CPUC Docket: A.22-12-009
Witness: Borden
Exhibit: TURN-01

PREPARED TESTIMONY OF
ERIC BORDEN

ADDRESSING PACIFIC GAS AND ELECTRIC COMPANY'S WILDFIRE MITIGATION AND CATASTROPHIC EVENT REQUEST

Submitted on Behalf of

THE UTILITY REFORM NETWORK

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

I. Introduction and Overview of Recommendations[1]

Pacific Gas and Electric Company's (PG&E's) use of memorandum and balancing accounts for all manner of costs has risen to unprecedented levels, and should be carefully scrutinized, as this spending will significantly impact affordability of electric rates if authorized for rate recovery. In a reasonableness review such as this one, it is the utility's burden to show that its spending was reasonable given the circumstances at the time, and what the utility knew or should have known.

This testimony focuses on vegetation management (VM) costs, with a primary focus on enhanced vegetation management (EVM). In 2021, PG&E overspent the GRC-authorized amount for the overall VM cost category by 140 percent, though only a portion of these above-authorized expenditures may be reviewed by the Commission due to the adopted ratemaking which treats 20 percent of the above-authorized spending as automatically deemed reasonable and charged to ratepayers. This is shown in Table 1 below.

Table 1. Vegetation management costs, authorized versus recorded ($ Thousands)

	CPUC Authorized	Recorded	Percent Overspend	Overspending	Subject to Review
Routine VM	$ 252,198	$ 682,525	171%	$ 430,327	$ 379,887
Enhanced VM	$ 350,616	$ 770,435	120%	$ 419,819	$ 349,696
Total	**$ 602,814**	**$ 1,452,960**	**141%**	**$ 850,146**	**$ 729,583**

Source: PG&E Testimony, Table 1-10, p. 1-14.

My analysis of PG&E's application and supporting testimony, discussed further in the ensuing sections, is summarized here:

- PG&E's extensive and very expensive use of memorandum and balancing accounts over the last few years is problematic and requires a different approach going forward to rein in uncontrolled spending and achieve better management of projects whose costs may be recovered from ratepayers. TURN has made some recommendations to this end in PG&E's pending test year 2023 GRC. But the degree of above-authorized spending presented in the vegetation management account here (141 percent, meaning PG&E spent

[1] This testimony is sponsored by Eric Borden from Synapse Energy Economics. His resume and a summary of previous testimonies is provided as an attachment to this testimony.

nearly 2.5 times as much as had been authorized) cries out for a more fundamental re-thinking of the Commission's approach. I recommend that the Commission initiate an investigation into alternative approaches that would better balance the goals of the currently-adopted ratemaking with the need to achieve affordable rates in California;

- CalFire's investigation of the cause of the 2021 Dixie Fire found significant evidence that PG&E was not in compliance with regulatory obligations related to vegetation management. Any amount deemed reasonable here should be "subject to refund" pending the Commission's investigation of PG&E's role in this fire.

- EVM cost overruns were not reasonably incurred and should be disallowed, for several reasons:

    - PGE does not demonstrate its overspending on EVM resulted in tangible benefits to ratepayers, namely reduction in wildfire risk;
    - PG&E's EVM overspending lacked prudent oversight and fiscal responsibility;
    - PG&E did not incorporate efficacy and cost-effectiveness of the EVM program into its decision-making;
    - PG&E removed trees that were marked for pruning which is wasteful, not risk-based, and not fiscally prudent.
    - PG&E's risk ranking methodology allows for a significant deviation from highest to lowest circuit segment risk prioritization and resulted in work on relatively low-risk miles.

TURN's recommendation is for a disallowance of $350 million, representing the full amount PG&E has requested here for the EVM program.

II. PG&E's Unprecedented Use of Memorandum and Balancing Accounts to Record Above-authorized Spending has Significantly Undermined Forecast Ratemaking

One of the primary tools used in California to economically regulate utilities is forecast ratemaking. In General Rate Cases (GRCs), a utility forecasts the majority of annual costs at a granular level, and these forecasts are scrutinized by parties and the Commission; ultimately, a revenue requirement deemed just and reasonable for the utility operations subject to the GRC is adopted by the Commission for the "test year" and, with attrition adjustments, for each of the three years that follow. Once the GRC-authorized revenue requirement is set, the utility has an economic incentive to stay within the budget adopted by the Commission, as any overspend generally reduces its profit; on the other hand, if the utility spends less than authorized, it may retain the difference as shareholder return.

Memorandum and balancing accounts, which I do not dispute are necessary in some circumstances, erode or eliminate the traditional cost management incentives provided by forecast ratemaking for cost categories that are included in utility GRC forecasts. Traditionally, these accounts have been used only for costs that are more clearly outside of the control of the utility, and generally not forecast or authorized at all on a prospective basis, such as the Catastrophic Event Memorandum Account that permits recorded costs of responding to natural disasters. This is <u>not</u> the case for much of the costs included in wildfire mitigation memorandum and balancing accounts, including but not limited to vegetation management. Rather than adhere to the amounts deemed reasonable by the Commission in a GRC decision – indeed, PG&E is clear the Commission's GRC decision does not set its annual budgets[2] - PG&E appears to be making a habit of largely if not completely ignoring authorized GRC forecasts due to the fact that it can record cost overruns in a memorandum or balancing account.

In just the last three years, PG&E has requested *$4.8 billion* in WMCE-related electric expenditures. This amount is just the portion of spending over the additional 20 percent of the GRC-forecasted amount that under current ratemaking practices is automatically deemed reasonable, so actual above-authorized expenditures have been even larger. To the extent authorized for rate recovery, these increases will come on top of increases adopted in utility GRCs and other individual applications.

[2] TURN-4, question 2.

Table 2. Summary of Wildfire Mitigation and Catastrophic Events Requested Costs ($ Thousands, Electric Only)

	FHPMA	WMPMA	CEMA	WMBA	VMBA	MGMA	Total
2020 WMCE	$ 291,557	$ 1,285,568	$ 347,035				$ 1,924,160
2021 WMCE			$ 631,051	$ 149,469	$ 591,718	$ 139,130	$ 1,511,368
2022 WMCE			$ 319,043	$ 101,457	$ 814,724	$ 90,068	$ 1,325,292
Total	**$ 291,557**	**$ 1,285,568**	**$ 1,297,129**	**$ 250,926**	**$ 1,406,442**	**$ 229,198**	**$ 4,760,820**

Source: 2020 WMCE (A.20-09-019): PG&E Testimony, p. 1-4; 2021 WMCE (A.21-09-008): PG&E Testimony, p. 1-7; 2022 WMCE: PG&E Testimony, p. 1-8, Table 1-3.

The level of PG&E's above-authorized expenditures in recent years is egregious and worrisome. The CPUC, through the more thorough and rigorous review that occurs in a GRC, approves what is necessary for clean, safe, affordable, and reliable – and then the utility can generally disregard the CPUC-approved spending level and simply deploy funds as it sees necessary. The onus then often effectively falls on intervenors to prove the unreasonableness of this spending despite lackluster utility testimony on the subject. This circular system is broken and not in the interest of ratepayers or the CPUC's desire to achieve and maintain affordable rates.

The level of overspending described above needs to flag for the Commission that there is a problem with the current approach. Whatever accommodation memorandum and balancing accounts were intended to provide for the potential for some degree of above-authorized spending in wildfire mitigation programs, PG&E's recorded figures raise questions about a reduced role of prudent program management seeking to keep spending to the lowest reasonable level. The Commission must revisit and revise the practices that give PG&E the ability to record an unlimited amount of cost overruns and seek recovery from ratepayers. I recommend that the Commission initiate an investigation into alternative approaches that would better balance the goals of currently-adopted ratemaking with the need to achieve affordable rates in California.[3]

III. Routine VM Costs Should be deemed "Subject to Refund" Until Penalties are Assessed for the Dixie Fire

[3] I recognize that this is not a PG&E-only problem, although PG&E may be the worst offender. I envision an Order Instituting Investigation (OII) which could apply to all Investor Owned Utilities.

PG&E's equipment ignited the Dixie Fire in 2021, one of the largest fires in California history, burning nearly 1 million acres, destroying 1,300 structures and causing 1 fatality.[4] Among other failures by the utility, state investigators found that the tree which caused the fire "was previously damaged and had visible outward signs of that damage and decay which would have been noticeable at the ground level by inspectors pre fire, without extraordinary effort."[5] This appears to violate Public Resources Code 4293 which states "dead trees, old decadent or rotten trees, trees weakened by decay or disease and trees or portions thereof that are leaning toward the line […] shall be felled, cut, or trimmed so as to remove such hazard."[6]

I am not recommending that the Commission undertake its review of the Dixie Fire in this proceeding. However, the outcome adopted here should reflect the possibility that a penalty tied to PG&E's vegetation management practices could be part of the outcome for such a review. At minimum, if any of PG&E's cost overruns for routine vegetation management are deemed reasonable in this case, the Commission should determine that these funds are "subject to refund," such that they may be returned to ratepayers at a later date if the Commission should deem this a reasonable penalty or other resolution of issues as part of the Dixie Fire investigation.

IV. EVM Cost Overruns Were Not Reasonably Incurred and Should be Disallowed

In 2021, PG&E overspent the $351 million it was authorized for the EVM program by 171 percent ($420 million) for a total expenditure of $770 million; $349 million of this amount is under review in this application.

Much of the above-authorized expenditures under review in this application is due to a tremendous increase in work and costs in the third and fourth quarter of 2021.

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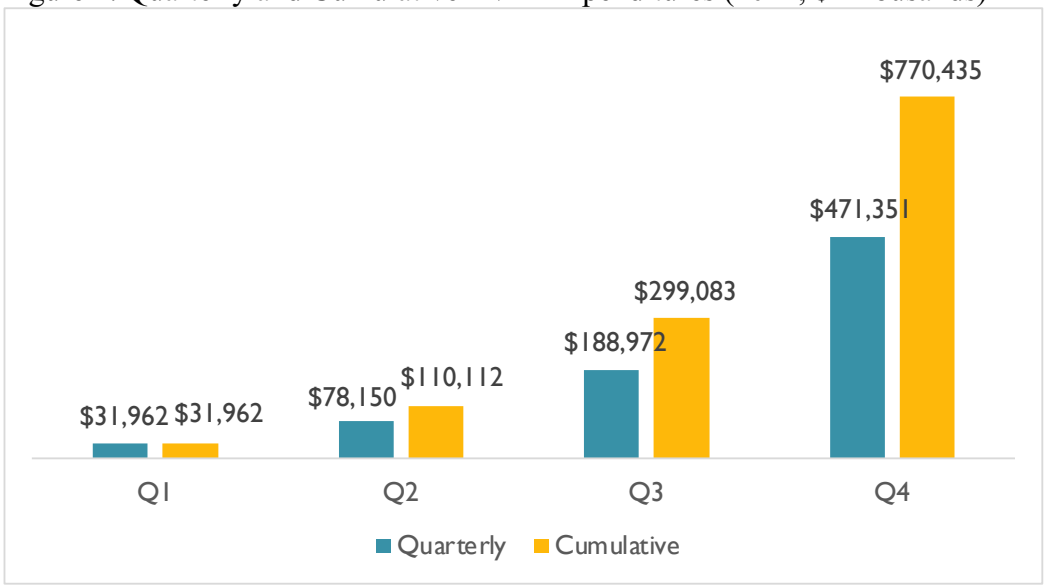
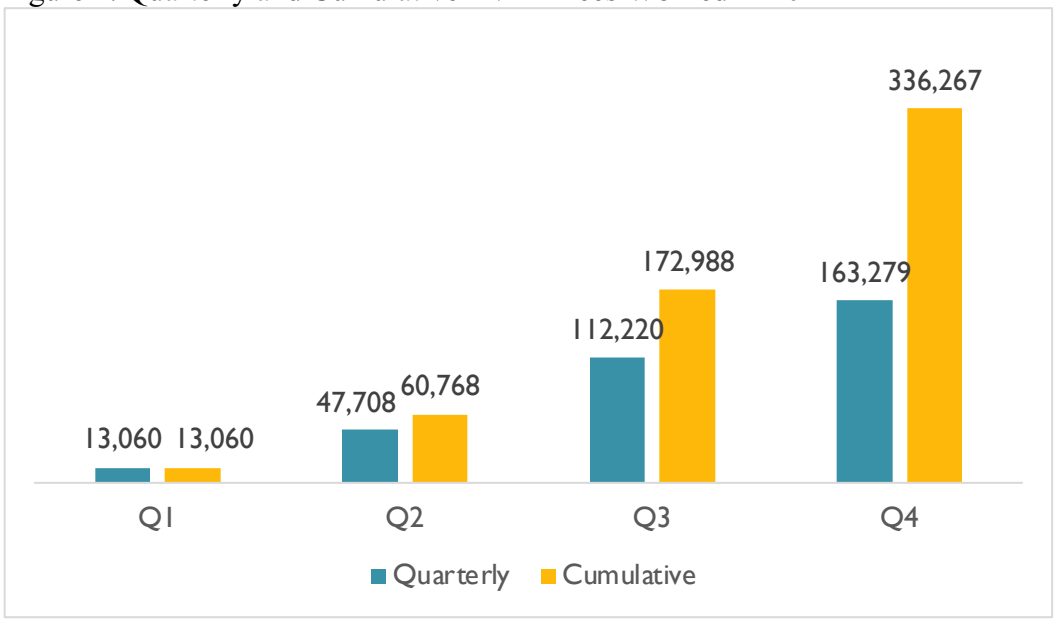
[4] https://www.fire.ca.gov/incidents/2021/7/13/dixie-fire/.
[5] CalFire Investigation, p. 6, https://s1.q4cdn.com/880135780/files/doc_downloads/2022/06/DIXIE_FINAL_Redacted_PGE-Proposed-Redactions-Statement-49411384.pdf.
[6] CalFire Investigation, p. 6, https://s1.q4cdn.com/880135780/files/doc_downloads/2022/06/DIXIE_FINAL_Redacted_PGE-Proposed-Redactions-Statement-49411384.pdf.

Figure 1. Quarterly and Cumulative EVM Expenditures (2021, $ Thousands)



Source: TURN-2, Question 23, Attch 1.

Figure 2. Quarterly and Cumulative EVM Trees Worked in 2021



Source: TURN-5, Question 3, Attch 25.

PG&E states that its above-authorized expenditures were primarily due to increased labor costs caused by SB 247, increased volume of work (59,000 more trees worked), a larger number of

tree removals than forecast, and additional costs for "wood management" than was forecast.[7] As demonstrated in the sections below, PG&E has not demonstrated its spending was reasonable and should be charged to ratepayers, as discussed further in the ensuing sections.

A. PG&E Does Not Demonstrate its Overspending on EVM Program Provided Tangible Benefits to Ratepayers

The fact that PG&E recorded costs to its memorandum costs for wildfire-related activities is not sufficient rationale for these costs to be collected from ratepayers. The reasoning for overspending should include documentation of ratepayer benefits – in this case wildfire risk reduction due to the activities of the program. I agree with what Wildfire Safety Division (WSD) said when it found in 2020,

> The effectiveness of wildfire mitigation activities contained in electrical corporations' WMPs cannot be determined using "program targets," e.g., number of miles of covered conductor installed or number of trees trimmed.[8]

Yet PG&E's explanation in testimony for its massive level of above-authorized expenditures on EVM includes no analysis of ratepayer benefits due to EVM spending.[9] Why should ratepayers pay additional costs, on top of the substantial spending levels already authorized in previous rate increases, for work that has not been demonstrated to be necessary or effective in achieving wildfire risk reduction goals? PG&E was authorized what the Commission believed were sufficient funds to accomplish the program, plus a 20 percent "buffer" amount which is automatically deemed reasonable. Yet PG&E provides no analysis in its testimony regarding the risk reduction benefits of ratepayer funding.

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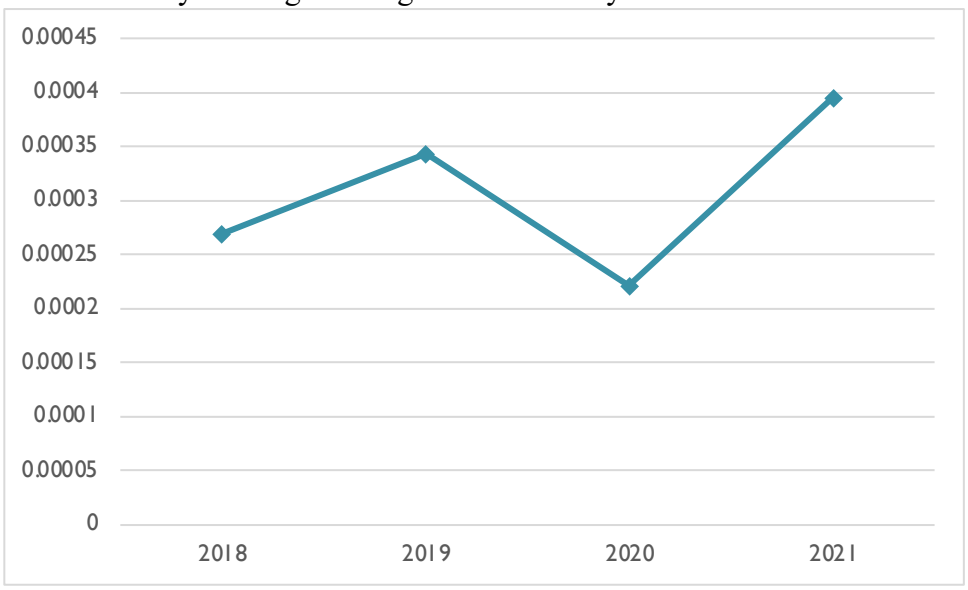
[7] PG&E Testimony, pp. 3-29 to 3-31.
[8] Wildfire Safety Division Resolution WSD-002, June 11, 2020, p. 42, https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M340/K859/340859823.PDF.
[9] PG&E Testimony, pp. 3-23 to 3-33.

Contrary to demonstrating benefits of the program, a high level of analysis shows weather-normalized[10] vegetation-caused ignitions *increased* in PG&E's High Fire Threat Districts (HFTD) in 2021 compared with the three years before. From 2018 to 2021, the figure below shows a 47 percent increase in vegetation-caused ignitions in PG&E's HFTD, normalized for risky wildfire weather conditions.

Figure 3. Vegetation-caused ignitions in PG&E's HFTD
Normalized by red flag warning circuit mile days



Source: Vegetation-caused ignitions provided in TURN-2, question 4, attachment 1. Red flag warning circuit mile days from PGE-Q1-2022 Data Report, File "2022-05-02_PGE_2022_Q1_QDR_R0," Table 6.

There is little evidence to suggest the level of above-authorized spending by PG&E in 2021 produced incremental ratepayer benefits.

B. PG&E Demonstrated a Lack of Fiscal Discipline in 2021

[10] To adjust ignitions for risky wildfire weather, I divide by the number of "red flag warning circuit mile days" a statistic developed in the Wildfire Mitigation Plan proceeding to measure and compare year to year weather relevant to wildfire conditions. This is defined as the "sum of overhead circuit miles of utility grid subject to red flag warning each day within a given time period, calculated as the number of overhead circuit miles that were under an RFW multiplied by the number of days those circuit miles were under said RFW. For example, if 100 overhead circuit miles were under an RFW for 1 day, and 10 of those miles were under RFW for an additional day, then the total RFW OH circuit mile days would be 110." Rrom PGE-Q1-2022 Data Report, File "2022-05-02_PGE_2022_Q1_QDR_R0," Table 6.

PG&E never intended to be limited by the CPUC authorized amount for 2021 EVM activities, nor did it rein in spending or shift to more cost-effective programs as the program blew past the utility's own internal budgets towards the end of 2021. The program was initially approved by PG&E's internal management, referred to as the Wildfire Risk Governance Forum (WRGF), with a cost of around $500 million, which was increased to $536 million near the end of 2020.[11]

Table 3. PG&E Internal Budgeting Timeline

Date	Action	Total Miles Approved	Estimated Cost Upon Which Plan Was Approved	Alternatives to Plan Considered
11/20/20	Approve "No Regrets Plan"	1,056	None	None
12/23/20	Approve modifications and additions	1,800	$507 million	None
EOY 2020	Approve Final Budget	1,800	$536 million	None
4/23/21	Approve modifications and additions (subject to later review)	2,400	None	None

It is not clear whether the total $770 million of expenditure was ever closely reviewed or approved by PG&E's management, though management was aware of the expenditures due to the Company's internal monitoring processes:

> The EVM program during 2021 consistently monitored actual year-to-date costs and end-of-year forecast costs on a monthly basis compared to the approved annual budget. This monitoring process included recurring monthly reviews commencing within Vegetation Management, in partnership with Electric Operations Business Finance, and subsequently within summarized data provided to higher level management. In October Q4 2021, as part of this monthly monitoring process, the program identified a potential cost increase relative to the forecasts, within prepared meeting materials, primarily driven by an anticipated increase in unit cost and increased tree work to deliver the annual target completed mileage.[12]

Despite this monitoring process, the Company appeared to have no idea throughout the year that it would overspend its budget to the degree it did, with presentations to management year that

[11] TURN-6, Atch 01, Atch 02, Atch 03; TURN-4, Question 3.
[12] TURN-3, Question 4(a) (emphasis added).

consistently maintained the program was on track to meet the internal target of $536 million. As late as November 2021, the Company believed it would hit its internal budget, only to exceed it in early and late December by several hundred million dollars.

Table 4**.** PG&E Select Internal Forecast Month

Date	PG&E Forecast for EOY Expenditure
Apr-21	536 million
Jul-21	536 million
Sep-21	536 million
Oct-21	536 million
Nov-21	536 million
12/7/21	$664 million
12/23/21	$781.4 million

Source: TURN-5, Question 3, Attachments 3, 6, 8, 9, 10, 11, 12.

Therefore, it seems that up to $245 million ($770 million less $536 million) of PG&E's EVM expenditures were not even foreseen by management until the money was already effectively out the door. And as stated above, it does not appear the additional expenditures were approved before they occurred by PG&E management.

Furthermore, as noted above, alternatives to these expenditures were not considered. This represents poor financial management, wherein PG&E's approach was to simply spend any amount to meet mileage targets. As PG&E explains:

> A ramp up of resources was required to meet the annual mileage target, and pricing had to be set at pricing levels agreed to by external contractors to complete this work. As a result, much of this work was billed on a time & materials (T&M) basis.[13]

PG&E paid contractors based on an effectively unlimited budget and high hourly costs towards the end of 2021 that could not benefit from negotiation or other cost control methods. Ratepayers' financial interests were not protected, so that PG&E could fulfill its mileage targets. Additionally, achieving the EVM mileage target may have helped PG&E management meet

[13] TURN-4, question 1.

performance measures leading to bonuses through the then-effective Long Term Incentive Plan.[14]

C. PG&E's Funding Decisions in 2021 Did Not Incorporate Known Concerns Regarding Cost-effectiveness and Efficacy of EVM

In PG&E's most recent 2022 Wildfire Mitigation Plan (WMP), PG&E stated it would transition away from EVM towards programs that are less resource intensive, such as Enhanced Powerline Safety Settings (EPSS) and partial voltage detection protection schemes.[15] This is based on analysis PG&E conducted in 2022, which found that any reduction to wildfire risk due to EVM was statistically insignificant; the study showed that EVM failed to reduce ignitions, outages, and tree failures in a statistically significant way.[16]

However, much was known before and during 2021 about the lack of effectiveness of the EVM program, information a prudent manager of ratepayer funds would have taken into account when considering large and growing levels of spending. First, TURN noted the following in PG&E's 2020 GRC (testimony was submitted in July of 2019); based on the utility's own data, large-scale removals of living, healthy trees was unlikely to reduce risk, but would impose massive resource and financial costs:

> […] based on the data provided, approximately 4% of the 2,000 ignitions in PG&E's territory reported from June 2014-2018 can be said to be the result of healthy trees falling over; the figure is 7% for Tier 2 and 3 HFTDs. In addition, the data suggests PG&E's program is much too large when one compares the scope of the problem with PG&E's proposed solution. Between June 2014 and 2018 there were 161 healthy and non-healthy trees that fell into powerlines in PG&E's HFTDs (Tier 2 and 3), an average of 36 trees per year. Over this period, there were 46 total incidences of healthy trees that fell into power lines in Tier 2 and 3 HFTDs, an average of about 10 per year. By contrast, PG&E's program targets 143,000 trees per year for removal. **An intelligently targeted**

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[14] TURN-4, question 1, Rev01, part c. The response states in part "PG&E's 2021 Long Term Incentive Plan (LTIP) included the Enhanced Vegetation Management (EVM) Effectiveness metric that measured the completed circuit miles of vegetation cleared consistent with the EVM program scope within high-fire risk areas to reduce wildfire risk."

[15] WMP, pp. 4-5, https://www.pge.com/pge_global/common/pdfs/safety/emergency-preparedness/natural-disaster/wildfires/wildfire-mitigation-plan/PGE-2023-WMP-R2.pdf.

[16] TURN-3, Question 1, Attachment 7.

program to remove only the riskiest trees could dramatically reduce costs and environmental harm, saving both ratepayers and the environment while effectively mitigating the risk posed by tall trees outside of the utility right of way.[17]

PG&E chose not to heed its own data and would remove nearly double the number of trees, 278,336 in 2021,[18] – which is the largest cost driver of the EVM program.[19]

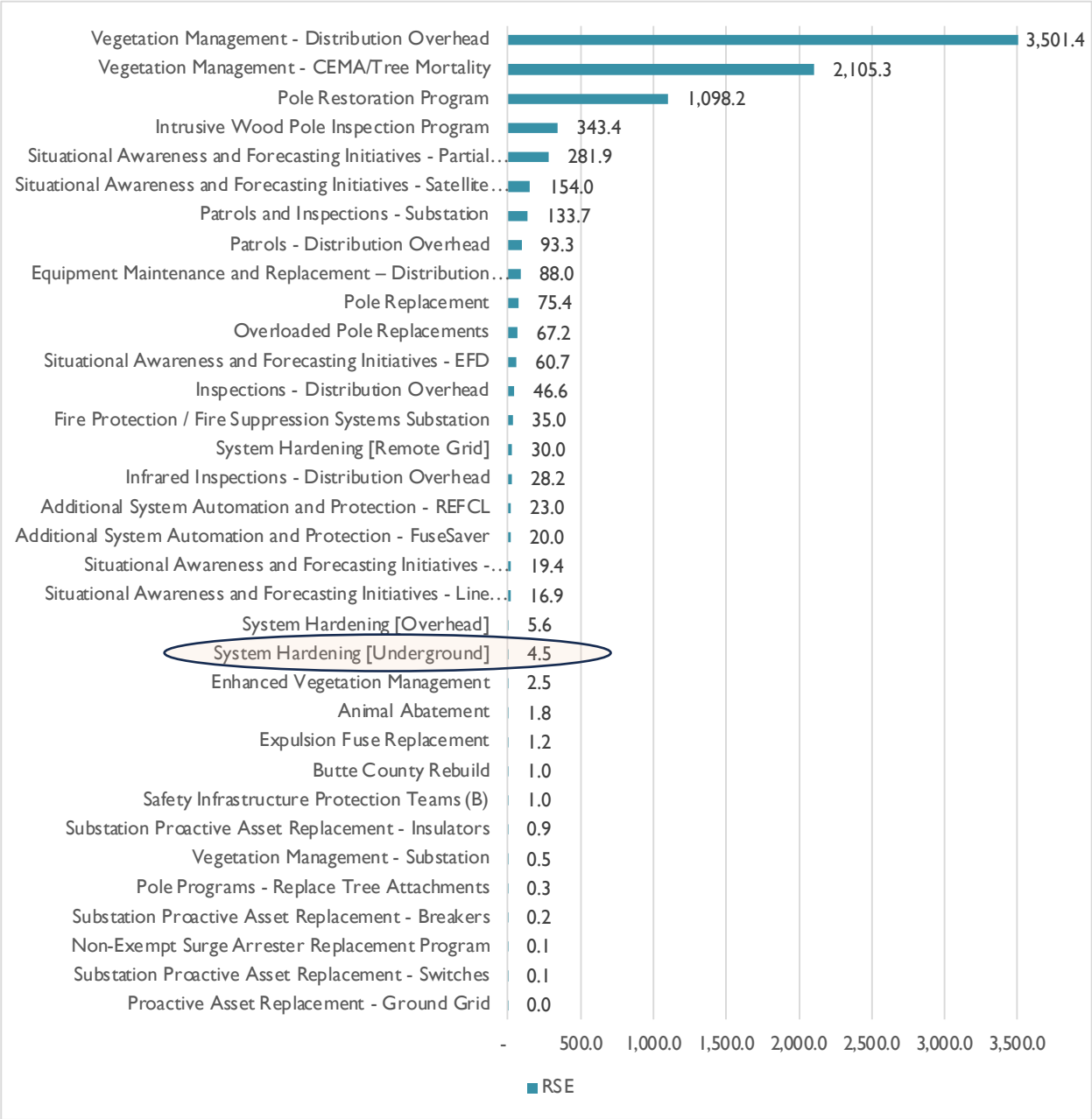
PG&E's own data continued to flash warning lights even as it over-estimated the effectiveness of the EVM program in its initial assessments. When PG&E filed its 2023 GRC in the middle of 2021, the risk spend efficiency (RSE) – a measure of cost-effectiveness – of EVM was one of the lowest of all its programs. Under the D.18-12-014 Settlement, RSE is calculated by dividing the expected risk reduction benefit from the mitigation (pre-mitigation risk minus post-mitigation risk - the numerator) by the costs of the mitigation (the denominator). The Settlement requires that "[t]he values in the numerator and denominator should be present values to ensure the use of comparable measurements of benefits and costs." This is accomplished for each program and separately for each risk tranche of each risk area.[20]

$$\boldsymbol{RSE} = \frac{(\boldsymbol{Pre{-}mitigation\ Risk{-}Post{-}Mitigation\ Risk})}{\boldsymbol{Cost}}$$

PG&E's calculation from its TY 2023 GRC filing of RSE for wildfire mitigation programs is shown below.

[17] Emphasis added. A.18-12-009, TURN-1, Eric Borden Testimony on behalf of TURN, p. 13, July 26, 2019.
[18] TURN-2, Question 1, Attachment 2.
[19] Tree removal represents 83 percent of trees worked (278,336 / 336,267) in the program, and tree removal is significantly more costly than tree trimming.
[20] D.18-12-014 at Attachment A, p. A-13 (Row 25) (RSE should be calculated by dividing the mitigation risk reduction benefit by the mitigation cost estimate."); and p. A-11 (Row 14) (". . . risk spend efficiencies will be determined at the Tranche level . . .").

Figure 4. PG&E Risk Spend Efficiency Results, 2023-2026, from TY 2023 GRC filed in June 2021[21]



[21] These reflect the utility's initially filed RSE workpapers in the case (around June 2021), which were subsequently updated as the utility's proposal shifted. Workpaper EO-WLDFR-3_RSE Input File, tab "RSE Results."

By far the most cost-effective program was traditional vegetation management, which TURN's testimony in the prior GRC had strenuously argued should be the priority for PG&E.[22]

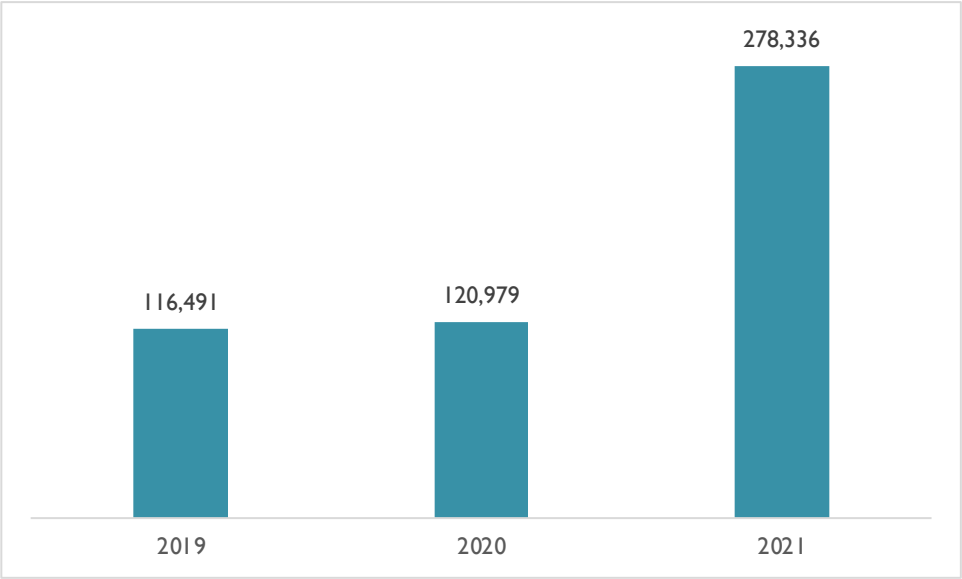
Again, as PG&E ramped up its program heading into and throughout 2021, this information was not adequately considered, nor were considerations about how *best* to spend ratepayer funds and utilize scarce resources to mitigate wildfire risk.

D. Tree Removals at the End of 2021 Were not Adequately Risk Based

PG&E states that it *"*issued new guidance in October 2021 that required crews to remove a tree if the tree being worked was within 12 feet of the line. Previously these trees would have been trimmed, but more trees were ultimately removed as a result of the new guidance."[23] While PG&E says this guidance was just a "clarification" of existing procedures,[24] it is not clear whether this was truly a "clarification" or a different approach to the implementation of EVM. Regardless, PG&E removed significantly more trees in 2021 over prior years, and much of this work occurred after October 2021 when PG&E met with and provided information to its contractors to ensure tree removal was taking place rather than tree trimming for trees within 12 feet of PG&E's power lines.

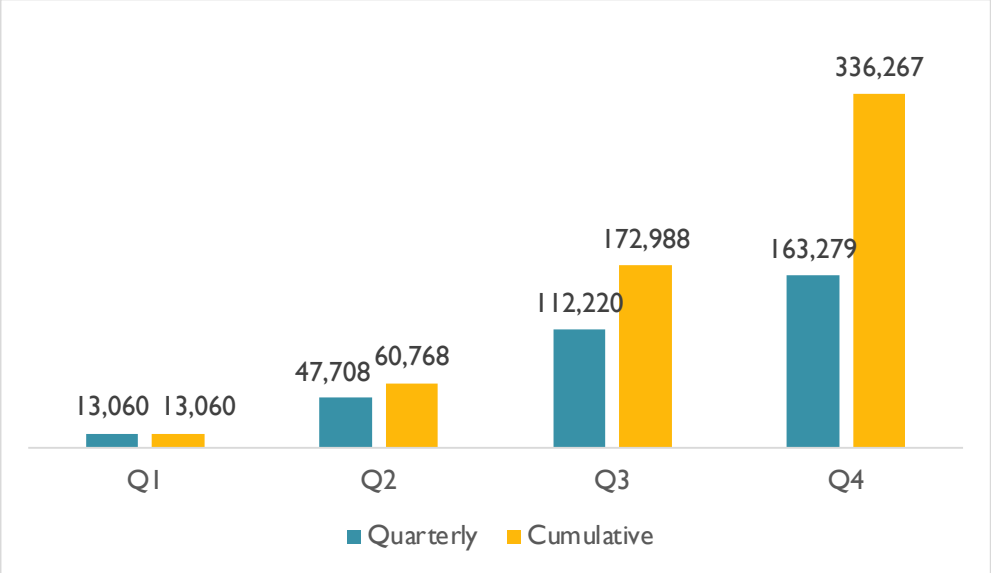
[22] A.18-12-009, TURN-1, Eric Borden Testimony on behalf of TURN, p. 14, stated in part "PG&E must do a better job of identifying and removing unhealthy trees, while removing only those healthy trees which truly pose a danger to power lines during dry, hot, windy conditions."
[23] Emphasis added. PG&E Testimony, pp. 3-30, lines 24 to 3-31, line 2.
[24] TURN-2, Question 22.

Figure 5. EVM Tree Removal (2019-2021)



Source: TURN-2, Question 1, Attachment 2.

Figure 6. EVM Tree Removal by Quarter (2021)



Source: TURN-5, Question 3, Attachment 25.

PG&E's approach to tree removal – whether adopted in October of 2021 or earlier - appears to violate the spirit if not the letter of then Wildfire Safety Division's 2020 Resolution, which found that PG&E's program should "focus on at risk trees first, rather than on every tree within striking

distance."[25] Essentially, WSD adopted a risk-based approach to tree removal, as opposed to PG&E's original proposal to remove all strike trees (trees tall enough to fall into PG&E power lines). But for 2021, PG&E partially reverted to its proposal from prior years that had been expressly rejected by WSD, though rather than "all strike trees" PG&E would remove all trees within 12 feet, even when identified by inspectors for pruning rather than removal (this did not apply to redwoods or sequoias).[26]

Removing trees that were identified for pruning, not removal, is a massive waste of resources, is not risk based, and is entirely unscalable and infeasible as an approach to wildfire risk reduction. For example, PG&E states that there are around 13 million "strike trees" (trees tall enough to hit a power line if they fell over) in its service territory – many of these trees are likely within 12 feet of PG&E's power lines.[27] Removing this number of trees would cost PG&E's ratepayers $14 billion,[28] all for a program that does not significantly reduce wildfire risk.

E. PG&E's Risk Ranking Methodology for EVM did Not Adequately Prioritize the Highest Risk Miles

PG&E touts its EVM program as prioritizing the highest risk miles:

> In 2021, PG&E committed to performing 80 percent of its EVM work on the highest 20 percent of risk ranked miles and to perform 1,800 miles of EVM work by the end of the calendar year. PG&E exceeded both commitments by performing 98 percent of the EVM work on the top 20 percent of risk ranked miles and completing 1,983 miles of EVM work.[29]

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[25] Wildfire Safety Division Action Statement on Pacific Gas and Electric Company's 2020 Wildfire Mitigation Plan (WSD-003), June 11, 2020, p. 43.
[26] TURN-4, question 5b.
[27] PG&E does not know how many "strike trees" are within 12 feet of power lines. TURN-2, question 22(f).
[28] PG&E's forecast for tree removal in the 2023 GRC was $1,089 per tree. It recorded $1,406 per tree in 2020. I use the forecast as a conservative estimate here. TURN-2, question 1, Attch 2, tab "2023 GRC WP 9-12."
[29] PG&E p. 3-25 lines 16-21.

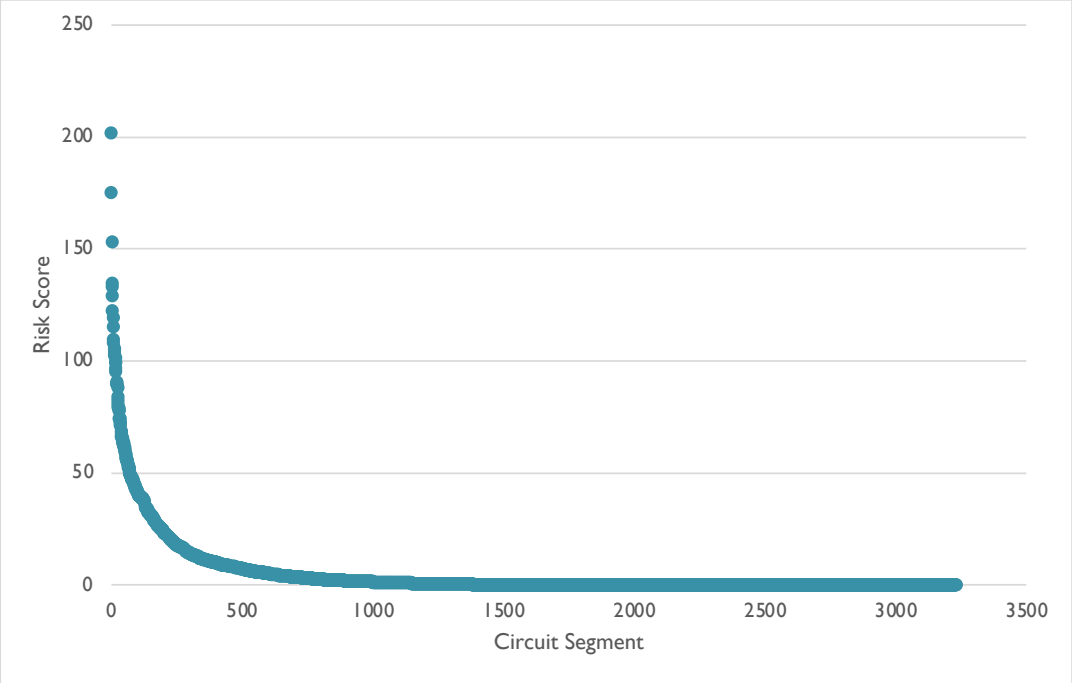
Unfortunately, PG&E's approach to risk for prioritization of circuit miles was not as favorable as these statistics suggest on their face.

The problem lies in the use of "risk ranked" miles rather than prioritization based on "risk." "Risk" is the product of likelihood and consequence of risk event, in this case an ignition. "Likelihood" is the probability that an event will occur, while "consequence" is the result of that event if it occurs. This is assessed on a granular basis at the circuit segment level by PG&E; note that circuit segments have different lengths. As PG&E explains, "[t]he risk model [for EVM] identified the highest risk miles in the HGRD regardless of tree species."[30]

As TURN noted in its comments on PG&E's most recent Wildfire Mitigation Plan,[31] PG&E's definition of "high risk" is based on the *count of circuit segments* modeled: for example, the total number of circuit segments in the utility's HFTD is multiplied by 20% to find the threshold of "top 20 percent."[32] Similarly, the top 50% under this methodology would multiply 50% by the number of circuits segments modeled. This methodology would identify the highest wildfire risk if each circuit segment had the same amount of risk; however, this is far from the case. The figure below shows the "tree-weighted" risk for each circuit segment according to PG&E's modeling results.

[30] PG&E Testimony, p. 3-24 lines 22-23.
[31] Opening Comments of The Utility Reform Network on Pacific Gas and Electric Company's 2023-2025 Wildfire Mitigation Plan, May 26, 2023, pp. 25-29.
[32] PG&E's response to WMP DR TURN-13, question 1.

Figure 7. Tree Weighted Risk Score by Circuit Segment[33]



If the risk were the same for each circuit segment, the graph would show a straight line across.[34] Clearly, risk among circuits varies significantly across the HFTD, with risk far more concentrated in a relatively small subset of circuit segments and HFTD miles. This renders PG&E's "count of segments" methodology inaccurate for prioritizing based on risk, particularly when making claims regarding what work was accomplished in the "top 20 percent."

To further explain why PG&E's methodology does not result in a targeting of circuit segments in the top 20 percent of risk, I provide the following illustrative example. Let's assume there are a total of 40 circuit segments, which PG&E has ranked from highest to lowest risk. Using PG&E's "risk ranked" methodology, the "top 20%" of circuits is anything from the 8th ranked circuit and above (40 * .2 = 8). However, since the actual *risk* varies significantly across circuit segments

[33] TURN-2, Question 17, Attachment 2.
[34] While the line at the bottom appears straight, it masks significant variability due to the very high risk of some circuit segments that increase the scale of the y axis.

(see Figure above), PG&E's "risk ranked" threshold does not actually correspond to the top 20% of risk. This is shown using illustrative numbers below.

Table 5. Illustrative Circuit Segment Ranking by "Top 20%" –
PG&E "Count" Methodology vs. Wildfire Risk

	Segment Rank	WF Risk	Cumulative WF Risk	Cumulative WF Risk %
	1	25,000	25,000	10%
Top 20% - WF Risk	2	24,000	49,000	20%
	3	15,000	64,000	27%
	4	14,900	78,900	33%
	5	14,800	93,700	39%
	6	14,700	108,400	45%
	7	14,600	123,000	51%
Top 20% - PG&E	8	14,500	137,500	57%
	9	14,400	151,900	63%
	10	14,300	166,200	69%
	11	14,200	180,400	75%
	12	14,100	194,500	81%
	13	14,000	208,500	87%
	14	13,900	222,400	93%
	15	16,800	239,200	100%
	16	1	239,201	100%
	17	1	239,202	100%
	18	1	239,203	100%
	19	1	239,204	100%
	20	1	239,205	100%
	21	1	239,206	100%
	22	1	239,207	100%
	23	1	239,208	100%
	24	1	239,209	100%
	25	1	239,210	100%
	26	1	239,211	100%
	27	1	239,212	100%
	28	1	239,213	100%
	29	1	239,214	100%
	30	1	239,215	100%
	31	1	239,216	100%
	32	1	239,217	100%
	33	1	239,218	100%
	34	1	239,219	100%
	35	1	239,220	100%
	36	1	239,221	100%
	37	1	239,222	100%
	38	1	239,223	100%
	39	1	239,224	100%
	40	1	239,225	100%

The actual difference between wildfire risk and PG&E's methodology is much more significant than in the illustrative table above. Based on PG&E's risk model results, sorted from highest to lowest risk circuit segment, I find that the top 20 percent of risk is contained in the top 30 circuit

segments,[35] rather than the top 647 circuit segments as would be indicated PG&E's "count of segments" methodology (3,233 circuit segments assessed * 20 percent = 647). And rather than 98 percent of work accomplished in the top 20 percent of risk as PG&E indicates in testimony (see above), just 31 percent of work was accomplished in the top 20 percent of risk.[36]

Table 6. EVM Work by Risk Tranche

	Total HFTD Miles	EVM Miles Accomplished	Percent of EVM Work in Risk Tranche	Estimated Cost
Top 20%	849	605	31%	$ 235,167,907
20%-30%	615	450	23%	$ 174,847,826
30%-40%	793	548	28%	$ 212,882,454
40%-50%	956	262	13%	$ 101,744,229
>50%	22,396	118	6%	$ 45,792,090
Total	**25,609**	**1,983**	**100%**	**$ 770,434,505**

Source: TURN-2, Question 17, Attachment 2. Cost estimated by multiplying average cost per mile ($388,520) by miles accomplished in the tranche.

The table shows that PG&E improved its risk-based approach to the EVM program over prior years. For example, in 2020 the Commission found that "less than 5 percent of the EVM work PG&E completed was on the 20 highest risk power lines according to PG&E's own rankings."[37] District Court Judge Alsup, who oversaw PG&E's probation, stated that "PG&E failed to use risk models as the predominant input…in PG&E's [EVM] work planning and execution for 2019 and 2020. This choice by PG&E defies belief."[38] However, PG&E's program was nowhere near as successful as the utility has claimed due to the faulty methodology and potentially misleading description discussed above. A purely risk-prioritized approach could have accomplished the

[35] TURN-2, question 17, Attachment 2.
[36] TURN-2, Question 17, Attachment 2. Based on "Remaining EVM Miles" which incorporates previously accomplished EVM work, PG&E could have accomplished 41 percent of EVM work in 2021 The 31 percent represents 76 percent of the total remaining miles (.31/.41).
[37] Resolution M-4852, p. 7.
[38] USA v. PGE, Doc 1277 (12/29/20), p. 16 (emphasis added) (quoting and reacting to the Federal Monitor's December 16, 2020 Letter, USA v PGE, Doc 1277-1.

1,983 miles of EVM work in the top 38 percent of risk;[39] instead, 380 miles of work was accomplished on miles from the 40th percentile and below, representing $146 million of total costs.

While the $146 million of EVM spending on relatively low-risk circuits could represent an alternative disallowance recommendation, I believe this issue, combined with the significant shortcomings in program implementation outlined throughout this testimony, only serves to underscore the reasonableness of my recommendation for a full disallowance of all above-authorized spending sought for recovery in this application.

F. PG&E Must Be Required To More Fully Identify The Key Decision Points Regarding Its 2021 EVM Program, And What It Knew About The Program's Effectiveness At Each Decision Point

My understanding is that in a reasonableness review such as this one, the Commission will assess the reasonableness of PG&E's conduct based at least in part on what the utility knew or should have known at the time it was making key decisions about that conduct. PG&E's direct showing, in my view, fails to provide a sufficient description of either its key decisions, or the basis for those decisions. For example, PG&E's effort seems to have driven largely by a perceived need to achieve its mileage target for 2021. But the testimony does not explain how this target was developed, or why the Commission should find it reasonable. Similarly, PG&E does not address why its forecasted cost of achieving its target was reasonable at the outset of 2021, or at the much higher levels forecasted later in the year. Specifically, it is unclear the process by which the $539 million and $780 million internal budgets were deemed reasonable by PG&E management (see Section IV (B) above), or the basis for deeming them reasonable. We do know that PG&E's 2021 Long Term Incentive Plan included an EVM metric that was tied to the number of circuit miles completed, suggesting there was a financial incentive to achieve that target for at least some of PG&E's personnel associated with the EVM program.[40]

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[39] TURN-2, Question 17, Attachment 2. Based on "Remaining EVM Miles" which incorporates previously accomplished EVM work.
[40] TURN-4, Question 1.c.

In its rebuttal testimony, PG&E should make a clearer demonstration of what it knew and when it knew it in the context of its EVM program as developed and implemented throughout 2021, as well as the role that management bonuses played in this decision-making.