIFICATION**

**Deficiency:** PG&E's VM inspectors may lack proper certification; they may not be certified by the International Society of Arboriculture (ISA). Since the scope of its program is so large, PG&E developed a specific evaluation tool called the "Tree Assessment Tool (TAT)" to be used by inspectors; however, PG&E is not requiring inspectors to be ISA certified.

**Condition:** *In PG&E's quarterly reports, PG&E shall detail:*

***i. The portion of its inspectors who are ISA certified;***

The ISA offers many different levels of certification. PG&E assumes that the question above is referring to ISA Certified Arborists. Approximately 29 percent of PG&E's Pre-Inspectors are ISA Certified Arborists. Additionally, approximately 3 percent of Pre-Inspectors are Registered Professional Foresters in the State of California. It is important to note that while being an ISA Certified Arborist may be helpful, this credential alone does not sufficiently qualify or determine whether an individual will be a good Pre-Inspector. For instance, VM has experienced an influx of out-of-state ISA Certified Arborists in the past who could not properly identify California trees and did not understand local vegetation growth rates. Also, VM has experienced ISA Certified Arborists who have been active in the industry for a long time and still misidentify trees or miscalculate growth rates. Additionally, to become an ISA Certified Arborist, you must be trained and knowledgeable in all aspects of arboriculture and meet a minimum qualification of having three or more years of on the job experience. That is why PG&E's pre-inspection program focuses on: (1) a Structured Learning Path to train Pre-Inspectors, (2) verification of 100 percent of EVM Pre-Inspector work, and (3) use of PG&E's TAT. Each of these is described below.

**The Structured Learning Path**

The Structured Learning Path for Pre-Inspectors includes the completion of a nine-course comprehensive training program that includes web-based training (WBT), scenario-based skills assessments, on-the-job training (OJT), and mentoring relationships with experienced Pre-Inspectors. Pre-Inspectors are required to pass scenario-based skills assessments that test key concepts covered in the training program, and experienced Pre-Inspectors will be paired with new Pre-Inspectors to provide OJT and serve as mentors and resources during the Pre-Inspector's first year of

training. We also require that contracted Pre-Inspectors pass an assessment in order to work as a PG&E Pre-Inspector contractor for VM.

### **Work Verification (WV)**

100 percent of EVM pre-inspection work is reviewed by the WV team, approximately 90 percent of whom are ISA Certified Arborists. The other 10 percent of the WV team generally have years of experience in forestry and/or utility line clearance work. As explained in our response to Condition PGE-19 in the Second Quarterly Report, the WV team reviews the completed pre-inspection work (doing this with the Pre-Inspector who performed the work beginning in 2020, to provide opportunities for correction, learning, and insight). We believe that teaming up the Pre-Inspector with the WV individual during the review provides the best opportunity for Pre-Inspector learning. Additionally, WV is bringing on additional work verifiers both internal and external. In 2021, PG&E will begin WV for both routine and CEMA work.

### **Tree Assessment Tool**

Finally, Pre-Inspectors using the TAT are less likely to need to make subjective decisions when identifying hazard trees. The PG&E TAT incorporates historical data on tree failures, regional species risk, and local wind gust data, to supplement the Pre-Inspector's knowledge and judgment with solid data and analytical insight. We have found that most, if not all, other risk assessment tools in the industry today still rely on subjective judgment by inspectors in the field who may lack access to the types of data and historical analysis available to PG&E Pre-Inspectors using the TAT. External SMEs from California Polytechnic State University and University of California, Berkeley have contributed to the TAT.

In summary, PG&E's approach to pre-inspection does not solely rely on the individual certifications of each inspector. Rather, our pre-inspection program provides and improves the overall training for everyone, verifies all work prescribed by EVM inspectors, and leverages a new tool to improve assessments.

### ***ii. The portion of its inspectors who plan to be ISA certified by the time of its 2021 WMP supplement filing; and***

Our vendors continue to actively support all Pre-Inspector employees in becoming ISA Certified Arborists. The portion of Pre-Inspectors that are ISA certified has increased by one percent since our last quarterly update. Currently 30 percent of our

Pre-inspectors are ISA Certified Arborist and our plan is to continue to support certification efforts as described in our 2021 WMP.

***iii. How it will ensure effective inspection QC protocols if some inspectors are not ISA certified.***

As we have described above, PG&E uses training, procedural guidance, and WV to ensure pre-inspection QC.

As discussed above in Subpart i, PG&E has implemented the Structured Learning Path, a 9-course, comprehensive Pre-Inspector training program for all Pre-Inspectors that includes WBT, scenario-based- skills assessments, OJT, and mentoring relationships with experienced Pre-Inspectors. Pre-Inspectors are required to pass scenario-based- skills assessments that test key concepts covered in the training program, and experienced Pre-Inspectors will be paired with new Pre-Inspectors to provide OJT and serve as mentors and resources during the Pre-Inspector's first year of training. This training includes a module devoted entirely to PG&E's EVM Program and is thus also a requirement for contractors performing EVM inspections. Contract Pre-Inspectors must also pass an assessment in order to work as a Pre-Inspector contractor for VM within PG&E.

PG&E's VM Department uses an Expert Technical Writer with a small contract staff team. These writers are currently reviewing all procedural documents related to VM and ensuring consistent, easily understood guidance for staff to use. They develop Bulletins where needed for additional clarity, and Job Aids as step-by-step guides. They may re-write entire procedural documents to ensure that these documents offer clear work and compliance guidance.

PG&E believes that through a combination of training, procedural guidance improvements, WV, and use of the TAT, we can ensure that VM inspection quality is effective and appropriate for providing safe and reliable electric service, while mitigating wildfire risks.

**CONDITION PG&E-28**  
**LACK OF JUSTIFICATION AND DETAIL FOR PG&E'S**  
**SELF-ASSESSED STAKEHOLDER ENGAGEMENT CAPABILITIES**

**Deficiency:** In response to the utility survey for the maturity model, PG&E answered many questions regarding its stakeholder and community engagement capabilities in ways that do not align with PG&E’s documented poor coordination and engagement efforts. For example, PG&E’s responses indicate that it has a clear and actionable plan to develop and maintain collaborative relationships with local communities; however, continued fallout and harsh criticism for poor coordination and collaboration with local communities during its October 2019 PSPS events, as well as, in preparation for the 2020 wildfire season suggests their “actionable plan” is not sufficient nor effective.

**Condition:** *In a quarterly report, PG&E shall:*

- i. List and describe all actions it is taking to coordinate and collaborate with local communities regarding its wildfire mitigation activities and PSPS;*

For ease of reference in this response, the following table contains the relevant filings, reports and documents that are referenced throughout this update:

**TABLE 2  
STAKEHOLDER ENGAGEMENT-RELATED REPORTS ATTACHED**

<b>Document Name</b>	<b>Proceeding</b>	<b>Date</b>	<b>File Name</b>
PG&E’s first Progress Report on Phase 2 Order Instituting Rulemaking (OIR) Implementation of De-Energization Guidelines	Decision (D.).20-05-051	August 4, 2020	Attachment 2020WMP_ClassB_PGE-28_Atch05
PG&E’s second Progress Report on Phase 2 OIR Implementation of De-Energization Guidelines	D.20-05-051	December 7, 2020	Attachment 2020WMP_ClassB_PGE-28_Atch01
PG&E’s 2020 PSPS Access and Functional Needs (AFN) Plan	D.20-05-051	June 1, 2020	Attachment 2020WMP_ClassB_PGE-28_Atch02
PG&E’s PSPS AFN September 2020 Quarterly Progress Report	D.20-05-051	September 1, 2020	Attachment 2020WMP_ClassB_PGE-28_Atch03
PG&E’s PSPS AFN December 2020 Quarterly Progress Report	D.20-05-051	December 1, 2020	Attachment 2020WMP_ClassB_PGE-28_Atch04
PG&E’s 2021 PSPS AFN Plan	D.20-05-051	February 1, 2021	Attachment 2020WMP_ClassB_PGE-28_Atch06

PG&E acknowledges that there were significant issues with communications and coordination with local communities during PSPS events in 2019. In 2020, we changed the way we engage with local communities, and the resources we provide, to give better



information before wildfire season and to improve coordination for PSPS events. This began in late 2019 with listening to direct feedback from customers, agencies and stakeholders on the ways that we could improve and creating outreach plans that were responsive to the concerns we heard. Since that time, we have been focused on improving local outreach, resources and coordination to avoid the issues experienced during 2019 PSPS events. This has included significantly increasing transparency around how PG&E's system is designed and operated and the processes involved in PSPS events.

We are including below a description of the steps that we have taken to improve local coordination in 2020 since our last reporting.

### **Listening Sessions**

In mid-November 2020, PG&E began reaching out to counties and tribes impacted by 2020 PSPS events to schedule a listening session. These sessions allow PG&E to meet with county and tribal emergency managers and local governments, listen to concerns, gather feedback, and identify ways we can improve our coordination going forward. The sessions were held virtually in 2020.

To date, we have completed 21 sessions with 16 scheduled and/or in progress.<sup>2</sup> The agenda for these sessions is intentionally flexible to allow the county/tribe to drive the conversation and provide a more open and candid dialogue between PG&E and the participating agencies.

We are documenting the feedback and action items received during these sessions and will be sharing a report with participants as well as the CPUC once all the sessions have been completed (anticipated for early February 2021).

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<sup>2</sup> Ten (10) county Office of Emergency Services (OES) and county administrator departments declined a meeting.

**TABLE 3  
Q4 2020- Q1 2021 COUNTY, CITY, AND TRIBAL PSPS LISTENING SESSIONS**

**December 2020 Complete**

Calaveras County (12/1)	Sierra County (12/9)	San Mateo County (12/15)
Butte County (12/1)	El Dorado County (12/9)	Yuba County (12/16)
Mendocino County (12/3)	Amador County (12/9)	Solano County (12/16)
Placer County (12/4)	Yolo County (12/9)	Marin County (12/16)
San Joaquin County (12/7)	Colusa County (12/10)	Nevada County (12/16)
Lassen County (12/8)	Madera County (12/10)	Santa Clara County (12/16)
Alameda County (12/8)	Santa Cruz (12/11)	Sonoma County (12/17)

**January 2021 Planned**

Monterey County (1/7)	Humboldt Tribal (1/14)	Northern Tribal (1/19)
Fresno County (1/11)	Lake County (1/14)	Sonoma Tribal (1/20)
Napa County (1/12)	Lake Tribal (1/15)	Southern Tribal (1/21)
Butte/Lassen/Yuba Tribal (1/13)	Mendocino Tribal (1/15)	Shasta Tribal (1/22)
Tuolumne County (1/13)	City of San Jose (1/15)	

PG&E will report on the 2020 PSPS Event Listening Sessions to the CPUC after their completion.

PG&E also held listening sessions with large commercial customers and critical facilities, as noted in the table below:

**TABLE 4  
PSPS LISTENING SESSIONS WITH LARGE COMMERCIAL CUSTOMERS AND  
CRITICAL FACILITIES RE: 2020 PSPS EVENTS**

<b>Audience</b>	<b>Date</b>
Stanford Health Care	October 6, 2020
Environmental Protection Agency (EPA) California Water Sector PSPS Webinars - PSPS SOP Fundamentals	October 21, 2020
EPA California Water Sector PSPS Webinars - Response, Recovery and Lessons Learned	November 17, 2020
PSPS Listening Session - Community Choice Aggregation (CCA)	November 20, 2020
PSPS Event Listening Session - Hospitals	December 2, 2020
PSPS Listening Session - Telecommunications Communications Providers	December 8, 2020
PSPS Listening Session - Transportation Agencies	December 8, 2020
PSPS Listening Session - Municipal Agencies	December 10, 2020
PSPS Listening Session - Water Agencies	December 10, 2020
EPA California Water Sector PSPS Webinars - PSPS Partnerships	January 14, 2021

PG&E will continue these types of engagement following each PSPS season.

### **Wildfire Safety Working Sessions**

In March 2021, PG&E’s dedicated agency representatives will begin outreach to county and tribal Offices of Emergency Services and regional key stakeholders to begin scheduling the 2021 Wildfire Safety Working Sessions. As stated in previous reporting, these sessions will provide local agencies with an opportunity to have detailed conversations regarding PG&E’s wildfire safety work planned in their community and PSPS improvements for 2021. PG&E is aiming to host Wildfire Safety Working Sessions in March through May of 2021, which will be earlier in the calendar year than the 2020 Wildfire Safety Working Sessions. Wildfire Safety Working Sessions will be offered to all county and tribal Offices of Emergency Services in PG&E’s territory.

### **Standardized Emergency Management System (SEMS) Training**

A key finding from 2019 PSPS events was the need for PG&E teams who are working in the Emergency Operations Center (EOC) to have better emergency management training. As a result, everyone who supports PSPS events in PG&E’s

EOC is being trained in SEMS. Since the state and local governments use SEMS to manage emergencies, this new training requirement will ensure PG&E's procedures are aligned with these agencies.

The specific training requirements included:

- IS-100.C – Introduction to Incident Command;
- IS-200.C – Basic Incident Command System (ICS) for Initial Response;
- IS-700.B – An Introduction to the National Incident Management System;
- IS-800.C – National Response Framework, an Introduction; and
- SEMS G606 – Standardized Emergency Management Introduction.

Trainings have occurred throughout 2020. All employees supporting the EOC will be required to have completed the training; when new employees are added to the EOC roster we target 60 days for them to complete the Phase I training courses. Further, we are completing additional training for a smaller population of key EOC team members including completing the ICS 300 & 400 courses.

### **PSPS Advisory Boards**

PG&E's advisory boards provide hands-on, direct advisory functions related to PSPS. This includes helping PG&E develop best practices for PSPS protocols, community preparedness, customer support resources and program offerings, regional coordination and the optimal use of existing and emerging technologies. PG&E currently engages in four PSPS-focused advisory boards: PSPS Advisory Board, People With Disabilities and Aging Advisory Council (PWDAAC or Council), Statewide Investor-Owned Utility (IOU) AFN Advisory Board, and the PG&E and Telecommunications Resiliency Collaborative.

1) PSPS Advisory Board: PG&E established a PSPS Advisory Board in February 2020, which includes representatives from the following seven rural and urban cities or counties, two tribal agencies and the League of Cities and California State Association of Counties:

- Butte County;
- California State Association of Counties;
- City of Santa Rosa;
- Hopland Band of Pomo Indians (Mendocino County);
- Kern County;
- League of California Cities;

- Marin County;
- Placer County;
- Robinson Rancheria Pomo Indians of California (Lake County);
- Santa Cruz County; and
- Sonoma County.

In 2020, PG&E hosted eight advisory board meetings: March 5, April 1, April 8, May 27, July 2, September 3,<sup>3</sup> October 8 and November 19. The meetings averaged two hours in length and provided a forum for participants to weigh in on a variety of PSPS Program updates such as customer notification scripts, wildfire safety working session content and meeting outlines and PSPS full-scale exercises, among other topics.

The 2021 PSPS Advisory Board meeting schedule will be developed in the first quarter of the year and will be included in the next quarterly report.

## 2) People with Disabilities and Aging Advisory Council:

In 2020, PG&E launched an AFN-focused advisory council, called the PWDAAC. The PWDAAC is a diverse group of recognized Community Based Organization (CBO) leaders supporting people with developmental or intellectual disabilities, physical disabilities, chronic conditions, injuries, and older adult communities, as well as members and advocates from within these communities.

In 2021, PG&E will convene the Council for at least four meetings per year. PG&E envisions convening the council quarterly, although the frequency or timing may be modified near the PSPS season. PG&E will continue to solicit feedback from the Council regarding PSPS, Medical Baseline, and other programs that support the AFN community. Due to COVID-19 pandemic conditions, PG&E will host virtual meetings until it is safe to hold in-person meetings.

In 2020, we convened nine PWDAAC meetings on a monthly basis on the following dates (three additional meetings included since last reporting on September): April 30, May 29, June 26, July 31, August 28, September 18, October 5, November 2, and December 18, 2020.

PWDAAC feedback is guiding the following past and future PG&E actions:

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<sup>3</sup> Please note that the meeting previously reported to take place on August 27, 2020, was rescheduled to September 3, 2020, at the request of the participants.

- PG&E directed CBO partners to the new PG&E Partners section of [www.pge.com/pspsupdates](http://www.pge.com/pspsupdates) to access event-specific PDF, Shape and Keyhole Markup language Zipped (KMZ) files and reviewed how to access on CBO Resource Partner Coordination call during each event;
- PG&E adjusted the location of Community Resource Center (CRC) signage as advised and confirmed adequate signage with partners during subsequent events;
- PG&E implemented daily CBO Resource Partner Coordination Calls at 12:30 p.m. during PSPS events to improve overall coordination of resources during PSPS events, connect various resource partners and share best practices.
- PG&E will develop a “decision tree” in 2021 to describe the coordination of the various CBO resources for customers and circulate the first draft for input from the PWDAAC Members;
- PG&E will coordinate battery resource allocation and distribution with CBO partners and will evaluate process changes to execute resources more efficiently; and
- PG&E will host regional CBO Resource Partner Strategy calls in 2021 to connect various resource partners and share best practices.

PG&E is working with the Council on the 2021 meeting schedule.

- 3) Statewide IOU AFN Advisory Council: PG&E also worked in partnership with Southern California Edison and San Diego Gas & Electric Company to establish the Statewide IOU AFN Advisory Council. The council is composed of a diverse group of recognized CBO, association and foundation leaders supporting the AFN population and leaders from various state agencies. The AFN Advisory Council provides insight into the unique needs of the IOUs’ most vulnerable customers and stakeholders, offers feedback, makes recommendations and identifies partnership opportunities to serve the broader AFN population before, during and after a PSPS event. Since last reporting, the Statewide IOU AFN Advisory Council held a meeting a meeting on January 22, 2021. Prior meetings were reporting in previous WMP Conditions Quarterly Reports.

The Statewide IOU AFN Advisory Council’s feedback is guiding the following past and future PG&E actions:

- PG&E added an additional dedicated AFN resource to complement the current Americans with Disabilities Act (ADA) Coordinator’s work within the AFN community;

- PG&E will improve customer outreach materials by leveraging the internal and external expert review of PSPS communications;
- PG&E will enhance the existing partnership with 2-1-1 to create a consistent statewide response to provide social services resources during a PSPS event;
- PG&E will continue to improve CRCs to support the AFN community, including accessibility, signage, charging and privacy screens; and
- PG&E will add Statewide IOU AFN Advisory Council members to the early PSPS notification distribution list.

The next Statewide IOU AFN Advisory Council meeting is scheduled to take place during the second quarter of 2021. Meeting topics include solicitation of feedback from participants regarding key areas of focus for 2021, which will inform agendas and cadence for future meetings.

PG&E and Telecommunications Resiliency Collaborative: PG&E initiated this coordination group in early 2020 to create a forum for communications providers to provide feedback on PG&E's current PSPS implementation protocols and to coordinate engagement before and during PSPS events, as well as to enhance collaboration and coordination during emergency response generally. In Q4 2020, PG&E has held the following sessions with communications providers:

- **October 8, 2020:** Representatives from Verizon, AT&T, Comcast, T-Mobile, U.S. Cellular, Charter Communications, Cox Communications, provided feedback to PG&E, the CPUC, and the California OES about the September 2020 PSPS events. Feedback was generally positive, with improvements recommended for more accessibility to PSPS event information, including maps in the PSPS portal and the support role provided during PSPS events by the Critical Infrastructure Lead. Other specific feedback was provided, such as suggesting the use of the PSPS portal for sharing information during non-PSPS events (e.g., rotating outages), and suggesting changes to the notification content and quantity, PSPS portal content (data fields) and cadence of updates to the PSPS Portal.
- **December 8, 2020:** Representatives from T-Mobile, AT&T, Frontier Communications, Wave Broadband, Comcast, Verizon and other telecom providers met to discuss PSPS events in 2020 and ideas for improving future events. Topics of the listening session included:
  - Information sharing;
  - Power restoration procedures;

- PSPS mitigation efforts; and
- 2021 planning and coordination.

More information about the AFN-related councils can be found in PG&E's 2020 PSPS AFN Plan (Attachment 2020WMP\_ClassB\_PGE-28\_Atch02), PG&E's September 2020 PSPS AFN Quarterly Progress report (Attachment 2020WMP\_ClassB\_PGE-28\_Atch03), and PG&E's December 2020 AFN Quarterly Progress Report filed on December 1, 2020 (Attachment 2020WMP\_ClassB\_PGE-28\_Atch04), and PG&E's 2021 PSPS AFN Plan (Attachment 2020WMP\_ClassB\_PGE-28\_Atch06).

More information about the PSPS Advisory Board, PSPS Regional Working Groups, and Telecommunications Resiliency Collaborative can be found in PG&E's second Progress Report on Phase 2 OIR Implementation of De-Energization Guidelines, filed December 7, 2020 (Attachment 2020WMP\_ClassB\_PGE-28\_Atch01).

PG&E will continue to meet with these stakeholders and will periodically bring these groups together, along with other stakeholder groups outlined in D.20-05-051, to solicit feedback on the PSPS Program.

### **PSPS Portal Improvements**

In Q4 2020, PG&E made real-time improvements to the PSPS Portal during PSPS events to provide users additional event-specific maps to assist with planning and response efforts. This included a CRC map, a map of non-PSPS outages within PG&E's electrical service territory and a map outlining areas that have been restored.

PG&E also hosted internal after-action review meetings following each PSPS event to gather feedback and identify potential improvements on the event, including the PSPS Portal. PG&E also sent surveys and hosted listening sessions with counties and tribes impacted by 2020 PSPS events. These forums provided agencies an opportunity to provide feedback and suggestions. Both internal and external feedback has been tracked and will be used to determine key 2021 improvements.

In Q1 2021, PG&E plans to prioritize and begin implementing PSPS Portal improvements. PG&E will also establish a PSPS Portal External Working Group with users from city, county and tribal agencies and critical facilities. Working group meetings will be hosted periodically to demo proposed improvements and collect real-time feedback.



## County Report

PG&E representatives will be providing counties and tribes with a quarterly report that contains the following information:

- **County Engagement Update:** A summary of quarterly outreach efforts that PG&E has conducted with each county, tribe and community and when these efforts were conducted or are scheduled. These efforts include PSPS Listening Sessions, Safety Town Hall, PSPS Advisory Committee meetings, PSPS Portal training, quarterly regional working group meetings and ongoing engagements with key stakeholders from within the respective jurisdiction. This document also includes status updates regarding specific follow up items that have been identified during recent engagements to ensure that we are honoring requests made by partners and helping with PSPS and wildfire preparation efforts as much as possible.
- **County Progress Report:** A summary of county-specific status updates regarding the various wildfire mitigation efforts we are conducting, which include weather station and high-definition camera installation, CRCs, sectionalizing device and transmission line switch installation, system hardening, EVM work and temporary generation at substation (as applicable) locations.

The first set of quarterly County Reports were disseminated to counties and tribes on September 21, 2020. PG&E plans to distribute County Reports for the fourth quarter of 2020 in Q1 2021. These reports will then be made available online on PG&E's CWSP page ([www.pge.com/cwsp](http://www.pge.com/cwsp)).

## Customer Outreach

PG&E expanded outreach efforts in 2020 to include additional informational resources, including videos, brochures, events and online tools to help customers and communities prepare. We reached out to customers through multiple touchpoints to provide communities with CWSP/PSPS-related information via:

- **Wildfire Safety Webinars:** PG&E hosted webinars to provide county-specific information to customers throughout PG&E's services area. These events were held every Wednesday evening from late April through September 2020, with 19 total events completed. The presentation portion of the webinar was recorded in 16 languages, including American Sign Language (ASL). So far, PG&E has scheduled 2 webinars for 2021 – January 27, 2021, focused on Shasta, Tehama, Lassen, Siskiyou counties; and February 3, 2021 focused on Butte, Plumas counties. PG&E

posts the full schedule of webinars, along with presentation documents and recorded and translated videos of presentations, at [www.pge.com/firesafetywebinars](http://www.pge.com/firesafetywebinars). We will continue to update this webpage as we schedule more 2021 webinars.

**TABLE 5  
WILDFIRE SAFETY WEBINARS HELD AND PLANNED**

Counties Invited				Date
Butte	Plumas	Lassen		April 29, 2020
Sonoma	Napa			May 6, 2020
Placer	Nevada	Sierra	Yuba	May 13, 2020
Colusa	Yolo	Solano		May 20, 2020
El Dorado	Amador	Calaveras		May 27, 2020
San Mateo	Santa Clara			June 3, 2020
Alameda	Contra Costa	Marin		June 10, 2020
Mendocino	Lake			June 17, 2020
Santa Cruz	Monterey	San Benito		June 24, 2020
Humboldt	Trinity	Siskiyou		July 1, 2020
Glenn	Tehama	Shasta		July 8, 2020
Alpine	Tuolumne	Mariposa		July 15, 2020
Merced	San Joaquin	Stanislaus		July 22, 2020
San Luis Obispo	Santa Barbara			July 29, 2020
Tulare	Madera	Fresno	Kern	Aug 5, 2020
All PG&E Customers				Aug 12, 2020
Wildfire Safety Town Hall				Aug 26, 2020
In-language All PG&E Customers – Chinese				Aug 31, 2020
In-language All PG&E Customers – Spanish				Sept 2, 2020
Wildfire Safety Town Hall				December 16, 2020
Wildfire Safety Town Hall (Shasta, Lassen, Tehama, Siskiyou counties)				January 27, 2021
Wildfire Safety Town Hall (Butte, Plumas counties)				February 3, 2021
Wildfire Safety Town Hall (Napa, Lake counties)				February 17, 2021
Wildfire Safety Town Hall (Marin, Sonoma counties)				March 3, 2021
Wildfire Safety Town Hall (Nevada, Sierra, Yuba counties)				March 17, 2021

A total of approximately 6,000 people attended previous webinar presentations. These customer-focused CWSP webinars were held in advance of 2020 wildfire season, and are continuing in 2021.

- Direct-to-Customer Mailings/E-Mails: To help customers prepare for emergencies and a potential PSPS event in 2020, PG&E conducted a multi-channel outreach and awareness campaign including letters, e-mails, tenant education kits, postcards and more. See Table 6.

**TABLE 6  
CWSP/PSPS PREPAREDNESS MAILINGS LAST QUARTER**

Name of Email or Mailing Campaign	Date
Regional Working Group update e-mail	October 1
October bill packaging/envelope messaging e-mail	October 10
PSPS Outage Tools education e-mail	October 17
PSPS Address-Level Alerts announcement	October 23
Post-PSPS Event Agency Survey	November 4
November bill packaging/envelope messaging	November 8
Outage Preparedness education e-mail	November 21
Business Customer Outage Preparedness education e-mail	November 28
Winter storm/Outage Preparedness email	December 15
<hr style="width: 20%; margin-left: 0;"/> <i>*Items updated from last reporting are in <b>bold</b>.</i>	

- **Informational Videos:** In 2020, PG&E developed a series of short (3-5 minute) and long-form videos (30 minutes) about the CWSP and PSPS programs that can be found at [www.pge.com/pspsvideos](http://www.pge.com/pspsvideos) and on PG&E’s YouTube Channel at [www.youtube.com/user/pgevideo](http://www.youtube.com/user/pgevideo). PG&E began developing additional short-form videos (3-5 minutes) about other topics to run in Q1 of 2021, including:
  - EVM;
  - PSPS Power Restoration Steps; and
  - System Hardening.

PG&E also began planning to create another 30-minute television program called “Responding to California’s Changing Environment” which will highlight the shared challenges we all face along the Pacific Coast with climate change and what PG&E is doing to address these changes. The program is scheduled to air in Q1 and Q2 of 2021 with television placements throughout our Northern and Central California service territory.

- **Social Media:** PG&E regularly provides customer preparedness resources through its official social media channels, including:
  - Twitter;
  - Facebook;
  - YouTube;
  - Instagram; and

- Nextdoor.

The table below summarizes posts, views, shares and reach (impressions) recorded for wildfire preparedness social media.

**TABLE 7  
SOCIAL MEDIA USAGE SUMMARY (Q4 2020)**

<b>Social Media Q4 Oct 1-Dec. 31</b>	<b>Posts</b>	<b>Shares</b>	<b>Views</b>	<b>Reach (impressions)</b>
Facebook	12	72	0	565,350
Instagram	5 Posts	Engagement: 543 likes	0	0
	18 Videos	0	12,010 views	0
Nextdoor	35	Total Engagement: 897	0	3.4 million
Twitter (includes local accounts)	82	118 retweets	0	252,876

During the 2020 PSPS events, PG&E provided event update videos on our social media platforms in English, ASL, Spanish, and Mandarin<sup>4</sup>. Some social media posts are translated into up to 15 languages. We also developed a three-minute YouTube video on safety tips for those with medical needs. We continue to work with 36 multi-cultural media organizations and five CBOs to assist with in-language communications and share our social media posts before and during PSPS events.

### Website Improvements

Since the 2019 PSPS events, PG&E has made significant content, user experience, stability and capacity improvements to its website. PG&E has built a new standalone, cloud-based website specifically for emergencies with the following functionalities and content:

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#### 4 See examples of translated social media posts:

- PSPS Alert Banner: <https://twitter.com/PGE4Me/status/1321169776014667779/photo/1>.
- PSPS Event Update in Chinese: <https://twitter.com/PGE4Me/status/1321220048791334912?s=20>.
- PSPS Update in Spanish: <https://twitter.com/PGE4Me/status/1321219692392968193?s=20>.
- PSPS Warning Alert in ASL: <https://twitter.com/PGE4Me/status/1320423102866542593?s=20>.

- Automatically redirects traffic from pge.com to alert site when a large PSPS event is active;
- Hosts an “all-in-one” map that includes both PSPS planned outages and actual outages (previously two separate maps and webpages);
- Offers more precise event maps at the parcel level (rather than buffered polygons that may falsely indicate certain addresses are included or excluded from the event scope);
- Provides lower bandwidth options, including “no map” outage tools on the website, which are easier to access for certain customers (such as cell phone users);
- Uses more concise language and layouts for fast, clear information delivery;
- Establishes a web performance protocol to ensure sufficient bandwidth capacity;
- Provides a fully multilingual site that mirrors the English site with translated content currently available in 16 additional languages, as required by the recent Administrative Law Judge ruling issued on August 21, 2020, regarding compliance filings submitted in response to D.20-03-004; and
- Verified ADA accessibility on both web and mobile views.

The new standalone emergency website launched in June 2020. PG&E detailed its website improvements in its first and second Progress Report on Phase 2 OIR Implementation of De-Energization Guidelines, filed on August 4, 2020 and December 7, 2020, respectively. Please see Attachment 2020WMP\_ClassB\_PGE-28\_Atch05 and Attachment 2020WMP\_ClassB\_PGE-28\_Atch01. In addition, please refer to PG&E’s PSPS ESRB-8 event reports for specific website statistics for each of the 2020 PSPS events (Section 6 – Customer Notifications).<sup>5</sup>

PG&E also translated “critical”<sup>6</sup> webpages from English into 15 non-English languages in 2020. See Table 2 for a list of the pages translated:

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<sup>5</sup> [www.pge.com/pspsreports](http://www.pge.com/pspsreports).

<sup>6</sup> PG&E describes its approaches for translating various types of materials in its print media and web content in its 2020 Outreach Workplan (pp. 11-12), such as clarifying instances when full translations are made available vs. tagline translations.

**TABLE 8  
LIST OF TRANSLATED “CRITICAL” WILDFIRE AND PSPS PREPAREDNESS WEBPAGES**

<b>Webpage</b>	<b>Vanity</b>	<b>Languages Available</b>
PSPS Landing Page	<a href="http://www.pge.com/psps">www.pge.com/psps</a>	16
PSPS Event Updates Page (Emergency Website)	<a href="http://www.pge.com/pspsupdates">www.pge.com/pspsupdates</a>	16
Wildfire Safety Landing Page	<a href="http://www.pge.com/wildfiresafety">www.pge.com/wildfiresafety</a>	16
PSPS Language Resources Page	<a href="http://www.pge.com/pspslanguagehelp">www.pge.com/pspslanguagehelp</a>	16
Medical Baseline Program	<a href="http://www.pge.com/medicalbaseline">www.pge.com/medicalbaseline</a>	16
PSPS Updates and Alerts	<a href="http://www.pge.com/en_US/residential/outages/public-safety-power-shutoff/psps-updates-and-alerts.page">www.pge.com/en_US/residential/outages/public-safety-power-shutoff/psps-updates-and-alerts.page</a>	16
PSPS Address Alert Signup	<a href="http://www.pge.com/pspsalerts">www.pge.com/pspsalerts</a>	16
PG&E Disability and Aging (AFN) Page	<a href="http://www.pge.com/disabilityandaging">www.pge.com/disabilityandaging</a>	16 + ASL
Open House Webinar Schedule & Presentations	<a href="http://www.pge.com/openhouse">www.pge.com/openhouse</a>	16 + ASL
PSPS Support	<a href="http://www.pge.com/en_US/residential/outages/public-safety-power-shutoff/psps-support.page">www.pge.com/en_US/residential/outages/public-safety-power-shutoff/psps-support.page</a>	16
Prepare for PSPS	<a href="http://www.pge.com/en_US/residential/outages/public-safety-power-shutoff/prepare/prepare-for-psps.page">www.pge.com/en_US/residential/outages/public-safety-power-shutoff/prepare/prepare-for-psps.page</a>	16
Why PSPS Events Occur	<a href="http://www.pge.com/en_US/residential/outages/public-safety-power-shutoff/why-psps-events-occur.page">www.pge.com/en_US/residential/outages/public-safety-power-shutoff/why-psps-events-occur.page</a>	16
Minimizing PSPS Events	<a href="http://www.pge.com/en_US/residential/outages/public-safety-power-shutoff/minimizing-psps-events.page">www.pge.com/en_US/residential/outages/public-safety-power-shutoff/minimizing-psps-events.page</a>	16
Wildfire Recovery & Support	<a href="http://www.pge.com/en_US/residential/outages/public-safety-power-shutoff/psps-support.page">www.pge.com/en_US/residential/outages/public-safety-power-shutoff/psps-support.page</a>	16
Consumer Protections	<a href="http://www.pge.com/consumerprotections">www.pge.com/consumerprotections</a>	16
PSPS Event Reports	<a href="http://www.pge.com/pspsreports">www.pge.com/pspsreports</a>	16

In each PSPS ESRB-8 event report (Section 6 – Customer Notifications) submitted in 2020, PG&E described the content and functionality available on the website for each event, highlighting improvements made since reporting the previous event. During 2020 PSPS events, PG&E placed banners on multiple pages on [www.pge.com](http://www.pge.com) that drove traffic to PG&E’s PSPS event site and implemented tools to drive traffic to and maintain stability of the PSPS emergency website / event updates page, [www.pge.com/pspsupdates](http://www.pge.com/pspsupdates). In addition, during large PSPS events anyone who entered [pge.com](http://pge.com) was taken to a splash screen on the PSPS event site giving the user a

choice of visiting [pge.com](http://pge.com) or the PSPS updates web pages. PG&E also made the following updates to the website in 2020 to support customers with AFN:

- Launched Thai, Hindi, and Portuguese languages on the emergency site used during PSPS events for a total of 16 languages;
- Launched preparedness content in 16 languages on [pge.com](http://pge.com), including PSPS landing page, how to prepare for a PSPS, PSPS support, Medical Baseline, People with Disabilities and Aging;
- Launched a new webpage available in 16 languages dedicated to describing our language support services for customers and help customers get in-language notifications and PSPS information ([www.pge.com/pspslanguagehelp](http://www.pge.com/pspslanguagehelp));
- Provided details of CRCs made available as soon as sites were confirmed (up to two days before de-energization for some locations), including locations listed by county, resources available at each center, type of CRC (e.g., indoor, outdoor), and operating hours. CRC locations were also indicated on the PSPS impact map;
- Provided links to additional resources for customers, including links to PG&E's electric vehicle charging locator map, videos in ASL, locations of Independent Living Centers, resources for customers with accessibility, financial, language and aging needs, backup power safety tips, Medical Baseline program information, and more; and
- Updated content and navigation of the AFN-targeted web page, [www.pge.com/disabilityandaging](http://www.pge.com/disabilityandaging), based on feedback received by members of the PWDAAC during the August 28, 2020, meeting. The page now includes resources available during a PSPS event and make the page more intuitive for customers seeking information. We organized the webpage by four categories of need, with applicable resources for each category. The categories include: (1) If you rely on power for medical/and or independent living needs; (2) If you need financial assistance; (3) If you are disabled or an older adult; and (4) If you need language support. We updated this webpage during each PSPS event as new resource partners were added.

In addition to our website, in 2019 PG&E provided PSPS event information to Google, who issued Google SOS alerts to the public. PSPS outage information was provided on Google products, including alert banners in Search and Maps with references to the PG&E website and available resources. The alerts included the name of the PSPS incident (e.g., "Northern California Power Outages") with links to more

comprehensive outage information. Google has discontinued this partnership for 2021 as their tool is not as targeted as PG&E communications and they felt like they were needlessly over notifying the public.

### **Meetings with Key Stakeholders**

PG&E regularly meets with key stakeholders including city/county/tribal officials, community groups and business associations. In 2020, meeting topics included additional information about PSPS mitigation efforts, local progress on wildfire safety measures and expanded resources available to prepare for PSPS events. In 2020 PG&E conducted meetings with more than 380 individual stakeholders (in addition to the other meetings referenced throughout this report). A list of stakeholder meetings held since last reporting has been provided in Table 10 below.

### **AFN Community Outreach**

On June 1, 2020, PG&E filed its 2020 PSPS AFN Plan, which includes a summary of the research, feedback and external input that has shaped the AFN population support strategy before and during PSPS events, the programs that serve these customers, the preparedness outreach approaches that are focused on vulnerable populations and the in-event customer communications that serve AFN populations. Please see Attachment 2020WMP\_ClassB\_PGE-28\_Atch02. On February 1, 2021, PG&E filed our 2021 AFN Plan. Please see Attachment 2020WMP\_ClassB\_PGE-28\_Atch06.

PG&E continues to actively support and collaborate with the AFN community in multiple ways, including but not limited to:

- **Conducting External Feedback and Research:** Through consultation with PG&E PWDAAC, Statewide IOU AFN Council, DAC Advisory Group, Low Income Oversight Board, local government advisory councils and working groups, Communities of Color Advisory Group, as well as research directly with its customers;
- **Continuing Outreach for and Management of Ongoing Customer Support Programs:** Such as the Disability Disaster Access Program, Portable Battery Program, Medical Baseline program, Energy Savings Assistance Program, California Alternate Rates for Energy Program, Family Electric Rate Assistance Program, Tribal Engagement, Food Bank and Meals on Wheels Programs, Well



Pump Generator Rebate Program, Self-Generation Incentive Program, CRC Program and 211 referral service;

- **Conducting Direct-to-Customer and Community Preparedness Outreach:** Through written communications to customers (e.g., e-mails, fact sheets, flyers, brochures, signage), Medical Baseline program acquisition targeting using its newly developed propensity model to target Medical-Baseline eligible customers, providing master meter tenant education with both owners and tenants, engaging with the healthcare industry, conducting Wildfire Safety Open House webinars, broadcasting and posting educational videos, engaging with over 300 CBOs and multicultural media organizations, and making communications translated and accessible for people with disabilities;
- **Bolstering PSPS In-Event Customer Communications:** PG&E continues improving customer notifications content, optimizing Medical Baseline customer contacts (including hourly retry process and door knocks), improving the quality and content of PGE.com, improving the dedicated CBO Liaison process, providing prompt customer contact center support, increasing media engagement, offering ZIP Code alerts, which is now transitioning to Address-Level Alerts starting November 2020) and engaging with Google to issue SOS alerts; and
- **Working with CBOs and multicultural media organizations:** PG&E engages with these partners to provide resources in a PSPS event, such as backup power solutions and communication for those with AFN. To date, PG&E has engaged with over 250 CBOs for information sharing and has secured contracts with 97 CBOs to provide additional resources to customers during PSPS events (e.g., portable battery provision, food replacement and translation services/event communications in indigenous languages).

PG&E filed its first quarterly PSPS AFN Progress update on September 1, 2020 (Attachment 2020WMP\_ClassB\_PGE-28\_Atch03), and its second 2020 AFN Quarterly Progress Report on December 1, 2020 (Attachment 2020WMP\_ClassB\_PGE-28\_Atch04) The progress reports include further information about the activities and progress of these various efforts. In addition, the 2021 WMP includes details on PG&E's AFN outreach strategies and tactics – see Sections 7.3.10.1, 8.2.4, and 8.4.

*ii. The timeline for completion of the actions identified in (i);*

Timing for each of these items is described above in Section i.

**iii. Actions it completed in the previous quarter;**

**TABLE 9  
STAKEHOLDER MEETINGS**

<b>Event/Audience</b>	<b>Date</b>
PSPS Portal User Training	October 2, 2020
Marin Public Disaster and Preparedness Committee	October 5, 2020
City of Mill Valley	October 5, 2020
Stanford Health Care (1:00 PM)	October 6, 2020
Auburn Lake Trails Fire Safe Council	October 6, 2020
Livermore Chamber Business Alliance	October 7, 2020
PSPS Advisory Committee	October 8, 2020
PSPS Portal User Training	October 9, 2020
Belvedere City Council (6:30 PM)	October 12, 2020
Hillsborough City Council	October 12, 2020
Grass Valley City Council	October 13, 2020
Mountain View Chamber of Commerce	October 14, 2020
Food Bank PSPS Training	October 14, 2020
Benicia Leader Roundtable	October 15, 2020
Lower Russian River Municipal Advisory Committee	October 15, 2020
El Dorado County Grant Commission	October 15, 2020
PSPS Portal User Training	October 16, 2020
City of San Rafael	October 19, 2020
Mill Valley Chamber of Commerce	October 19, 2020
Corte Madera Council	October 20, 2020
California Association of Medical Product Providers (CAMP)	October 20, 2020
EPA California Water Sector PSPS Webinars - PSPS SOP Fundamentals (10:00am-12:00pm)	October 21, 2020
California Catastrophe Response Council	October 22, 2020
PSPS Portal User Training	October 23, 2020
Town Hall with Madera County District 5 Supervisor (6:00PM)	October 29, 2020
PSPS Portal User Training	October 30, 2020
Drive Thru Senior Info Fair	November 6, 2020
In-Language CBO Partners (2:00pm)	November 9, 2020
Napa County Board of Supervisors	November 10, 2020
Town of Paradise Town Hall	November 12, 2020

**TABLE 9  
STAKEHOLDER MEETINGS  
(CONTINUED)**

Event/Audience	Date
Small Business Utility Advocates	November 13, 2020
CPUC - Policy Innovation and Coordination Group for the EPIC: PSPS Workstream (10:00-11:30am)	November 16, 2020
EPA California Water Sector PSPS Webinars - Response, Recovery and Lessons Learned (10:00am-12:00pm)	November 17, 2020
PSPS Advisory Committee (2:30 - 3:30pm)	November 19, 2020
San Francisco Planning and Urban Research Association - Urban Infrastructure Council	November 20, 2020
PSPS Event Listening Tour - CCA	November 20, 2020
PSPS Event Listening Tour - Calaveras County (9:00am)	December 1, 2020
PSPS Event Listening Tour - Butte County (2:30pm)	December 1, 2020
PSPS Event Listening Tour - Hospitals (1:00-2:00pm)	December 2, 2020
City of Lakeport	December 2, 2020
PSPS Event Listening Tour - Mendocino County (1:00pm)	December 3, 2020
PSPS Event Listening Tour - Placer County (2:00pm)	December 4, 2020
Q4 Bay Area Regional Working Group (10:30 - 12:00pm)	December 7, 2020
PSPS Event Listening Tour - San Joaquin County (1:00 - 3:00pm)	December 7, 2020
T&D World - Wildfire and Risk Mitigation Leadership Forum Podcast: The Customer Perspective	December 8, 2020
PSPS Event Listening Tour - Lassen County (1:00 - 2:00pm)	December 8, 2020
PSPS Event Listening Tour - Alameda County (1:00pm)	December 8, 2020
PSPS Listening Tour - Telecommunications Communications Providers (1:00pm-2:00pm)	December 8, 2020
PSPS Listening Tour - Transportation Agencies (10:00-11:00am)	December 8, 2020
PSPS Event Listening Tour - El Dorado County (10:00am-12:00pm)	December 9, 2020
PSPS Event Listening Tour - Sierra County (10:00am)	December 9, 2020
PSPS Event Listening Tour - Amador County (2:00pm)	December 9, 2020
PSPS Event Listening Tour - Yolo County (2:00pm)	December 9, 2020
PSPS Event Listening Tour - Municipal Agencies (10:00-11:00am)	December 10, 2020
PSPS Event Listening Tour - Colusa County (10:00am)	December 10, 2020
PSPS Event Listening Tour - Madera County (1:00pm)	December 10, 2020
PSPS Listening Tour - Water Agencies (2:00-3:00pm)	December 10, 2020

**TABLE 9  
STAKEHOLDER MEETINGS  
(CONTINUED)**

Event/Audience	Date
PSPS Event Listening Tour - Santa Cruz County (2:00pm)	December 11, 2020
Q4 South Bay/Central Coast Regional Working Group (10:30 am - 12:00pm)	December 15, 2020
Q4 Central Valley Regional Working Group (1:00 - 2:30pm)	December 15, 2020
PSPS Listening Tour - San Mateo County (10:30am)	December 15, 2020
Amador County Commission on Aging	December 15, 2020
Safety Town Hall - All Customer	December 16, 2020
Q4 North Coast Regional Working Group (10:00 - 11:30am)	December 16, 2020
Q4 Sierra Regional Working Group (1:00 - 2:30pm)	December 16, 2020
PSPS Event Listening Tour - Yuba County (9:00am)	December 16, 2020
PSPS Event Listening Tour - Santa Clara County (1:30pm)	December 16, 2020
PSPS Event Listening Tour - Solano County (10:00am)	December 16, 2020
PSPS Event Listening Tour - Marin County (11:00am)	December 16, 2020
PSPS Event Listening Tour - Nevada County (11:00am)	December 16, 2020
U.S. Veterans Business Alliance	December 17, 2020
PSPS Event Listening Tour - Sonoma County (3:00pm)	December 17, 2020
Electricity Subsector Coordinating Council Wildfire Working Group	December 18, 2020

**TABLE 10  
REGIONAL WORKING GROUP MEETINGS**

Event/Audience	Date
<u>North Coast</u> : Colusa, Glenn, Humboldt, Lake, Mendocino, Napa, Sacramento, Siskiyou, Solano, Sonoma, Trinity, Yolo counties	December 16, 2020
<u>Sierra</u> : Alpine, Amador, Butte, El Dorado, Lassen, Nevada, Placer, Plumas, Shasta, Sierra, Sutter, Tehama, Yuba counties	December 16, 2020
<u>Bay Area</u> : Alameda, Contra Costa, Marin, San Francisco, San Mateo	December 7, 2020
<u>South Bay/Central Coast</u> : Monterey, San Benito, San Luis Obispo, Santa Barbara, Santa Clara, Santa Cruz counties	December 15, 2020
<u>Central Valley</u> : Calaveras, Fresno, Kern, Kings, Madera, Mariposa, Merced, San Joaquin, Stanislaus, Tulare, Tuolumne	December 15, 2020

*iv. Actions planned for completion in the following quarter (Q1 2021), all dates provided are as of January 20, 2021 and subject to change.*

**TABLE 11  
STAKEHOLDER MEETINGS**

<b>Event/Audience</b>	<b>Date</b>
<b>Santa Mateo Fire Chiefs</b>	<b>January 5, 2021</b>
<b>PSPS Event Listening Tour - Monterey County (9:30 - 10:30 am)</b>	<b>January 7, 2021</b>
<b>PSPS Event Listening Tour - Napa County (1:00 - 2:00 pm)</b>	<b>January 12, 2021</b>
<b>PSPS Event Listening Tour - Butte/Lassen/Yuba Tribes (9:00 - 11:00 am)</b>	<b>January 13, 2021</b>
<b>PSPS Event Listening Tour - Humboldt Tribes (2:00 - 4:00 pm)</b>	<b>January 14, 2021</b>
<b>PSPS Event Listening Tour - Lake County (2:00 - 4:00 pm)</b>	<b>January 14, 2021</b>
<b>EPA California Water Sector PSPS Webinars - PSPS Partnerships (10:00am-12:00pm)</b>	<b>January 14, 2021</b>
<b>PSPS Event Listening Tour - Mendocino Tribes (9:00 - 11:00 am)</b>	<b>January 15, 2021</b>
<b>PSPS Event Listening Tour - Lake Tribes (2:00 - 4:00 pm)</b>	<b>January 15, 2021</b>
<b>PSPS Listening Tour - City of San Jose (TBD)</b>	<b>January 15, 2021</b>
<b>PSPS Event Listening Tour - Northern Tribes (10:00 am - 12:00 pm)</b>	<b>January 19, 2021</b>
<b>PSPS Event Listening Tour - Sonoma Tribes (9:00 - 11:00 am)</b>	<b>January 20, 2021</b>
<b>Calistoga Town Hall with PG&amp;E (3:00 pm)</b>	<b>January 20, 2021</b>
<b>PSPS Event Listening Tour - Southern Tribes (2:00 - 4:00 pm)</b>	<b>January 21, 2021</b>
<b>Western Energy Corporate Communications Conference (2:15 - 3:30 pm)</b>	<b>February 3, 2021</b>
<i>Note: Additional stakeholder meetings will be added as requests are received from cities, counties, tribal governments, critical customers and other key stakeholders.</i>	

**TABLE 12  
MAILINGS**

<b>Event/Audience</b>	<b>Date</b>
<b>No Contact Info Postcards</b>	<b>February 15, 2021</b>
<b>Wildfire Safety Progress Email</b>	<b>February 20, 2021</b>
<b>Address Alerts Emails/Postcards</b>	<b>March 1, 2021</b>