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BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

In the Matter of the Application of Pacific Gas and Electric Company for Approval of 2026 – 2030 Electric Program Investment Charge Investment Plan. (U 39 E)	Application No. 26-08-___

APPLICATION OF PACIFIC GAS AND ELECTRIC COMPANY (U 39 E) FOR APPROVAL OF 2026 - 2030 ELECTRIC PROGRAM INVESTMENT CHARGE INVESTMENT PLAN

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Dated: August 26, 2026

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APPLICATION OF PACIFIC GAS AND ELECTRIC COMPANY (U 39 E) FOR APPROVAL OF 2026 - 2030 ELECTRIC PROGRAM INVESTMENT CHARGE INVESTMENT PLAN

I. INTRODUCTION

Pursuant to Ordering Paragraphs ("OP") 2 and 5 of Decision ("D.") 26-02-037 of the California Public Utilities Commission ("Commission") and Article 2 and Rule 3.2 of the Commission's Rules of Practice and Procedure, Pacific Gas and Electric Company ("PG&E") hereby files this *Application For Approval of 2026 – 2030 Electric Program Investment Charge Investment Plan*. PG&E's 2026 – 2030 Electric Program Investment Charge ("EPIC 5") Investment Plan is provided as Attachment 1 to this Application. PG&E prepared this EPIC 5 Investment Plan using the template format requested by CPUC Energy Division staff in email communications with EPIC Administrators between March and June 2026.

II. BACKGROUND

On March 2, 2026, the Commission issued D.26-02-037, authorizing PG&E, Southern California Edison Company ("SCE"), and San Diego Gas & Electric Company ("SDG&E") (collectively, "the IOUs") to continue in their role as EPIC program administrators,[1] along with the California Energy Commission ("CEC," and together with the IOUs, "EPIC Administrators") for the EPIC investment plan cycle covering years 2026 through 2030. The Commission further

[1] D.26-02-037 at 23 ("[W]e authorize the IOUs to continue as EPIC Administrators for the EPIC 5 Investment Plan Cycle.").

directed the EPIC Administrators to "file their [EPIC] 5 investment plan applications for Commission consideration by no later than August 26, 2026."[2]

PG&E's authorized budget for EPIC 5 has already been established as $92,685,000, inclusive of PG&E's project and administrative budgets, as well as its portion of the Commission oversight budget.[3] This budget was approved by the Commission and is currently being collected in rates.[4] However, pursuant to OP 2 of D.26-02-037, EPIC Administrators "may propose increases to account for inflation in their EPIC 5 investment plan applications."[5] Accordingly, PG&E includes in this Application at Section III.B, a request to increase its EPIC 5 budget by $8,342,000 (approximately 9%) to account for inflation, which PG&E is confident can return substantial ratepayer benefits from scaled, validated solutions that significantly outweigh the budget increase amount. Because of this request for a budget increase, this Application also complies with Rule 3.2.[6]

PG&E's past EPIC projects have provided significant value to customers by facilitating and accelerating integration of new technologies onto the electric grid, as well as by helping to advance the safety, affordability, reliability and delivery of clean energy to customers. EPIC projects are critical tools helping California achieve its energy and environmental policy goals.

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[2] *Id*. at OP 5.

[3] *Id*. at Appendix B, Table 2.

[4] Pursuant to OPs 2 and 3 of D.26-02-037, PG&E filed Advice Letter ("AL") 7866-E on March 26, 2026 and Supplemental AL 7866-E-A on April 23, 2026 to modify its tariff sheets to reflect the authorized collection of the EPIC surcharge in electric rates beginning January 1, 2026, through December 31, 2030. The disposition letter accepting AL 7866-E-A with an effective date of January 1, 2026 was received on June 9, 2026.

[5] *See also*, D.21-11-028 at OP 3 ("All administrators will have the ability to propose to adjust their budgets for their 2026-2030 investment plan by the rate of inflation, as calculated using the California Department of Finance's California Consumer Price Index for Urban Wage Earners and Clerical Workers (CPI-W) method.").

[6] Rule 3.2 applies to "Applications for authority to increase rates, *or to implement changes that would result in increased rates*…." Rule 3.2(a) (*emphasis added*).

III. REQUESTED RELIEF

California's grid is being reshaped by accelerating electrification and unprecedented load growth, intensifying climate risk, aging infrastructure, and ambitious California clean energy goals, all while affordability pressure on customers intensifies. Significant technological innovation across every aspect of PG&E's operations is needed to meet this confluence of challenges, and PG&E's EPIC program remains the critical central mechanism for driving the transformation needed.

A. The Commission Should Approve PG&E's EPIC 5 Investment Plan

PG&E's proposed Strategic Initiatives and funding approach in its EPIC 5 Investment Plan balance the need to invest in technology advancement that furthers the full breadth of EPIC Strategic Goals and Objectives with the urgency and importance of weighting investment toward areas that have the highest potential to improve affordability and drive future rate reduction for customers once proven solutions are scaled. PG&E's Investment Plan meets all the requirements set out by the Commission and adequately details how PG&E will use its EPIC 5 budget to meet the Strategic Goals and Objectives set by the Commission. The Commission should therefore approve the Investment Plan without modification.

B. The Commission Should Approve an Increase for PG&E's Budget for EPIC 5 to Account for Inflation

As discussed in D.21-11-028[7] and D.26-02-037,[8] PG&E requests that the Commission approve an increase to its EPIC 5 budget to prevent further erosion of the investment power of the EPIC program towards advancing critical program objectives. PG&E is confident that this increase would yield ratepayer benefits well in excess of the ratepayer funds spent, since EPIC projects drive critical innovation that can meaningfully reduce grid system costs to deliver significant returns to customers in bill savings, once validated solutions are scaled.

[7] D.21-11-028 at OP 2.

[8] D.26-02-037 at 25 and OP 2.

The last inflation adjustment for the EPIC Program was approved in the transition from the EPIC 2 funding cycle (2015–2017) to the EPIC 3 funding cycle (2018–2020), more than eight years ago. EPIC Administrators were not authorized to propose an inflation adjustment to the budget for the EPIC 4 investment period (2021–2025), so the annualized EPIC budget has been fixed since 2018 (EPIC 3). The specified method for calculating cumulative inflation (CPI-W)[9] forecasted for the 2026–2030 period would permit a maximum increase of 17.88%, but, mindful of affordability concerns, PG&E is requesting 9%, rounded to $8,342,000, which is roughly half of the ~18% maximum. This additional funding supports PG&E's EPIC 5 Strategic Initiatives and Research Topics that will prioritize investment in demonstrations of technologies and solutions that have high potential to significantly reduce customer rates once proven and scaled. PG&E has matured its practice of innovation and enhanced impact with each successive EPIC cycle and expects the affordability impact of EPIC 5 to surpass EPIC 4 portfolio impacts, while also delivering critical safety, reliability, sustainability and equity solutions for customers.[10]

IV. SUMMARY OF PG&E'S EPIC 5 INVESTMENT PLAN

PG&E's EPIC 5 Investment Plan continues to drive innovation to support California's progress toward an equitable clean energy future. PG&E's EPIC 3 and EPIC 4 work is turning demonstrations into deployed value for ratepayers, and EPIC 5 builds on these efforts to direct ratepayer investment to the innovations best positioned to advance affordability, safety, reliability, and equity while furthering California's decarbonization and climate adaptation goals.

PG&E's EPIC 5 Investment Plan is composed of six areas of strategic investment, called Strategic Initiatives. The Commission provided a strategic framework to guide EPIC Administrator investment plans through the adoption of five Strategic Goals for EPIC[11] and

[9] D.18-01-008 at 33 and OP 6.

[10] Attachment 1, PG&E EPIC 5 2026-2030 Investment Plan, Appendix A10 at 141.

[11] D.24-03-007, Appendix A.

thirteen Strategic Objectives for EPIC 5.[12] Across its Strategic Initiatives, PG&E's EPIC 5 Investment plan addresses each of the 5 Strategic Goals and nearly all Strategic Objectives. PG&E's 6 Strategic Initiatives are as follows:

- **Initiative 1**: Ensuring cost-effective and timely access to EV connections for the benefit of all Californians
- **Initiative 2**: Enabling affordable load growth through advanced planning and operating capabilities
- **Initiative 3**: Accelerating affordable building electrification across customer groups to enable community-scale decarbonization
- **Initiative 4**: Understanding and planning for climate and weather impacts on operations, assets, and the environment
- **Initiative 5:** Building community resilience from prevention through recovery
- **Initiative 6:** Exploring pathways to streamline interconnection for DERs and new load

Under these six Strategic Initiatives, PG&E has proposed 14 Research Topic Areas ("Topics") that characterize the key gaps, potential solutions to explore, expected outcomes from solution demonstrations, proposed metrics and plans for coordination with other proceedings, EPIC Administrators and the Gas RD&D program. These Strategic Objectives, Initiatives and Topics are described in detail in the EPIC Investment Plan, included as Attachment 1.

The table below summarizes the relationship between PG&E's proposed Strategic Initiatives and the Commission's Strategic Goals and Strategic Objectives, as well as PG&E's allocation of its proposed EPIC 5 budget across Strategic Initiatives and the associated share (%) of the technology demonstration and deployment ("TD&D") budget for each initiative. PG&E's proposed $8,342,000 budget increase is reflected in the funding summary table below. More detailed background information on the inflation calculation and PG&E's justification for an EPIC budget adjustment can be found in Appendix A10 of Attachment 1.

[12] D.26-02-037, Appendix A.

Funding Item	Amount	Primary Strategic Goal and Strategic Objectives (SO) Addressed
Initiative 1: Ensuring cost-effective and timely access to EV connections for the benefit of all Californians	$15,100,000 (16.70%)	**Primary Goal:** Transportation Electrification **Objectives**: SO 1, SO 2
Initiative 2: Enabling affordable load growth through advanced planning and operating capabilities	$23,280,000 (25.75%)	**Primary Goal**: DER Integration **Objectives**: SO 12, SO 11, SO 3
Initiative 3: Accelerating affordable building electrification across customer groups to enable community-scale decarbonization	$11,079,167 (12.25%)	**Primary Goal**: Building Decarbonization **Objectives**: SO 4, SO 5, SO 6
Initiative 4: Understanding and planning for climate and weather impacts on operations, assets, and the environment	$4,525,000 (5.00%)	**Primary Goal**: Climate Adaptation **Objectives**: SO 8, SO 13
Initiative 5: Building community resilience from prevention through recovery	$22,830,000 (25.25%)	**Primary Goal**: Climate Adaptation **Objectives**: SO 13, SO 9, SO 8
Initiative 6: Exploring pathways to streamline interconnection and energization for DERs and new load	$13,605,000 (15.05%)	**Primary Goal**: DER Integration **Objectives**: SO 10
Administration and Oversight		
CPUC Oversight Budget	$505,133	
PG&E Administrative Budget	$10,102,700	
Total Request	**$101,027,000**	

If PG&E's proposed budget adjustment to account for inflation is not approved, or if an alternate increase amount is approved by the Commission, PG&E would divide the resulting TD&D program budget using the same share (%) for each Strategic Initiative represented in the funding summary table above.

V. STATUTORY AND PROCEDURAL REQUIREMENTS

A. Statutory Authority – Rule 2.1

This Application is filed pursuant to D.26-02-037 and Public Utilities Code Sections 451, 728, 740.1 and 8360.

B. Legal Name and Principal Place of Business – Rule 2.1(a)

Since October 10, 1905, Pacific Gas and Electric Company has been an operating public utility corporation, organized under the laws of the State of California. PG&E is engaged principally in the business of furnishing gas and electric service in California. PG&E's principal place of business is at 300 Lakeside Drive, Oakland, CA 94612.

C. Correspondence and Communication Regarding This Application – Rule 2.1.(b)

All correspondence, communications, and service regarding this Application should be addressed to:

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D. Proposed Categorization – Rule 2.1(c)

PG&E proposes that this Application be categorized as "ratesetting."

E. Need for Hearing, Issues to Be Considered, and Proposed Schedule – Rule 2.1(c)

PG&E anticipates that evidentiary hearings will not be needed.

The principal issue presented in this Application is whether the Commission should approve PG&E's request for approval of its 2026 – 2030 EPIC Investment Plan in compliance with the requirements of D.26-02-037, D.21-11-028, and previous EPIC decisions. In addition, PG&E also requests that the Commission approve an increase of $8,342,000 (approximately 9%) to its EPIC 5 budget to account for inflation.[13]

PG&E proposes the following procedural schedule:

PROPOSED SCHEDULE – NO HEARINGS	
ACTION	**DATE**
Application Filed	August 26, 2026
Response/Protests	September 28, 2026
Reply to Response/Protests	October 8, 2026
EPIC 5 Post-Application Workshop	October 20-22, 2026
Prehearing Conference	October 2026
Scoping Memo	November 2026
Opening Briefs	November 2026
Reply Briefs	December 2026
Proposed Decision	January 2027
Opening Comments on Proposed Decision	20 days from issuance of Proposed Decision
Reply Comments on Proposed Decision	5 days from last day for filing Opening Comments
Final Decision	March 2027

F. Articles of Incorporation – Rule 2.2

PG&E is, and since October 10, 1905, has been an operating public utility corporation organized under California law. A certified copy of PG&E's Amended and Restated Articles of Incorporation, effective June 22, 2020, was filed with the Commission on July 1, 2020, with PG&E's Application 20-07-002. These articles are incorporated herein by reference.

G. Authority to Increase Rates – Rule 3.2

PG&E is providing material in this Application that complies with Rule 3.2. This Application is not a general rate increase application, so Rule 3.2(a) applies, except for subsections (4), (7), and (9).

[13] As explicitly permitted in D.26-02-037 (at OP 2) and D.21-11-028 (at OP 3).

H. Balance Sheet and Income Statement – Rule 3.2(a)(1)

Exhibit A of this Application presents PG&E's most current balance sheet and income statement for the period ended June 30, 2026.

I. Statement of Presently Effective Rates – Rule 3.2(a)(2)

PG&E's presently effective gas and electric rates were filed on March 16, 2026, in A.26-03-017, and are incorporated by reference herein.

J. Statement of Proposed Increases or Changes Which Will Result in Increases – Rule 3.2(a)(3)

PG&E's request for increase to its EPIC 5 budget (detailed in Section III.B) would increase its revenues by less than one percent.

K. Summary of Earnings – Rule 3.2(a)(5) and (a)(6)

Exhibit B shows for the recorded year 2025 the revenues, expenses, rate bases and rate of return for PG&E's Electric and Gas Departments.

L. Most Recent Proxy Statement – Rule 3.2(a)(8)

PG&E's most recent proxy statement was filed with the Commission on May 15, 2026, in A.26-05-007. This proxy statement is incorporated by reference herein.

M. Type of Rate Change Requested – Rule 3.2(a)(10)

The rate increases reflected in this Application only pass through to customers increased costs to PG&E for the services and commodities furnished by it.

N. Notice and Service of Application – Rule 3.2(b)-(d)

As required by Ordering Paragraph 5 of D.26-02-037, PG&E has served this Application on the service list for R.19-10-005 and the service lists for each IOU's pending or most recent general rate case: A.25-05-009 (PG&E); A.23-05-010 (SCE); and A.26-06-015 (SDG&E).

Within 20 days after filing this Application, PG&E will mail a notice stating in general terms the proposed revenues, rate changes and rate making mechanisms requested in this Application to the parties listed in Exhibit C of this Application, including the State of California and cities and counties served by PG&E. Within 20 days, PG&E will also publish in newspapers

of general circulation in each county in its service territory a notice of the filing of this Application and any proposed changes in rates.

Within 45 days after filing this Application, PG&E will also include notices of proposed changes in rates with the regular bills mailed or emailed to all customers affected by the proposed changes.

VI. CONCLUSION

PG&E requests that the Commission grant PG&E's Application as described herein so that PG&E may continue to administer its EPIC program in the best interests of California ratepayers.

Respectfully Submitted,

JEFFREY K. ASAY

By: */s/ Jeffrey K. Asay*
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Attorney for
PACIFIC GAS AND ELECTRIC COMPANY

Dated: August 26, 2026

VERIFICATION

I am an officer of Pacific Gas and Electric Company, a corporation, and am authorized to make this verification on its behalf. The statements in the "Application of Pacific Gas and Electric Company (U 39 E) For Approval of 2026 – 2030 Electric Program Investment Charge Investment Plan" are true of my own knowledge, except as to matters which are therein stated on information or belief, and as to those matters I believe them to be true.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on August 26, 2026, at Oakland, California.

/s/ Michael Delaney
Michael Delaney
VICE PRESIDENT
STRATEGY & INNOVATION

Pacific Gas and Electric Company (U 39 E)
2026 – 2030 Electric Program Investment Charge (EPIC)
Investment Plan

ATTACHMENT 1

Pacific Gas and Electric Company

Electric Program Investment Charge (EPIC)

EPIC 5 2026-2030 Investment Plan

August 26, 2026

The EPIC program is funded by California utility customers under the auspices of the California Public Utilities Commission

ACKNOWLEDGMENT

PG&E's EPIC 5 2026-2030 Investment Plan was prepared by Dan Gilani, Director, Innovation, Strategy & Programs (IS&P) and Britt Shaw, EPIC program lead from PG&E's IS&P team with the support of numerous internal subject matter experts and consultants.

0. Table of Contents

1. Executive Summary

Background: California's grid is being reshaped by accelerating electrification and unprecedented load growth, intensifying climate risk, aging infrastructure, and ambitious California clean energy goals, all while affordability pressure on customers intensifies. Significant technological innovation across every aspect of PG&E's operations is needed to meet this confluence of challenges, and PG&E's EPIC program remains the critical central mechanism for driving the needed transformation. PG&E's EPIC 5 Investment Plan proposes customer-funded research, development, and demonstration (RD&D) across six Strategic Initiatives, each aligned to the EPIC Strategic Goals and Strategic Objectives adopted by the Commission in D.24-03-007 and D.26-02-037, respectively. PG&E's EPIC 3 and EPIC 4 work has turned demonstrations into deployed value for ratepayers, and EPIC 5 builds on these efforts to direct ratepayer investment to the innovations best positioned to advance affordability, safety, reliability, and equity while furthering California's decarbonization and climate adaptation goals.

Funding Overview: PG&E's proposed initiatives and funding approach balances the need to invest in technology advancement that broadly furthers the range of EPIC 5 Strategic Goals and Objectives with the urgency and importance of weighting investment toward areas that have the highest potential to improve affordability and drive future rate reduction for customers once proven solutions are scaled. PG&E proposes a 9% increase to its EPIC budget, roughly half of the inflation impact between EPIC 4 and EPIC 5 periods, to ensure EPIC maintains its investment power to advance technologies that can ultimately return outsized affordability impacts for customers.[1] PG&E proposes to divide the resulting $90.4M technology demonstration and deployment (TD&D) budget across its six Strategic Initiatives, determining the share based on anticipated volume of projects, potential impact to affordability, and estimated relative costs for demonstrations under each initiative.

Strategic Goals and Objectives: PG&E's Initiatives and Topics include meaningful target areas of innovation to support the realization of the EPIC 5 Strategic Goals (SGs) and Strategic Objectives (SOs) adopted by the CPUC. Section 4 of this plan estimates potential measurable impacts that PG&E's proposed EPIC 5 innovation may deliver if scaled. Across each SG, the proposed work links to active Commission proceedings and involves active coordination with the CEC and the other IOUs.

Strategic Initiative and Research Topic Areas

Initiative 1 – Ensuring cost-effective and timely access to EV connections for the benefit of all Californians: Transportation is California's largest source of GHG emissions, and the State's climate and air quality goals cannot be met unless cost, timeline, and accessibility barriers to EV adoption are mitigated. This Initiative advances hardware, design, and construction innovations for non-residential charging, including V2X-capable sites, with portfolio-level approaches for multi-site customers such as transit agencies and depot operators in Topic 1.1: *Accelerating non-residential, MHDV, and fleet electrification.* Its Topic 1.2: *Advancing residential TE with specific emphasis on ESJ Communities* develops technologies and tools for cost-effective conventional and bidirectional residential charging, enables multi-family charging through shared infrastructure and tenant-level billing, improves pre-purchase cost transparency, and informs customer program and incentive design, with

[1] CPUC D.26-02-037 authorizes Administrators to propose an increase to the EPIC budget to adjust for inflation, as calculated based on California CPI-W data, in the EPIC 5 Investment Plan.

demonstrations concentrated in the communities most often left out of electrification. These Topics deliver faster, lower-cost EV connections, accelerate the displacement of tailpipe emissions, and convert transportation electrification into reduced rates for all customers, supporting the Transportation Electrification Policy and Infrastructure proceeding (R.23-12-008), the Near-Term Priorities Decision (D.21-07-028), and the Transportation Electrification Framework (D.22-11-040).

Initiative 2 – Enabling affordable load growth through advanced planning and operating capabilities: PG&E's peak demand is projected to increase by 20-40% by 2040 as EV adoption, large loads, and building and industrial electrification accelerate.[2] This Initiative develops the capabilities to enable PG&E to accommodate this growth affordably. Topic 2.1: *Smart planning tools to holistically optimize upgrades across the system* delivers innovations to improve and consolidate planning input data, advance forecasting capabilities, and automate evaluation of a broader set of solutions for addressing system constraints. Topic 2.2: *Solutions to optimize the cost and scope of grid upgrades* advances solutions for extracting more usable capacity from existing assets and rights-of-way through enhanced grid management, asset health monitoring, and novel construction methods. Finally, Topic 2.3: *Enabling orchestration of flexible resources and a framework for valuing flexibility* builds the operational visibility, orchestration, and valuation framework that unlocks flexible resources as a bridging solution and as a viable alternative to grid upgrades. This Initiative prioritizes DAC and low-income community circuits for demonstration as they face the greatest exposure to emerging capacity constraints and the least ability to absorb their costs. This Initiative also directly supports the High DER Future proceeding (R.21-06-017), the Integrated DER proceeding (R.14-10-003), and the Grid Modernization Framework (D.18-03-023).

Initiative 3 – Accelerating affordable building electrification across customer groups to enable community-scale decarbonization: Electrification is essential to California's decarbonization goals, but the cost and complexity of deploying technologies and methods at scale remains a barrier to adoption. This Initiative targets systematic and cost-effective electrification and opens pathways for hard-to-decarbonize sectors while coordinating with gas system planning. Topic 3.1: *Lowering the cost and complexity of building electrification from assessment to installation* aims to cut the cost and complexity of building electrification, including installation and remediation barriers. Topic 3.2: *Planning and detection tools for zonal electrification readiness* proactively targets electrification through appliance detection and lifecycle modeling, neighborhood analysis, and improved gas and electric GIS data foundations. Topic 3.3: *Unlocking electrification pathways for hard-to-decarbonize end uses* develops novel load disaggregation, cost curves and hosting capacity models for converted process load to inform coordinated gas and electric planning and advance industrial electrification. These barriers, and air pollution from industrial loads, fall hardest on ESJ communities and Tribes, a priority focus through demonstration targeting. These topics give PG&E the evidence base for coordinated electric and gas planning that directly informs the Building Decarbonization OIR, the Long-Term Gas Planning OIR (R.24-09-012), and SB 1221 implementation.

Initiative 4 – Understanding and planning for climate and weather impacts on operations, assets, and the environment: California's grid faces an accelerating convergence of climate-driven hazards that existing data and models cannot fully capture across daily operations and multi-decade planning. This Initiative and its *Topic 4.1: Enhancing climate and weather analytics to reduce systemic risk*

[2] PG&E Electrification Impacts Study (EIS) Part 2 Report, R.21-06-017 (filed Jan. 28, 2026).

develop novel modeling techniques that let PG&E cost-effectively and optimally sequence grid hardening to deliver affordability benefits. This Initiative also develops tools that quantify how climate-driven outage and safety risks are distributed across communities to optimize downstream mitigation and infrastructure investment. This Initiative is the analytical backbone of PG&E's EPIC climate adaptation portfolio, advancing methods at lower levels of technological maturity including: AI-enhanced weather modeling, integration of downscaled climate data into PG&E's scenario-based planning, species-specific tree failure prediction, and novel fire modeling techniques for urban conflagration, survivability, and suppression capability. These gaps and innovations directly support PG&E's WMP filings, and the RAMP 2024 (A.24-05-008) and Climate Adaptation (R.18-04-019) proceedings.

Initiative 5 – Building community resilience from prevention through recovery: The events that drive PG&E's largest customer impacts – including wildfire ignition, severe wind and atmospheric river damage, and resulting long-duration outages – are growing more frequent and less predictable. This Initiative delivers solutions to reduce risk and mitigate risk more cost-effectively, improving reliability and resilience through a mutually reinforcing set of capabilities: Topic 5.1: *Prevent: understanding and mitigating risk to communities and customers* develops novel undergrounding construction and asset designs, AI/ML asset diagnostics and remote sensing, and ignition-prevention protection schemes. Topic 5.2: *Withstand: minimize community and customer impacts* develops networked mid-feeder microgrids, utility-orchestrated batteries, real-time ignition detection, and robotics for suppression and restoration. Topic 5.3: *Recover: rebound from catastrophic events* develops climate-adapted forest management and post-event landscape rehabilitation. Rural, DVC, low-income, and Tribal communities bear the largest shares of climate exposure; thus, demonstration siting prioritizes these communities in future projects. Outcomes will impact subsequent WMP filings, and RAMP 2024 (A.24-05-008) and Climate Adaptation (R.18-04-019) proceedings.

Initiative 6 – Exploring pathways to streamline interconnection for DERs and new load: PG&E faces substantial load growth from electrification, large load requests, and bidirectional resources, straining interconnection and energization processes and imposing costs on customers through slower electrification, higher energy costs, and power quality risks. This Initiative tackles these bottlenecks across two complementary fronts. Topic 6.1: *Streamlining Customer Interconnection* develops enhanced data infrastructure, advanced automation, and integrated computational tools to reduce interconnection study times and Topic 6.2: *Accelerating Speed-to-Power* demonstrates clean bridging technologies, such as solid-state transformers and orchestrated distribution-side demand flexibility, and stability management tools to safely energize customers ahead of permanent grid upgrades. This Initiative prioritizes demonstration siting on circuits serving DACs and low-income communities, where capacity constraints have historically slowed DER and EV adoption, and will track energization outcomes. These innovations directly support the Commission's Streamlining Interconnection and High DER Future proceedings (R.17-07-007 & R.21-06-017).

Strategic Roadmap: For each Initiative, PG&E presents a graphical timeline that situates the proposed EPIC 5 work within the broader view of RD&D activity, including PG&E's past projects and relevant efforts led by the CEC and other entities, to show how each area builds on demonstrated results. These roadmaps show how PG&E is sequencing foundational analytics and design work with field demonstration, and how the 2026–2030 cycle is positioned to carry proven technology approaches toward scaled, rate-reducing deployment across PG&E's system.

2. Background

Regulatory Background for EPIC 5

The California Public Utilities Commission (Commission) established the Electric Program Investment Charge (EPIC) in 2011 through D.11-12-035 and renewed the Program in 2020 in D.20-08-042. The Commission's mission for EPIC is to "invest in innovation to ensure equitable access to safe, affordable, reliable, and environmentally sustainable energy for electricity ratepayers."[3]

On March 2, 2026, the Commission issued D.26-02-037 authorizing the Investor-Owned Utilities (IOUs), PG&E, SCE and SDG&E, to continue as EPIC program administrators for the fifth investment period for the program 2026-2030 ("EPIC 5"), along with the California Energy Commission (CEC).[4] CPUC also adopted 5 Strategic Goals and 13 Strategic Objectives to guide administrator investment plans for the EPIC 5 program cycle.[5] The CEC receives 80 percent of the budget with the IOUs sharing the remaining 20 percent of the budget to fund their respective project portfolios. D.26-02-037 also allows all EPIC Administrators to propose increasing their EPIC 5 (2026-2030) budgets by the rate of inflation, as calculated using the California Department of Finance's California Consumer Price Index for Urban Wage Earners and Clerical Workers (CPI-W) method. The Commission instructed PG&E, along with CEC, SCE and SDG&E to each file EPIC 5 Investment Plan Applications covering 2026-2030 on August 26, 2026.[6]

Starting in EPIC 4, the Commission directed all Administrators to file EPIC 5 investment plans at the initiative level, and defined Strategic Initiatives as the strategies EPIC Administrators employ to meet CPUC's Strategic Objectives. EPIC Administrators were also directed by the Commission to propose funding levels for their Initiatives and specify how these Initiatives will be operationalized under Research Topic Areas, including potential solutions, proposed metrics for future projects, projected equity outcomes and coordination opportunities with other EPIC Administrators and Gas RD&D program administrators (where relevant). Projects shall be selected and funded only after Commission approval of Administrator EPIC 5 Investment Plans. For more detailed regulatory and legislative background relevant to the EPIC Program and EPIC 5 priorities, see Appendix A7.

Impact Delivered through PG&E's EPIC Program

PG&E's EPIC program has provided significant value to customers by facilitating and accelerating integration of new technologies onto the electric grid that help to advance the safety, affordability, reliability and delivery of clean energy to customers. EPIC projects drive critical innovation that can meaningfully reduce grid system costs to deliver outsized returns to customers in bill savings, once validated solutions are scaled.

In D.21-11-028, the Commission directed the IOUs to "coordinate with the California Energy Commission and this Commission's Energy Division staff to develop a single, uniform benefits analysis

[3] D.21-11-028, Appendix A.
[4] D.26-02-037, OP 2.
[5] D.24-03-007, Appendix A for EPIC Strategic Goals; D.26-02-037, Appendix A for EPIC 5 Strategic Objectives.
[6] D.26-02-037, OP 5.

framework and set of metrics that enable the evaluation and tracking of the benefits of all EPIC projects."[7] PG&E coordinated extensively with SCE, SDG&E, the CEC and Commission Energy Division staff to create a common framework for benefits analysis of all EPIC projects. This framework was the basis for PG&E's EPIC 1, 2, & 3 Benefits Impact Report, which was filed with the EPIC 4 Investment Plan Application.[8]

As described in the Benefits Impact Report, PG&E's EPIC 1, 2 and 3 projects have provided customer benefits in increased safety, improved reliability, reduced costs, and other complementary benefits. Due to continuous improvement and maturation of PG&E's internal practice of innovation, PG&E's EPIC 4 portfolio is on track to produce even greater impacts than previous cycles for customer affordability, safety, reliability and resiliency, sustainability and equitable access to clean energy technologies. The summaries below describe a selection of active EPIC 4 projects and the forecasted net benefits over the next 10 years from scaling these technologies into standard operations or sustained programs, assuming successful project demonstration outcomes[9]:

- **EPIC 4.02A and 4.02B** (EPIC Budget: $12.5M) - *Socket of the Future & Residential Single-Family Home (SFH) EV* ("ChargeBoost") and *Panel Upgrade Avoidance* ("PanelBoost") – These projects aim to solve a key barrier to electrification for customers with 100-150A panels who wish to add Level 2 EV home charging and/or any other electric loads to their homes. These projects have completed lab validation stage and are now deploying cost-efficient smart load management hardware and software solutions that can help participating customers avoid panel and service upgrades, which can vary in customer-side costs from $3,000 to $50,000/site with 2-to-12-month durations. The combined deployment of grid edge computing with AMI 2.0 meters and supporting hardware to manage load intelligently can prevent equipment overloads and maintains or extends asset useful life while accelerating residential customer electrification. If these technologies perform as expected, the total anticipated savings from scaled deployment and related reduction in transformer failures and replacement costs over the next 10 years is estimated at roughly $1.1 billion.
- **EPIC 4.05** (EPIC Budget: $5.8M) – *Dynamic Line Rating (DLR) and Asset Health Monitoring* – This project tests and evaluates tools for visibility into a transmission line's dynamic rating and overall asset health with a focus on potential degradation. If successful, the DLR solutions being demonstrated in the field today could be scaled up to meaningfully reduce market congestion and curtailment of generation on transmission lines by improving visibility into management of power flows on constrained lines. Our projected benefit to cost ratio for DLR is in the 5-10x range and could yield benefits of $50-$100M over ten years relative to today's baseline congestion costs and curtailments.

[7] D.21-11-028, OP 12.

[8] A.22-10-003 (updated in AL 7145-E and AL7306-E), Appendix C.

[9] For clarity, the estimated future benefits from the EPIC 4 projects listed in this section are based on early-stage analysis in RD&D phase, not actual measured values. They project the hypothetical magnitude of impact if the technologies are proven successful for their target use-case and adopted into scaled operations.

- **EPIC 4.27** (EPIC Budget: $2.4M) – *Service Planning and Design (SP&D) Customer Service Delivery Operations Automation Tool* – Though still in early stages of development, this project seeks to develop an AI-enabled tool to improve the application intake process for customer requested electrification projects. If successful, this can reduce the duplicative labor hours for resubmissions of missing information, improve the cost estimates for customer projects and decrease the amount of cancelled projects due to delays and cost overruns. The combined forecasted improvements in labor and cost estimation are projected to save $500+ million over 10 years on operating expenses and would accelerate customer electrification timelines.
- **EPIC 4.30** (EPIC Budget $2.0M) – *Pole Design Automation* – This project is in early-stage development and testing of novel technology designed to accelerate pole design, improve output quality, and streamline production. If successful and scaled, this solution could generate nearly $260 million in savings over 10 years.

PG&E plans to build on project successes and incorporate learnings from EPIC 4 and prior cycles to deliver an EPIC 5 portfolio of technology demonstrations that can produce even greater impact once solutions are scaled into operations, with significant affordability benefit to PG&E electric customers.

EPIC Community Engagement and Administrator Coordination for EPIC 5

For EPIC 5, IOU Administrators were required to file Community Engagement Plans ahead of filing their Investment Plans and consult with the Disadvantaged Communities Advisory Group (DACAG) on the planned approach. PG&E filed its EPIC 5 Community Engagement Plan (CEP) on June 26, 2026[10] which outlines PG&E's strategy to build equitable, meaningful, and lasting partnerships with ESJ communities and Tribes throughout our service area during investment planning and to increase delivery of benefits to equity communities in ongoing implementation of the program. The stakeholder feedback received in this investment planning stage, PG&E's response to that feedback and more activity details are provided in Appendix A1.

PG&E appreciates CPUC Energy Division Staff's emphasis on increasing the expected coordination between EPIC Administrators and with the Gas RD&D program to make the most efficient use of EPIC program funds and improve program outcomes. PG&E is strongly aligned with the Commission's directive to move beyond simply avoiding duplication and toward identifying opportunities for IOU and CEC Administrators to pursue joint projects or coordinate on complementary projects in similar Research Topic Areas.

To achieve the highest benefits for California ratepayers, technologies developed or demonstrated through EPIC must ultimately be deployed on IOU grids and integrated with utility systems at scale. Considering this, PG&E plans to coordinate heavily with CEC and other IOU Administrators to develop workable mechanisms for IOUs to help shape CEC solicitations for technology demonstrations that need to be validated in utility context and to coordinate in shepherding promising technologies from CEC's early stage RD&D into utility-led TD&D, or to alert CEC of promising IOU-validated technologies that would need CEC-led market facilitation efforts to enable scaling.

[10] PG&E AL 7932-E, filed June 26, 2026.

3. Funding Overview

This section outlines PG&E's proposed budget for EPIC 5, allocation of funds across six proposed Strategic Initiatives and administration and oversight cost categories.

Budget Increase Proposal

CPUC Decision D.26-02-037 allows all EPIC Administrators to propose increasing their EPIC 5 (2026-2030) budgets by the rate of inflation, as calculated using the California Department of Finance's California Consumer Price Index for Urban Wage Earners and Clerical Workers (CPI-W) method. Using this method and the latest CPI-W data from May 2026 shows nearly 18% compounded inflation for the EPIC 5 period.[11] EPIC Administrators were not authorized to propose an inflation adjustment to the budget for the EPIC 4 investment period (2021-2025), during which time the compound inflation escalation was nearly 24%.[12]

After careful consideration of the reduction of EPIC's purchasing power since 2021, the significant rate reduction benefits expected to be delivered by PG&E's EPIC 4 program, and the impact of an EPIC 5 budget increase, PG&E is not proposing an increase to match the projected inflation impact for the EPIC 5 period (~18%). Instead, PG&E proposes a modest 9% increase to the EPIC 5 budget, which equates to a rounded increase of $8,342,000. This proposed increase is meant to limit further erosion of the EPIC program's purchasing power while expanding EPIC 5's impact through an accompanying set of Strategic Initiatives and Research Topics that will prioritize funding demonstrations of solutions that have high potential to significantly reduce customer rates once scaled.

The cross-section of examples of active EPIC 4 projects provided in the Background section illustrates the significant return PG&E customers should expect from EPIC program investments in innovation. While individual projects' outcomes and lifecycle benefits are not fully certain at the RD&D stage and estimates are based on early analysis in demonstration phase, we expect that our portfolio of EPIC 4 projects will cover the program's cost many times over. PG&E has matured its practice of innovation and enhanced our impact with each successive EPIC cycle, and we expect the affordability impact of EPIC 5 to surpass EPIC 4's while also delivering critical safety, reliability, sustainability and equity solutions for customers.

PG&E's proposed budget increase is reflected in the funding summary table below. *More detailed background on the inflation calculation and PG&E's justification for an EPIC budget adjustment can be found in Appendix A10***.**

[11] The California Department of Finance (DOF) forecasts that the compounded annual California CPI-W inflation rate during EPIC 5 (2026 to 2030) will be 3.34%. Compounding this inflation rate over the period shows a total inflation escalation of (1.0334^5 – 1) = 17.88%. *See Appendix A10*.

[12] California DOF data for CPI-W during the EPIC 4 cycle (from 2021-2025) shows that the compounded annual California CPI-W inflation rate was 4.38%. Compounding this inflation rate over the period shows an inflation escalation of (1.0438^5 – 1) = 23.91%. *See Appendix A10*.

Budget Allocation

PG&E proposes to allocate the EPIC 5 budget as outlined in **Table 1**, below. Roughly twenty-five percent (25%) of the $90.4M in TD&D program funds would be allocated to each of Initiatives 2 and 5, which encompass a wide variety of potential technologies or solutions to validate under their six total research topics and which have high potential to dramatically reduce cost compared with existing operations, offering substantial affordability outcomes for customers. The remaining initiatives, Initiatives 1, 3, 4 and 6, also drive affordability benefits but would each receive a lower share that considers the likelihood that projects under those initiatives would involve either lower cost solutions (e.g., software technologies instead of hardware) or that PG&E may have opportunities to share costs with partner technology vendors or site host customers, particularly large load customers.

The required CPUC Oversight Budget is calculated as PG&E's 50.1% share of the remaining oversight budget not covered by the CEC's budget, assuming a 9% increase to the total EPIC 5 Budget. PG&E's Administrative Budget is set at 10% of PG&E's EPIC budget, assuming an increase of $8,342,000 to the total collections amount approved in D.26-02-037 for PG&E's EPIC 5 Budget ($92,685,000), which was the budget level set in EPIC 4 (2021-2025).

Table 1. Investment Plan Funding Summary

Strategic Initiative (Funding Item)	Amount	Primary Strategic Goal Addressed	Strategic Objectives (SO) Addressed[13]
Initiative 1: Ensuring cost-effective and timely access to EV connections for the benefit of all Californians	$15,100,000 (16.70%)	**Transportation Electrification**	**SO 2**, SO 1
Initiative 2: Enabling affordable load growth through advanced planning and operating capabilities	$23,280,000 (25.75%)	**DER Integration;** (*Secondary*: Transportation Electrification)	**SO 12**, SO 11, SO 3
Initiative 3: Accelerating affordable building electrification across customer groups to enable community-scale decarbonization	$11,079,167 (12.25%)	**Building Decarbonization;** (*Secondary*: Achieving 100% Net Zero Carbon Emissions and the Coordinated Role of Gas)	**SO 4**, SO 5, SO 6,
Initiative 4: Understanding and Planning for Climate and Weather Impacts on Operations, Assets, and the Environment	$4,525,000 (5.00%)	**Climate Adaptation**	**SO 8**, SO 13

[13] Bold font designates the primary Strategic Objective (SO) addressed by each Strategic Initiative. Other Strategic Objectives served by the same Strategic Initiative are included following the primary SO.

Initiative 5: Building community resilience from prevention through recovery	$22,830,000 (25.25%)	**Climate Adaptation** (*Secondary*: DER Integration)	**SO 13**, SO 9, SO 8
Initiative 6: Exploring pathways to streamline interconnection and energization for DERs and new load	$13,605,000 (15.05%)	**DER Integration** (*Secondary*: Transportation Electrification)	**SO 10**
Administration and Oversight			
CPUC Oversight Budget[3]	$505,133		
Administrative Budget	$10,102,700		
Total Request	**$101,027,000**		

Table 2 maps PG&E's proposed Strategic Initiatives to the EPIC Strategic Goals and EPIC 5 Strategic Objectives.

Table 2. Investment Plan Strategic Initiatives by EPIC Strategic Goal and Objective:

		EPIC STRATEGIC GOAL				
		1. Transportation Electrification	2. Distributed Energy Resource (DER) Integration	3. Building Decarbonization	4. Achieving 100 Percent Net-Zero Carbon Emissions and the Coordinated Role of Gas	5. Climate Adaptation
EPIC STRATEGIC OBJECTIVE	1. Reducing Medium and Heavy-Duty Vehicle Charging Infrastructure Costs	Initiative 1				
	2. Overcoming Barriers to EV Benefits in Disadvantaged Communities	Initiative 1				
	3. Smart Planning Tools for New Load and Clean Resources	Initiative 2	Initiative 2			
	4. Reducing Cost of Whole Home Electrification			Initiative 3		
	5. Innovative Approaches for Difficult-to-Decarbonize Sectors				Initiative 3	

		EPIC STRATEGIC GOAL				
		1. Transportation Electrification	2. Distributed Energy Resource (DER) Integration	3. Building Decarbonization	4. Achieving 100 Percent Net-Zero Carbon Emissions and the Coordinated Role of Gas	5. Climate Adaptation
	6. Community-Scale Decarbonization			Initiative 3	Initiative 3	
	7. Impacts Research for New Generation and Storage					
	8. Increase Predictability of Weather Impact on, Intermittent Resources, Climate Risks, and Load					Initiative 4; Initiative 5
	9. Leveraging DERs for Grid and Community Resiliency		Initiative 5			Initiative 5
	10. Expediting and Streamlining Interconnection and Energization Processes	Initiative 6	Initiative 6			
	11. Providing Data Input into a Value of DER Framework	Initiative 2	Initiative 2			
	12. Optimizing Feeder / Circuit Operations		Initiative 2			
	13. Cost-Effective Grid Hardening for Long-Term Climate Impacts					Initiative 5; Initiative 4

Table 3 provides a preliminary estimate of the share (%) of administrative expenses in each EPIC administrative budget category over the EPIC 5 period. This estimated budget includes only EPIC administrative costs—specifically, 10% of PG&E's EPIC budget. It does not include project-specific costs, even if similarly labeled, which are funded through the Program Area budgets.

Table 3. Anticipated Allocation of PG&E EPIC 5 Annual Administrative Budget

EPIC Administrative Budget Category[14]	Preliminary Estimate of Anticipated Share of Annual Administrative Expenses over EPIC 5 Period (%)[15]
Labor	**45%**
General and Administrative Expense and Overhead	**20%**
Travel	**2%**
Event Fees for Hosted and Attended Events	**3%**
Supplies and Materials	**15%**
Contracted Services	**15%**
Total	**100%**

PG&E Assumptions for Anticipated Administrative Budget Allocation

EPIC Administrators prioritize spending that supports program delivery, stakeholder engagement, and measurable public benefits while minimizing unnecessary or duplicative costs. Recognizing that implementation needs may evolve, particularly for community engagement, administrative spending may shift across budget categories during EPIC 5. Any adjustments will remain within the approved overall budget and will continue to reflect principles of fiscal responsibility and program alignment. This flexibility helps ensure resources are directed where they can most effectively advance EPIC objectives while maintaining transparency through budget tracking and annual reporting.

PG&E developed EPIC 5 administrative budget estimates using EPIC 4 historical data, assuming a similar share of costs in labor, G&A expense, and contracted services that support program planning, project reporting, and other administration. Anticipated Supplies and Materials costs also includes software for EPIC portfolio management and program administration. A key difference in EPIC 5 is the development and implementation of PG&E's EPIC 5 Community Engagement Plan (CEP)[16] and anticipated increase in activities including in-person, virtual, or hybrid workshops and compensated engagement opportunities. As a result, spending in travel, event-related costs, and supplies may be higher compared with EPIC 4 and would include contracted services supporting community engagement. PG&E's EPIC team will seek to coordinate outreach with other PG&E programs to maximize engagement with ESJ communities and Tribes while using ratepayer funds efficiently. PG&E anticipates CEP activities may drive shifts in budget category share from year to year depending on community engagement preferences and timing of key milestones for engagement (e.g., investment planning, project selection, implementation milestones and reporting).

[14] Per administrator response to Decision (D.)21-11-028 at Ordering Paragraph (OP) 16.

[15] Actual expenses to be reported in each administrator's following year EPIC Annual Report.

[16] PG&E AL 7932-E, filed June 26, 2026.

4. Strategic Goals and Strategic Objectives

EPIC Strategic Goal 1. Transportation Electrification - Investment Plan Alignment and Impact: Transportation is California's largest source of greenhouse gas emissions, and State climate and air quality goals cannot be met unless customers are able to connect new EV load affordably and on a reasonable timeline. Today, about 25% of PG&E commercial customers in the queue for EV interconnection require service or distribution grid upgrades. Through projects under Initiatives 1, 2, and 6, we aim to demonstrate technologies that, if scaled, could reduce the share of EV interconnection load requiring upgrades by 15% or more to lower both the cost and the timeline for customers adding new EV charging, supporting non-residential, fleet, and MHDV EV adoption. PG&E estimates over 860,000 EVs in our service area today, and to reach our goal of 3M EVs by 2030, Initiative 1 supports technologies that, if scaled, target a 15% reduction in residential customers requiring a panel upgrade, making EV connections more affordable and accessible.

Together, these efforts advance four Strategic Objectives: hardware, design, and construction innovations under Topic 1.1 address SO 1 by reducing the cost and timeline of deploying MHDV charging infrastructure, while cost-reducing charging technologies, multi-tenant billing, and program design under Topic 1.2 address SO 2 by extending EV access to DACs. Increased visibility into EV loads in Initiative 2 addresses SO 3 by supporting efficient grid planning, and streamlined interconnection and energization under Topics 6.1 and 6.2 address SO 10 by enabling EV load to connect faster.

Through the PICG process and a Transportation Electrification and Vehicle-Grid-Integration working group, administrators have divided scope to avoid duplication: the CEC will lead cross-cutting EV RD&D while PG&E and the other IOUs will demonstrate utility-specific solutions on their systems *(see Section 7 for topic-level coordination detail)*.

EPIC Strategic Goal 2. Distributed Energy Resource Integration - Investment Plan Alignment and Impact: California has established a goal to deploy 7,000 MW of flexible load by 2030 in support of a renewable and zero-carbon power sector by 2045. Meeting this goal requires cost-effectively integrating high penetrations of DERs to relieve grid constraints while enabling the system to orchestrate load at scale. Through projects under Initiative 2, with support from DER projects in Initiative 5, we aim to demonstrate technologies that, if scaled, could enable 1,000 MW of dispatchable flexible load by 2030 and unlock approximately 300 MW of unused capacity on existing infrastructure. The savings from projects supporting this goal are significant; PG&E's EIS Part 2 found that incorporation of demand response and engineering best practices could deliver $3.4B in primary savings through 2040, compared to EIS Part 1.[17] PG&E has over 22 GW of load in the interconnection queue across the 2024–2026 planning cycles; in Initiative 6, we aim to expedite interconnection and demonstrate clean bridging technologies that, if scaled, could accelerate an incremental 1,000 GWh of new demand, enabling earlier in-service dates for customers seeking to connect DERs and loads. PG&E estimates that these innovations, combined with novel large-load rate structures, could provide a rate benefit of approximately 0.5-1% per GW by 2035.

Together, these efforts advance three main Strategic Objectives: Topic 2.2 addresses SO 12 by safely increasing circuit utilization without necessitating new construction. Orchestration of flexible resources on feeders facing upgrades under Topic 2.3 enables SO 11 by generating the empirical data

[17] PG&E Electrification Impacts Study Part 2 Report, R.21-06-017 (filed Jan. 28, 2026).

needed to value flexibility against conventional investment and streamlined interconnection and energization under Topics 6.1 and 6.2 connect new DERs and large loads faster, meeting SO 10.

Through the PICG process and joint working groups, the administrators have divided scope by stage: the CEC funds earlier-stage, transferable work on modeling frameworks and valuation methodologies, while PG&E and the IOUs demonstrate utility-specific applications on their own grid systems which in turn help to refine these modeling frameworks and validate valuation methodologies *(see Section 7 for topic-level coordination detail)*.

EPIC Strategic Goal 3. Building Decarbonization - Investment Plan Alignment and Impact: Building electrification is one of the largest affordability challenges in the clean energy transition. California's path to economy-wide carbon neutrality by 2045 depends on sustaining a 3% annual building electrification retrofit rate (3.6% for affordable housing), yet today the all-in cost and complexity of converting a home, from the first assessment through final installation, remain the primary barriers to achieving this rate, particularly in the communities that stand to gain the most. Through EPIC 5 Initiative 3, PG&E will pursue innovation that lowers the cost and shortens the timeline of electrification for residential buildings and small businesses. California's 2022 CARB Scoping Plan for Achieving Carbon Neutrality targets 6M heat pumps installed statewide by 2030, of which PG&E anticipates 2.4M will be deployed across its own service area.[18] The innovation under this SG aims to drive down the cost and complexity of electrification to bring this ambitious target within reach.

Initiative 3 advances SO 4 by reducing the cost and complexity of building electrification through Topic 3.1, and SO 6 by building the detection and planning capability that community-scale decarbonization requires through Topic 3.2. The work supports the state's building decarbonization goals and reinforces the CPUC's Building Decarbonization (R.19-01-011) and the Gas Transition Planning (R.24-09-012) proceedings. As a combined electric and gas utility, PG&E can demonstrate how the retirement of gas infrastructure can be coordinated with electrification to offset customer cost and sequence investment, so the transition stays affordable for customers that electrify and those that stay on the gas system.

Through the PICG process and a Building Decarbonization & Gas Transition Working Group, EPIC administrators have shared respective priorities for innovation and will continue coordination to ensure that future projects will focus on distinct technologies, applications or user segments, and will share learnings and results to help inform complementary or sequentially phased work by other administrators *(see Section 7 for topic-level coordination detail).*

EPIC Strategic Goal 4. Achieving 100% Net-Zero Carbon Emissions and the Coordinated Role of Gas - Investment Plan Alignment and Impact: Reaching California's goal of economy-wide carbon neutrality by 2045 will require closing the "last 10%": the hard-to-decarbonize commercial and industrial loads for which cost-effective electrification pathways do not yet exist. These same sectors are concentrated sources of NOx, particulate matter, and other surface-level pollutants that disproportionately burden DAC and low-income communities. PG&E serves ~900 non-core industrial gas accounts today, representing approximately 9.3 MMT CO2e/year of building and process emissions, with high value manufacturing representing ~20% of these total emissions. Topic 3.3 aims

[18] https://ww2.arb.ca.gov/sites/default/files/2023-04/2022-sp.pdf.

to demonstrate process load disaggregation and system planning approaches to identify where electrification is technically feasible and NPV-positive for certain industrial customer segments, comparing continued gas service against electrification across total emissions reduced, potential electric demand flexibility services, and customer lifecycle cost. These approaches, if scaled, target 10%, or ~0.2 MMT CO2e/year from hard-to-decarbonize loads through cost-effective measures, roughly equivalent to removing ~43,500 gasoline passenger vehicles from the road annually, contributing significant gas system cost savings.

This work advances SO 5 by developing the sector and process-level segmentation analysis needed to identify electrifiable difficult-to-decarbonize end uses, allowing California to close the final gap to carbon neutrality, and it aligns with the CPUC's Long-Term Gas Planning proceeding, where the coordinated, orderly transition of the gas system is a central concern. PG&E will coordinate these efforts with the CEC and other California RD&D programs to align investments, avoid duplication, and accelerate the emerging strategies this Goal calls for *(see Section 7 for topic-level coordination detail)*.

EPIC Strategic Goal 5. Climate Adaptation - Investment Plan Alignment and Impact: PG&E's service area spans terrain that is highly exposed to extreme heat, drought, wind gusts, and precipitation swings. Adapting the existing grid to these conditions cost-effectively, while supporting the customers and communities most vulnerable to climate-driven hazards, is the central challenge of this Goal. PG&E addresses this across the full risk lifecycle: Initiative 4 sharpens the climate and weather analytics that enable anticipated systemic risk, while Initiative 5 aims to prevent ignitions and harden assets to help communities withstand events when they occur and to recover from catastrophic events faster and over the longer term, with particular attention to DVC, low-income, and Tribal communities. Successful demonstration and sustained implementation of PG&E's proposed innovation in ignition and consequence reduction supports efforts to ensure zero habitable structures are impacted by PG&E attributable fires in HFTD / HFRA. Work will continue beyond this program cycle to reduce future risk as the underlying climate hazards grow.

Under Initiative 5, PG&E will pursue innovations that can reduce impact to customers when events do occur, including continuous monitoring, adaptive protection improvements, automated and faster restoration, and customer and community resilience solutions such as microgrids and batteries. If successful and scaled, these innovations can support PG&E's customer satisfaction-driven target SAIDI value of 193 by 2030, representing over 35% reduction from forecasted SAIDI for 2030, as well as future reductions beyond 2030.

To achieve these outcomes, PG&E's plan advances SO 8 by developing novel modeling capabilities to better account for the impacts of weather and climate risks on PG&E's system and service area in Topic 4.1; SO 13 through Initiatives 4 and 5, by advancing technologies to prevent risk, withstand event impacts, and advance long-term recovery, as well as SO 9 through the utility-orchestrated battery innovations under Topic 5.2. The portfolio supports the state's resilience and wildfire framework, including the Climate Adaptation Proceeding (R.18-04-019) and the Wildfire Mitigation Plans reviewed by the Office of Energy Infrastructure Safety. PG&E will coordinate this work with the CEC and the other IOUs, demonstrating targeted utility applications extending from CEC-funded statewide climate data and analytics tools and aligning resiliency innovation priorities and projects so that proven solutions can scale across California *(see Section 7 for topic-level coordination detail)*.

5. PG&E Strategic Initiatives

PG&E's EPIC 5 Investment Plan is guided by the strategic framework the California Public Utilities Commission established through two decisions. Five Strategic Goals for EPIC were adopted in D.24-03-007 and thirteen Strategic Objectives for the EPIC 5 investment period in D.26-02-037. All are referenced in shorthand throughout this plan as "SG" and "SO", respectively.

Strategic Goals:

Strategic Goal 1 (SG 1): Transportation Electrification;

Strategic Goal 2 (SG 2): Distributed Energy Resource (DER) Integration;

Strategic Goal 3 (SG 3): Building Decarbonization;

Strategic Goal 4 (SG 4): Achieving 100 Percent Net-Zero Carbon Emissions and the Coordinated Role of Gas; and

Strategic Goal 5 (SG 5): Climate Adaptation.

Strategic Objectives:

Strategic Objective 1 (SO 1): Reducing Medium and Heavy-Duty Vehicle Charging Infrastructure Costs

Strategic Objective 2 (SO 2): Overcoming Barriers to EV Benefits in Disadvantaged Communities

Strategic Objective 3 (SO 3): Smart Planning Tools for New Load and Clean Resources

Strategic Objective 4 (SO 4): Reducing the Cost of Whole Home Electrification

Strategic Objective 5 (SO 5): Innovative Approaches for Difficult-to-Decarbonize Sectors

Strategic Objective 6 (SO 6): Community-Scale Decarbonization

Strategic Objective 7 (SO 7): Impacts Research for New Generation and Storage

Strategic Objective 8 (SO 8): Increase Predictability of Weather Impact on Intermittent Resources, Climate Risks, and Load

Strategic Objective 9 (SO 9): Leveraging Distributed Energy Resources for Grid and Community Resiliency

Strategic Objective 10 (SO 10): Expediting and Streamlining Interconnection and Energization Processes

Strategic Objective 11 (SO 11): Providing Data Input into a Value of DER Framework

Strategic Objective 12 (SO 12): Optimizing Feeder / Circuit Operations

Strategic Objective 13 (SO 13): Cost-Effective Grid Hardening for Long-Term Climate Impacts

Initiative 1: Ensuring cost-effective and timely access to EV connections for the benefit of all Californians

Initiative Funding Amount: $15,100,000

Strategic Priority: Transportation is California's largest source of greenhouse gas emissions, and State climate and air quality goals cannot be met unless customers across every segment – from home EV charging to MHDV electrification – can connect new load affordably and on a reasonable timeline. High upfront costs, long connection timelines, complex processes, and capacity constraints remain among the most significant barriers to adoption, weighing most heavily on the customers least able to absorb them: smaller fleet operators and low-income communities already bearing disproportionate transportation-related pollution. This initiative demonstrates the technologies, designs, construction methods, customer-facing tools, and program designs that reduce the cost, complexity, and timeline of connecting EV loads, organized around two interconnected Topics.

Topic 1.1: Accelerating non-residential, MHDV, and fleet electrification: Advances hardware, design, and construction innovations that reduce cost and timeline for non-residential charging on the distribution system, including the infrastructure and installation costs of V2X-capable sites, validated across vehicle types, site conditions, and grid conditions.

Topic 1.2: Advancing Residential TE with specific Emphasis on ESJ Communities: Develops technologies and tools that reduce cost, complexity, and timelines of conventional and bidirectional residential charging technologies; improve pre-purchase transparency; enhance utility visibility into customer charging behavior and evolving load; and inform customer program, pricing, and incentive design – with emphasis on DAC and low-income communities in single- and multi-family settings.

Together, these topics deliver faster, lower-cost EV connections across the customer base, accelerate displacement of tailpipe emissions in the most affected communities, and convert transportation electrification into rate-reducing load growth that spreads fixed system costs across a larger base.

Strategic Objective(s) Supported: SO 1: Reducing Medium and Heavy-Duty Vehicle Charging Infrastructure Costs; SO 2: Overcoming Barriers to EV Benefits in Disadvantaged Communities

Strategic Goal(s) Supported: SG 1: Transportation Electrification

Alignment with EPIC Equity in RD&D Framework: This Initiative addresses all five EPIC Equity Framework principles. Engagement and outreach activities supporting the EPIC Equity Framework are addressed comprehensively in PG&E's Community Engagement Plan (CEP), which establishes the foundation for community-informed RD&D across the EPIC 5 portfolio. Topic- or project-specific tailoring of engagement and outreach activities will be identified during project development phase. The discussion below focuses on principles with initiative-specific considerations (Prioritization, Metrics, and Access) while Engagement and Outreach follow the CEP unless noted otherwise.

Prioritization: Site selection will prioritize the non-residential and residential settings with the greatest equity benefit. For non-residential and fleet electrification, this includes customer segments such as drayage, transit, and refuse/delivery operating in disadvantaged and low-income communities. For residential charging, this includes DAC and low-income census tracts with a focus on solutions for renters, older housing with constrained electric panel or service capacity, and multi-family and parking-constrained settings.

Metrics: Impacts on ESJ communities and Tribes will be measured separately where possible, including cost and timeline reductions at sites, EV adoption supported by deployed infrastructure,

expanded charging access, and estimated air pollution and GHG reductions in non-attainment areas, DACs and low-income communities.

Access: The initiative lowers financial and structural barriers that exclude smaller non-residential and fleet operators and residential customers in ESJ Communities today, broadening participation in electrification and access to EV fuel-cost savings.

Alignment with EPIC Strategic Goals and Strategic Objectives: This initiative directly advances SG 1 (Transportation Electrification) by encouraging greater EV adoption across non-residential and residential segments, accelerating the State's progress toward its ZEV goals while limiting the proportional infrastructure costs of adding transportation load on the grid. The initiative supports two Strategic Objectives: 1) SO 1 (Reducing Medium- and Heavy-Duty Vehicle Charging Infrastructure Costs): Topic 1.1 aims to demonstrate innovations that reduce the cost of non-residential charging, alongside process innovations that streamline the electrification timeline, supporting SO 1's aim of reducing both the cost and time to deploy MHDV charging infrastructure, toward the stretch goal of a 50% reduction in IOU MHDV charging and grid upgrade costs by 2035; and 2) SO 2 (Overcoming Barriers to EV Benefits in Disadvantaged Communities): Topic 1.2 aims to broaden EV access for DAC households, including lower-cost bidirectional and V2X approaches that strengthen the customer value proposition. Demonstrations will prioritize siting in DAC and low-income communities, and aim to include solutions to unblock affordable charging for renters, multi-family and parking-constrained customers where access barriers are highest, addressing SO 2's objective of extending EV benefits to historically underserved communities. This initiative responds to EPIC's cross-cutting principles:

Affordability: By reducing both customer-side and utility-side connection costs and enabling increased electrification, the initiative spreads fixed system costs across a larger base and places downward pressure on rates for all customers. Customers newly able to adopt EVs will save on transportation energy costs, with the greatest relief accruing to high-energy-burden households.

Equity: This Initiative prioritizes residential projects in DACs and low-income communities and works to lower barriers for non-residential and fleet customers, including smaller operators, that serve ESJ communities, operate sites or depots in DACs or low-income communities, or would reduce local air pollution by switching to EVs. We will engage community-based organizations and Tribes in project selection and design, and track outcomes and investment in aforementioned communities.

Customer-focused solutions: Both Topics center the customer experience. Topic 1.2 improves customer program, pricing, and incentive design and gives customers pre-purchase visibility into charging costs and timelines, while Topic 1.1 informs program and incentive structures suited to the operational needs of non-residential and fleet customers. Together they reduce friction across the EV connection process and help customers make informed adoption decisions.

Reliability: Improved utility visibility into evolving load, combined with program designs that encourage charging compatible with local distribution capacity, supports reliable service as EV load grows. Better-sited and better-managed non-residential connections likewise reduce localized stress on distribution equipment.

Resilience: By lowering the cost and complexity of bidirectional, V2X-capable charging across residential and non-residential segments, the initiative expands the vehicle base and sites able to provide backup and grid-support value in periods of grid stress, with flexibility realized through the orchestration and valuation work in Initiative 2.

Coordination and Alignment with CPUC Proceedings: This initiative directly supports:

Transportation Electrification Policy and Infrastructure (R.23-12-008): This proceeding found that EV and charging infrastructure will grow significantly and anticipated that expenses will be driven largely by the State's MHDV goals; the cost-reducing innovations under Topic 1.1 respond directly to its focus on how IOUs can effectively and affordably support EV load growth.

Near-Term Priorities (D.21-07-028) and Transportation Electrification Framework (D.22-11-040): This Initiative also supports the Commission decisions directing transportation electrification investment toward underserved communities; D.21-07-028 requires allocating at least 50% of near-term priority program expenditures to those communities, and D.22-11-040 reserves a majority of Transportation Electrification Framework program funding for them. Topic 1.2 supports these decisions by concentrating demonstrations in multi-family, parking-constrained, and ESJ community settings where access barriers are highest.

Ratepayer benefits from this Initiative include: (1) lower-cost, faster EV connections across residential, non-residential, and fleet segments; (2) rate-reducing load growth that spreads fixed system costs across a larger base; (3) reduced utility-side cost to serve new transportation load; (4) expanded EV access and fuel-cost savings for DVC and low-income customers; and, in response to feedback from the December 2025 PICG workshop, (5) validated approaches that inform future GRC filings, rate design, and planning processes before deployment at scale.

Coordination with EPIC and Gas RD&D Program Administrators: PG&E's Initiative 1 will be implemented in coordination with the following IOU and CEC EPIC 5 initiatives, which aim to address similar gaps: SCE: Enhanced Grid Utilization and Flexibility (EGUF); Intelligent Grid Planning and Orchestration (IGPO); SDG&E: Advancing Grid and Community Resilience with Distributed Energy Solutions; CEC: Harnessing the Value of Transportation Electrification for Ratepayers. The EPIC administrators have formed a Transportation Electrification and Vehicle-Grid Integration working group to facilitate coordination between administrative staff and subject matter experts which will support continued collaboration during project design, selection and implementation. Discussions have covered initiative- and topic-level priorities, areas of potential complementary research, and models for collaboration during plan implementation. These mechanisms may include but are not limited to IOU technical advisory to CEC in GFO co-development, complementary projects focusing on different stages of technology development and/or different use-cases, and potential joint projects with CEC and IOU Administrators funding different portions of project scope. See Topics 1.1 and 1.2 for specific coordination examples.

Unique Role: EPIC is uniquely positioned to fund this Initiative because the work is largely pre-commercial and must be field-validated before it can inform prudent, larger-scale utility investment. The GRC funds deployment of proven technologies and system upgrades themselves; federal programs have focused on national charging networks and early-stage technology rather than utility-specific demonstration; and private investment tends toward proprietary tools rather than the shared, multi-IOU and CEC data across California's diverse conditions on which this work depends.

Initiative 2: Enabling affordable load growth through advanced planning and operating capabilities

Initiative Funding Amount: $23,280,000

Strategic Priority: California's accelerating load growth, driven by increased EV adoption, large loads, and building and industrial electrification, is expected to increase peak demand in PG&E's service area 20-40% by 2040.[19] Meanwhile, an aging asset base pushes load-driven upgrades and replacements to compete for the same capital. Supporting this growth with conventional upgrades alone would require tens of billions of dollars on timelines too slow to keep pace with demand. This initiative demonstrates the planning and operating capabilities that enable safe and reliable growth without causing rate increases for customers. Smarter upfront planning, better utilization of existing infrastructure and rights of way, novel construction solutions, and intelligent orchestration of flexible resources optimize the volume, cost, and sequencing of investments needed to serve growing demand. The work is organized around three interconnected Topics:

Topic 2.1: Smart planning tools to holistically optimize upgrades across the system: Planning tools that consolidate data, sharpen forecasting, and automate evaluation of a broader solution set, directing capital to where it delivers the most value.

Topic 2.2: Solutions to optimize the cost and scope of grid upgrades: Solutions to extract more usable capacity from existing assets and rights-of-way, deferring or avoiding conventional upgrades, and advanced construction methods that reduce the cost of unavoidable upgrades.

Topic 2.3: Enabling orchestration of flexible resources and a framework for valuing flexibility: Operational visibility and orchestration that let a variety of flexible resources stand in for upgrades, paired with a defensible framework to value and subsequently incentivize that flexibility.

In response to December 2025 PICG workshop feedback that the initiative's link to deferred grid investment was unclear, each Topic now speaks to that outcome, concentrating ratepayer benefits in the communities facing the greatest reliability and affordability challenges, improving system-wide reliability, and better supporting customer electrification and load growth.

Strategic Objective(s) Supported: SO 3: Smart Planning Tools for New Load and Clean Resources; SO 11: Providing Data Input into a Value of DER Framework; SO 12: Optimizing Feeder / Circuit Operations

Strategic Goal(s) Supported: SG 2: DER Integration (primary); SG 1: Transportation Electrification

Alignment with EPIC Equity in RD&D Framework: This Initiative addresses all five EPIC Equity Framework principles. Engagement and outreach activities supporting the EPIC Equity Framework are addressed comprehensively in PG&E's Community Engagement Plan (CEP), which establishes the foundation for community-informed RD&D across the EPIC 5 portfolio. Any topic- or project-specific tailoring of activities will be identified during project development phase. The discussion below focuses on principles with initiative-specific considerations (Prioritization, Metrics, and Access) while Engagement and Outreach follow the CEP unless noted otherwise.

Prioritization: Once novel approaches and tools are proven through this initiative, selection criteria for demonstration and deployment will aim to prioritize circuits serving DAC and low-income communities. Prioritizing these circuits directs improved reliability and earlier intervention on

[19] PG&E Electrification Impacts Study Part 2 Report, R.21-06-017 (filed Jan. 28, 2026).

emerging capacity risk to the communities most exposed to outages and least able to absorb their costs. The planning tools developed in Topic 2.1 make the equity implications of investment decisions visible to planners at the point of decision-making, so DAC capacity risks can be proactively identified.

Metrics: A range of metrics will be used to assess ratepayer benefits, with impacts to DAC and low-income communities measured separately where possible and integrated into public reporting. These span planning efficiency, forecasting accuracy, changes in the Affordability Ratio for customers at the 20th income percentile, avoided and deferred capacity costs, feeder and infrastructure utilization, load flexibility program participation and customer compensation, and avoided emissions.

Access: This initiative aims to lower barriers that keep DAC customers from participating in flexibility programs primarily by orchestrating flexible loads customers already have, such as water heating, HVAC, and electric vehicles to extend participation beyond those who can afford to purchase new DERs. Additionally, education and outreach delivered through community-based organizations makes program participation simpler and its benefits more accessible to DAC customers.

Alignment with EPIC Strategic Goals and Strategic Objectives: This initiative advances SG 2 (DER Integration) by building the planning, utilization, and operational capabilities needed to integrate high penetrations of DERs and flexible load cost-effectively, orchestrating resources to defer and avoid grid upgrades and developing the framework to value the grid services they provide. This work supports the state's goal of a renewable, zero-carbon power sector by 2045 and builds toward the state's goal to deploy 7,000 MW of flexible load by 2030. This initiative also supports SG 1 (Transportation Electrification) through enhanced forecasting and orchestration of EVs as a flexible resource. The initiative supports: 1) SO 3: strengthening computational efficiency, improving forecasting of BTM load and demand flexibility, and automating the evaluation of a solution set spanning wires upgrades, non-wires alternatives, demand flexibility, DER orchestration, and asset replacement; 2) SO 12: developing capabilities to operate the system closer to its limits and methods to deliver additional capacity within PG&E's existing footprint, together with coordination of flexible resources at scale, to defer or avoid upgrades to capacity-constrained feeders; 3) SO 11: orchestrating flexible resources on feeders facing planned upgrades and measuring the avoided cost to generate the deployment data needed to value flexibility across distribution, transmission, and generation in place of today's proxy-based avoided-cost estimates. This initiative demonstrates emerging strategies for advanced planning and operations, responding to EPIC’s cross-cutting principles:

Affordability: This initiative's core desired outcome is lowering rates by deferring or avoiding conventional grid upgrades through increased DER orchestration, system utilization, and planning. These efficiencies support increased DER penetration and contribute to rate-reducing load growth.

Equity: The initiative prioritizes circuits serving DAC and low-income communities for demonstration and deployment, increases visibility into DAC capacity risk through the planning tools it develops, and extends flexibility participation. More information is detailed in the equity sections above.

Customer-focused solutions: This initiative will increase customer ability to participate in load and DER orchestration through improved interoperability and will advance the valuation framework for DER flexibility, which will inform fair customer participant compensation.

Reliability & Resilience: Earlier visibility into emerging grid stress, paired with coordinated use of flexible resources, allows PG&E to absorb new load while maintaining reliable service.

Safety: This initiative gives PG&E greater flexibility to manage grid loads and keep assets operating

within safe capacity limits, preventing failures that could compromise safety.

Coordination and Alignment with CPUC Proceedings: This initiative directly supports:

High Distributed Energy Resources Future (R.21-06-017): All Topics respond to the proceeding's direction to strengthen scenario planning, distribution forecasting, and integrated-planning transparency. Feeder and circuit optimization advances D.24-10-030's direction to evolve grid capabilities and integration capacity analysis.

Integrated Distributed Energy Resources (R.14-10-003): Deployment-based valuation data under SO 11 refines the avoided-cost methodology addressed in D.22-05-002, replacing today's proxy-based estimates with an empirical basis for valuing flexibility against conventional investment.

Grid Modernization Framework (D.18-03-023): Capabilities validated through RD&D inform the 10-year grid modernization vision the IOUs present in their GRC filings.

Demand Response Programs (A.22-05-002): Orchestration and flexibility-valuation capabilities coordinate with operational demand response programs authorized in A.22-05-002, such as PG&E's Automated Response Technology program (D.23-12-005), which aggregates residential DERs as a CAISO Proxy Demand Resource.

Ratepayer benefits from this Initiative include: (1) reduced T&D investment as better planning targets capital where it is most needed and flexible resources defer conventional upgrades; (2) accelerated rate-reducing load growth for customers as the system absorbs electrification without proportional build-out; (3) lower cost of serving new load as existing infrastructure is used more fully; (4) fair compensation to customers who provide grid services; and (5) prioritized reliability and affordability gains in DACs, along with open tools available to other California utilities.

Coordination with EPIC RD&D Program Administrators: This initiative will be implemented in coordination with the following EPIC Administrators' initiatives, which aim to address similar or complementary gaps. CEC: Harnessing the Value of Transportation Electrification for Ratepayers, Leveraging DERs for Load, Flex, Affordability, and Reliability; Accelerating Grid Connection of Clean Energy Resources and Beneficial Loads; SCE: Enhanced Grid Utilization and Flexibility (EGUF); Intelligent Grid Planning and Orchestration (IGPO); SDG&E: Advancing Grid and Community Resilience with Distributed Energy Solutions, and Coordinated DER Portfolio at the Customer Level. The EPIC Administrators have formed technical working groups to share priorities, identify overlapping or complementary research, and explore collaboration methods during implementation. This may include IOU technical advisory to CEC in GFO development, complementary projects focusing on different stages of technology development and/or different use-cases, and exploring opportunities for joint projects with Administrators funding different portions of project scope, as appropriate.

Unique Role: EPIC ratepayer funding is the appropriate source for three main reasons. First, the work requires a utility-specific operational environment and system and data access that no other funder replicates; earlier-stage programs such as the CEC's fund transferable research but stop short of utility-specific demonstration, and federal programs address mature transmission technologies. Second, the forecasting methods, valuation frameworks, and orchestration approaches are pre-commercial and must be demonstrated in live utility conditions before they can be relied on in operations or included in rate base, matching EPIC's multi-year horizon and defining what later GRC investment should fund. Third, the deliverables are open, transferable planning frameworks and valuation methods that benefit the system broadly rather than returning value to a single vendor.

Initiative 3: Accelerating affordable building electrification across customer groups to enable community-scale decarbonization

Initiative Funding Amount: $11,079,167

Strategic Priority: Electrifying California's homes, businesses, and industrial facilities requires grid capacity in the right locations, coordinating gas and electric system planning, and delivering a customer experience simple and affordable enough to make electrification the preferred choice. PG&E is building each of those capabilities today. What has not been demonstrated is the integration across them, and that integration determines the all-in cost a customer pays. This Initiative demonstrates the planning, program, and measurement capabilities that make electrification affordable at the residential, neighborhood, and industrial scale California's climate commitments require. The work is organized around three interconnected Topics:

Topic 3.1: Lowering the cost and complexity of building electrification from assessment to installation: This Topic shortens the customer journey from initial assessment to installation, targets cost reductions across the residential electrification cost stack, develops programs across building types that work when appliances unexpectedly fail, and builds customer-facing tools that show a customer which incentives they qualify for and in what order.

Topic 3.2: Planning and detection tools for zonal electrification readiness: This topic develops AMI-based detection tools that identify customer-driven appliance electrification and appliance lifecycle modeling that intervenes before customers default to like-for-like gas replacement. It pairs those tools with improved gas and electric GIS and neighborhood-level load hosting capacity analytics to identify candidate replacement segments where gas retirement and customer electrification align.

Topic 3.3: Unlocking electrification pathways for hard-to-decarbonize end uses: This topic develops planning tools PG&E does not have today for the large commercial and industrial gas loads that are hardest to decarbonize. It disaggregates industrial gas metering to the equipment level and extends hosting capacity models to represent converted process load, establishing which facilities can electrify, which cannot, and what their converted load means for the distribution system.

Strategic Objective(s) (SO) Supported: SO 4: Reducing Cost of Whole Home Electrification; SO 5: Innovative Approaches for Difficult-to-Decarbonize Sectors; SO 6: Community-Scale Decarbonization

Strategic Goal(s) Supported: SG 3: Building Decarbonization (primary); SG 4: Achieving 100% Net-Zero Carbon Emissions and the Coordinated Role of Gas (secondary)

Alignment with EPIC Equity in RD&D Framework: Across all three Topics, ESJ, DVC and Tribal communities are the focus of this Initiative's work as affordability and complexity barriers in residential electrification fall hardest on these households. Engagement and outreach activities supporting the EPIC Equity Framework are addressed comprehensively in PG&E's CEP.

Prioritization: Topic 3.1 prioritizes ESJ, DVC, and Tribal-community households in its demonstrations from the start. Topic 3.2 sites and sequences its demonstration zones to reach ESJ, DAC, low-income, and Tribal communities first, verifying that benefits reached them, while testing a variety of customer segments to validate these methods. Topic 3.3 focuses its industrial work on facilities that drive the most local air pollution, prioritizing the pathways with the largest pollution reductions per dollar.

Metrics: Retrofit cost reductions are reported by building type and ESJ versus non-ESJ community type. Customer drop-off from process complexity is reported by income tier and language access. Energy burden reduction is measured per household from PG&E billing data. Co-pollutant reduction is

estimated at industrial sites in ESJ communities under Topic 3.3.

Access: Outputs are produced in consolidated, community-accessible formats. Topic 3.1 aims to address the billing and coordination barriers for multi-family residents and renters. Opportunities to partner with large load customers to co-fund building electrification costs may also lower barriers for residential customers and provide flexible capacity in specific demonstration zones.

Alignment with EPIC Strategic Goals and Strategic Objectives: This Initiative addresses SG 3 by lowering the cost, complexity, and coordination barriers to building electrification across residential, neighborhood, and industrial customers, and addresses SG 4 by producing the customer- and feeder-level measurement and planning tools that inform where and how the residual gas system can be decommissioned as those customers electrify. The initiative supports three Strategic Objectives: 1) SO 4: Topic 3.1 directly addresses this objective through building cost and complexity reductions; 2) SO 5: Topic 3.3 develops the load disaggregation and hosting capacity methods that industrial process load electrification requires; and 3) SO 6: Topic 3.2 provides the analytical and data foundations through which zonal and industrial electrification innovation inform coordinated electric and gas planning. This Initiative responds to EPIC's cross-cutting principles in the following ways:

Affordability: Topic 3.1 reduces the all-in price a household pays to electrify, which is the largest barrier to adoption. Topic 3.2 targets electrification into zones where load hosting capacity analytics show where existing infrastructure can absorb new load, deferring electric upgrades, and where electrification enables retirement instead of gas investment, both leading to reduced rates. Topics 3.2 and 3.3 produce the evidence needed to sequence gas retirement, limiting the fixed costs that would otherwise spread across a shrinking customer base and likely fall hardest on low-income households.

Equity: Affordability barriers in residential electrification and local pollutant burden from industrial loads concentrate in the same communities; this Initiative's equity benefits are detailed above.

Customer-focused solutions: Topic 3.1 is built around the customer journey and targets the cases standard programs lack, including emergency replacements and multi-family properties where the retrofit decision and the electric bill sit with different parties. Topic 3.3 applies community-first design lessons from previous demonstrations to industrial customer engagement.

Reliability: Topic 3.2's load hosting capacity analytics covering voltage rise, drop, flicker, impedance, and transient-load behavior support distribution system reliability under growing electrification load.

Emerging strategies: AMI load disaggregation enabled by edge computing and the higher frequency and resolution of data collected by modern smart meters. Other methods include appliance lifecycle modeling, AI and ML-driven assessment, and geospatial analytics.

Coordination and Alignment with CPUC Proceedings: This initiative directly supports the following:

Long-Term Gas Planning OIR (R.24-09-012): Customer class segmentation, process-level gas load disaggregation, and feeder-level capacity assessment, together with gas GIS data quality and zonal readiness methodologies, provide the utility-specific evidence base R.24-09-012 needs to evaluate decommissioning proposals against a defensible analytical baseline.

SB 1221 (neighborhood decarbonization zones) implementation, D.25-12-042: The zones designated under this decision and the publicly available maps of planned pipeline replacement are available as inputs to Topic 3.2's zonal analysis. This Initiative produces the electric-side readiness evidence that decommissioning sequencing requires as gas segments approach replacement.

High DER Future OIR (R.21-06-017): This Initiative produces feeder-level insights that inform R.21-06-017's distribution-side planning processes.

Integrated Resource Planning OIR (R.20-05-003): Neighborhood-scale and customer class load analyses feed IRP distribution-side planning inputs.

Building Decarbonization OIR (R.19-01-011): Topic 3.1's program design and customer journey innovations inform program implementation guidance and coordinate with PG&E's existing activities under the CPUC's Building Decarbonization proceeding.

Ratepayer benefits from this Initiative may include: (1) Lower all-in cost of building electrification across residential and small business customers, with the largest impact on DVC households; (2) Deferred distribution upgrades through proactive zonal targeting; (3) Reduced stranded gas asset exposure through utility-specific evidence for decommissioning; (4) Measurable methane and co-pollutant reductions in ESJ communities near industrial sites; (5) More equitable distribution of decarbonization investment across DVC, low-income, and Tribal communities.

Coordination with EPIC and Gas RD&D Program Administrators: PG&E coordinated with the CEC, SCE, and SDG&E throughout Initiative development in a Building Decarbonization & Gas Transition Working Group and will continue that coordination to avoid duplicative investment and identify joint work. The CEC leads technology development and market readiness for appliances, building retrofits, and neighborhood thermal systems, and pre-commercial technology development for hard-to-decarbonize industries. The IOUs lead the utility-side work those technologies require to reach scale: simplifying the customer journey, establishing zonal readiness, identifying customer-led electrification, and developing the distribution planning methods that determine where new load, including electrified industrial load, can be served. This Initiative also extends beyond residential customers to small and medium businesses.

Gas RD&D coordination: This Initiative produces the customer- and feeder-level evidence on which customers can electrify, and what that means for the distribution system, that future Gas RD&D Plans can use as an input. The complementary gas-side cost, risk, and feasibility framing developed under PG&E's 2026 Gas RD&D Plan informs, in turn, where electrification sequencing under this Initiative delivers the most value.[20] The programs run on separate planning cycles, so each informs the other over time rather than on a shared schedule.

Unique Role: EPIC is uniquely positioned to fund this Initiative because building and industrial decarbonization are held back by a lack of pre-commercial integration work that makes it deployable at scale. That work must be field-validated within PG&E's system before it can support prudent, larger-scale investment. The GRC deploys proven technologies and pays for system upgrades directly, federal programs concentrate on upstream technology and component development, and private investment favors proprietary point solutions over the generalizable, multi-IOU methods that California's diverse conditions demand. These timing pressures make EPIC the right source: The Bay Area Air District's 2027 zero-NOx standards will drive electric replacements,[21] and PG&E's gas main replacement cycle opens a near-term window to generate retire-or-replace evidence before ratepayers absorb stranded assets, on a timeline that requires significant utility-side innovation.

[20] PG&E Advice Letter 5222-G, *2026 Gas Research, Development and Demonstration Plan* (filed June 1, 2026).
[21] https://www.baaqmd.gov/news-and-events/page-resources/2023-news/031523-ba-rules.

Initiative 4: Understanding and Planning for Climate and Weather Impacts on Operations, Assets, and the Environment

Initiative Funding Amount: $4,525,000

Strategic Priority: California's electric grid faces converging climate-driven hazards, including extreme heat, drought, hydrological whiplash, severe precipitation, coastal flooding, high-impact wind events, wildfires, and the emergence of urban conflagration, a new catastrophic risk category. PG&E has made substantial progress addressing many hazards in recent years; notably, investments in undergrounding, EPSS, PSPS, and situational awareness have meaningfully reduced ignition risk across the service area, while PG&E's 2024 CAVA evaluated asset and operational vulnerability to extreme heat, flooding, sea level rise, and drought against 2050 climate projections and identified potential adaptation measures.[22] These hazards span day-to-day weather events driving immediate decisions, seasonal and multi-year resource and reliability planning, and multi-decade planning and investment. Existing data, models, and planning tools remain insufficient to capture how evolving climate and weather risks affect grid operations, asset vulnerability, and communities. Without significant advances in modeling capabilities, PG&E cannot reliably anticipate how climate hazards reshape infrastructure vulnerability, outage exposure, and long-term wildfire mitigation needs, nor account for the feedback loops between them – for example, escalating wildfires drive emissions that further accelerate climate trends. This Initiative will develop and demonstrate the modeling, data integration, and decision-support capabilities PG&E needs to anticipate these effects across assets, communities, and multi-decade planning horizons — including novel approaches to quantifying uncertainty, integrating predictive technologies for new climate conditions, and applying data analytics to climate-driven trends (e.g., wind gust analysis) that may also improve analytical frameworks used statewide. EPIC-funded RD&D under this Initiative will support PG&E in planning, building, and operating amid unprecedented climate impact, while enabling more targeted investment in resilient infrastructure and better safety, reliability, and affordability for communities.

Strategic Objectives Supported: SO 8: Increase Predictability of Weather Impact on Intermittent Resources, Climate Risks, and Load; SO 13: Cost-Effective Grid Hardening for Long-Term Climate Impacts

Strategic Goal Supported: SG 5: Climate Adaptation

Alignment with EPIC Equity in RD&D Framework: Engagement and outreach activities supporting the EPIC Equity Framework are addressed comprehensively in PG&E's CEP, which establishes the foundation for community-informed RD&D across the EPIC 5 portfolio; topic- or project-specific tailoring will be identified during project development. The discussion below focuses on the principles with initiative-specific considerations – Prioritization, Metrics, and Access – while Engagement and Outreach are covered by the CEP unless otherwise noted.

Prioritization: Climate hazards may disproportionately impact DVCs. This Initiative seeks to develop tools that will inform targeted PG&E's risk mitigation and infrastructure investments, ensuring future benefits for the most vulnerable communities.

Metrics: Projects in this area will deliver new climate adaptation insights important to communities but may not provide direct benefits within the EPIC 5 period. Equity-specific metrics may be focused on new knowledge, including: localized changes in climate-driven outage risk in DVCs and changes in

[22] PG&E 2024 Climate Adaptation Vulnerability Assessment (CAVA), R.18-04-019.

the number and value of DVC infrastructure assets identified as climate-vulnerable.

Access: Select risk data, vulnerability models, and hazard assessments produced through this initiative will be accessible to DVC communities and local planners, subject to data privacy, proprietary, and confidentiality considerations, including sharing technical outputs in usable formats with community organizations, local governments, and tribal authorities.

Alignment with EPIC Strategic Goals and Strategic Objectives: This initiative is the analytical backbone of PG&E's climate adaptation portfolio, producing the data infrastructure and risk models that inform downstream adaptation investments and directly support SG 5. The initiative supports two Strategic Objectives: 1) SO 8, by advancing near-term weather forecasting and data systems that drive day-to-day operations; and 2) SO 13, by producing the longer-horizon climate projections, hazard, and asset degradation models that inform multi-decade capital investment decisions for grid hardening, while increasing affordability and reducing outage risk and community impacts. Responding to December 2025 PICG workshop feedback that the Climate Resilience proposal did not clearly define which planning projects would be included, this initiative will demonstrate projects that translate improved data and models into concrete planning applications across PG&E operations. This initiative responds to EPIC's cross-cutting principles in the following ways:

Affordability: Improved risk modeling across hazards enables sequenced, cost-effective, prioritized grid planning and mitigation, limiting asset failures that would otherwise cascade into rate impacts.

Equity: Modeling outputs will quantify the localized distribution of climate risk and reliability impacts across communities, with equity metrics highlighting new insights specific to DVCs.

Customer-focused solutions: Climate-informed investment ensures right-sized solutions, particularly for multi-decade undergrounding and VM programs that mitigate multiple climate hazards. Within fire modeling, the development of a community survivability framework and suppression quantification inform hardening investments and targeted field work to drive safety risk.

Reliability: Improved forecasting and scenario modeling address the largest category of reliability losses – those occurring during MEDs.

Resilience: Resilience is the core of this Initiative, informing long-term operations and resilience investments in response to increasing climate risks.

Emerging strategies: This Initiative advances AI-enhanced climate and asset-failure modeling to anticipate how a changing climate reshapes grid risk — spanning climate data, vegetation and tree-failure prediction, and fire behavior. Because fire modeling depends on different inputs across planning horizons, PG&E will advance two techniques: improving near-term, weather-coupled fire spread models, whose underlying science has not kept pace with how climate change alters fuel conditions and fire behavior; and developing longer-horizon, climate-adjusted ignition and consequence models to inform multi-decade undergrounding and hardening investments.

Safety: This Initiative will inform downstream operational and planning decisions that improve field worker safety during extreme heat, winds, storms; and community safety from wildfire-related impacts, event-driven landslides and tree failures. All modeling and data work under this Initiative will follow PG&E cybersecurity protocols.

Coordination and Alignment with CPUC Proceedings:

Climate Adaptation Proceeding (R.18-04-019): Aligned with the CAVA process (D.20-08-046 & D.24-

08-005); outputs support needs identified in PG&E's 2024 CAVA filing.

RAMP 2024 (A.24-05-008): Forward-looking, climate-adjusted hazard and consequence modeling strengthens the climate change cross-cutting factor in RAMP, enabling refined Risk Spend Efficiency calculations for investment prioritization.

WMP: EPIC's climate-adjusted ignition and consequence modeling directly informs WMP planning across time horizons; short-horizon models support day-to-day operational decisions such as PSPS and EPSS settings, while mid- to long-term models inform the sizing, pacing, and prioritization of distribution undergrounding and VM programs in WMP cycles.[23]

ESJ Action Plan: Supports SG 4 (*Increase climate resiliency in ESJ Communities)* and Action Item 4.1.1 (*Initiate Climate Change Adaptation Planning with Emphasis on* DVCs*)*.[24]

Ratepayer benefits from this initiative may include: (1) Cost avoidance through climate-informed investment targeting, to avoid reactive replacement costs and unnecessary over-investment; (2) Avoidance of mal-adaptive investments where evolving climate conditions warrant a fundamentally different approach or mitigation strategy; (3) Reliability improvements from better forecasting and proactive operational response; (4) Long-term affordability, by prioritizing investments that reduce compounding costs of climate-driven asset damages.

Coordination with EPIC and Gas RD&D Program Administrators: PG&E will implement this Initiative in coordination with fellow EPIC Administrators to avoid duplication, share learnings, and enable collaboration with their related initiatives: (1) CEC: Leading Innovation in Electricity Sector Resilience and Adaptation; (2) SCE: Safe and Advanced Field Execution (SAFE); (3) SDG&E: Next-Generation Resilience and Response. The EPIC Administrators have formed a Climate Adaptation working group to identify complementary efforts across Initiatives and Topics and will continue collaboration through project design, selection, and implementation. The CEC is well-positioned to use EPIC funds for foundational, open-access climate science and data supporting all California utilities, while IOUs are uniquely positioned to tailor those tools to the infrastructure and territory each serves. Collaboration mechanisms may include IOU technical advisory support to CEC in GFO development, complementary projects addressing different stages of data analytics or model development, different scenario-specific applications, and/or joint projects.

Unique Role: This Initiative addresses a combination of core innovation challenges requiring novel and specialized modeling methods either at lower technological maturity or apply emerging methods in a new utility context, making EPIC the appropriate source to demonstrate effectiveness, drive improvement, and prove readiness at scale. Utility-side innovation is required to translate climate projections into asset-, feeder-, and community-level risk using PG&E's proprietary planning data, internal grid models, and service-territory characteristics. EPIC, rather than the market, is appropriate because private-sector actors cannot validate these solutions without demonstration in a real utility context requiring physical and data access only the utility can provide. Federal programs (e.g., DOE, FEMA) fund broader climate science but not utility-specific translation. These activities fall outside routine utility operations funded through non-innovation budgets, including the GRC.

[23] PG&E Wildfire Mitigation Plan, approved by Office of Energy Infrastructure Safety (2026–2028).
[24] CPUC Environmental & Social Justice Action Plan, Version 2.0 (Apr. 7, 2022).

Initiative 5: Building community resilience from prevention through recovery

Initiative Funding Amount: $22,830,000

Strategic Priority: Climate change is increasing the frequency, intensity, and unpredictability of the events driving PG&E's largest customer impacts: wildfire ignition, severe wind and atmospheric river damage, post-event landscape degradation, long-duration outages, property destruction, and the public safety impacts that follow. Community resilience depends on prevention to withstanding to recovery, where innovations at each stage compound the others: better prevention reduces the events communities must withstand, more efficient response reduces recovery burden, and recovery that adapts landscapes to future conditions reduces risk and future prevention needs. Today, PG&E addresses each stage with separate tools, data, and operational frameworks not designed for the multi-hazard climate environment driving these impacts. This Initiative conducts the RD&D needed to close that gap, building an integrated set of novel capabilities that prioritize the communities bearing disproportionate exposure at every stage. The work is organized around three interconnected Topics:

Topic 5.1: Prevent: Understanding & mitigating risk to communities & customers: Advances innovations that cut the unit cost and complexity of wildfire mitigation such as undergrounding in climate hazard-vulnerable areas; remote sensing and continuous monitoring to improve asset diagnostics and maintenance; protection schemes that prevent ignitions and outages under new climate stressors; and forest management approaches that build ecosystem resilience.

Topic 5.2: Withstand: **Minimize community & customer impacts:** Faster, more targeted restoration after de-energization events; next-generation networked, automated mid-feeder microgrids and utility-orchestrated customer- and service-level solutions delivering customer resiliency and grid value at scale; real-time ignition notification and suppression; and temporary infrastructure that keeps customers energized during planned grid hardening.

Topic 5.3: Recover: Rebound from catastrophic events: Novel analytical frameworks and decision-support tools for quantifying the costs, benefits, and tradeoffs of post-event recovery approaches, accounting for temporal and fuel-state changes; research-based tools that inform fire-damaged tree removal; climate-adapted landscape rehabilitation that reduces future grid exposure; and wood management and conversion pathways supporting broader decarbonization goals.

Strategic Objectives Supported: SO 8: Increase Predictability of Weather Impact on Intermittent Resources, Climate Risks, and Load; SO 9: Leveraging Distributed Energy Resources for Grid and Community Resiliency; SO 13: Cost-Effective Grid Hardening for Long-Term Climate Impacts.

Strategic Goals Supported: SG 5: Climate Adaptation (primary); SG 2: DER Integration (secondary)

Alignment with EPIC Equity in RD&D Framework: PG&E will prioritize the ESJ communities, DACs, low-income households, and Tribes bearing the largest shares of climate-driven exposure: the highest ignition and outage risk to prevent, the longest restoration times and lowest backup resource availability to withstand, and the slowest, least-resourced recovery after catastrophic events. Engagement and outreach supporting the EPIC Equity Framework are addressed comprehensively in PG&E's CEP, which establishes the foundation for community-informed RD&D. The discussion below focuses on the principles with initiative-specific considerations — Prioritization, Metrics, and Access — while Engagement and Outreach are covered by the CEP unless otherwise noted.

Prioritization: Demonstration site selection will prioritize low-income, DAC and Tribal locations in HFTDs and areas with non-wildfire-driven outage patterns across all three Topics.

Metrics: All reliability, outage, ignition, and recovery metrics will be disaggregated by low-income, DAC and Tribal status, accounting for the diversity of equity needs across PG&E's service area.

Access: Selected project outputs will be made available as public goods to other IOUs, CAL FIRE, USFS, Tribes, local emergency managers, and community-based forestry groups. Community-facing outputs will be translated into accessible formats to be leveraged for resilience and recovery planning.

Alignment with EPIC Strategic Goals and Strategic Objectives: This Initiative directly advances SG 5 (Climate Adaptation) by building the prevention, withstand, and recovery capabilities California needs to keep climate-driven hazards from escalating into long-duration outages and catastrophic community impacts. The initiative supports three Strategic Objectives: 1) SO 8, by reducing the unpredictability climate-driven events introduce into PG&E's major-event response; 2) SO 9 and SG 2, by developing next-generation microgrid configurations and utility-orchestrated battery architectures that deliver customer resiliency and grid value at scale; and 3) SO 13, by reducing the cost and complexity of long-duration hardening investments that protect against long-term climate impacts. Responding to December 2025 PICG workshop feedback, this Initiative concentrates on capabilities that will translate directly into operational adoption and serve the communities most exposed to climate-driven grid impacts, once demonstrated and de-risked.

Affordability: Addressed through reduced undergrounding and grid-hardening costs, avoided operational and VM costs, and grid-service value from customer batteries.

Equity: Demonstration siting, metric disaggregation, and the recovery decision frameworks developed here aim to concentrate benefits in high-risk ESJ, low-income, and Tribe communities.

Customer-focused solutions: Advanced through faster restoration after de-energization events and recovery frameworks designed around the communities most exposed to climate-driven events.

Reliability: Improves through reductions in faults and ignitions per circuit-mile, fewer and shorter outages, and customer-focused battery and microgrid solutions centered on reliability.

Resilience: Designed for the multi-hazard climate environment PG&E increasingly operates in, where one event can blend wildfire risk, outages, and infrastructure damage across the distribution system.

Emerging strategies: Include novel undergrounding techniques that cut per-mile cost and complexity; AI/ML-driven asset diagnostics, monitoring, and protection schemes for ignition prevention; networked mid-feeder microgrids and utility-orchestrated battery solutions; real-time ignition detection and rapid-response capabilities; and novel forest management, landscape rehabilitation, and wood conversion pathways.

Safety: Improvements accrue through reduced climate-driven asset failure, faster suppression of ignitions, and reduced customer and field-worker exposure during inspections, undergrounding, and post-event recovery. Modeling and data work will follow PG&E cybersecurity protocols.

Coordination and Alignment with CPUC Proceedings: This initiative directly supports:

Climate Adaptation Proceeding (R.18-04-019): Outputs across all three Topics provide the technical foundation for CAVA-informed investment proposals and support needs in PG&E's 2024 CAVA filing.

RAMP 2024 (A.24-05-008): Ignition prevention, suppression, and restoration capabilities strengthen the climate change and wildfire factors in RAMP, enabling more defensible Risk Spend Efficiency calculations for prioritizing investments.

WMP: PG&E EPIC projects have been incorporated into WMP filings since its inception, reflecting

EPIC's foundational role in maturing technologies PG&E can deploy at scale to reduce wildfire risk. Capabilities developed under this Initiative feed directly into subsequent WMP filings.[25]

ESJ Action Plan: This Initiative supports *Goal 4 (Increase climate resiliency in ESJ Communities)* and *Action Item 4.1.1 (Initiate Climate Change Adaptation Planning with Emphasis on* DVCs*)* by concentrating demonstrations, and benefits in impacted ESJ communities.[26]

Ratepayer benefits from this Initiative may include: (1) avoided outage costs through faster restoration, expanded resiliency coverage, and fewer climate-driven faults and ignitions; (2) reduced catastrophic-event exposure through prevention, suppression, and optimized recovery; (3) lower rates from reduced per-mile hardening and avoided vegetation-management costs; (4) grid-service value from utility-orchestrated batteries; (5) more equitable distribution of climate-resilience investments across DVC, low-income communities, and Tribes.

Coordination with EPIC and Gas RD&D Program Administrators: PG&E will coordinate with EPIC Administrators on topics and projects to avoid duplication, enable collaboration, and share learnings. This initiative will be implemented in coordination with the following IOU EPIC Administrators' initiatives, which address similar gaps: (1) CEC: Leading Innovation in Electricity Sector Resilience and Adaptation; (2) SCE: Field Intelligent Technologies and Safe and Advanced Field Execution; (3) SDG&E: Next Generation Resilience and Response. PG&E will pursue woody biomass conversion innovation in coordination with Gas RD&D: this Topic advances upstream densification and conversion methods, while Gas RD&D develops downstream tools and standards for evaluating biochar and RNG pathway viability. The EPIC administrators have formed a Climate Adaptation working group to facilitate coordination, covering shared initiative- and topic-level priorities, areas of overlap or complementary research, and collaboration mechanisms for plan implementation — including IOU technical advisory support to CEC in GFO development, complementary projects addressing different stages of data analytics or model development and different scenario-specific applications, and potential joint projects with CEC and IOU administrators funding different portions of scope, as appropriate.

Unique Role: RD&D in this Initiative delivers a unique combination of mutually reinforcing capabilities required for community resilience across the full prevention-to-recovery arc and aims to capture their compounding value across the customer resiliency cycle. These activities sit at lower technological maturity than work funded through the GRC, which funds operational execution of established practices; this Initiative funds the multi-year R&D required to develop, prove out, and de-risk next-generation capabilities so they can scale through later GRC funding. Utility-side innovation is necessary because only PG&E can integrate these building blocks with its distribution system, risk models, asset databases, and operational workflows to translate them into community resilience outcomes. Federal programs (DOE, USFS, FEMA, NRCS) support technology-specific research but not utility-side integration. EPIC is also appropriate because private vendors and consultants can develop products but cannot validate these integrated capabilities without demonstration in a real utility context — and the market lacks incentive to build them. Work conducted under this Initiative will be reflected in the WMP, as key EPIC wildfire mitigation projects have been since the WMP's inception; the WMP identifies wildfire mitigation needs, plans, and innovations but does not fund them.

[25] PG&E Wildfire Mitigation Plan, approved by Office of Energy Infrastructure Safety (2026–2028).
[26] CPUC Environmental & Social Justice Action Plan, Version 2.0 (Apr. 7, 2022).

Initiative 6: Exploring Pathways to Streamline Interconnection & Energization for DERs and New Load

Initiative Funding Amount: $13,605,000

Strategic Priority: PG&E has nearly 13GW of load in queue from data center applicants alone, representing a 67% increase relative to PG&E's peak planning area load of 19GW in 2025.[27] This extraordinary load growth, driven by vehicle and building electrification, large load requests, and the proliferation of bi-directional resources, is straining interconnection and energization processes and challenging PG&E's ability to connect customers in a timely manner. Growing demand on the existing T&D system is further exacerbating energization delays as upgrades are often a prerequisite for interconnection and existing interim solutions, such as Remedial Action Schemes, are insufficient and unsustainable at scale. These bottlenecks impose real costs on customers, inhibiting the rate-reducing load growth that benefits all customers, slowing electrification and clean energy benefits, and creating power quality and reliability risks across the system. This Initiative will tackle these challenges by pursuing innovation across two complementary fronts:

Topic 6.1: Streamlining Customer Interconnection: This Topic targets the study and approval workflows at both the distribution and transmission level, developing enhanced data infrastructure, advanced automation, and integrated computational tools to reduce interconnection study times and accelerate interconnection.

Topic 6.2: Accelerating Speed-to-Power: This Topic addresses the physical gap between a customer's desired in-service date and completion of permanent grid upgrades by demonstrating novel bridging technologies, operational stability management tools, and other approaches, such as dynamic contingency management, that can safely energize customers ahead of upgrades.

These topics remove the most significant barriers at both the distribution and transmission levels to enabling the rate-reducing load growth that can provide broader benefit to the system. PG&E estimates that the innovation included under this Initiative, combined with novel rate structures that more accurately account for the transmission and generation costs of serving large loads, could provide a rate benefit to other customers of approximately 0.5-1% per GW of large load by 2035.

Strategic Objective(s) Supported: SO 10: Expediting and Streamlining Interconnection and Energization Processes

Strategic Goal(s) Supported: SG 1: Transportation Electrification; **SG 2:** DER Integration

Alignment with EPIC Equity in RD&D Framework: This Initiative addresses the EPIC Equity Framework across all five principles. Engagement and outreach activities supporting the EPIC Equity Framework are addressed comprehensively in PG&E's CEP, which establishes the foundation for community-informed RD&D across the EPIC 5 portfolio. Any topic- or project-specific tailoring of engagement and outreach activities will be identified during project development. The discussion below focuses on principles with initiative-specific considerations (Prioritization, Metrics, and Access) while Engagement and Outreach follow the CEP unless noted otherwise.

Prioritization: For projects targeting the acceleration of interconnection and/or energization of DERs, EV infrastructure, or building electrification projects, demonstration sites will be prioritized to target circuits serving DACs and low-income communities where capacity constraints may have historically

[27] https://www.caiso.com/library/historical-ems-hourly-load.

delayed energization and DER adoption.

Metrics: Various metrics will be used to assess ratepayer benefits, with impacts to DAC and low-income communities measured separately where possible and integrated into public reporting. These metrics include interconnection timeline reductions, number of DER and EV charger installations in DACs and low-income communities achieving interconnection within CPUC-established energization timeframes, and changes in the Affordability Ratio for customers at the 20th income percentile. Air quality co-benefits from fossil bridging displacement will also be estimated and reported for projects sited in DACs in the context of CalEnviroScreen indicators for relevant census tracts.

Access: Improvements to interconnection automation and data quality developed under Topic 6.1 will reduce the informational complexity that customers in DACs and low-income communities face when seeking interconnection. Project design will incorporate accessible communication of interconnection status and options to customers.

Alignment with EPIC Strategic Goals and Strategic Objectives: This Initiative directly supports SO 10 by pursuing innovations to streamline the interconnection process through enhanced automation, improved data quality and synchronization, and advanced scenario modeling capabilities. Innovations aimed at accelerating energization through novel bridging solutions and stability management technologies also directly support the goals articulated in SO 10 by shortening timelines for the interconnection and energization of DERs, EV infrastructure, and new loads, with a priority focus on DACs and low-income communities. This Initiative advances SG 1 by removing interconnection barriers and enabling shorter in-service timelines for EV and EV supply equipment and SG 2 by enabling the swift, equitable integration of DERs onto the distribution system. This initiative responds to EPIC's cross-cutting principles in the following ways:

Affordability: Streamlining interconnection and increasing grid throughput via affordable, clean bridging technologies can exert downward pressure on rates for all customers, providing a benefit of approximately 0.5-1% per GW by 2035 when combined with novel large load rate structures.

Equity: This Initiative will prioritize circuits serving DACs and low-income communities in siting interconnection demonstrations for DERs or building energization and will incorporate feedback from engagement with representatives of ESJ Communities and Tribes in project design.

Customer-Focused Solutions: Both Topics reduce customer friction during interconnection and energization. Topic 6.1 develops tools to enable iterative consideration of customer configurations within system constraints to reduce rework and improve transparency. Topic 6.2 supports customers awaiting energization, enabling earlier in-service dates through clean bridging technologies.

Reliability: Topic 6.2 includes development of enhanced analytics for evaluating power quality and stability risks prior to interconnection, as well as demonstration of technologies to mitigate voltage deviations, oscillatory effects, frequency instability, and protection system trips.

Resilience: Faster, more equitable interconnection accelerates DER deployment in DACs and Low-income communities, which is foundational to community resilience as demonstrated in Strategic Objective 9. By reducing reliance on Remedial Action Schemes (RAS), Topic 6.2 can also reduce systemic operational risk and the likelihood of grid stress events affecting vulnerable populations.

Emerging Strategies: This Initiative leverages advanced analytics including computational scenario acceleration, as well as novel bridging technologies such as power electronics-based mobile substations. These approaches represent significant departures from current industry practice.

Coordination and Alignment with CPUC Proceedings: This Initiative is directly responsive to several active CPUC proceedings and Commission decisions:

Establish Energization Timelines (R.24-01-018): This Initiative supports achievement of Commission established average and maximum energization targets for IOUs by reducing study cycle times and enabling clean bridging solutions to accelerate energization.

Streamlining Interconnection / High DER Future (R.17-07-007 / R.21-06-017): This Initiative advances these directives by developing computational tools to improve transparency and reduce cycle times for interconnection requests.

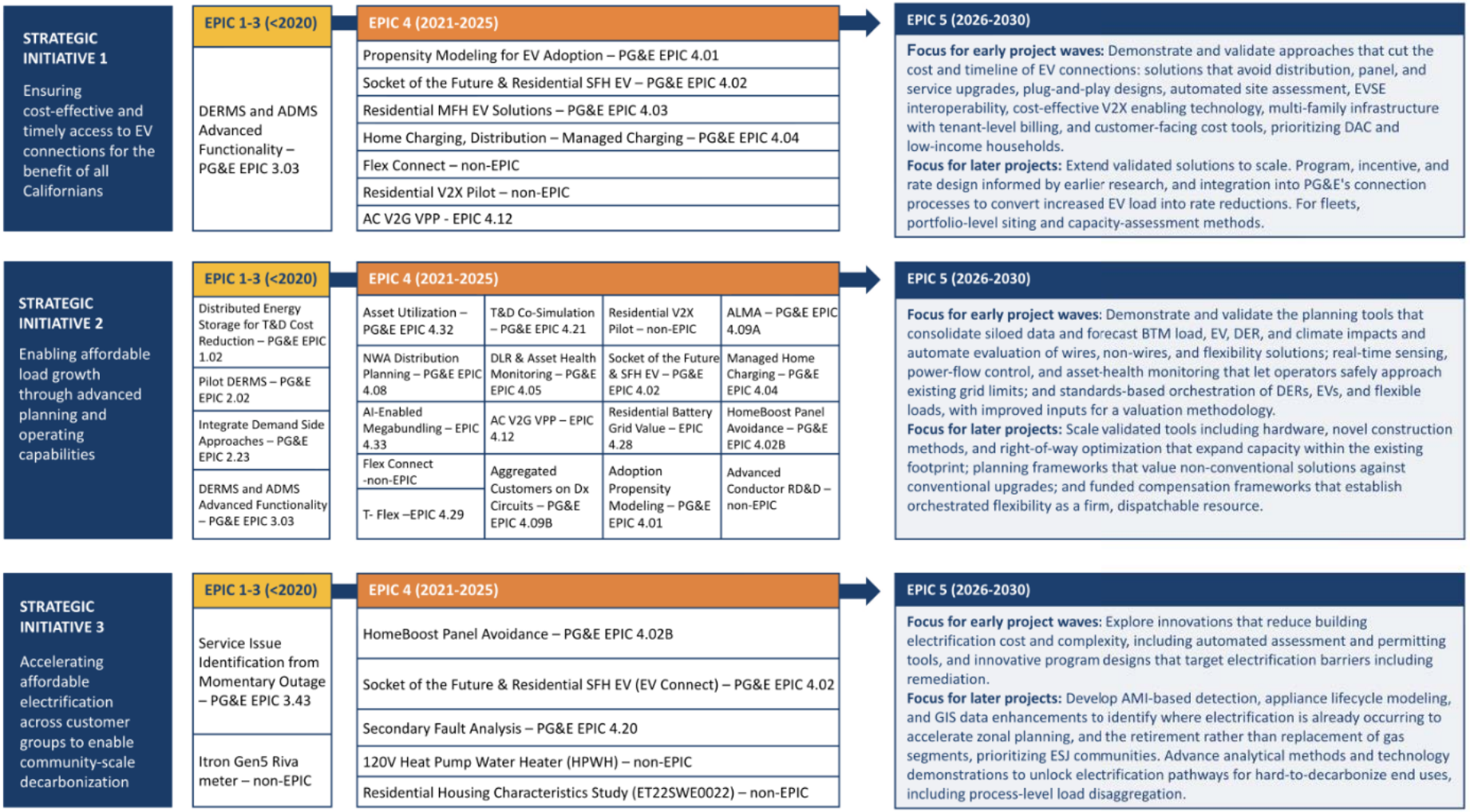
Microgrids Pursuant to SB 1339 (R.19-09-009): Topic 6.1 advances the goals of interconnection process streamlining and cost reduction for microgrid applications. Bridging solutions demonstrated in Topic 6.2 may support microgrid and resiliency use cases consistent with this proceeding.

Ratepayer benefits from this Initiative include: (1) reduced interconnection and energization costs as automation reduces per-project labor and rework; (2) accelerated rate-reducing load growth for all customers as new customers are energized faster; (3) reduced reliance on fossil backup; (4) accelerated DER deployment in DACs and low-income communities, expanding equitable access to demand flexibility and rate savings; and (5) a replicable interconnection toolkit for California IOUs.

Coordination with EPIC and Gas RD&D Program Administrators: The initiative will be implemented in coordination with the following IOU EPIC administrators' initiatives aiming to address similar gaps: CEC: Accelerating Grid Connection of Clean Energy Resources and Beneficial Loads; SCE: Enhanced Grid Utilization and Flexibility (EGUF); Intelligent Grid Planning and Orchestration (IGPO); SDG&E: SDG&E will not be pursuing overlapping Research Topics targeted at supporting SO 10. The EPIC administrators met during early investment plan development in a working group on *Interconnection and Energization* to facilitate coordination, sharing research topic-level priorities, identifying areas of potential overlap or complementary research, and exploring mechanisms for collaborating during plan implementation. For the research topics under this initiative, we foresee opportunities to collaborate with other Administrators through joint or complementary projects, such as developing and testing AI-enabled interconnection planning tools, advancing novel bridging technologies and helping ensure RD&D efforts progress from CEC's early-stage development to IOU demonstrations in utility-scale deployment and evaluation.

Unique Role: The innovation challenges in both Topics require deep integration with utility-specific planning data, internal models, customer data, physical assets, and operating systems that are inaccessible to other RD&D bodies without close utility collaboration. PG&E will coordinate closely with private sector actors (e.g., hyperscalers), as appropriate, to ensure that they are investing the capital and developing the capabilities required to solve these challenges on the customer-side. However, innovation on the utility-side is critical for developing the grid management capabilities that preserve system reliability and for advancing the analytical tools that promote affordability through optimized decision-making. EPIC is appropriate for the progressive technology demonstrations and learning cycles required to validate the novel approaches pursued under this Initiative with the goal of producing validated solutions for future GRC funding.

6. Strategic Roadmap



STRATEGIC INITIATIVE 4

Understanding and planning for climate and weather impacts on operations, assets and the environment

EPIC 1-3 (<2020)	EPIC 4 (2021-2025)
New Resource Forecast Methods (Meteorological Modeling) – PG&E EPIC 1.05	AI-Enhanced Urban and WUI Fire Conflagration Risk Model – PG&E EPIC 4.34
Pyregence – CEC EPIC EPC-18-026	Cal-Adapt Analytics Engine – CEC EPIC EPC-23-024
	Spatial Informatics Group – CEC EPIC EPC-25-025
	Lawrence Livermore National Lab – CEC EPIC EPC-25-024

EPIC 5 (2026-2030)

Focus for early project waves: Explore and validate novel foundational modeling methods for microscale weather forecasting, wildland and urban conflagration spread modeling, and tree health analysis.
Focus for later projects: Explore compound event analytics to capture how heat, wind, precipitation, and fire interact across operational and planning horizons. Validate predictive asset failure models and AI/ML tree health analysis, following foundational modeling efforts, to anticipate risk under evolving climate stress, advance risk-informed sizing, pacing, and targeting of multi-decade grid hardening such as undergrounding, covered conductors, and vegetation management, prioritizing the DVC and Tribal communities most exposed. *(Phasing of TD&D under this Initiative may depend on timing of CEC-funded statewide data and tool advancement. PG&E will continue coordination with EPIC Admins.)*

STRATEGIC INITIATIVE 5

Building community resilience from prevention through recovery

EPIC 1-3 (<2020)		EPIC 4 (2021-2025)
New Resource Forecast Methods (Meteorological Modeling) – PG&E EPIC 1.05	Data Analytics for Predictive Maintenance – PG&E EPIC 3.20	Fluid-free Steerable Boring – PG&E EPIC 4.13
Demonstrate "Next Generation" SmartMeter™ Functionalities – PG&E EPIC 1.14	Drone Enablement and Operational Use – PG&E EPIC 3.41	Automated UAS Deployment for Alarm-Triggered Events – PG&E EPIC 4.16
Predictive Risk Identification with RF Added to Line Sensors – PG&E EPIC 2.34	Automated Fire Detection from Wildfire Alert Cameras – PG&E EPIC 3.45	Rapid Wildfire Suppression – PG&E EPIC 4.18
Location-Specific Options for Reliability/Resilience Upgrades – PG&E EPIC 3.11	Operational Vegetation Management Efficiency – PG&E EPIC 3.47	Woody Supply Chain – PG&E EPIC 4.19
		Secondary Fault Analysis (Waveform Analytics) – PG&E EPIC 4.20
		GridScope Sensors – non-EPIC
		PG&E Portable and Permanent Backup Battery Programs – non-EPIC

EPIC 5 (2026-2030)

Focus for early project waves: Demonstrate novel monitoring methods, condition-based asset diagnostics, lower-cost undergrounding methods and adaptive protection schemes to reduce ignition and outage risk in climate hazard-exposed territory. Develop innovative automated de-energization and restoration workflows, demonstrate novel microgrid configurations and battery orchestration, and drone-based ignition detection and suppression methods to shorten PSPS and EPSS outages and limit event impact.
Focus for later projects: Advance post-event recovery decisions including climate-adapted landscape rehabilitation, damaged tree removal frameworks, and optimized wood management pathways, prioritizing DAC, Tribal, and HFTD communities that face the most difficult recovery pathways.

STRATEGIC INITIATIVE 6

Exploring pathways to streamline interconnection for DERs and new load

EPIC 1-3 (<2020)	EPIC 4 (2021-2025)
N/A	SP&D ChatBot for Electrification Service Delivery – PG&E EPIC 4.27
	T&D Co-Simulation Modeling – PG&E EPIC 4.21
	T-Flex – PG&E EPIC 4.29

EPIC 5 (2026-2030)

Focus for early project waves: Demonstrate foundational technologies and data capabilities for faster interconnection and energization, including enhanced data infrastructure, GIS/model synchronization, and AI-driven study automation to improve visibility into grid constraints. Validate clean bridging technologies, including solid-state transformers and linear generators, plus grid-stability management, prioritizing DAC and low-income circuits.
Focus for later projects: Build on validated technologies and data to enable the lowest-risk bridging solution across a portfolio of proven options per site, and integration of automated interconnection processes and standardized load-coordination protocols into PG&E's standard interconnection agreements and toolkit.

7. PG&E Research Topic Areas

PG&E's EPIC 5 Investment Plan is guided by the strategic framework the California Public Utilities Commission established through two decisions. Five Strategic Goals for EPIC were adopted in D.24-03-007 and thirteen Strategic Objectives for the EPIC 5 investment period in D.26-02-037. All are referenced in shorthand throughout this plan as "SG" and "SO", respectively.

Strategic Goals:

Strategic Goal 1 (SG 1): Transportation Electrification;

Strategic Goal 2 (SG 2): Distributed Energy Resource (DER) Integration;

Strategic Goal 3 (SG 3): Building Decarbonization;

Strategic Goal 4 (SG 4): Achieving 100 Percent Net-Zero Carbon Emissions and the Coordinated Role of Gas; and

Strategic Goal 5 (SG 5): Climate Adaptation.

Strategic Objectives:

Strategic Objective 1 (SO 1): Reducing Medium and Heavy-Duty Vehicle Charging Infrastructure Costs

Strategic Objective 2 (SO 2): Overcoming Barriers to EV Benefits in Disadvantaged Communities

Strategic Objective 3 (SO 3): Smart Planning Tools for New Load and Clean Resources

Strategic Objective 4 (SO 4): Reducing the Cost of Whole Home Electrification

Strategic Objective 5 (SO 5): Innovative Approaches for Difficult-to-Decarbonize Sectors

Strategic Objective 6 (SO 6): Community-Scale Decarbonization

Strategic Objective 7 (SO 7): Impacts Research for New Generation and Storage

Strategic Objective 8 (SO 8): Increase Predictability of Weather Impact on Intermittent Resources, Climate Risks, and Load

Strategic Objective 9 (SO 9): Leveraging Distributed Energy Resources for Grid and Community Resiliency

Strategic Objective 10 (SO 10): Expediting and Streamlining Interconnection and Energization Processes

Strategic Objective 11 (SO 11): Providing Data Input into a Value of DER Framework

Strategic Objective 12 (SO 12): Optimizing Feeder / Circuit Operations

Strategic Objective 13 (SO 13): Cost-Effective Grid Hardening for Long-Term Climate Impacts

Initiative 1: Ensuring cost-effective and timely access to EV connections for the benefit of all Californians

Research Topic Area 1.1: Accelerating non-residential, MHDV, and fleet electrification

Gaps Addressed: Meeting California's goal of transitioning all MHDVs to zero-emission by 2045 will require deploying non-residential and fleet charging infrastructure faster and at lower cost than existing approaches can deliver. The all-in cost for an MHDV charging site averages $800k or higher driven primarily by hardware and the install process, and charger activation timelines average 25 months in PG&E's service area.[28] Delivering adequate power is often the central challenge, with last-mile line extension, distribution capacity upgrades, and trenching among the largest cost and timeline drivers, all varying widely with site-specific conditions. These barriers often lead to abandoned projects or forgone electrification, with the heaviest impact on customers least able to bear the upfront capital. Adoption is further constrained where customer program and incentive structures are not designed around the operational needs of non-residential and fleet customers, for both conventional and bidirectional charging. This Topic aims to address these gaps specifically by:

- **Cost reduction at the component, site, and portfolio level:** Novel technologies, design approaches, and construction methods to reduce underlying costs, including technologies that increase the capacity and power density delivered per site and reduce or avoid the need for distribution capacity upgrades, incorporate V2X charging hardware where it adds value, and lower the infrastructure and installation costs of V2X-capable sites for customers and PG&E.
- **Timeline and process acceleration:** Technologies and approaches that streamline the electrification process, such as plug-and-play hardware designs, automated or simplified site-assessment methods, approaches that improve interoperability across EVSE, OEM telematics, and utility systems, to reduce the total time to charger operation for single- and multi-site customers.
- **Portfolio-level solutions for multi-site customers:** For multi-site customers, including transit agencies and depot operators, portfolio-level siting and capacity-assessment methods and repeatable site-design approaches that can apply across a customer's full set of locations.
- **Effective program and incentive design:** Program and incentive structures informed by prior V2X efforts that have the potential to increase adoption of conventional and bidirectional charging among non-residential and fleet customers.

Funding this Topic is critical to enable rate-reducing load growth for all customers, deliver air quality benefits to the DAC and low-income communities that bear the heaviest pollution burden, and expand non-residential electrification access to a broader customer base through published, replicable cost models that inform electrification planning beyond PG&E.

Unique Role: EPIC is best positioned to support this innovation need because the non-residential electrification RD&D presented in this Topic is pre-commercial and requires demonstration and validation before commercial deployment. The validated multi-IOU, multi-vehicle-type, multi-site data needed to de-risk these approaches are difficult for any single vendor to assemble, and private sector investment tends toward proprietary tools that capture value for the developer rather than benefitting the broader ecosystem. Federal programs have supported early-stage charging RD&D but

[28] Timeline reflects PG&E EV Fleet program median activation time across 2021-24 (Fig. 3) https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/energy-division/documents/sb-350-te/srp-ab10821083-2024-evaluation-report092025.pdf.

are not structured to fund demonstrations under California's distinctive regulatory, climate, and grid conditions. PG&E's existing ratepayer-funded programs are appropriate for proven designs and system upgrades, but this Topic requires RD&D at lower levels of technological maturity most appropriately conducted through EPIC rather than the GRC.

Leveraging Past RD&D: EPIC 4.01 (Propensity Modeling for EV Adoption) developed propensity modeling currently being integrated into PG&E's forecasting methodology for residential L1/L2 charging; this Topic could expand this work to non-residential charging, improving load forecasting and capacity planning. PG&E's V2X Commercial Pilot, which incentivizes bidirectional chargers for commercial and MHDVs, has collected data this Topic will leverage to better design non-residential V2X programs and pricing structures. Additionally, EPIC 3.03 (DERMS and ADMS functionality) underpins PG&E's Flex Connect offering which has unlocked 4GWh+ of incremental energy for grid-constrained customers using dynamic site limits based on short-term grid loading forecasts. This Topic builds on Flex Connect's established capabilities and goals by driving down costs, streamlining the customer experience, and enabling greater scalability for more varied use-cases.

Metrics and Impact Assessment: The following metrics may be used to assess ratepayer benefits, as appropriate according to the scope of future projects, with outcomes and investment in DAC, low-income communities, and Tribes published in public reporting. Baselines will be established prior to projects, disaggregated by charger type where applicable, and post-deployment costs and timelines measured against those baselines to isolate the cost reduction attributable to each approach.

- Reduction in EVSE installation times by phase and community, tracked using interconnection, work-management records or similar (Customer-focused solutions, months)
- Reduction in installed infrastructure cost per site, using cost records or similar (Affordability, $)
- Reduction in utility-side cost to serve new non-residential load, estimated from distribution upgrade cost data, load forecasts or similar (Affordability, $/MW)
- Number of electric MHDVs supported by infrastructure deployed under this Topic, by community, drawn from vehicle registration data or similar (Affordability, count)
- Estimated GHG reduction in non-attainment areas and DACs from MHDV electrification, modeled using established tools such as CARB's EMFAC or equivalent (Decarbonization, Equity, CO_2e)

Expected Outcomes: Near-term (3 yrs): Projects will demonstrate innovations that reduce the cost and timeline of charging infrastructure deployment, including bidirectional capabilities, generating evidence on performance, reliability, and customer experience across vehicles and site conditions.

Mid-term (3-10 yrs): Demonstrations of infrastructure with V2X capability may position fleet sites to provide future grid value to flow back to ratepayers. Validated solutions will be adopted into PG&E's deployment programs and the broader non-residential electrification market, supporting the SO 1 stretch goal of a 50% reduction in IOU MHDV charging infrastructure and grid upgrade costs by 2035, in part through site designs that avoid or defer capacity upgrades.[29]

Long-term (10+ yrs): Reduced non-residential electrification costs and faster deployment will support California's 2045 goal of zero-emission MHDVs, delivering air quality benefits in DACs and non-attainment areas that bear a disproportionate share of MHDV pollution today. Rate-reducing load growth will spread fixed system costs across a larger base, placing downward pressure on rates.

[29] D.26-02-037, Appendix A.

Equity Outcomes: This Topic delivers direct equity benefits through improved air quality and access. MHDVs produce a disproportionate share of pollutants concentrated along freight corridors, near ports, in industrial areas, and along transit routes that run through or border DACs; faster, cheaper electrification accelerates the displacement of these emissions in the communities that bear the heaviest pollution burden today, and initial demonstrations will prioritize customer segments such as public transportation, refuse and delivery fleets, and drayage operations operating in proximity to DAC and low-income communities.[30] This Topic also aims to reduce the financial barriers to non-residential electrification that disproportionately exclude smaller operators who are least able to absorb upfront capital.[31] Community engagement will be conducted in coordination with PG&E's existing DVC and Tribe engagement programs, including collecting community input at key project milestones. Outcomes will be reported in line with the EPIC Equity in RD&D Framework.

Marketing and Deployment Plans: Innovations developed under this Topic will progress through four steps: 1) Demonstration and validation: each technology, tool, approach, or program input will be demonstrated and validated at varying site configurations, producing evidence on cost, performance, reliability, and customer experience. 2) Open publication: In response to CPUC feedback on cost transparency, methods and reference cost and performance data will be published in accessible formats for other IOUs, site operators and hosts, local governments, and vendors, for use in assessing electrification pathways. 3) Broader Integration: validated approaches will be incorporated into PG&E programs, incentive structures, and engineering and design standards. 4) Adoption at scale: coordination with other EPIC Administrators, non-residential operators, and vendors will support adoption across California. PG&E will track and report adoption indicators in its EPIC Annual Reports. Barriers to deployment at scale include permitting and inspection delays, site variability, workforce and supply chain constraints, site capacity and power density limits, and broader grid capacity constraints. PG&E will work to mitigate these barriers through coordination with stakeholders such as the CEC, IOUs, vendors, and contractors, to share best practices, establish commercial pathways for novel technology, and support workforce engagement. Capacity upgrade mitigation efforts such as bridging solutions across a broader portfolio of uses cases and loads will be advanced with Topic 6.2.

Coordination with EPIC and/or Gas RD&D Program Administrators: The EPIC administrators will coordinate across Topics to ensure complementary rather than duplicative investments. The CEC will fund earlier-stage technology development for emerging and non-light-duty transportation sectors including working with EVSE OEMs early-stage technology validation, data collection on the operational and grid-connection characteristics of these end-uses, and research into co-location and DC distribution approaches that reduce EVSE footprint and cost across CA. PG&E and IOU EPIC programs will fund demonstration of hardware, design, and construction innovations that reduce the cost and end-to-end timeline of non-residential charging on the utility distribution system across diverse vehicle types and site and grid conditions. The administrators will review proposed projects for methodological overlap and identify opportunities for sequencing or joint work prior to implementation.

[30] https://ww2.arb.ca.gov/news/california-takes-bold-step-reduce-truck-pollution.

[31] https://ww2.arb.ca.gov/our-work/programs/innovative-small-e-fleet-pilot-program/project-background-innovative-small-e.

Initiative 1: Ensuring cost-effective and timely access to EV connections for the benefit of all Californians

Research Topic Area 1.2: Advancing residential TE with specific emphasis on ESJ Communities

Gaps Addressed: Residential charging is the dominant pathway for light-duty EV adoption, with over 80% of charging happening at home, yet visibility barriers, complexity, and cost for customers and the utility constrain uptake.[32] For single-family customers, installing home charging frequently triggers panel, service, or upstream distribution upgrades with customer costs ranging from a few hundred dollars to $10,000 or more.[33] For multi-family residents, at least two-thirds lack home charging access in California.[34] Multi-family charging often requires upgrades to shared electrical infrastructure, coordination with property owners lacking incentives to act, and tenant-level billing solutions nonexistent at scale. These barriers fall hardest on renters and ESJ Communities, and especially in multi-family and parking-constrained housing. This topic aims to address the gaps that the Commission has identified for SG 1: high charger capital and ownership costs, charging access for DAC and low-income customers, and localized distribution impacts, specifically through:

- **Reducing the cost and complexity of residential charging and V2X:** Novel technologies and approaches to enable charging without triggering panel, service, or upstream distribution upgrades for both single-family and multi-family applications, using lower-cost, vendor-agnostic approaches suited to deployment at scale. More cost-effective V2X solutions, including AC bidirectional charging, leveraging OEM partnerships that can deliver grid value while strengthening the customer value proposition.
- **Enabling multi-family charging:** Lower-cost shared charging infrastructure and tenant-level billing and submetering approaches that address the property-owner coordination and cost-recovery barriers limiting access for renters and DAC and low-income community households.
- **Improving customer program design and participation, particularly in DACs:** Effective program, incentive, and pricing structures – informed by the value of demand flexibility and by a better understanding of customer charging behavior proposed in Topic 2.3 – supported by customer-facing tools to convey EV adoption costs and timelines to increase uptake, help DAC and low income households access EV benefits, and inform bidirectional program design and rate design.
- **Managing localized distribution impacts of residential charging:** Improved visibility into evolving residential load and customer charging behavior to support program targeting and enrollment, encourage charging compatible with local distribution capacity, and inform system planning.

Funding this Topic is a priority because it reduces the barriers to residential EV uptake at the scale and timeline the State's 2035 ZEV sales goal requires.

Unique Role: EPIC is uniquely positioned to support this Topic because the residential charging approaches contemplated are pre-commercial and require demonstration and validation under California's distribution and customer conditions before they can be relied upon at scale. The multi-customer, multi-site evidence needed to de-risk these approaches are difficult for any single vendor to assemble, and private-sector investment tends toward proprietary solutions that capture value for

[32] https://www.energy.gov/topics/national-ev-charging-network.

[33] https://www.pge.com/en/clean-energy/electric-vehicles/getting-started-with-electric-vehicles/electric-vehicle-charging.html.

[34] https://www.energy.ca.gov/sites/default/files/2022-01/CEC-600-2022-021.pdf.

the developer rather than the shared findings that benefit the broader residential market. Federal programs have supported early-stage charging RD&D but are not structured to fund demonstrations under California's distinct regulatory, distribution, and customer conditions. CARB incentive programs and the GRC are appropriate for deploying mature, de-risked technology at scale, but the innovations this Topic requires are at lower levels of technological maturity and require demonstration appropriately conducted through EPIC.

Leveraging Past RD&D: This Topic builds on existing RD&D including: EPIC 4.02A (Socket of the Future) is testing whether a meter-socket grid-edge platform allows customers with 100A panels to add Level 2 EV charging without triggering panel or service upgrades; this Topic expands the use-cases of the technology and explores the lower-cost, vendor-agnostic approaches required for deployment at scale. EPIC 4.03 (EV Charging Solutions for Parking-Constrained Customers) and 4.01 (Propensity Modeling for EV Adoption) characterize deployment barriers and localized adoption respectively; this Topic builds on both to design tenant-level billing and cost-recovery structures and customer programs matched to local grid capacity. EPIC 4.04 (Home Charging, Distribution - Managed Charging) is demonstrating third-party orchestration of residential charging to prevent transformer overloads; this Topic aims to improve critical load visibility and customer-facing cost information for improved orchestration programs. EPIC 4.12 (AC V2G VPP) developed AC-based bidirectional charging using vehicle-based inverters to lower hardware and installation costs, and PG&E's VGI V2X Residential Pilot is generating data on customer cost structures and program design; this Topic extends both to additional use cases beyond single-family homes and to future residential V2X.

Metrics and Impact Assessment: The following metrics will be used to assess ratepayer benefits, according to the scope of projects, with outcomes and investment in DAC, low-income communities, and Tribes published in public reporting. Baselines will be established prior to each project to isolate the cost and time savings attributable to each approach.

- Reduction in customer-side installation cost for residential EV charging (Affordability; $)
- Number of residential EV charging connections completed without triggering panel, service, or upstream grid upgrades, and the estimated value of upgrades avoided (Affordability; count, $)
- Reduction in time from customer EV purchase to operational charging, compared to current PG&E timelines (Customer-focused solutions; %)
- Estimated expansion of residential EV charging access, measured from demonstration data against the population of DAC households currently lacking access (Equity; %).

Expected Outcomes: Near-term (1-3 yrs): Ratepayers benefit indirectly as foundational work on customer-facing tools, program and pricing design, cost-effective V2X approaches, and installation methods delivers initial validation of lower-cost, lower-friction residential charging, building the base for the subsequent affordability and access benefits.

Mid-term (3-10 yrs): As demonstrated approaches are adopted into PG&E's standard residential connection processes and customer programs, ratepayers benefit from lower installation costs, shorter timelines from EV purchase to operational charging, and fewer panel, service, and upstream upgrades. Improved visibility into residential load and customers' charging behavior, paired with program designs that keep charging within local capacity, helps defer distribution upgrades.

Long-term (10+ yrs): At full-scale deployment, ratepayers realize avoided customer and grid upgrade costs across PG&E's system, and DAC and low-income customers face fewer barriers excluding them from EV adoption. Charging behavior research informs rate structures, further lower rates.

Equity Outcomes: This Topic extends residential EV charging to the DAC and low-income households facing the steepest cost and access barriers. Home charging can lower transportation energy burden, yet access is lowest among those who would benefit most.[35] Through targeted access expansion, the Topic can also displace tailpipe emissions where the pollution burden is the heaviest.[36] Demonstrations will prioritize DAC, low-income, and Tribal sites, using engagement and outreach channels aligned with PG&E's EPIC 5 CEP and structured input during scoping, technology selection, and evaluation to influence program design and incentive structures. Community satisfaction will be assessed through participant surveys at demonstration sites, structured feedback sessions with participating households and CBOs, and reporting cost reductions and access expansion in DACs and low-income communities as set out in the Metrics and Impact Assessment section. Outcomes will be reported consistent with the EPIC Equity in RD&D Framework adopted in D.26-02-037.

Marketing and Deployment Plans: Innovations from this Topic will progress through four steps: 1) Demonstration and validation: technologies, program and pricing designs, and customer-facing tools will be field-validated across single-, multi-family, and ESJ Community settings. 2) Integration: Approaches will be evaluated for integration into PG&E's residential connection, customer service, program, and grid planning processes. 3) Dissemination: findings, performance data, and reference designs will be shared through industry forums, EPIC Admin workshops, and engagement with vendors and manufacturers. 4) Adoption at scale: multi-stakeholder engagement, dissemination, and early integration will support broader adoption. Findings on costs and program design influencing PG&E's rate design processes, consistent with the scope of this Topic. Barriers to deployment at scale include limited awareness of the value of EVs, insufficient stakeholder coordination and incentive alignment, long permitting and inspection timelines, and the risk of unpermitted installations. PG&E will mitigate these through DAC-specific outreach and accessible customer tools, business models that support tenant-level billing, and coordination with IOUs, the CEC, industry groups, and policymakers to establish EVSE and V2X standards and streamline permitting.

Coordination with EPIC and/or Gas RD&D Program Administrators: The EPIC Administrators will coordinate to ensure complementary rather than duplicative investments and may include opportunities to pursue joint and/or complementary projects**.** For example, CEC and IOUs may collaborate to test bidirectional charging valuation frameworks and compensation models in IOU-hosted demonstration projects with residential customers. CEC may fund earlier-stage technology development to reduce charging costs, including customer-side VGI costs, and barriers to bidirectional technologies; or projects advancing EV telematics and EVSE data quality and interoperability, or produce equitable-participation research. PG&E would fund demonstration and integration of cost-reducing charging and load management technology on the utility system and customer premises, tenant-level billing solutions in regulated contexts, and the residential sensing and managed-charging and V2X capabilities to improve utility visibility into evolving load. Administrators will review proposed projects for overlap and identify opportunities for sequencing or joint work.

[35] Vega-Perkins, Jesse, *et al* 2023 *Environ. Res. Lett.* **18** 014027, https://doi.org/10.1088/1748-9326/aca4e6.
[36] https://oehha.ca.gov/calenviroscreen/report/calenviroscreen-40.

Initiative 2: Enabling affordable load growth through advanced planning and operating capabilities

Research Topic Area 2.1: Smart planning tools to holistically optimize upgrades across the system

Gaps Addressed: The evolving dynamics of load growth, climate impacts, and the proliferation of distributed resources make it difficult for existing forecasting and planning tools to reliably optimize outcomes at the system, transmission, distribution, and secondary level. Concurrently, the increase in aging asset tags, as installed assets approach the end of useful life, adds an additional layer of planning complexity to harmonize planned upgrades with necessary asset replacements and maximize cost efficiency across both programs. Innovation is needed to improve the quality of the data and forecasting that drive the identification of system constraints, to automate evaluation of a broader range of solutions to address those constraints, and to add considerations for asset maintenance and replacements into system planning outputs. Addressing the following gaps would increase the fidelity of planning outputs, expand the solution set, and improve planners' ability to make optimal investment decisions to support system needs in the most cost-effective manner:

- **Data quality, forecasting, and planning abilities:** The consolidation of data from siloed systems, enhanced forecasting of and visibility into how electrification and EV adoption impact customers' behind-the-meter load and demand flexibility over the short- and medium-term, integration of localized climate impacts, and AI capabilities to iteratively improve data quality will provide planners with better planning inputs. Advanced planning tools can support the integration of capacity analysis, enable planning on the secondary system, and add consideration for asset utilization and individual asset health to the planning process.
- **Solution-evaluation tools:** Automating and expanding the evaluative toolkit beyond bespoke, time-intensive analyses will enable planners to rapidly test "what if" scenarios across a richer solution space that spans wires upgrades, non-wires alternatives, demand flexibility programs, DER orchestration, and novel engineering configurations.
- **Holistic planning view:** Advances in modeling capabilities to provide a more holistic view of grid investments across asset management, grid hardening, and system planning will yield better optimized planning outcomes across programs.

This Topic directly aligns with Strategic Objective 3 to advance forecasting capabilities associated with building electrification, EVs, intermittent resources, and DERs and to leverage these advances to optimize the capital planning process. Improved planning tools play a critical role in supporting California's decarbonization goals, customers' electrification journeys, and overall system reliability, while ensuring efficient deployment of capital to promote affordability. Funding this Topic is a priority because the decisions made today about how to invest in the grid will affect rates in the long run.

Unique Role: Without close utility collaboration, other R&D bodies would lack access to these utility-specific inputs that can enable value creation across the entire planning lifecycle from the aggregation of high-quality data to enhanced forecasting, automated solution evaluation, and ultimately integration with the investment planning process. The novel forecasting methods and automated solution-space evaluation tools of interest under this Topic are at lower levels of technological maturity and require demonstration and maturation that is most appropriately conducted through EPIC instead of the GRC.

Leveraging Past RD&D: This Topic extends capabilities developed in several predecessor projects, including EPIC 4.01 (Propensity Modeling for EV Adoption), 4.08 (Non-Wires Alternatives Integration into Distribution Planning), 4.09A (Advanced Load Management Analytics), 4.21 (T&D Co-Simulation

Modeling), and 4.33 (AI-Enabled Megabundling). EPIC 4.01 is developing capabilities to more accurately anticipate EV adoption, a critical input for system planning. Extending this modeling to the electrification of other end uses can further enhance planners' visibility into evolving customer load and better direct resources to emerging constraints. EPIC 4.08 creates the foundations for evaluating non-wires alternatives, optimizations, and demand flexibility as a substitute or complement to traditional upgrades in distribution planning. This Topic would expand the potential solution set to include novel engineering configurations and integrate these capabilities into standard distribution planning workflows. EPIC 4.09A builds foundational capabilities for evaluating load management strategies alongside conventional infrastructure investments to provide a more direct cost comparison. This modeling work will be a crucial input for any project that seeks to automate the evaluation of a more fulsome set of alternatives to traditional wires. EPIC 4.21 develops the capabilities to consider needs more holistically across both transmission and distribution to optimize investments systemwide. This Topic would leverage these capabilities with the potential to add consideration for asset management investments and alternatives to traditional upgrades. EPIC 4.33 aims to develop AI-enabled capabilities to group related system needs across asset classes to improve cost-value optimization of the plannable capital portfolio. This Topic would extend that bundling capability to factor asset maintenance and replacement into planning outputs.

Metrics and Impact Assessment: The following metrics will be used to assess ratepayer benefits, as appropriate according to the scope of future projects, with outcomes and investment in DAC and low-income communities collected and integrated in public reporting:

- Reduction in time necessary to perform a given planning task with advanced solutions compared to current baseline (Affordability; hours, %)
- Reduction in forecasting error between forecasted and actual load when using enhanced tools relative to baseline, with separate reporting for DAC-designated circuits (Affordability; %)
- Cost of conventional capacity upgrades deferred or avoided as a direct result of tool-enabled identification of non-wires alternatives or demand flexibility opportunities (Affordability; $)

Once successfully scaled, solutions validated under this Topic would also produce improvement in the Affordability Ratio for customers, which delivers outsized impact for low-income households.

Expected Outcomes: Near-term (1-3 yr): Foundational enhancements to data inputs, forecasting models, and advanced analytics provide better insight into emerging constraints and expanded evaluative capabilities for optimizing interventions. Early work establishes the necessary evidence base and toolset that unlock mid- and long-term affordability and reliability benefits.

Mid-term (3-10 yr): Enhancements are directly incorporated into existing tools and systems and applied in actual planning processes, resulting in capital optimization that directly reduces T&D investments that would otherwise be needed. These improvements meaningfully reduce the unit cost of accommodating load growth, while also improving reliability outcomes.

Long-term (10+ yr): Sustained use of holistic, data-integrated planning tools will compound into improved capital efficiency, fewer stranded assets, higher utilization rates across the T&D system, and a planning paradigm that directs investment to where it generates the greatest reliability and affordability benefit at the lowest cost.

Equity Outcomes: Data inputs, forecasting models, and scenario evaluation tools will be developed to produce outputs with the granularity needed to identify capacity risk and investment needs in ESJ

Communities, making the equity implications of investment prioritization decisions visible to planners at the point of decision-making. Integrating localized climate impacts into the planning process can also surface where rising temperatures and resulting increased air-conditioning load may create localized capacity risk. Early modeling indicates these impacts may be particularly acute in the Central Valley, burdening local DAC populations with increased outage risk. Enhanced planning that proactively identifies these emerging constraints can improve reliability in these communities and avoid outage burdens. Community satisfaction will be assessed through structured feedback sessions with participating community-based organizations and tribal stakeholders at key project milestones, covering whether projects addressed the community's stated concerns, whether engagement was meaningful and ongoing, and whether results were shared in accessible formats. Outcomes will be reported aligned with the EPIC Equity in RD&D Framework adopted in D.26-02-037.

Marketing and Deployment Plans: The path to scale moves through three steps: 1) Foundational data and model development: develops data infrastructure and core analytical models, including identifying data gaps, establishing baselines, developing and training models for BTM load evolution, and forecasting localized peak demand and DER flexibility potential. 2) Operational validation: transitions to operational prototypes tested in live planning environments, including integrating forecasting models and scenario evaluation tools into existing software environments, testing their ability to improve decision-making, and measuring how expanded solution-space analysis changes investment recommendations. 3) Scaled deployment: focuses on integrating proven tools into standard operational workflows and initiating the knowledge transfer for other utilities and planning stakeholders to adopt new capabilities. Barriers to deployment may include data access and quality, institutional inertia in planning processes, and interoperability across utility environments. Co-designing tools with distribution engineers, prioritizing explainability and transparency in outputs, and structuring tools to augment rather than replace judgment can help drive adoption. To enhance interoperability, projects should include open standards, modular architectures, robust documentation, and the involvement of other IOU administrators.

Coordination with EPIC and/or Gas RD&D Program Administrators: The EPIC administrators coordinated during investment plan development through a DER Integration working group and a working group on Interconnection, Energization and Large Load Addition to exchange respective priorities in related topic areas among program staff and subject matter experts to ensure complementary rather than duplicative investments. Under Topic 2.1, PG&E will coordinate with EPIC Administrators during project concept development to identify potential overlap in target solutions to be demonstrated under similar Initiatives, such as SCE's *Intelligent Grid Planning and Orchestration (IGPO)* Initiative, and align on ways to run parallel projects that focus on different applications of similar technology or different technology approaches to address gaps in forecasting and holistic planning tools. The CEC's Topic, *Data and Planning Tools for Grid Infrastructure Investments and Coordinating Customer Decisions,* additionally presents opportunities for jointly implemented projects with IOU administrators since several of the target solutions in their scope would need to be tested and validated by IOUs in utility planning processes and with utility data. For example, IOUs could provide technical input in the scoping of a CEC GFO seeking to create advanced planning tools and CEC could fund the earlier stage development work, while utilities would participate in the technology demonstration phase.

Initiative 2: Enabling affordable load growth through advanced planning and operating capabilities

Research Topic Area 2.2: Solutions to optimize the cost and scope of grid upgrades

Gaps Addressed: Demand from large loads and the electrification of transportation, buildings, and industry is projected to increase PG&E's peak demand by approximately 20-40% by 2040, straining the limits of the existing T&D system.[37] Utilizing conventional upgrades alone to accommodate this growth will require tens of billions of dollars to complete on timelines that lag demand. While upgrades will be unavoidable in many cases, increasing the utilization of current infrastructure could be a viable alternative to accommodate new load at a lower level of overall investment, while novel construction methods could simultaneously reduce costs for needed upgrades. PG&E estimates that projected electrification and DER adoption will require between $23 billion and $31 billion of investments through 2040 on the distribution system alone. Furthermore, the EIS Part 2 found that leveraging engineering best practices and incorporation of demand response could deliver $3.4 billion in savings for customers through 2040.[38] Given the magnitude of these projections, innovations that could optimize, defer, or reduce this total level of investment could have considerable affordability impacts. However, key capability gaps must be addressed to unlock this opportunity.

Currently, grid operators lack the real-time visibility, situational awareness, and operational control to safely approach the true limits of the existing system, resulting in a more conservative approach to grid management that may underutilize capacity and trigger avoidable conventional upgrades. Grid operators lack real-time visibility into the level of utilization that individual assets can handle without impacting their health or useful life. Lastly, executing capacity upgrades often requires obtaining new rights-of-way for upgraded infrastructure and relies on traditional construction methods that are time- and resource-intensive. Innovation in the following areas can increase the utilization of existing capacity, assets, and rights-of-way in a manner that preserves safety and reliability, while also promoting affordability through the deferral or avoidance of capital expenditures at projected levels:

- **Grid management:** Integrated sensing, unified data infrastructures, advanced power flow control and topology optimization capabilities, and enhanced decision-support systems aim to provide grid operators with the real-time visibility and operational control necessary to manage the system more dynamically within existing limits as headroom declines.
- **Asset health and operational capacity monitoring:** Enhanced health monitoring and intelligence at the individual asset level will provide a more nuanced understanding of an individual asset's health and operational capacity in real-time.
- **Novel equipment and construction methods:** Alternative technologies and construction methods aim to enable delivery of additional capacity within the same footprint and rights-of-way as PG&E's existing assets, on accelerated timelines, and at lower costs. This may include, but is not limited to, innovative ways for deploying infrastructure more efficiently and strategic conversion from alternating current to direct current lines.

Funding this Topic is a top priority because maximizing utilization of the existing system would produce meaningful system-wide benefits, not only for accelerating electrification, but also for achieving significant cost reductions. This Research Topic directly supports the goals articulated in SO

[37] PG&E Electrification Impacts Study Part 2 Report, R.21-06-017 (filed Jan. 28, 2026).

[38] Ibid.

12 by enabling the deferral or elimination of costly capacity upgrades through greater utilization of the existing system and more cost-efficient execution of necessary upgrades. Load management and the orchestration of flexible resources are a supplemental set of capabilities to enable capital deferral/optimization that are covered in Topic 2.3.

Unique Role: EPIC funding is appropriate for this Topic, as the validation of potential solutions requires demonstration in live utility environments to assess technical and operational efficacy and to establish the economic case for pursuing alternatives to conventional upgrades. While federal funding programs exist to support the deployment of more mature Advanced Transmission Technologies, projects funded under this Topic will not be limited to the transmission system and will demonstrate more novel approaches that have yet to be proven at scale. This lower level of technical maturity for the solutions that will be demonstrated makes projects under this Topic well-suited for EPIC, rather than GRC or other funding sources.

Leveraging Past RD&D: This Research Topic will extend learnings from EPIC 4.05 (Dynamic Line Rating), EPIC 4.32 (Asset Utilization), and advanced conductor RD&D funded outside of EPIC. EPIC 4.05 is demonstrating dynamic line rating (DLR) and asset health monitoring (AHM) vendors and products on sections of PG&E's transmission system. This Topic will extend this work by meaningfully integrating selected sensing products and creating unified data infrastructure and decision-support systems to enable the safe, reliable deployment of DLR and AHM. EPIC 4.32 will explore a range of approaches, including advanced power flow control and topology optimization capabilities, to increase the utilization of grid assets; while the project is in very early stages, further RD&D under this Topic will build on early learnings to further validate novel solutions before broader system integration. Beyond EPIC, PG&E has advanced the use of high-capacity conductors, installing 21 miles of advanced conductors and integrating their evaluation into all reconductoring projects. PG&E will continue to explore next-generation technologies that provide real-time asset health information.

Metrics and Impact Assessment: The following metrics will be used to assess ratepayer benefits, as appropriate according to the scope of future projects, with outcomes and investment in DAC and low-income communities collected and integrated in public reporting:

- Avoided/deferred conventional capacity upgrade costs, reported per-project and extrapolated to system-wide impact if tools deployed at scale (Affordability; $)
- Reduction in DER capacity-limited feeders/circuits (count, miles; Customer Solutions)
- Transformer and conductor upgrade deferrals vs. expectations (count, miles; Affordability)
- Change in load factor for circuits where utilization tools are deployed, measuring the improvement in the ratio of average to peak demand (%; Affordability)

Expected Outcomes: Near-term (1-3 yr): Demonstration of foundational tools and methodologies establishes the technical and economic case for expanded deployment of alternative solutions. Integration of relevant data infrastructure, monitoring and control systems, and planning workflows establish foundations for generating actionable outputs to support system planning processes and inform GRC filings.

Mid-Term (3-10 yr): The integration of validated tools into planning and operations enables measurable deferrals and avoidance of conventional capacity upgrade projects, reduced peak loading on constrained circuits, and increased load factor across the existing T&D footprint, directly translating to significantly reduced or deferred capital expenditure and avoided rate pressure.

Long-Term (10+ Years): While near-term benefits will largely be driven by software capabilities, longer-term impacts will stem from scaled hardware deployments, novel construction methods, and right-of-way optimizations. Sustained deployment of these capabilities will compound into structural improvements in system efficiency and capital productivity. Higher asset utilization reduces the infrastructure footprint required to support load growth, generating durable cost savings.

Equity Outcomes: Project design will explicitly reflect the needs of priority communities by incorporating feedback gathered through CBOs, tribal representatives, and local government outreach focused on surfacing community-defined reliability and affordability needs. Consistent with findings that grid capacity constraints are more acute in ESJ communities, project selection will include criteria for prioritizing circuits serving DAC and low-income communities, ensuring that improved utilization and upgrade optimization benefit communities that face the greatest barriers to electrification and where additional capacity may increase adoption of zero-emission technologies.[39] Demonstration of novel AHM technologies may improve reliability and safety in selected communities, as improved asset intelligence can help avoid outages from unanticipated failures. Outcomes will be reported in line with EPIC's Equity in RD&D Framework adopted in D.26-02-037.

Marketing and Deployment Plans: The path to scale follows three steps: 1) Demonstration and development: creates performance baselines, models for evaluating tradeoffs between alternative approaches, and the integrations to support dynamic operations. 2) Operational validation: integrates demonstrated approaches into system planning processes and grid management and control workflows, enabling a more real-time operational regime. 3) Production integration: transitions validated solutions into standard planning and procurement practice with revised GRC investment frameworks incorporating non-conventional capacity solutions. Findings, data, and reference designs will also be shared through relevant channels to support broader adoption. Barriers to deployment include uplift to legacy systems to enable real-time workflows, inertia in planning processes, and interoperability challenges across IOU environments. These barriers will be addressed through investments in integration research and workforce development, coordination with system planners, grid operations, and other stakeholders on planning requirements, and CPUC engagement on GRC frameworks for evaluating non-conventional capacity solutions.

Coordination with EPIC and/or Gas RD&D Program Administrators: The EPIC Administrators will coordinate through ongoing technical working groups during project design and selection to ensure complementary rather than duplicative investments. Given high potential for affordability benefits from innovation, all Administrators plan to invest in RD&D that would optimize grid upgrades, and we anticipate opportunities to collaborate with CEC, SCE, and SDG&E through joint or complementary projects demonstrating new grid management sensing and control solutions, asset health monitoring improvements, and new, cost-efficient construction methods. For example, IOUs may provide technical advisory for a CEC-funded GFO for early-stage requirements development and laboratory testing of power control systems. IOUs could fund later stage technology demonstrations of different lab-validated technologies integrated with utility grid systems and tested in real-world conditions. Administrators will review proposed projects for methodological overlap and identify opportunities for sequencing or joint work prior to implementation.

[39] Brockway, A.M., Conde, J. & Callaway, D. Inequitable access to distributed energy resources due to grid infrastructure limits in California. *Nat Energy* 6, 892–903 (2021). https://doi.org/10.1038/s41560-021-00887-6.

Initiative 2: Enabling affordable load growth through advanced planning and operating capabilities

Research Topic Area 2.3: Enabling orchestration of flexible resources and a framework for valuing flexibility

Gaps Addressed: As California's clean energy transition accelerates and grid faces increased stress, new loads and existing flexible resources are increasingly positioned to serve as dependable grid resources in place of, or alongside, conventional infrastructure investment. By 2030, PG&E aims to enable 1GW of flexible, dispatchable load across EVs, DERs, and large loads. Many of these loads exist today, but PG&E lacks the asset-level visibility and controls needed to predict asset behavior and detect grid stress against system thresholds in real time. The industry also lacks the technical infrastructure and tools to orchestrate these resources at scale for flexibility, resilience, and speed-to-power. Without this foundation, the DSO cannot plan or dispatch distribution-sited flexibility as a firm resource, leaving it unavailable to provide localized capacity, voltage support, and ramping to defer upstream upgrades. Compounding these challenges, current avoided-cost and GRC-based frameworks cannot value flexibility against conventional investment, as they are not grounded in real-world outcomes and assess resources in isolation. This Topic aims to address the following areas:

- **Asset-level visibility and forecasting:** Develop real-time, asset-level modeling, methods for forecasting customer-sited asset and aggregator behavior, and communication and control frameworks that translate disparate grid data into actionable signals working with existing PG&E platforms, activating DERs, EVs, and large loads as firm grid assets the system can plan against.
- **Scalable orchestration:** Demonstrate coordination capabilities built on industry-standard implementation, such as scaling IEEE 2030.5 across devices, OEMs, and utility-side infrastructure, moving PG&E from today's device-by-device approach to scalable, safe, system-wide orchestration across DER types and BTM and FTM resources. Enable the DSO to orchestrate distribution system VPP or DER assets to enable earlier energization of transmission-connected customers before upstream upgrades.
- **A valuation and compensation framework for flexibility:** Develop a valuation methodology grounded in real-world outcomes, giving planners and the Commission a defensible basis to weigh flexibility against conventional grid investment, value resources as part of a portfolio across distribution, transmission, and generation, and fairly compensate DER owners for grid services.

PG&E's EIS Part 2 Report included a scenario that states enhanced orchestrated demand flexibility can reduce distribution infrastructure costs by $1.8B through 2040.[40] Funding this Topic reduces reliance on fossil fuel peaker plants, and directs capital to where it's needed most, supporting an equitable, timely, and cost-effective energy transition.

Unique Role: EPIC is uniquely positioned to support this work because the challenges require utility-specific operational context, planning data, and distribution-system access no other RD&D body can replicate. A defensible flexibility valuation framework must be derived from empirical deployment against real distribution needs. Orchestration and interoperability require utility-led coordination across IOUs, the CEC, and standards bodies – work the private sector has little incentive to lead since the frameworks must stay open and transferable. GRC funding suits scaling proven solutions, but pre-

[40] PG&E Electrification Impacts Study Part 2 Report, R.21-06-017 (filed Jan. 28, 2026).

commercial demonstration of orchestration platforms, stress-detection engines, and novel valuation methods is inconsistent with the GRC's expectation of prudent, near-term ratepayer benefit.

Leveraging Past RD&D: For orchestration, EPIC 2.02 (DERMS) demonstrated orchestration of aggregated DERs for distribution capacity and voltage support, and EPIC 3.03 (DERMS/ADMS Advanced Functionality) established a low-cost DER telemetry platform and standards-based communication; together they laid foundations for this Topic, with 3.03 finding that DER control – across devices, manufacturers, and the utility – remains unsolved. EPIC 4.09B (Aggregated Customers on Distribution Circuits) advanced circuit-level coordination of aggregated customer resources, EPIC 4.04 (Home Charging, Distribution – Managed Charging) demonstrated active management of residential EVs as a grid resource, and EPIC 4.28 (Residential Battery Grid Value Demonstration) is in early stages of orchestrating utility-managed batteries; this Topic applies these efforts toward coordinated orchestration across resource types against distribution system constraints. EPIC 4.02A (Socket of the Future) and EPIC 4.02B (Panel Upgrade Avoidance) manage electrification loads within existing panel limits through meter-connected infrastructure; this Topic extends that capability to orchestrate a broader range of BTM loads as coordinated flexible resources. EPIC 4.12 (AC V2G VPP) is supporting the pooling and dispatching of residential bidirectional EVs, while PG&E's operational V2X Pilots are demonstrating coordinated grid export from customer bidirectional systems; this Topic builds on both toward standards-based, system-wide orchestration of V2X. This Topic also aims to build on the site-specific demonstrations of Flex Connect and EPIC 4.29 (T-Flex) toward a standardized capability to orchestrate flexible resources as a firm resource. Both are discussed further in Topics 1.1 and 6.2, respectively. For valuation, EPIC 2.23 (Integrate Demand-Side Approaches into Utility Planning) developed location-specific marginal capacity cost methods, and EPIC 4.09A is developing a modeling framework for a co-optimized view of generation, transmission, and distribution incorporating FTM and BTM resources – early steps toward valuing flexible resources on a portfolio-wide basis.

Metrics and Impact Assessment: The following metrics will be used to assess ratepayer benefits, as appropriate according to the scope of future projects, with outcomes and investment in DAC, low-income communities, and Tribes collected and integrated in public reporting. Measurements may draw on PG&E operational data, including load flexibility program enrollment and performance records and distribution planning and hosting-capacity (ICA) data.

- Customers enrolled in load flexibility programs supported by this Topic (Reliability; count)
- Avoided and deferred capacity upgrade costs (Affordability; MW, $)
- Load flexibility program savings and compensation received by DAC and low-income customers (Equity, Affordability; %, $)
- Cost-effective peak load reduction (Affordability; $/kW)
- Load energized on an accelerated schedule (Customer-focused solutions; kWh, MWh)
- Avoided peaker plant emissions using established industry tools (Decarbonization; tCO2e).

Expected Outcomes: Near-term (1-3 yrs): Core capabilities including asset-level visibility, automated and real-time grid-stress detection, and multi-DER orchestration capabilities are proven at demonstration scale, generating the first empirical data on the value of flexibility.

Mid-term (3-10 yrs): Proven capabilities scale across the service area, and the valuation methodology matures into funded customer compensation frameworks embedded in PG&E's communication and control systems. Orchestrated flexibility becomes a defensible alternative to conventional investment

and enables DERs to serve as bridging solutions ahead of upstream upgrades. Ratepayer benefit grows through deferred capital, higher infrastructure utilization, and improved customer incentives.

Long-term (10+ yrs): Flexibility is established as a firm, cost-effective alternative to conventional grid investment, integrated into standard distribution planning and operations. Ratepayer benefit is sustained via rate-reducing load growth that promotes electrification without proportional build-out.

Equity Outcomes: Flexibility programs typically benefit customers who can afford to purchase DERs, excluding many low-income and DAC customers. This Topic closes that gap by orchestrating flexible loads customers may already have, including water heating, HVAC, EVs, and appliances, extending participation and its compensation and affordability benefits to communities these programs have historically excluded with CBOs supporting education and outreach. Where large loads sit near DVCs, demonstrations may also evaluate whether co-located clean flexible resources can support community resilience, such as backup capacity for critical facilities during outages, while assessing the local-impact considerations that siting such resources raises. Community priorities and input will be assessed through structured feedback sessions with CBOs and tribal stakeholders at key project milestones, covering whether projects addressed stated concerns, whether engagement was meaningful and ongoing, and whether results were shared accessibly. Outcomes will be reported consistent with the EPIC Equity in RD&D Framework adopted in D.26-02-037.

Marketing and Deployment Plans: Deployment moves through three stages: 1) Demonstration: focuses on validating asset-level visibility and behavioral prediction to gauge firmness, automated grid-stress detection against operational thresholds, and orchestration of various flexible loads across BTM/FTM assets. 2) Integration: proven capabilities deploy on feeders with scheduled capacity upgrades to defer or avoid them while measuring the load factor change and avoided cost – generating empirical data for the valuation methodology. 3) Scaled deployment: customer programs are updated, informed by Initiative 1's testing of which program designs drive uptake; validated tools are built into PG&E's planning and deferral processes; and results are shared with other IOU administrators and the CEC to inform industry interoperability standards. The barriers standing between demonstration and scale are 1) flexible resources are sparse on feeders where deferral is most valuable; orchestrating loads customers already have widens the resource base, 2) flexibility is not proven as a reliable substitute for conventional upgrades – the staged deferral demonstrations aim to generate data planners need to treat it as such, and 3) devices and manufacturers often do not interoperate; building on IEEE 2030.5, modular architectures, and shared designs with IOUs and standards bodies supports interoperability at scale.

Coordination with EPIC and/or Gas RD&D Program Administrators: The EPIC Administrators will coordinate across Topics through the DER working group to review proposed projects for overlap and identify opportunities for sequencing or joint work before implementation. For example, IOUs could provide technical advisory to CEC in shaping GFOs for projects focused on testing interoperability standards, and transferable methodologies for valuing DER flexibility across utility territories. PG&E will fund utility-specific demonstrations of orchestration capabilities on real distribution systems, an empirically grounded flexibility valuation methodology derived from actual deployment outcomes, and integration of proven tools into distribution planning and deferral processes and will coordinate with other EPIC Administrators to transfer learnings and avoid duplication. CEC and IOUs could also develop a coordinated V2X or DER orchestration project where CEC funds technology developer work and IOUs host demonstrations and support relevant system integration.

Initiative 3: Accelerating affordable building electrification across customer groups to enable community-scale decarbonization

Research Topic Area 3.1: Lowering the cost and complexity of building electrification from assessment to installation

Gaps Addressed: PG&E's ability to advance building decarbonization is constrained by the affordability and complexity of electrification retrofits. Heat pumps, induction cooking, panel management devices, and 120V heat pump water heaters are all available, yet electrification remains out of reach for many customers because of the cost and complexity of installation. Total retrofit expenses often greatly exceed the price of the equipment, and the customer journey is fragmented across single-family homes, multi-family buildings, and small and medium businesses, with long wait times and overlapping incentive programs leaving customers without a single trusted entry point. Oftentimes, appliance turnover happens under emergency conditions, when a failed appliance leaves customers only hours or days to decide, resulting in a like-for-like gas replacement. These barriers all slow progress toward both the Bay Area Air District's zero-NOx appliance standards rolling out in 2027 and improved zonal planning. This Topic addresses innovation needs that include, but extend beyond, gaps identified under the Building Decarbonization Strategic Goal:

- **Cost reduction across the retrofit cost stack:** Design and installation approaches that reduce or avoid the costs sitting beyond the appliances themselves, such as circuit rewiring, construction work to accommodate new appliances, and integrated installation packages.
- **Automated assessment and permitting tools:** An automated load assessment tool tested across multiple PG&E jurisdictions, combined with customer-facing tools that simplify the incentive landscape, will compress the customer journey by reducing time-to-completion and addressing the process complexity that drives customer drop-off. These tools must also work fast enough to keep electrification a viable choice at the moment of replacement.
- **Program design innovations:** Innovations validated through demonstrations will increase the share of buildings eligible to participate in electrification programs by simplifying the front end of the journey, including pathways for multi-family customers and attention to small and medium business customers who face different retrofit barriers than single-family homes and are not served by existing residential-focused programs.

Funding this Topic is critical to advancing SO 4's goal of reducing the cost of whole-home electrification, lowering the cost and complexity barriers that hold back the state's 2030 goal of a 3% annual building electrification retrofit rate (3.6% for affordable housing) and producing validated tools and program models transferable across administrators.[41]

Unique Role: EPIC is uniquely positioned to support this Topic because the program designs and integrated customer journeys it develops are pre-commercial and require demonstration under PG&E service area building stock, contractor market, and customer conditions before they can be relied upon at scale. The multi-building-type evidence needed to de-risk these approaches is difficult for any single vendor to assemble, and private vendors tend to build individual products and keep their cost and performance data proprietary rather than share it across the market. DOE and CEC programs advance upstream technology and component development but are not structured to fund the utility customer integration work this Topic addresses. PG&E's GRC is appropriate for deploying proven

[41] Retrofit rates originate in the EPIC Strategic Goals Built Environment Workshop Report.

electric infrastructure at scale, but the program and customer journey innovations this Topic requires are at lower maturity and are demonstrated most appropriately through EPIC.

Leveraging Past RD&D: This Topic builds on a documented sequence of PG&E EPIC investments in residential electrification cost reduction. EPIC 4.02B (HomeBoost Panel Avoidance) demonstrates a smart add-on panel approach that optimizes electric appliances or EV charging, enabling electrification without triggering panel or service upgrades, removing one of the largest costs in a residential retrofit. 4.02B was preceded by the Residential Smart Panel Lab and Field Study (2022), which evaluated smart panel function, and complemented by the 120V Heat Pump Water Heater project (2021), which validated panel upgrade-avoiding water heater designs alongside TOU research to minimize peak demand impact. The water heater work is directly relevant given the Bay Area Air District's zero-NOx appliance standards, which take effect for water heaters in 2027. The Residential Housing Characteristics Study (ET22SWE0022), which characterized baseline conditions in DAC and Hard-to-Reach single-family housing, provides baseline data for this Topic's cost reduction work.

Metrics and Impact Assessment: Ratepayer benefit at this Topic level accrues through cost reductions for customer retrofits, reduced completion time, and particular benefits to ESJ communities through demonstration siting. The following metrics will be used to assess ratepayer benefits, as appropriate according to the scope of future projects, with outcomes and investment in DAC, low-income, and Tribal communities collected and integrated in public reporting:

- Reduction in all-in installed cost of retrofits per validated solution, measured against PG&E service area baseline costs (Affordability; %, $)
- Reduction in customer time-to-completion, from initial inquiry to completed installation, disaggregated by building type, and categorized by planned versus emergency scenarios (Customer-focused solutions; days)
- Reduction in customer drop-off between assessment and installation, including the share of homes proceeding to completion despite remediation needs (Customer-focused solutions; %)
- Increase in share of retrofit demonstrations located in and benefiting DAC, low-income, and Tribal communities, including disaggregated cost reductions (Equity; %)

Expected Outcomes: Near-term (3 years): Validated approaches, with the tool(s) tested in two to four jurisdictions, and demonstration results from the low hundreds of households for the workstreams noted above. Knowledge transfer outputs, including case studies, frameworks, and M&V protocols, are produced throughout the project lifecycle.

Mid-term (3-10 years): Validated approaches move into PG&E's residential electrification programs and are shared with other administrators via dedicated working groups. Program design learnings inform PG&E's appliance compliance support for emergency replacements. Average all-in whole-home electrification cost in PG&E service area drops, and completion timelines shorten.

Long-term (10+ years): Affordability and improved customer experience help residential beneficial electrification scale. Customer-led organic adoption becomes the norm on which PG&E's longer-term zonal decarbonization strategy depends. Reduced residential gas demand contributes to the state's 2045 net zero goal.[42]

Equity Outcomes: Affordability and complexity barriers fall hardest on ESJ Communities, DVCs, low-

[42] AB 1279 (2022), Health & Safety Code § 38562.2, https://leginfo.legislature.ca.gov.

income communities, and Tribes, and major remediation needs fall disproportionately on these homes, sometimes rendering them ineligible for PG&E's building retrofit programs. Projects funded under this Topic will prioritize these communities by involving CBOs and Tribal representatives in demonstration design, so that cost-reduction and program-design innovations reflect community-defined needs and reduce the share of program-eligible homes that stop their electrification journey. Community engagement and outreach for this Topic will largely follow PG&E's EPIC Community Engagement Plan (CEP). We will seek input on project concepts, design, and metrics from ESJ Communities and Tribal representatives; provide accessible updates on progress, learnings, and results; and seek opportunities to meaningfully involve and consult these communities to understand priorities. Outcomes will be reported in alignment with the EPIC Equity in RD&D Framework.

Marketing and Deployment Plans: The validation stage tests cost reduction approaches, automated assessment tools, and program design innovations, measuring technical performance, customer experience, and ESJ/DVC participation. The integration stage incorporates validated solutions into PG&E's residential electrification programs and shares knowledge with other administrators via workshops, case studies, and M&V protocols. The deployment stage scales proven approaches into full deployment, informed by data on how emergency replacement scenarios can be improved. Market transformation for the appliances themselves sits with CalMTA, whose CPUC-approved room heat pump and induction cooking initiatives are now in implementation under D.25-11-023. This Topic addresses the installation, remediation, and permitting costs that persist after those products reach the market and will share validated cost and program-design results so market transformation and utility deployment reinforce each other. PG&E anticipates several potential barriers to deployment. Contractor capacity for heat pump work is the most immediate barrier, addressed through workforce development partnerships and process simplifications optimizing per-job time. Heat pump and heat pump water heater supply chain constraints will be addressed via manufacturer coordination and demand signaling. Complex permitting variability across PG&E's footprint is another constraint that this Topic aims to address through automated permitting tools and direct jurisdictional engagement. Data security and customer privacy from AMI and AI/ML-driven assessments will follow PG&E's data governance frameworks.

Coordination with EPIC and/or Gas RD&D Program Administrators: Through a Building Decarbonization & Gas Transition Working Group, PG&E and other Administrators have identified opportunities for joint or sequenced projects, with scope divided by technology-development phase, utility-application priorities, and regional building stock distinctions. Coordination discussions have established some distinguishing factors: CEC projects may focus on appliance- and component-level or building retrofit technology development and early-stage demonstrations in partnership with vendors, while PG&E and other IOU projects may focus more on permitting, path-to-adoption, and utility customer-integration work. CEC building decarbonization work that centers on technology development may be sequenced with complementary IOU EPIC projects in automated permitting and customer journey improvement, and the zonal-readiness and electrification planning IOUs undertake. Administrators will continue to coordinate and review proposed project concepts for methodological overlap prior to implementation. Coordination with the Gas RD&D program centers on the boundary between the electric-side customer integration work this Topic addresses and the gas-side analytical methods Gas RD&D develops, which draw on electric-side planning outputs as inputs.

Initiative 3: Accelerating affordable building electrification across customer groups to enable community-scale decarbonization

Research Topic Area 3.2: Planning and detection tools for zonal electrification readiness

Gaps Addressed: Community-scale decarbonization requires PG&E to shift from reactive, individual responses to proactive, coordinated zonal strategies, but the data and tools to do this at a neighborhood scale do not exist today. PG&E cannot reliably see where customer-led electrification is occurring, identify which barriers constrain which neighborhoods, or determine which parts of the gas system can be retired rather than replaced. AMI data has shown promise for near real-time load disaggregation but has not been operationalized for planning or validated beyond single-family detached homes. The barriers that stall electrification at the neighborhood level are equally opaque, from affordability and remediation to local grid capacity for new load. Underlying asset records compound the problem, with details needed for electric hosting-capacity analysis and gas-retirement decisions often incomplete or held only on paper for older services. Without addressing these gaps, gas main replacement and electrification investment decisions continue without neighborhood-level data, exposing ratepayers to stranded asset costs and a shrinking gas customer base bearing rising per-customer costs. This Topic aims to support innovation that includes, but is not limited to:

- **AMI-based detection of customer-led electrification:** Detection methods that identify electrification as it happens and extend validated load disaggregation beyond single-family detached homes will provide neighborhood-level visibility into where the transition is underway and where system and customer benefits overlap.
- **Appliance lifecycle modeling:** Modeling that identifies end-of-life windows before failure provides PG&E with time to present electrification while the customer is still planning for a replacement.
- **Neighborhood barrier and load intelligence:** Methods that map affordability, remediation, reliability, and customer willingness barriers alongside local grid capacity for new electric load, including technical factors like voltage rise, drop, flicker, impedance, and transient load behavior, will help to identify which zones are ready to electrify.
- **Electric and gas system geospatial foundation:** Methods, including AI/ML combining graph theory and system analysis, that infer missing service connections and asset details from existing records rather than resurveying the system asset by asset will enable the hosting capacity analysis that finer-tuned electrification planning requires.

Funding this Topic is critical to advancing SO 6's goal of reducing the cost and timing uncertainty of community-scale decarbonization, providing better evidence on where to electrify, in what order, and which gas lines can be retired rather than replaced.

Unique Role: EPIC is uniquely positioned to support this Topic because the planning capabilities it develops are nascent and require applied validation within PG&E's system and area before they can inform investment at scale. The methods sit between upstream research and proven deployment, and private-sector investment waits downstream for these questions to be answered rather than funding the analysis itself. Federal research at DOE and national labs develops methods and tools but is not structured for California's conditions or PG&E's system, and the CEC funds gas decommissioning and long-term planning research that PG&E draws on as inputs rather than recreates. The GRC is appropriate for deploying proven planning solutions at scale, while this EPIC Topic appropriately funds technology maturation and validation for capabilities at lower readiness.

Leveraging Past RD&D: This Topic builds on PG&E's work with a next-generation residential AMI meter that runs analysis at the meter itself rather than only centrally, demonstrated across three EPIC projects (and a related workstream). EPIC 3.43 (Service Issue Identification Leveraging Momentary Outage Information) deployed more than 400 of these meters, selected the platform vendor later used in EPIC 4.20 and 4.02, and showed that grid-edge computation could identify equipment failures and locational issues from metering data. EPIC 4.20 (Secondary Fault Analysis) applies machine learning with meter data for near-real-time visibility into secondary voltage and asset health, which is the measurement layer beneath this Topic's load hosting capacity analysis. EPIC 4.02A (Socket of the Future) demonstrated with initial field participants that managing load at the meter can let customers on an existing 100A panel add electric load without a panel or service upgrade. 4.02B workstream (Panel Upgrade Avoidance) is extending that approach to appliance electrification, using an add-on panel to manage household load within the limits of the existing panel to avoid a service upgrade. This Topic applies two capabilities from that work, load-change detection at the meter and near-real-time measurement of local grid conditions, to determine where electrification is occurring and which zones can absorb it; it also advances PG&E's EPIC 4 scenario modeling into operational use across detection, barrier mapping, and load hosting capacity. The Residential Housing Characteristics Study (ET22SWE0022) also informs the approach.

Metrics and Impact Assessment: Metrics apply as appropriate to each project's scope. Outcomes and investment in DAC, low-income, and Tribal communities will be reported publicly. Community satisfaction will be measured through structured feedback at defined project milestones and will align with DACAG guidance and equity frameworks. Methods to measure impact may include:

- Avoided cost of gas infrastructure retired early through electrification-informed retire-vs-replace decisions (Affordability; $)
- Deferred distribution upgrade dollars through coordinated zonal electrification and load management, compared against an electrification baseline (Affordability; $)
- Increased number of mapped gas terminal branches and electric services (Safety; count)
- Reduced time from customer electrification to system-level identification (Reliability; weeks)

As validated technologies are scaled beyond EPIC 5 project demonstrations, increased zonal electrification will yield reductions in local household energy costs relative to income, an improvement in energy burden that has outsized impact for DAC and low-income communities.

Expected Outcomes: Near-term (3 years): Detection, planning, and forecasting tools give PG&E granular visibility into electrification readiness, appliance turnover, gas system condition, and zonal load growth, informing design of program portfolios from new construction to gas retirement.

Mid-term (3-10 years): Outputs inform identification and feasibility of non-pipeline alternative opportunities at scale, with early estimates of avoided stranded gas asset cost and deferred grid upgrade cost becoming available system-wide.

Long-term (10+ years): Zonal-scale decarbonization integrated into PG&E's net-zero pathway aligned with the state's 2045 net zero goal, reducing stranded asset exposure for the shrinking gas customer base and sustaining methane combustion reductions at neighborhood scale.[43]

Equity Outcomes: Validating these detection and targeting methods requires testing them across market-rate, DAC, DVC, low-income, and Tribal communities alike, because a tool trained only where

[43] AB 1279 (2022), Health & Safety Code § 38562.2, https://leginfo.legislature.ca.gov.

demonstrations already concentrate will carry that sample's blind spots into future decisions. Projects will prioritize DAC, low-income, and Tribal communities in demonstration zones, while spanning the fuller range of community types needed to keep the underlying methods unbiased. For relevant project scopes, energy burden reduction for DAC and DVC residents will be measured against a matched comparison group, and outputs will be delivered in formats consistent with the "one-stop shop" principle, with split-incentive issues for renters addressed in program design recommendations.[44] Community engagement and outreach for this Topic will follow PG&E's EPIC CEP, coordinating on shared electrification engagement opportunities to seek input on project concepts, design, and metrics from DVC and Tribal representatives and to provide accessible updates on progress and results. Community satisfaction will be assessed through feedback with participating CBOs and Tribal stakeholders at key project milestones. Outcomes will be reported in alignment with the EPIC Equity in RD&D Framework adopted in D.26-02-037.

Marketing and Deployment Plans: PG&E first develops underlying methods: detection signatures, appliance lifecycle and end-of-life intervention modeling, GIS neighborhood barrier intelligence, load hosting capacity methodology, and GIS data quality improvements. These are validated through deployment in demonstration zones, with built-in location and benefit-accrual verification, and then move into program design to inform retire-vs-replace decisions. PG&E anticipates several barriers to the work in this Topic. PG&E's obligation to serve (providing gas service on customer request) complicates decommissioning sequencing, and this Topic surfaces the customer choice friction zones program design must work around. In HFTDs, PSPS and EPSS exposure may require resilience investments before zonal adoption, affecting prioritization and timelines. Further, customer willingness varies significantly by neighborhood, so the barrier intelligence layer enables tailored program design rather than a one-size-fits-all approach.

Coordination with EPIC and/or Gas RD&D Program Administrators: The EPIC Administrators in the Building Decarbonization & Gas Transition Working Group will coordinate to avoid duplicative investments, guided by a clear division of scope. CEC EPIC projects may fund earlier-stage work on appliance-level technology with vendors, multi-building thermal approaches and other innovation that transfers across utility service areas, while PG&E plans to fund the electric system-side detection, barrier mapping, and load-hosting-capacity work specific to PG&E’s service area. This Topic's capabilities are distinct from the analytical methods PG&E proposes in its 2026 Gas RD&D Plan, which develops a gas-side framework for comparing decommissioning options, using existing electric-side planning outputs.[45] This topic generates the empirical, feeder-level readiness evidence that shows whether local grid assets can support electrification as gas mains approach retirement. The two programs also follow separate planning cycles, so EPIC 5 zonal readiness results over the next 5+ years will inform future Gas RD&D plans, while Gas RD&D learnings from annual project cycles will sharpen where electrification efforts under this Topic deliver the most value. Administrators will review proposed projects for overlap and identify opportunities for complementary or joint work before implementation.

[44] D.26-02-037, as noted in guidance from page 108.

[45] PG&E, Advice Letter 5222-G, *2026 Gas RD&D Plan* (filed June 1, 2026).

Initiative 3: Accelerating affordable building electrification across customer groups to enable community-scale decarbonization

Research Topic Area 3.3: Unlocking electrification pathways for hard-to-decarbonize end uses

Gaps Addressed: PG&E's electrification strategy reaches most buildings and end uses on the gas system, but not the residual category of hardest-to-decarbonize customers: the large commercial and industrial loads including process-heat-intensive manufacturing. Roughly 25% of PG&E's current Scope 3 emissions come from gas used by these customers, and recent statewide estimates project industrial gas demand to remain steady through 2040.[46] Electrification technologies for industrial process heat, including industrial heat pumps, electric boilers, and high-temperature thermal storage, are commercially available. However, PG&E does not have a validated, transferable method for determining which facilities and processes can electrify and how the feeders are impacted by converted process load. Today's knowledge is limited and inconsistent; customer metering does not disaggregate by industrial process, and sector averages are not granular enough for feeder-level planning. Existing hosting capacity models built for residential and small commercial loads do not model the step changes, harmonics, and transient inrush that electrified process equipment produces. Desktop analyses use assumed rather than measured values, leaving no common approach connecting industrial energy use to electrification pathways or distribution system impacts. This Topic develops and validates capabilities that include, but extend beyond:

- **Process-level gas load disaggregation:** This Topic develops and validates novel methods that break interval gas metering down to the equipment level, using equipment surveys and manufacturer data as references. The method is built first in high-value sectors such as food processing and pharmaceutical manufacturing, where equipment-level reference data is obtainable, and is designed to transfer to other processes where direct measurement is harder.
- **Hosting capacity models for converted process load:** New modeling methods extend hosting capacity analysis to industrial process load, validated against observed conversions and producing feeder-level capacity envelopes for planning.
- **Integrated gas and electric planning tools:** Customer class cost curves built from novel disaggregated load data feed tools that align electric capacity planning with industrial equipment replacement cycles, enabling coordinated industrial electrification with gas system retirements.

Funding this Topic is critical to advancing SO 5's goal of innovative electrification approaches for difficult-to-decarbonize commercial and industrial sectors. It also carries this Initiative's primary contribution to SG 4, establishing where electrification is viable for the "last 10%" of emissions California must still address and where the gas system retains a coordinated role.

Unique Role: EPIC is uniquely positioned to support this Topic because the customer class and feeder-level models it develops are pre-commercial and require validation against PG&E's unique industrial base and distribution system before they can inform planning at scale. This work is best suited for EPIC rather than Gas RD&D because it produces the electric-side adoption and distribution evidence that gas transition analysis needs. The 2026 Gas RD&D Plan develops methods for comparing where gas decommissioning is feasible, while this Topic evaluates which industrial

[46] Emissions dderived from PG&E's industrial gas throughput from the 2026 PG&E California Gas Report, with Scope 3 emissions reported in PG&E's 2025 Corporate Sustainability Report. Future gas demand from California Gas and Electric Utilities, *2026 California Gas Report*, pg 39, prepared pursuant to D.95-01-039.

customers can electrify.[47] The CEC's industrial decarbonization research addresses social feasibility, community engagement, and policy framing that this Topic uses as inputs. On the federal and market side, DOE's Industrial Decarbonization Roadmap has a national, sector-wide focus while private site studies examine one facility at a time. Further, the disaggregation methods and planning tools this Topic matures are at lower readiness and fit most appropriately through EPIC rather than the GRC.

Leveraging Past RD&D: While this Topic includes nascent work for PG&E, the EIS Part 1 and PG&E's EIS Part 2 in R.21-06-017 forecast feeder-level electrification load across all customer classes, but modeled electrification only for transportation and buildings, not industrial or manufacturing process load.[48] This Topic also draws on CEC gas transition and industrial decarbonization research in coordination with PG&E's Gas RD&D work, as described in ”Unique Role.”

Metrics and Impact Assessment: The following metrics will be used to assess ratepayer benefits, as appropriate according to the scope of future projects, with outcomes and investment in DAC, low-income, and Tribal communities collected and integrated in public reporting. Impact assessment will use load disaggregation against interval gas metering and customer-provided submetering where available, cost-effectiveness modeling consistent with industry approaches at the customer class level, and scenario analysis using the EIS Part 2 grid impact framework.[49]

- Energy transition techno-economic analysis to support the economic case for these activities, including measurement of avoided CapEx, energy delivered per dollar of combined investment, and the deferral value of electrification-enabled gas cost savings (Affordability; $)
- Increase in share of hard-to-decarbonize gas load with a defined electrification pathway and cost (Customer-focused Solutions; %)
- Reduction in criteria pollutants from identified electrification pathways in ESJ communities, using CalEnviroScreen or related health-burden indicators on industrial sites (Equity; tons)
- High-value manufacturing sectors with validated process segmentation (Decarbonization; count)

Expected Outcomes: Near-term (3 years): Industrial sector segmentation framework for electrification potential, covering select manufacturing sectors in PG&E's service area and indexed by NAICS code. Equipment-based thermal load profile library, derived from interval gas metering and equipment surveys, supporting feeder-level distribution planning for new load currently served by gas. Customer class electrification cost curve set built from that disaggregated and validated data.

Mid-term (3-10 years): PG&E adopts evidence-based industrial customer class electrification pathways into its integrated electric and gas distribution planning, including the project timelines a cost-effective transition requires. Feeder-level capacity envelopes for industrial electrification enter PG&E's distribution capacity planning. A share of the industrial gas load in this category carries a validated, costed electrification pathway.

Long-term (10+ years): Industrial electrification under these pathways contributes meaningfully to the state's 2045 carbon neutrality target.[50] Long-term affordability is protected for the low-income

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[47] PG&E, Advice Letter 5222-G, *2026 Gas RD&D Plan* (filed June 1, 2026).

[48] Kevala, Inc. EIS Part 1: Bottom-Up Load Forecasting and System-Level Electrification Impacts Cost Estimates. CPUC, R.21-06-017. May 9, 2023; PG&E. EIS Part 2 Report. R.21-06-017. (filed Jan. 28, 2026).

[49] Ibid.

[50] AB 1279 (2022), Health & Safety Code § 38562.2, https://leginfo.legislature.ca.gov.

residential ratepayers who would otherwise absorb the cost of a gas system serving an ever-smaller base. Local co-pollutant emissions fall, delivering health benefits, especially for DVC communities.

Equity Outcomes: This Topic prioritizes ESJ outcomes by focusing on facilities that contribute disproportionately to local air quality burden, and by identifying pathways with the largest co-pollutant reductions per dollar of investment. Community engagement will largely follow PG&E's EPIC CEP. PG&E will coordinate to seek input on project concepts, design, and metrics from DVC and Tribal representatives, provide accessible updates on progress and results, and seek opportunities to meaningfully involve and consult with DVCs and Tribes, including identifying potential facilities operating in ESJ communities and Tribal lands or diverse businesses for participation in projects. Additionally, innovation in this space supports more affordable and timely electrification options for manufacturers in the energy transition, ultimately enabling them to stay in California and maintain quality local jobs that are particularly important for economic opportunity in ESJ communities.

Marketing and Deployment Plans: Innovations progress through three steps: 1) project outputs integrate into PG&E's electric distribution planning processes at the feeder and substation level. 2) The resulting planning decisions feed into regulatory filings and proceedings as electric-side evidence informing whether targeted gas distribution assets can be retired rather than replaced. 3) The outputs inform industrial customer deployment through structured engagement with sector trade associations and individual high-value manufacturing customers, with partner-specific commitments developed during project formation. Barriers to deployment include industrial customers reluctant to share equipment- or process-level energy data due to proprietary concerns, which will be addressed through NDAs and analytical methods that use aggregated rather than site-level data. Further, this work may be perceived as benefiting private industry; this is addressed by focusing on ratepayer benefits and by excluding technologies (e.g., advanced nuclear, direct air capture) the CPUC identified in December 2025 PICG workshop feedback as inappropriate for ratepayer funding.

Coordination with EPIC and/or Gas RD&D Program Administrators: Through the Building Decarbonization and Gas Transition Working Group, EPIC Administrators have discussed opportunities for complementary work, with roles in joint, sequential, or parallel projects guided by technology development phases, utility application priorities, and regional differences in priority hard-to-decarbonize sectors. For example, CEC may fund EPIC projects focused on advancing pre-commercial technologies to unblock electrification of high temperature heat processes and other difficult-to-decarbonize processes under its "Cost-Effective Industrial Decarbonization" Initiative. PG&E could collaborate with CEC to fund sequential TD&D projects that demonstrate newly validated technologies with our industrial customers and cost-effective grid integration of the new loads. Further, PG&E EPIC work in supporting industrial pathways to electrification will be performed in coordination with PG&E Gas RD&D program's complementary but distinct efforts that inform gas system decommissioning planning and research into renewable natural gas fuels that may support hybrid energy systems for some C&I customers in the gas transition. During early project concept design and selection, EPIC and Gas RD&D administrators will review proposed projects for overlap and identify sequenced or joint opportunities before implementation.

Initiative 4: Understanding and Planning for Climate Impacts on Operations, Assets, and the Environment

Research Topic Area 4.1: Enhancing climate and weather analytics to reduce systemic risk

Gaps Addressed: PG&E's ability to plan for intensifying climate hazards is constrained by incomplete data and models that lack current climate trajectories and cannot anticipate how compounding climate stressors will reshape grid risk, asset performance, tree health dynamics, and future catastrophic event likelihood. Managing these physical risks requires more granular and reliable climate and weather data and modeling tools, better integrated into utility planning. For example, fire modeling spans distinct planning horizons relying on varying inputs such as near-term weather for operational decision-making, current climatology for baseline risk and consequence modeling, and emerging approaches incorporating projected future climatology to anticipate shifting conditions. Urban conflagration requires fundamentally new approaches to structure-to-structure fire spread not addressed by conventional wildland fire models. Without advances in applying localized, downscaled results to hazard modeling and asset degradation, downstream investments in grid hardening, undergrounding, vegetation management, and emergency response will continue to be sized and targeted sub-optimally for both cost and resilience outcomes. This Topic addresses innovation needs that respond to, but extend beyond, gaps identified under the Climate Adaptation Strategic Goal:

- **Advanced weather forecasting for day-to-day operational response:** Advances including microscale forecasting, wind gust modeling, LiDAR-informed vertical wind profiling, and AI/ ML downscaling will augment current operational data.
- **Compound and cascading climate hazard analytics:** Modeling innovations to capture non-linear interactions across hazards, heat, precipitation, drought, flood, wind, and fire.
- **Wildfire spread modeling, including urban conflagration:** This Topic advances novel urban conflagration approaches and broader wildfire model validation; a community survivability index integrating transportation corridors, access, and vulnerability with dynamic fire-spread pathways; and suppression quantification accounting for resource availability and competing incidents. It also covers vegetation–climate interaction modeling to capture how hydrological whiplash and shifting climate conditions compound tree failure risk and post-fire debris hazards.
- **Climate-adjusted asset lifecycle and failure modeling:** Advanced failure models to quantify how sustained heat, humidity, and extreme wind alter the expected performance, health, and lifespan of grid equipment under future climate states.
- **Risk analytics to right-size grid hardening investments:** Innovations include long-horizon, climate-adjusted ignition, consequence, reliability modeling, and AI/ML-leveraged, multi-modal analysis (satellite, LiDAR, hyperspectral and drone imagery, weather patterns, tree species).

These modeling and forecasting advances give PG&E the analytical foundation to size, sequence, and target its largest hardening programs — including undergrounding, covered conductor, pole replacement, and vegetation management — so that each dollar delivers the greatest reduction in outage and catastrophic-wildfire risk while lowering the overall long-term costs. They advance the SG 5's goal of cost-effective grid hardening while sharpening day-to-day operational decisions, such as PSPS and suppression response, protecting the most vulnerable communities during extreme events.

Unique Role: Projects under this Topic are critical for PG&E's long-term infrastructure planning and investment, given the long-term nature of climate impacts. The focus areas in this Topic remain at

lower technological maturity levels, requiring both the demonstration and maturation EPIC is best suited to provide, and approaches that are highly specific to PG&E's service area. Utility-specific translation of climate projections into asset-, feeder-, and community-level risk is not addressed by federal climate science or general academic research, and should be pursued through EPIC given the direct, long-term ratepayer benefit from more informed, targeted infrastructure investment and avoided costs of climate-driven grid failures. Survivability-informed modeling for mitigation targeting and suppression quantification for improved field response is also utility-side work that requires utility-owned risk models, asset databases, and investment planning workflows. EPIC and the GRC play sequential roles, with EPIC best suited to early-stage modeling of emerging risks that remain at too low a technological maturity level for GRC recovery. The capabilities produced through this Topic will inform PG&E's future GRC budgets for broader climate risk mitigation investments.

Leveraging Past RD&D: This Topic builds on meteorological modeling capability established in EPIC 1.05 (Demonstrate New Resource Forecast Methods to Better Predict Variable Resource Output), which demonstrated 3km-resolution, hourly weather forecasting for fire danger rating and storm damage prediction. The proposed work advances this foundation toward AI/ML-enhanced weather forecasting, fire modeling, and statewide approaches. It also extends the urban conflagration and WUI fire spread modeling work initiated in EPIC 4.34 (AI-Enhanced Urban and WUI Fire Conflagration Risk Model), which is conducting a preliminary side-by-side evaluation of multiple vendors' methods for modeling urban conflagration risk, a nascent space. PG&E will build on 4.34's learnings to demonstrate integration and validation of promising new methods for modeling urban conflagration risk for PG&E's planning and operations. PG&E's current climate modeling efforts leverage data and tools from the EPIC-funded, CEC-administered Cal-Adapt Analytics Engine. EPIC 5 projects will similarly use CEC-funded foundational climate data, including new CEC tools developed in EPIC 5, for utility-specific applications. Other supporting work includes CEC's fire and weather modeling, e.g, Pyregence (EPC-18-026), Spatial Informatics Group (EPC-25-025), and LLNL (EPC-25-024).

Metrics and Impact Assessment: Ratepayer benefit at this Topic level accrues from improved operational and mitigation investment decisions enabled by more accurate modeling. Several metrics will be used to assess ratepayer benefits, with outcomes and investment in DAC, low-income communities, and Tribes collected and integrated into public reporting. The following examples, to be refined at the project level, will be particularly relevant to this Topic:

- Reduction in weather and fire forecasting error, tracked across key forecast variables (e.g., wind gust, 24-hour fire spread), with accuracy, bias, and correlation assessed (Resilience; %)
- Reduction in CMI from more precise PSPS/EPSS actions and better-staged storm restoration enabled by more accurate weather and fire modeling (Resilience; customer minutes)
- Improved accuracy of the impacts of localized climate projections on asset failure, benchmarked against current asset life predictions to optimize hardening investments **(**Affordability, %)
- Improved tree health and failure prediction accuracy, validated against field-verified failure and inspection records (Reliability; %)
- Increase in mitigation investment directed to communities with high survivability risk (Safety, %)

Expected Outcomes: Near-term (1–3 yr): Improved weather and fire forecasting reduce MED costs and refine PSPS targeting. Wildland and urban conflagration modeling extends and improves day-to-day fire spread and long-term risk modeling. Improved hazard tree identification under shifting climate and moisture conditions reduces vegetation-driven ignitions in HFTDs.

Mid-term (3–10 yr): Climate, fire, and tree health modeling and forecasting inform proactive siting, hardening, and VM pacing. Survivability metrics embedded in standard mitigation decisions across the service area, and suppression programs using novel technologies extend across HFTDs. Novel tree health monitoring and hazard tree identification improve outcomes.

Long-term (10+ yr): Multi-decade grid hardening investments are sized, paced, and targeted against climate-adjusted projections, reducing risk and the cumulative cost of mitigations.

Equity Outcomes: The work developed under this topic will enable more targeted mitigations for communities and geographies facing the greatest exposure. For example, Delta flood and compound coastal flood scenarios disproportionately affect Central Valley DAC populations and Tribes in bay, delta, and estuarine areas, while urban conflagration threatens dense, lower-income WUI communities. Survivability-informed mitigation targeting helps ensure that resiliency investments reach vulnerable communities where vulnerability factors elevate safety risk during high-impact events. Community engagement and outreach for this Topic will largely follow PG&E's EPIC CEP. PG&E's CAVA and EPIC teams share common opportunities for engagement on climate adaptation and community resiliency efforts, and will coordinate to seek input on project concepts, design and metrics from DVC and Tribal representatives: provide accessible updates on progress, learning, and results; and pursue opportunities to meaningfully involve and consult with DVCs and Tribes to understand community priorities and incorporate Traditional Ecological Knowledge, as appropriate.

Marketing and Deployment Plans: Innovations will progress through four steps: 1) foundational model improvements, 2) standardized hazard modeling validated against observed events, 3) integration of validated models into distribution-level planning and operational workflows, consistent with December 2025 PICG workshop direction; and 4) integration into regulatory and long-term planning cycles (RAMP, CAVA, and WMP). PG&E anticipates several deployment barriers at scale, including vendor lock-in on proprietary modeling platforms, which may be mitigated by prioritizing open-source frameworks in procurement; model uncertainty in climate projections, addressed by evaluating tools that derive probabilistic risk-modeling inputs from model results, such as climate emulators for operational risk assessments; and the scale of PG&E's tree population across diverse climate zones and terrain, managed through coordination with CAL FIRE and USFS.

Coordination with EPIC and/or Gas RD&D Program Administrators: The EPIC Administrators will coordinate in the Climate Adaptation working group to discuss opportunities for complementary work, with roles in joint or sequential/parallel projects guided by each Admin's technology development phase and priorities for utility applications, climate impacts, and regional weather patterns. For example, PG&E and other IOU administrators could provide early input or technical advisory for new CEC EPIC 5 projects funding foundational, open-access climate science, data and analytical tools that benefit all California utilities, potentially investing in the Cal-Adapt Analytics Engine and other new applied research projects. PG&E and other IOUs would fund their own utility-specific applications of these CEC-funded standardized climate data and tools within their own processes and decision-making, while adding regionally specific datasets and purpose-built tools to analyze localized risk and impacts of climate-driven hazards and extreme weather on their infrastructure. PG&E may also seek to coordinate with other IOUs and CEC on shared weather forecasting and wind gust modeling tools statewide. Administrators will review proposed projects for methodological overlap and identify opportunities for sequencing or joint work prior to implementation. There is no overlapping or joint work with Gas RD&D in this Topic.

Initiative 5: Building community resilience from prevention through recovery

Research Topic Area 5.1: Prevent: understanding & mitigating risk to communities & customers

Gaps Addressed: Climate-driven hazards are raising the risk of grid faults across PG&E's service area faster than current hardening practices can keep up, as asset stress, extreme weather exposure, and shifting forest dynamics compound into catastrophic events. Extreme heat degrades transformers, conductors, and other equipment faster than historical ratings account for, while wildfire, wind and storm impacts increasingly stress overhead infrastructure. This Topic develops the innovations PG&E's hardening and prevention programs need to affordably keep pace with climate change. California's three largest IOUs spend more than $5B annually on wildfire-related activities, with wildfire costs now representing roughly 18% of PG&E's total system costs, so even modest efficiency gains from EPIC innovation would translate into material ratepayer savings.[51] Per mile undergrounding costs, currently $3.05M, remain prohibitive at the scale California's growing fire season and ratepayer affordability demand.[52] Undergrounding also reduces outage exposure from flood- and high-wind-driven events. The same cost and climate pressures apply across vegetation management (VM): PG&E's VM program averages $1.21 billion annually in spending today through 2027.[53] New applications of underutilized grid data could substantially reduce wildfire risk. Forest management, meanwhile, lacks methods to optimize treatments against mitigation alternatives — a gap climate change widens as it reshapes fuel and forest conditions. PG&E estimates approximately $3.45 billion in residual catastrophic wildfire risk (with PSPS/EPSS) today represents societal impact.[54] PG&E has made significant progress towards reducing risk through past EPIC projects, detailed in the section "Leveraging Past RD&D", but further innovation is needed to significantly uplevel current practices. Feedback from the December 2025 PICG workshop guided PG&E to clarify how proposed EPIC 5 wildfire-related topics differ from WMP work, and to explicitly link proposed activities to climate adaptation and societal benefits. The WMP is a reporting, not funding, mechanism, and wildfire-related RD&D work funded through EPIC has been an essential contributor to PG&E's wildfire risk mitigation efforts and reported in the WMP since its inception. This Topic addresses innovation needs that include, but extend beyond, gaps identified under the Climate Adaptation SG:

- **Underground cost innovation:** Methods that meaningfully lower undergrounding cost and complexity in the most climate-exposed system areas;
- **Asset diagnostics for a changing environment:** Condition-based asset diagnostics and remaining-life estimation that hold up across distribution equipment classes as heat, wind, and moisture patterns move beyond historical norms, and as climate hazard impacts intensify;
- **Data-driven risk reduction:** Grid data (AMI, SCADA, and monitoring solutions) used for proactive and reactive wildfire risk reduction, including adaptive protection schemes using virtualized protection and high sample rate monitoring for conventional and high-impedance faults; and
- **Optimized forest management:** Novel optimization and valuation methods that prioritize a

[51] California Assembly Utilities & Energy Committee, Wildfire Spending Oversight Hearing Background (March 5, 2025), page 8-9.

[52] https://www.pge.com/en/newsroom/press-release-details.93c3cab6-7065-4ccc-82bb-e44d6e0bd2fe.html.

[53] PG&E 2027 GRC (A.25-05-009), Ex. PG&E-4, Table 2-8 (2-37).

[54] PG&E 2027 GRC (A.25-05-009), Ex. PG&E-02 (Policy), Errata II WP 1-13, "PG&E 2027 GRC Risk Values" sheet. Societal impact accounts for safety and electric reliability impact, and excludes financial losses to PG&E.

variety of forest treatments by their wildfire consequence reduction value and quantify ecosystem co-benefits for adjacent communities.

Together, these innovations reduce the likelihood of ignitions, asset failures, and outages before they occur and harden the system affordably enough to scale across the remaining at-risk grid, delivering the largest risk reductions to the communities that carry the most exposure today.

Unique Role: Next-generation wildfire and climate risk reduction solutions remain costly and at lower-than-needed technological maturity levels to scale, requiring EPIC's demonstration and de-risking. EPIC project work also provides granularity to measure impact per dollar spent and define the functional and operational requirements for realizing that impact. This is utility-side work that only PG&E can integrate with its distribution system, risk models, asset databases, and operational workflows. At the federal level, DOE funds materials and methods research in this space, and CEC supports earlier-stage technology development and statewide planning tools. However, neither translates emerging solutions into deployment-ready capabilities in a real utility environment. The GRC, by contrast, serves as a much larger funding mechanism to deploy solutions at scale across PG&E's system after successful validation and investment de-risking through EPIC.

Leveraging Past RD&D: EPIC 2.34 (Predictive Risk Identification with Radio Frequency (RF) Added to Line Sensors) advanced distribution sensors that predict incipient issues and pinpoint their location; and EPIC 3.20 (Data Analytics for Predictive Maintenance) developed analytics leveraging PG&E data for overhead transformer predictive maintenance and failure prevention. PG&E tested and selected a fluid-free boring technology under EPIC 4.13 (Fluid-free Steerable Boring), now in an initial demonstration phase. This Topic will continue to evaluate promising boring methods to make them cost-effective and deployable at scale across PG&E's system. The EPIC 4.20 (Secondary Fault Analysis) project demonstrated waveform analytics, testing secondary circuit fault-detection software on a production circuit segment, and found it needed further development, showcasing the need to extract more value from grid data PG&E already collects, rather than installing additional sensors. Beyond PG&E's own work, this Topic draws on California's broader research base on climate-driven asset stress and forest dynamics, including research from USFS and local community organizations.

Metrics and Impact Assessment: Ratepayer benefit accrues through customer rate reductions due to reduced VM expenditures, avoided ignitions and outages, improved asset reliability, and more equitable distribution of climate resilience investments across communities. Proactive monitoring and reactive protection strategies both contribute directly to ignition avoidance and downstream customer outage costs. Outcomes and investment in DAC, low-income communities, and Tribes collected will be integrated into public reporting. The following examples, to be refined at the project level, will be particularly relevant to this Topic:

- Reduction in unit costs of technology deployment and intervention, including undergrounding, continuous monitoring, and VM (Affordability; %)
- Reduction in climate-driven fault, outage, and ignition events, including down-conductor events and high-impedance faults avoided through expanded coverage, and fault rate reductions on undergrounded segments relative to the overhead segments they replace (Reliability, Safety; %)
- Increase in share of PG&E's HFRA circuit-miles equipped with continuous monitoring, and/or expanded protection technologies deployed systemwide (Reliability, Safety; %)
- Increase in technology demonstration deployments located in and benefiting DVCs and Tribes in HFTDs, and reduction in outage exposure for repeat-event customers (Equity; count)

Expected Outcomes: Near-term (1–3 yr): Novel, validated undergrounding cost reduction technologies are demonstrated alongside protection equipment that catches and isolates faults while proactively monitoring the system. Tools that draw more fully on the grid data PG&E already collects are deployed. Novel forest and vegetation management practices are demonstrated.

Mid-term (3–10 yr): Validated approaches are integrated into PG&E's prevention operations. Mitigation costs in HFTD areas decrease significantly, and climate-driven ignition rates and asset-failure events decline against historical baselines. Hardware-dependent solutions requiring system-wide scale-up start being deployed at scale.

Long-term (10+ yr): Risk prevention scales, through validated, cost-effective mitigation and prevention technology innovation. Customer impacts from hardening activities fall. Forest management is scaled and optimized for long-term risk prevention. DAC, low-income, and Tribal communities with the most exposure today see the greatest risk reductions.

Equity Outcomes: Community engagement and outreach for this topic will largely follow PG&E's EPIC CEP. PG&E's CAVA and EPIC teams share common opportunities for community engagement on climate adaptation and community resiliency efforts. We will coordinate to seek input on project concepts, design, and metrics from DVC and Tribal representatives; provide accessible updates on progress, learnings, and results; and seek opportunities to meaningfully involve and consult with DVCs and Tribes to understand community priorities and incorporate Traditional Ecological Knowledge, as appropriate, within our climate adaptation and climate impact mitigation RD&D. Projects under this Topic will prioritize DAC, low-income, and Tribal communities in HFTDs and broader climate hazard-exposed areas, where demonstrations of prevention technologies will have significant equity and safety impacts.

Marketing and Deployment Plans: The path to scale follows three steps: 1) demonstrations validate novel proactive and reactive risk prevention technologies; 2) validated solutions integrate into PG&E's prevention operations; and 3) proven approaches move into full operational integration, refined further by validated performance. PG&E anticipates several deployment barriers. First, the cost and complexity of scaling demonstrated methods system-wide; PG&E will address this by evaluating cost-reduction trajectories and scalability during the demonstration stage, so only approaches with a credible path to affordable system-wide deployment advance. Vendor and contractor capacity presents a related risk, as undergrounding and diagnostics work depends on a limited pool of specialized contractors; to mitigate this risk, PG&E will develop a broad partner network. Forest management interventions depend on coordination with non-PG&E parties such as USFS; PG&E will mitigate these dependencies through early and ongoing engagement.

Coordination with EPIC and/or Gas RD&D Program Administrators: EPIC Administrators will coordinate through a Climate Adaptation working group and other regular touchpoints to discuss opportunities for complementary work in this Topic, with roles in joint, sequenced, or parallel projects guided by technology development phase and priorities for utility applications and unique service area risk profiles. For example, IOUs could provide technical advisory for CEC EPIC 5 projects funding early-stage development or lab demonstration of new prevention technologies. PG&E and other IOUs could then fund projects that demonstrate these technologies in their mid-TRL phases and evaluate performance in the field for different applications and regional contexts. During early project concept and selection, administrators will review proposed projects for methodological overlap and identify opportunities for sequencing or joint work prior to implementation.

Initiative 5: Building community resilience from prevention through recovery

Research Topic Area 5.2: Withstand: minimize community & customer impacts

Gaps Addressed: Climate-driven events are forcing more grid disruptions across PG&E's service area; this Topic's goal is to limit their duration, scope, and customer impact when they occur. Outages associated with weather-related events currently account for approximately 125 to 159 SAIDI minutes per year across PG&E's service area, corresponding to $2.17 to $2.78 billion in annual customer costs.[55] This defines the size of community impact from climate hazard-driven events that PG&E aims to address. Proactive de-energization through PSPS and EPSS, while critical to ignition risk reduction, disproportionately impacts a small share of customers who experience repeat outages annually, often in HFTD, Tribal, and rural communities with limited mitigation options. PG&E's current toolkit has meaningful gaps as climate-driven hazards intensify these impacts. Current mitigations are not optimized for the multi-hazard environment PG&E now operates in, where a single event can cascade across hundreds of miles of distribution circuit. Restoration after de-energization depends on manual patrol, switching, and operator availability, while resiliency assets such as customer batteries and microgrids are not yet optimally deployed or coordinated to deliver both customer resilience and broader grid value at scale. As part of undergrounding at-risk lines, customers are de-energized during planned construction work, and this increases as PG&E's undergrounding footprint grows. Today's suppression capability is constrained by first-responder proximity, difficult access to remote terrain, and weather conditions that accelerate catastrophic fire spread and customer impacts. This Topic advances capabilities needed to help PG&E respond more effectively and rapidly under growing uncertainty and addresses innovation needs that include and extend beyond gaps identified in SG5:

- **Restoration after de-energization events:** Innovations include automating de-energization and re-energization workflows; and advances in temporary infrastructure to keep customers energized during undergrounding construction.
- **Response capability across multi-hazard climate-driven events:** Innovations focus on standalone customer battery deployments; and community-scale microgrid integration, specifically, networked microgrids serving multiple front-of-meter customers and seamlessly automated mid-feeder microgrid configurations enabled by multiple isolation points, which keep portions of a circuit energized during upstream de-energization.
- **Real-time ignition detection, notification and rapid suppression capabilities:** Advances in rapid response and early intervention include approaches that reach ignition sites faster than ground-based dispatch, techniques that improve ignition visibility, suppression efficiency, and access and infrastructure-adjacent road data for first responders.

Together, these innovations advance SG 5 by creating a grid that stays reliable and safe as extreme events intensify, and limit the duration, scope, and customer impact of climate-driven events, keeping critical load and the most exposed rural, Tribal, DVC, and low-income communities powered through outages and reducing the consequence of the ignitions that do occur.

Unique Role: The capabilities developed in this Topic require earlier-stage demonstration, iterative learning, and de-risking that EPIC is designed to fund before scaling to routine operations. Automated PSPS/EPSS execution and restoration, novel microgrid configurations, utility-orchestrated battery integration, ignition rapid response, and temporary underground construction infrastructure depend

[55]Using PG&E SAIDI data and $3.17/CMI (PG&E, 2024 RAMP Report, Fig. 2-3; derived from LBNL ICE Calculator).

on PG&E-specific risk models, asset databases, distribution standards, and operator workflows. This is work CEC, federal agencies, and private vendors cannot replicate on PG&E's behalf. EPIC and the GRC play separate, sequential roles: EPIC demonstrates and de-risks these emerging capabilities under PG&E's actual operating conditions, while the GRC deploys validated solutions at scale. Since these capabilities are not yet proven, they are not well-suited for GRC funding at this stage. The WMP, by contrast, is a planning and reporting document identifying wildfire mitigation needs, plans, and innovations PG&E pursues, but the RD&D must be funded elsewhere, highlighting EPIC's critical role.

Leveraging Past RD&D: This Topic builds on prior EPIC investment across EPSS/PSPS operations, microgrid demonstration, and customer-side resiliency assets. EPIC 1.14 (Next Generation SmartMeter Telecom Network Functionalities) developed the foundation for PG&E's SmartMeter Partial Voltage Detection system, now deployed systemwide, avoiding ~$22M annually in customer impacts. Outside EPIC, PG&E has also deployed GridScope sensors in select regions to improve fault and outage localization, and this Topic advances automated and accelerated restoration and re-energization workflows to further compress outage durations after PSPS/EPSS events. EPIC 3.11 (Location-Specific Options for Reliability and/or Resilience Upgrades) established, through the Redwood Coast Airport Microgrid, that a single end-of-line, front-of-the-meter, multi-customer microgrid can operate seamlessly during grid disruptions. RCAM became the blueprint for utility-connected community microgrids for the Community Microgrid Enablement Program (CMEP) and Microgrid Incentive Program (MIP). This Topic advances next-generation configurations, and centers unresolved protection, controls, and communications challenges. EPIC 3.45 (Automated Fire Detection from Wildfire Alert Cameras) delivered the foundation for PG&E's AI-enabled wildfire camera detection capability now deployed systemwide. EPIC 3.41 (Drone Enablement and Operation Use) established PG&E's capacity to deploy drones for inspection and operations, and EPIC 4.16 (Automated UAS Deployment System for Alarm-Triggered Events) is now testing automated drone deployment in response to system alarms. This Topic extends these and other projects, by advancing the most promising suppression methods. For customer resiliency, PG&E's backup battery programs established baseline customer demand and field-deployment learnings. This Topic proposes innovation to expand from individual customer resiliency to coordinated battery orchestration supporting outage mitigation and broader grid services use cases.

Metrics and Impact Assessment: Ratepayer benefit accrues through reduced customer outage hours, faster restoration after large-scale events, and expanded resiliency coverage in communities most exposed to repeat outages. Several metrics will be used to assess ratepayer benefits, with outcomes and investment in DACs, low-income communities, and Tribes integrated into public reporting. The following examples, to be refined at the project level, will be particularly relevant:

- Reduction in outage frequency and duration, tracked against pre-intervention baselines, with specific attention to repeat-exposure customers (Reliability; SAIDI/SAIFI/CEMI)
- Increase in number of strategies demonstrating outage ride-through/recovery and % of critical load maintained during outage events, measured by customer time to restoration and number of critical customers served by microgrids and/or batteries (Resilience; count, %)

Expected Outcomes: Near-term (1–3 yr): Novel workflows demonstrated for PSPS- and EPSS-specific restoration decisions in select high-impact areas. Emerging ignition notification and rapid suppression technologies, including robotic and drone-based systems, are evaluated in PG&E's service area, with selected capabilities demonstrated in coordination with first responders. Networked microgrid

coordination and mid-feeder seamless islanding automation developed and tested.

Mid-term (3–10 yr): PSPS and EPSS events are shorter and more responsive to evolving conditions. Novel microgrid configurations are integrated into PG&E's standard microgrid deployment toolkit, extending community-scale resiliency into areas where it is currently challenging.

Long-term (10+ yr): Customer outage exposure during climate-driven events is meaningfully reduced across PG&E's service area, with the greatest reductions concentrated in communities historically most exposed. Resiliency assets function as a distributed grid resource contributing to customer outage protection, system stability, and affordability outcomes for non-participating customers.

Equity Outcomes: PSPS and EPSS outages fall disproportionately on rural, low-income, and Tribal communities, who face longer outage durations and slower restoration. Novel PSPS/EPSS workflows for faster, more targeted restoration directly reduce this burden while notification and suppression technologies following ignitions reduce fire event consequences in HFTDs and the wildland-urban interface (WUI). Next-generation microgrid concepts would focus on rural and Tribal communities most burdened by outages, directly targeting equity concerns. Community engagement will largely follow PG&E's EPIC CEP. PG&E's CAVA and EPIC teams can jointly engage communities on climate adaptation and community resiliency efforts. We will coordinate to seek input on community priorities, project concepts, design, and metrics from DVC and Tribal representatives, provide accessible updates and results, and incorporate Traditional Ecological Knowledge, as appropriate.

Marketing and Deployment Plans: Innovations under this Topic will progress through four steps: 1) research and methodology development across the Topic's capability areas, spanning microgrid protection and controls, automated restoration workflow design, orchestrated batteries for resiliency, and ignition response and suppression; 2) PG&E demonstrations of these configurations; 3) integration into PG&E's operational protocols and standards; and 4) publication of frameworks, architectures, and tools for broader adoption, where applicable, with other IOUs, OEIS, CAL FIRE, local emergency management agencies, and community microgrid developers. PG&E anticipates several deployment barriers. Integration with legacy PSPS workflows and control systems is non-trivial and will require phased rollout aligned to operator training and protocol updates. Cost-effectiveness of battery orchestration depends on value capture from grid services, which must be validated. Microgrid costs remain significant, and PG&E's EPIC focus is on novel controls, protection, and communications architecture rather than full project funding, so incremental funding sources will be needed to enable deployment. Advanced drone and robotics systems are expensive, and their cost-effectiveness depends on demonstrating extensive deployment across a range of use cases.

Coordination with EPIC and/or Gas RD&D Program Administrators: Through a series of working group meetings, Administrators have discussed opportunities for complementary work in this area. CEC's related Topic, *Building Community Energy Resilience and Reliability,* will fund new research into community-informed planning tools for prioritizing community investments in energy resilience. This is distinct from and can inform PG&E's planned focus on TD&D activities for grid hardening, outage response and restoration improvement, and microgrids and battery solutions for community resilience. SCE and SDG&E also have related topics, and IOUs will coordinate to review proposed projects in early development for methodological overlap and identify opportunities for joint work or complementary projects with different technologies demonstrated or utility-specific, distinct applications. Administrators will share learnings during implementation that may mutually strengthen the complementary projects supporting EPIC's Climate Adaptation strategic goal.

Initiative 5: Building community resilience from prevention through recovery

Research Topic Area 5.3: Recover: rebound from catastrophic events

Gaps Addressed: Climate-driven disasters are reshaping California's landscapes faster than recovery practices can keep up, and PG&E's responses in an event's aftermath shape community resilience against future events. Today, PG&E's recovery work focuses first on protecting affected communities and restoring power as rapidly as possible, with the near-term goal of returning the system and surrounding environment to their prior condition. Over the longer term, where cost-effective as part of a rebuild, PG&E increasingly seeks to harden the system rather than restore it exactly as it was. While speed of restoration is paramount, today's approach misses the opportunity to use recovery moments to build community resilience and adapt landscapes to future climate conditions. Denser forests are far more susceptible to climate change and drought, and the "blank palette" of post-event rehabilitation offers a rare opportunity to introduce species better suited to future conditions. However, the industry also lacks tools that integrate the customer, electrical system, and ecosystem dimensions of recovery against a range of future climate scenarios. The absence of utility-specific, research-based assessment criteria leads to inconsistent removal decisions for damaged trees after major events, unnecessary tree loss, and contested customer and community experiences. Wood generated through vegetation management is currently a cost and logistics burden, with limited at-scale conversion pathways available to PG&E. This Topic addresses innovation needs that include, but extend beyond, gaps identified under the Climate Adaptation SG:

- **Post-event recovery landscape rehabilitation for future climate conditions:** Analytical frameworks to quantify and evaluate the costs and benefits of alternative rehabilitation approaches, and to optimize rehabilitation for fire resilience in fire-impacted landscapes.
- **Defensible, research-based criteria for fire-damaged tree removal:** Tree analysis methods to accurately determine when fire-damaged trees pose genuine ignition risk versus likely recovery.
- **Wood management and conversion pathways at scale:** Advancements in testing mobile, centralized, and hybrid processing approaches for woody biomass collection and conversion.

These innovations make recovery decisions more cost-effective, reduce long-term ignition, limit unnecessary tree loss, and improve customer safety and satisfaction in PG&E's fire-prone communities, while equipping PG&E with tools to ensure dollars spent on post-event recovery reduce future exposure, and drive lower long-term costs, shorter outages, and reduced catastrophic risk.

Unique Role: The tools and standards needed to guide recovery after a major climate-driven event are still early in development. EPIC funding is the appropriate mechanism to develop research-based, defensible risk criteria for fire-damaged tree removal that PG&E can apply consistently across its service area. Similarly, wood management innovation — including in-field densification, biochar conversion, and RNG pathways — requires multi-year RD&D timelines before scaled deployment is viable. Post-event recovery decisions sit at a unique intersection of customer impact, system restoration, and landscape management specific to electric IOUs and unaddressed by any other RD&D body. For example, standards governing damaged tree removal across PG&E's area are currently informed by a mixture of USFS regional thresholds and UC Davis guidance, but none are developed for the range of tree species across eco-regions within PG&E's service area. Federal agencies such as USFS, FEMA, and NRCS focus on forest management and disaster response at a landscape scale; and don't develop utility-specific approaches for post-event response. This work is not recoverable through the GRC, which funds operational execution of proven technologies at scale

but not the multi-year RD&D needed to develop the tools for long-term resilience.

Leveraging Past RD&D: EPIC 3.47 (Operational Vegetation Management Efficiency Through Novel Onsite Equipment) demonstrated small-scale mobile torrefaction and wood baling technologies for lowering vegetation management costs through onsite processing. While EPIC 3.47 established the foundational case for in-field wood processing as an alternative to haul-and-dispose, it focused on operational cost reduction and did not address the full range of conversion pathways this Topic advances. EPIC 4.19 (Woody Supply Chain) extended this into the biomass value chain – from locational targeting through collection, in-situ processing, chain of custody tracking, and carbon sequestration quantification. This Topic is distinct in advancing novel demonstration options for biomass collection and conversion, and framing wood management in a post-event recovery and climate adaptation context, connecting wood conversion to community resilience outcomes.

Metrics and Impact Assessment: Ratepayer benefit accrues through avoided outage costs, reduced VM expenditure, improved post-event recovery, and more equitable distribution of climate resilience investments. Several metrics will be used to assess ratepayer benefits, with outcomes and investment in DAC, low-income communities, and Tribes integrated into public reporting. The following examples, to be refined at the project level, will be particularly relevant:

- Changes in outage frequency and duration**,** tracking impacts in demonstration areas, repeat outage exposure for customers in post-event recovery zones, and reduction in vegetation-driven HFTD ignitions (Reliability; SAIDI/SAIFI/CEMI, count)
- Change in O&M costs for projects and at scale, including VM costs per acre treated and truck miles avoided for wood management (Affordability, Customer-focused solutions; $, miles)
- Avoided GHG emissions from reduced transport and fossil fuel-powered equipment, tracked as an air quality benefit for DVCs (Decarbonization, Customer-focused solutions; CO_2e)

Expected Outcomes: Near-term (1–3 yr): Post-event recovery decision framework is developed for the PG&E area, including defensible, research-based criteria for damaged tree removal and initial cost-benefit analytics for landscape rehabilitation alternatives under future climate conditions. Novel biomass conversion approaches are demonstrated.

Mid-term (3–10 yr): Standardized post-event rehabilitation analytics are deployed across PG&E's service area, integrating customer resilience, fire, erosion, and ecosystem outcomes. Climate-adapted rehabilitation approaches with embedded maintenance plans reduce repeat outage and VM costs. Wood management pathways operate at scale, reducing GHG emissions and field safety risk.

Long-term (10+ yr): Communities experience faster recovery and reduced repeat outage exposure. VM costs decline as smarter landscape design reduces long-term consequences. Scaled wood management approaches feed broader decarbonization pathways.

Equity Outcomes: Projects under this Topic will prioritize DVCs, low-income communities, and Tribes in recovery sequencing and rehabilitation decisions – communities that are disproportionately impacted by climate-driven events and often face longer outages and slower recovery. Beyond infrastructure, this Topic advances community resilience by reducing unnecessary tree removal, preserving existing ecosystem value and avoiding negative customer experiences that result from sub-optimal removal decisions. Wood management innovations that densify woody biomass close to the source and reduce road miles traveled will lower truck traffic and associated air quality impacts in rural and Tribal communities, a direct quality-of-life benefit beyond reliability. Community

engagement will largely follow PG&E's EPIC CEP. Within this topic, PG&E's CAVA and EPIC teams share many opportunities for community engagement on climate adaptation and community resiliency efforts under both programs. We will coordinate to seek input on project concepts, design, and metrics, provide accessible updates on progress and results, and seek opportunities to meaningfully involve and consult with DVCs and Tribes to capture community priorities.

Marketing and Deployment Plans: Innovations developed under this Topic will follow four steps: 1) research and methodology development; 2) PG&E field demonstrations in active post-event recovery zones; 3) integration into PG&E standards, response protocols, and customer communication frameworks; and 4) publication of frameworks and tools for broader adoption. Integration into PG&E's vegetation management work, WMP, and CAVA-related adaptation planning ensures EPIC outputs compound in value. The most significant deployment risk is most demonstrated capabilities will need to be operationalized by or in close coordination with other parties, including CAL FIRE, USFS, NRCS, Tribal land managers, local agencies, and end-use markets for woody biomass products. Beyond this broad coordination challenge, PG&E anticipates several additional barriers. The scale of work required each year varies greatly by event, making consistent application of new frameworks demanding and unpredictable; this will be addressed through phased rollout and integration into existing field crew training and protocols. Markets for wood end-use products such as biochar and RNG are nascent, and current biochar methods are not scalable across PG&E's system; near-term demonstrations will test and document pathways that inform market development over time. Resistance from agencies and communities to damaged tree removal also represents a significant engagement challenge, to be addressed through proactive communication and consultation frameworks. Sustained maintenance funding for rehabilitated areas will require coordination with USFS, CAL FIRE, and other land management partners to identify shared cost mechanisms.

Coordination with EPIC and/or Gas RD&D Program Administrators: EPIC Administrators will coordinate through technical working groups and regular meetings to discuss opportunities for complementary work in this area, with roles guided by each Administrator's priorities for post-event landscape rehabilitation and unique IOU service area landscape conditions. CEC may fund statewide evaluation of various climate risk mitigation strategies, including cultural burning and landscape resilience management, that could inform or complement PG&E-funded demonstrations of emerging strategies under this Topic. Administrators will review proposed projects to avoid duplication and identify opportunities for complementary prior to implementation. PG&E's EPIC team also coordinates with the Gas RD&D Program. PG&E's Gas RD&D 2026 Plan includes complementary non-duplicative work on woody biomass-to-RNG and biochar pathways under its Clean Fuels Integration initiative.[56] While this Topic focuses on upstream stages of the biomass value chain — collecting, densifying, and converting woody biomass generated through PG&E's VM and post-event recovery operations — the Gas R&D Plan focuses on developing more usable technical and analytical tools for evaluating cleaner fuel pathways under California conditions, including tools to compare options more consistently, identify cost and implementation barriers, and clarify how byproducts such as biochar may affect pathway viability. These distinct but braided efforts are sequenced along the same value chain, and PG&E will coordinate across teams to ensure outputs from EPIC-funded conversion and densification demonstrations inform the Gas R&D Plan's end-use research, and vice versa.

[56] PG&E 2026 Gas RD&D Plan, submitted to the CPUC under D.23-11-069.

Initiative 6: Exploring Pathways to Streamline Interconnection & Energization for DERs and New Load

Research Topic Area 6.1: Streamlining Customer Interconnection

Gaps Addressed: The rapid proliferation of DERs, EV chargers, vehicle-to-grid technologies, and large load customers is straining interconnection study and approval workflows. The resulting growth in the interconnection queue is outstripping the capabilities of existing planning systems, slowing electrification and creating delays for customers, increasing energy costs, and introducing reliability challenges as the deployment of grid upgrades struggles to keep pace. Additionally, flexible resources (e.g., VPPs) and service arrangements have become increasingly common as customers and PG&E seek to accelerate interconnection and energization. Accounting for this flexibility adds complexity to the study and planning processes that can cause further delays. The existing study process is limited by the quality, availability, and synchronization of input data, the manual nature of various forecasting and evaluation processes, limited customer visibility into existing constraints, and lack of integration between critical, connected workflows. Innovation in the areas below could streamline and accelerate the interconnection study process:

- **Interconnection study inputs:** Enhanced GIS/CYME/model synchronization and a robust library of granular, customer-type specific load shapes will increase visibility into T&D constraints. Artificial intelligence and machine learning tools can further improve GIS/CYME data quality, including equipment settings data, mapping of service lines to transformers, and other secondary system information down to the premise level.
- **Forecasting and evaluation tools:** Automating first-pass screenings and enabling the rapid evaluation of various scenarios based on dynamic customer or utility inputs, including AI tools that could simplify the complexity introduced by flexible resources, will avoid manual rework and help assess configurations that could connect customers more quickly. Enhanced analytics will enable the evaluation of power quality and reliability risks prior to interconnection.
- **Workflow integration:** Enhanced connection across related workflows, including interconnection, hosting capacity, and flexible load, will increase the accuracy and speed of responses to complex interconnection requests.

Per PICG feedback from the December 2025 workshop, this Topic will focus on accelerating interconnection and energization across all customer segments. While the Topic will enhance the interconnection process broadly, accelerating energization for large loads has the potential to be uniquely impactful at the system level, and PG&E is pursuing a range of approaches to ensure that the energization of large loads is rate reducing for other customers. We anticipate that these efforts could provide a benefit of approximately 0.5-1% per GW by 2035 through the collective effects of EPIC-funded innovation, enhanced coordination with large load customers, and novel rate structures that more accurately account for the transmission and generation costs of serving large loads. This Topic is essential to PG&E's ability to manage growing demand and DER interconnection requests in an equitable manner that supports overall system reliability and affordability.

Unique Role: EPIC funding will enable necessary collaboration with the private sector to tailor their existing capabilities to the needs of a real utility operating environment, delivering the end-to-end integrated workflows that can deliver outsized value to ratepayers. Due to the earlier-stage demonstrations and iterative learning that this Topic requires, projects under this Topic are not well-

suited for GRC funding at this stage. While pathways exist at the federal level supporting expeditious permitting and buildout of data centers and related infrastructure, projects funded under this Topic will address specific utility-side technologies to benefit a broad range of customers.

Leveraging Past RD&D: This Topic builds on several EPIC 4 projects, including EPIC 4.27 (Improving Service Delivery for Electrification) and 4.21 (T&D Co-Simulation Modeling). Customer insights from the user design research and interfaces developed as part of EPIC 4.27 will inform any project targeted at enabling iterative consideration of customer inputs throughout the interconnection application process. This prior work will be most informative for demonstrations on the distribution side. EPIC 4.21 is demonstrating solutions to optimize and integrate the distribution and transmission planning processes. PG&E will continue to build on these early integrations to further streamline interconnection processes and incorporate insights from other related workflows for more holistic consideration of broader system conditions and constraints.

Metrics and Impact Assessment: The following metrics will be used to assess ratepayer benefits, as appropriate according to the scope of future projects, with outcomes and investment in DAC and low-income communities collected and integrated into public reporting:

- Decrease in interconnection time from application to Permission to Operate with separate reporting for projects in DACs and low-income communities (Customer-focused Solutions; %)
- Load interconnected on an accelerated schedule (Affordability; kWh/MWh)
- Reduction in interconnection and energization approval costs, measured as the change in per-project cost from application to Permission to Operate vs. manual baseline (Affordability; $)
- Change in Affordability Ratio, measured vs. baseline ratio established at outset, with separate reporting for customers at the 20th percentile of the income distribution (Affordability; %)
- DERs and EV charging installations in DACs and low-income communities interconnecting within CPUC-established energization target timeframes (Customer-focused Solutions; %)

Expected Outcomes: Near-term (1-3 yr): Establish and validate the technical foundations, including enhancements to data sources and development of advanced scenario modeling and automation capabilities to help accelerate interconnections for the customers in scope for EPIC demonstrations.

Mid-term (3-10 yr): Interconnection and energization processes leverage automation, standardized designs, and advanced analytics to significantly reduce cycle times and enable faster deployment of DERs, electrification projects, and large load customers. Advances unlock demand flexibility, reliability, and affordability benefits that accrue to the system more broadly.

Long-term (10+ yr): Automated interconnection and energization processes accelerate California's clean energy transition by supporting broad-based DER adoption and electrification, while minimizing system upgrade costs. Ratepayers benefit from the effects of rate-reducing load growth, enhanced reliability, and reduced friction at the individual customer level when seeking to interconnect.

Equity Outcomes: Grid capacity constraints disproportionately limit DER adoption in ESJ communities, limiting their ability to fully reap the benefits of electrification and demand flexibility.[57]

[57] Brockway, A.M., Conde, J. & Callaway, D. Inequitable access to distributed energy resources due to grid infrastructure limits in California. *Nat Energy* 6, 892–903 (2021). https://doi.org/10.1038/s41560-021-00887-6.

Projects funded under this Topic will seek to address these structural challenges by involving CBOs, tribal governments, and local governments in ESJ Communities in upfront project design to identify the categories of interconnection delay (e.g., residential DER, EV charging, V2X) most acutely felt and to ensure that the study process improvements being prioritized reflect community-defined needs and address identified barriers to achieving equitable outcomes. Unlocking pathways to more rapid DER deployment in ESJ communities through these targeted interventions can help bolster community resilience, ensure equitable, affordable access to the benefits of electrification for project participants. Community engagement will follow the structure and processes laid out in PG&E's CEP but may be tailored for projects sited in ESJ Communities to incorporate community input on specific baseline metrics, and preferred format and cadence of engagement and results reporting. Outcomes will be reported in alignment with the EPIC Equity in RD&D Framework adopted in D.26-02-037.

Marketing and Deployment Plans: The path to scale moves through three stages: 1) Development of foundational data architecture and computational frameworks: focuses on establishing quantitative baselines for study cycle times, scenario volumes, and data quality by project category, defining power-flow modeling requirements and validation standards, and identifying select interconnection and energization workflows for early automation. 2) Testing validated tools in live environments: transitions to testing prototype tools against actual interconnection study cases, validating the accuracy of these study outputs against historical interconnection decisions, and measuring resulting changes in cycle times and interconnection costs. 3) Operational integration and cross-utility dissemination: proven tools will be integrated into PG&E's standard operational practice and knowledge transfer for other utilities and regulatory stakeholders will enable broader adoption. Barriers to deployment may include quality and availability of input data, verification and validation of study outputs across diverse use cases and grid conditions, and seamless integration with internal workflows and external counterparties. Project design that emphasizes variety in study types, inputs, and grid conditions, includes direct comparison with existing processes for validation, and focuses on coordination with adjacent stakeholders can mitigate these barriers. Developing capabilities with open standards and modular, configurable design can address broader interoperability challenges.

Coordination with EPIC and/or Gas RD&D Program Administrators: The EPIC Administrators in the Interconnection, Energization, & Large Load Addition Working Group envision continued coordination throughout EPIC 5 between CEC and IOU staff to share data and knowledge, review proposed projects for methodological overlap and identify opportunities for sequencing or joint work prior to implementation. For example, PG&E foresees opportunity to work jointly with CEC to develop AI tools for collaborating between the two distinct existing study processes that occur at the IOU (load serving infrastructure) and at CAISO (supply deliverability infrastructure), resulting in a more accurate CEC forecast, and further resulting in a cost- and need-optimized planning data set. The CEC forecasts can then more accurately reflect specific areas' deficiencies and needs. Further, regulatory entities' requirements to introduce non-firm and flexible interconnection options will require greater consideration for the potential of flexibility to manage constraints and congestion to serve large loads and thereby reduce the overall level of investment required to meet their needs. IOUs could also potentially serve as technical advisors on the design and evaluation of CEC GFO(s) related to creation of vendor standards for BTM technologies that can enable flexible service connections.

Initiative 6: Exploring Pathways to Streamline Interconnection & Energization for DERs and New Load

Research Topic Area 6.2: Accelerating speed-to-power

Gaps Addressed: Necessary grid upgrades cannot keep pace with the extraordinary load growth across PG&E's service area, resulting in a critical misalignment between customers' desired in-service dates and energization timelines. Existing transmission bridging solutions are either fossil-fuel-based or narrow in applicability, while others, such as Remedial Action Schemes (RAS), enable faster energization, but introduce complexity and risk that is unsustainable at scale. On the distribution side, current solutions rely on capacity-constrained customers self-providing flexibility, often through static or dynamic load limits, or on fossil-based generation. Beyond capacity constraints, connecting new loads before infrastructure upgrades can also introduce power quality and reliability risks, further delaying energization, as rapid, variable load ramps can interact with high penetrations of inverter-based resources to cascade into voltage deviations, frequency instability, and protection system trips. This Topic addresses these existing gaps to enable safe energization of customers ahead of permanent grid upgrades without creating system reliability risks, by advancing a range of capabilities including:

- **Transmission bridging solutions:** Novel bridging technologies, such as solid-state transformers, linear generators, other novel generation technologies, and dynamic contingency management, aim to enable faster energization without curtailment schemes or fossil generation. Projects involving novel generation technologies will focus on utility considerations for their interconnection and operation as bridging solutions, rather than on the development or maturation of the core generation technology.
- **Distribution bridging solutions:** Novel bridging technologies, such as linear generators and solid-state transformers, will enable faster energization without relying solely on customer self-curtailment. Projects that demonstrate solutions enabling the Distribution System Operator (DSO) to orchestrate demand flexibility as a bridging solution for customer energization will be addressed in Topic 2.3.
- **Solution evaluation tools:** Modeling tools that integrate planning outputs, real-time grid conditions, and the capabilities of emerging bridging technologies will enable PG&E to consistently identify the lowest-cost, lowest-risk path to faster energization.
- **Grid stability mitigation:** Technologies capable of mitigating power quality and reliability risks while permanent infrastructure is constructed can accelerate energization. Coordination solutions that enable customers and the grid to work together, avoiding redundant protective systems, will lower total costs of maintaining reliability.

This Topic directly advances the technology demonstrations and analytical frameworks needed to reduce energization timelines under high-DER, high-load-growth conditions. The orchestration of DERs and flexible load will also be explored as paths to accelerated energization and are covered in Topic 2.3. Addressing these gaps will create a scalable pathway to accelerate speed-to-power while lowering overall system costs. Funding this Topic is a priority as it can deliver significant cost savings, while removing barriers to electrification, reducing reliance on fossil-fuel based backup generation, and decreasing risk and instability across the system.

Unique Role: EPIC funding will enable collaborative partnerships that bring together novel

capabilities from the private sector and other R&D bodies with the utility access necessary to perform live field demonstrations that can provide confidence in deploying these technologies at scale. The earlier stage solution development and validation required to address the existing gaps in this Topic are not well-suited for GRC funding, but once developed, the solutions demonstrated under this Topic will enable PG&E to more effectively optimize the deployment of GRC funds and enhance cost-efficiency of system upgrades. PG&E will coordinate closely with large load customers to ensure that they are funding and developing the capabilities required to solve these challenges on the customer-side. EPIC funding will be critical for developing grid management capabilities that preserve reliability and for advancing analytical tools that promote affordability through optimized decision-making.

Leveraging Past RD&D: This Topic will build on learnings from EPIC 4.29 (T-Flex). PG&E's EPIC 4.29 project is developing transmission energy management system (EMS) functionality for look-ahead forecasting and customer load modification signaling paired with flexible service agreements to enable speed-to-power for new large load customers on capacity-constrained areas of the transmission grid. EPIC 5 projects will further explore coordinated dispatch of nearby DERs and other aggregated dispatch resources to increase reliability for flexible transmission interconnections or incorporate dynamic line ratings, leveraging learning from EPIC 4.05, and/or ambient adjusted ratings into T-Flex operational forecasts and scheduling. Further exploration of orchestration topics described here will be addressed in projects funded under Topic 2.3.

Metrics and Impact Assessment: The following metrics will be used to assess ratepayer benefits, as appropriate according to the scope of future projects, with outcomes and investment in DAC and low-income communities collected and integrated in public reporting:

- Decrease in time to receive service, measured from interconnection request to in-service date, relative to baselines where bridging solutions are not deployed (Customer Solutions; %)
- Load energized on an accelerated schedule (Affordability; kWh/MWh)
- Decrease in interconnection and energization costs over time due to reduced timelines, quantified per project and extrapolated at scale (Affordability; $)
- Locational changes in service interruption indexes including SAIDI, SAIFI, and CAIDI (Reliability; minutes/year)

Expected Outcomes: Near-term (1-3 yr): Validated bridging solution demonstrations and stability management capabilities will enable PG&E to energize initial cohorts of customers ahead of permanent infrastructure completion, generating measurable reductions in energization timelines and operational risk.

Mid-term (3-10 yr): Demonstrated bridging technologies and coordination protocols are replicated across additional locations and interconnection requests, accelerating energization timelines, reducing frequency and severity of grid stability events, and creating rate stabilization effects by increasing near-term throughput across the existing grid.

Long-term (10+ yr): A mature, replicable portfolio of clean bridging solutions and grid-stability management tools will structurally lower the cost of connecting new load and DERs, reducing the capital intensity of the ongoing clean energy transition, contributing to sustained rate affordability, and ensuring reliable grid operations for all ratepayers.

Equity Outcomes: Projects will prioritize demonstrations of distribution bridging solutions for DERs on circuits serving disadvantaged and low-income communities, thereby accelerating deployment of DERs, EV infrastructure, and building electrification technologies for priority communities. In advance of demonstration siting decisions, PG&E will conduct structured outreach to community leaders, tribal representatives, and local organizations in candidate areas to understand community-specific priorities and concerns. Where clean bridging technologies displace fossil-dependent interim solutions, air quality co-benefits will also be estimated and reported. Projects under this Topic may also reduce the likelihood that a grid stress event results in a load shed affecting vulnerable populations. Community engagement activities for projects in this Topic will follow the structure and processes laid out in PG&E's CEP but may be tailored for projects sited in ESJ Communities to incorporate community input on specific baseline metrics and preferred format and cadence of engagement during project implementation and results reporting. Outcomes will be reported in alignment with the EPIC Equity in RD&D Framework adopted in D.26-02-037.

Marketing and Deployment Plans: The path to scale will move through three stages: 1) Field-scale demonstration: executes demonstrations of bridging technologies and grid-stability coordination approaches in targeted locations and develops foundational toolsets to evaluate bridging approaches based on local conditions. 2) Systematic replication: replicates successful demonstrations across additional locations to refine the operational playbook and to reduce per-deployment cost and prepare models and tools for integration into standard workflows. 3) Full integration into PG&E's standard interconnection toolkit: bridging solution selection and deployment becomes a routine element of PG&E's interconnection toolkit with optimal solutions identified and configured via automated processes. Load coordination protocols are embedded in standard interconnection agreements reducing grid strain, and technologies capable of addressing power quality challenges are deployed at scale. Given the critical nature of this challenge, numerous vendors claim to offer potential solutions. Objectively and rigorously assessing this broad, diverse solution set to identify the best ecosystem of capabilities to meet the needs of PG&E's system and customers and California's clean energy goals will present a near-term barrier to deployment. This will be addressed through a thorough selection process and through demonstrating a diverse portfolio of approaches to avoid solution lock-in.

Coordination with EPIC and/or Gas RD&D Program Administrators: The EPIC administrators will coordinate across Topics to ensure complementary rather than duplicative investments. PG&E is planning to coordinate with the CEC and other IOU administrators to advance novel bridging solutions, including the potential to provide specific requirements to inform CEC solicitations or co-developing solicitations for speed-to-power technology demonstrations that reflect IOU operations requirements. Potential areas of interest for collaboration include power electronics-based mobile transformers or substations, or novel generating technologies at the grid-edge that can be deployed to support the accelerated interconnection of new load. CEC may focus on the maturation of earlier-stage solutions, while projects funded under PG&E's Topic would evaluate more mature solutions in an IOU operating environment and/or demonstrate the capabilities offered by bringing together ecosystems of individual solutions. The administrators will review proposed projects for methodological overlap and identify opportunities for sequencing or joint work prior to implementation.

8. Appendices

The following appendices provide supporting details for the EPIC 5 Investment Plan.

A1. **Summary of Investment Plan Development Stakeholder Comments and Correlated Administrator Responses**
A2. **Equity Matrix with Equity Funding Summary**
A3. **Mapping of Planned Investments to the Electricity System Value Chain**[58]
A4. **Information Summary of Demand Response Research, Development and Demonstration Activities**[59]
A5. **Disadvantaged Communities Advisory Group Engagement**
A6. **Tribal Engagement**
A7. **Regulatory and Legislative Background**
A8. **Acronyms and Abbreviations**
A9. **Glossary**
A10. **EPIC 5 Budget Increase Justification**

[58] D.12-05-037 at OP 12 requires a mapping of the planned investments to the electricity system value chain, including: (i) Grid operations/market design; (ii) Generation; (iii) Transmission; (iv) Distribution; and (v) Demand-side management.
[59] D.13-11-025 requires informational summaries of the IOUs' Research, Development and Demonstration (RD&D) activities undertaken as part of their approved Energy Efficiency (EE) and Demand Response (DR) portfolios.

Appendix A1: Summary of Investment Plan Development Stakeholder Comments and Correlated Administrator Responses

PG&E conducted workshops and engagement activities during development of its EPIC 5 Investment Plan to support transparency, gather input, and strengthen alignment between proposed investments and the priorities of interested parties, equity communities, Tribes, and community-based organizations. These activities provided opportunities for participants to learn about EPIC, ask questions, comment on draft investment planning topics, and share perspectives on community needs, potential benefits, and barriers to participation. This appendix documents that input and PG&E's corresponding responses.

The sections below are organized by engagement event. Each subheading identifies the event and date, followed by a brief description of who attended and how the session was structured, and then a summary of the feedback, questions, and comments received along with PG&E's corresponding response or planned action. The summaries focus on input relevant to PG&E's EPIC 5 Investment Plan and are intended to document how engagement informed investment planning, support accountability, and provide a clear feedback loop for participants and other interested parties.

Participants raised a broad range of concerns, many of which extend beyond the scope of what the EPIC program can address. Recurring EPIC-related themes included:

- **Affordability and bill savings** — a threshold consideration for any investment, with participants asking how proposed research connects to direct customer cost relief.
- **Transportation electrification access** — vehicle and charging costs, charging availability, and barriers facing renters and underserved communities.
- **Climate adaptation and community resilience** — including cooling centers and resilience hubs in areas experiencing extreme heat.
- **Customer education and energy usage** — clearer, multilingual information to help customers understand and manage their electricity use.
- **Grid capacity and interconnection** — solutions that make better use of existing infrastructure and support timely interconnection.
- **Sustained engagement and transparency** — continued dialogue and clear reporting on how community input influences decisions.

Where comments fell outside EPIC's research and demonstration mandate, PG&E is working to connect stakeholders with the appropriate PG&E departments so that input reaches the groups best positioned to act on it.

1. Joint IOU DACAG Meeting, April 17, 2026

The Disadvantaged Communities Advisory Group (DACAG) is an 11-member advisory group created by Senate Bill 350 (de León, 2015) that advises the California Energy Commission and the California Public Utilities Commission on how to design and implement policies and programs that more effectively serve disadvantaged communities and advance the state's clean energy and pollution reduction goals. PG&E participated in the April 17, 2026 DACAG meeting alongside SCE and SDG&E to

introduce the EPIC program, describe proposed EPIC 5 investment planning approaches, and invite input on engagement, equity, and community benefit considerations. DACAG members shared feedback during the public discussion, summarized below along with PG&E's corresponding responses or planned actions.

Table 1: Feedback and PG&E Responses at DACAG Meeting

Stakeholder	Feedback/Question/Comment	PG&E Response
DACAG Member	Engagement should inform decisions, with clearer linkage between input and outcomes.	PG&E will implement a structured feedback loop to document, synthesize, and consider input at key decision points, including investment planning and project selection, and will report how input informed decisions through CEP reporting.
DACAG Member	Track engagement themes and clearly report how input is incorporated or why it is not.	PG&E will document engagement themes and incorporate them into reporting, using metrics and narrative summaries to show how input is considered and integrated into program decisions.
DACAG Member	Clearly set expectations about the types of input within EPIC scope, including program constraints.	PG&E will clearly define the purpose of engagement, the input sought, and any constraints in materials and workshops to support more focused and effective participation
DACAG Member	Increase engagement with Tribal governance structures through existing leadership forums to strengthen connections with Tribal communities.	PG&E will align with Tribal Liaisons and existing Tribal forums, including leadership convenings, to support relationship-building and engagement. PG&E has begun participating in these forums to better understand Tribal priorities and will continue to refine its approach in consultation with Tribal representatives.
DACAG Member	Stakeholders noted limited awareness of EPIC, including its purpose, customer bill impacts, and available benefits.	PG&E will expand use of plain-language materials, including EPIC overview content and CBO toolkits, to improve awareness, accessibility of information, and support informed participation.
DACAG Member	Maintain ongoing engagement and communication throughout the EPIC lifecycle, including follow-up updates and information on projects and outcomes.	PG&E will include engagement opportunities during project development and leverage advisory groups and CBO partnerships to support ongoing input, with continued

		evaluation of opportunities for deeper collaboration as projects are defined.

2. Northern California ESJ Communities & Tribes Workshop, May 28, 2026

The Northern California ESJ Communities & Tribes Workshop was designed for representatives of community-based organizations, disadvantaged communities, and Tribes in Northern California. PG&E hosted this virtual webinar format workshop and invited stakeholders from CBOs, Tribes and other organizations through various PG&E groups that conduct community engagement, Tribal affairs, and outreach with our diverse supplier network. This workshop had 25 attendees excluding presenters, 40% of whom were representatives of CBOs.

To support participation and better understand audience priorities, PG&E launched several live polls during the workshop covering home EV charging access, priorities during major outages, and the benefits and barriers associated with whole-home electrification. Figure 1 below shows the polling results and provides a high-level view of the topics, needs, and priorities participants identified during the engagement.

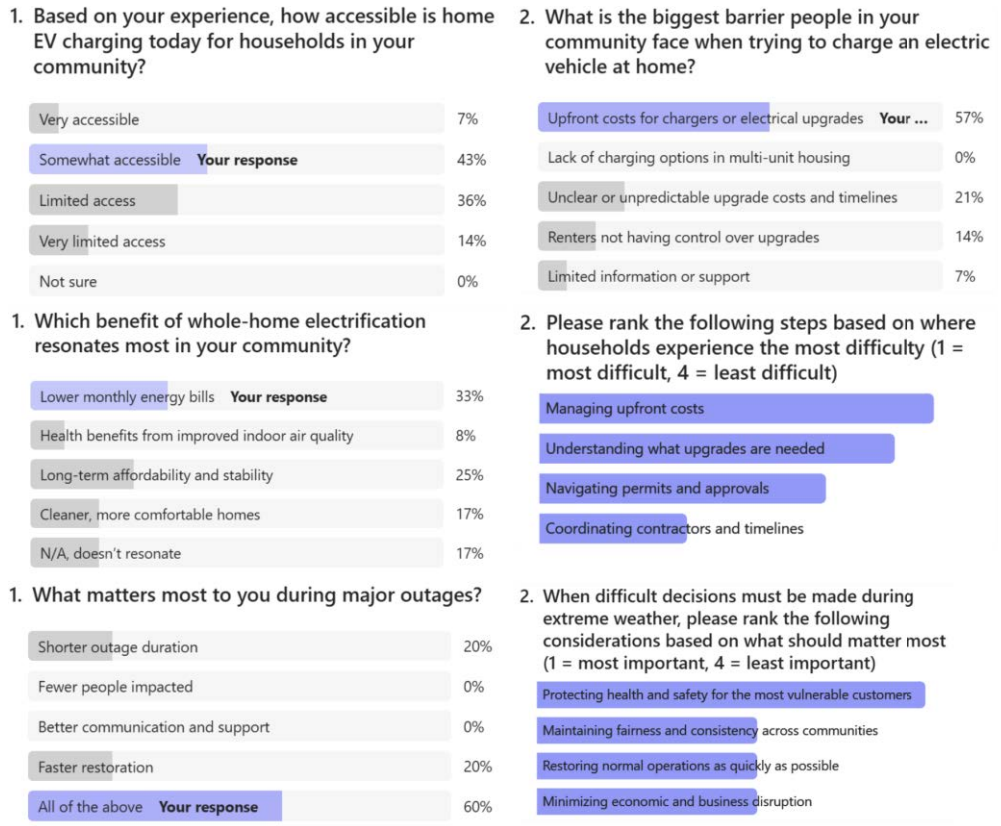

Figure 1: Polling Results, Northern California ESJ Communities & Tribes Workshop

Poll responses pointed to affordability and cost predictability as the dominant concerns across all three topic areas:

- **Home EV charging access** — half of respondents described home charging as offering limited (36%) or very limited (14%) access, with 43% reporting it as somewhat accessible. Upfront costs for chargers or electrical upgrades was identified as the single biggest barrier (57%), followed by unclear or unpredictable upgrade costs and timelines (21%) and renters lacking control over upgrades (14%).
- **Outage priorities** — 60% of respondents selected all listed outage attributes as equally important, with the remainder split evenly between shorter outage duration (20%) and faster restoration (20%). When asked to rank considerations for difficult decisions during extreme weather, participants placed protecting the health and safety of the most vulnerable customers first, followed by maintaining fairness and consistency across communities, restoring normal operations quickly, and minimizing economic and business disruption.
- **Whole-home electrification** — lower monthly energy bills resonated most (33%), followed by long-term affordability and stability (25%), cleaner and more comfortable homes (17%), and health benefits from improved indoor air quality (8%); 17% indicated that none of the listed benefits resonated. Ranking the steps households find most difficult, participants placed managing upfront costs first, then understanding what upgrades are needed, navigating permits and approvals, and coordinating contractors and timelines.

These results reinforced affordability, cost transparency, and support for navigating upgrade processes as priorities for consideration in EPIC 5 investment planning.

While participants were invited to ask questions during the workshop and provide written comments after the event, there were no live questions about the EPIC 5 Investment Plans and only one written response in a post-event survey submission. This workshop was the first of several large public workshops PG&E conducted in support of CPUC engagement requirements. Across these events, participation was limited relative to the scale of outreach, live Q&A activity was minimal, and very little post-event written feedback was received. PG&E is evaluating these results as it plans future engagement, and expects that smaller, facilitated sessions may generate more substantive input alongside continued use of broadly noticed workshops. PG&E will continue to offer multiple channels for interested parties to ask questions, share feedback, and inform future EPIC planning activities.

Table 2: Participant Feedback at Northern California ESJ Workshop

Stakeholder	Feedback/Question/Comment	PG&E Response
Survey Respondent	A participant from a CBO operating in PG&E service area recommended that PG&E allow additional time for community outreach and engage directly with community members through follow-up conversations and requested that PG&E follow up with them directly regarding their feedback.	PG&E invited the participant to take part in an interview to gather additional information and better understand their feedback. A summary of that engagement is included in Section 8 of this appendix.

3. Southern California ESJ Communities & Tribes Workshop, June 18, 2026

SCE and SDG&E hosted the Southern California ESJ Communities & Tribes Workshop, with PG&E participating as a co-presenter in the virtual webinar. This workshop had 15 virtual participants. Participants were invited to ask questions during the live session, and a post-event survey was sent to all registered attendees. Participant questions and feedback are provided in Table 3 below. PG&E will continue to coordinate with SCE and SDG&E on joint engagement activities and provide future opportunities for interested parties to ask questions and share input.

Table 3: Participant Feedback at Southern California ESJ Workshop

Stakeholder	Feedback/Question/Comment	PG&E Response
Workshop Participant	A participant asked how IOUs select project partners.	IOU administrators answered this question during the workshop, explaining that there are multiple avenues for getting involved in EPIC, including vendor solicitations for specific project scopes, and provided contact information for each IOU EPIC team during the workshop.
Workshop Participant	A participant asked if non-profit organizations can benefit from EPIC projects.	IOU administrators answered this question during the workshop, explaining that there are multiple avenues for non-profit organizations to get involved in EPIC as project partners, customer participants, site hosts and/or other roles, as relevant to the project. Administrators provided contact information for attendees to follow up after the workshop with other questions.
Survey Respondent	In a post-workshop survey response, a participant indicated that future workshops would be improved by providing more detail on community benefits. The respondent shared that community resilience was the most valuable topic or project discussed for them/their community.	PG&E and other IOU Administrators appreciate this feedback and will consider ways to provide more information in future events on the community benefits that can be delivered in EPIC demonstrations and from scaled deployment once technologies are validated through EPIC. PG&E's Initiative 5: *Building community resilience from prevention through recovery* and its three research topics (5.1-5.3) focus on innovations that can strengthen community resiliency, grid hardening and reliability, and post event landscape management. See Section 5 for Initiative details and Section 2 for information

		about the sizable funding share allocated to this Initiative.

4. Joint IOU Workshop, June 23, 2026

The Joint IOU EPIC 5 Investment Plan Workshop was conducted collaboratively by PG&E, SCE, and SDG&E to present their proposed EPIC 5 Investment Plan strategies, research topic areas, and innovation priorities. Representatives from each utility shared an overview of their proposed investment plans and invited feedback from interested parties through webinar presentations, live discussion, and the Q&A feature.

Table 4: Participant Feedback at Joint IOU Workshop

Stakeholder	Feedback/Question/Comment	PG&E Response
Workshop Participant	A participant supported PG&E's emphasis on streamlining interconnections and accelerating speed-to-power and asked whether EPIC 5 could support dynamic, software-driven congestion management solutions that optimize existing transmission capacity and reduce long-term reliance on Remedial Action Schemes as large load growth increases.	PG&E thanked the participant for the feedback and recognized the interest in technologies that can improve infrastructure utilization and support timely interconnections. PG&E noted that the input would be captured and incorporated into the stakeholder feedback section of the EPIC 5 Investment Plan.
Workshop Participant	A participant suggested DLR, GETs, and HTLS reconductoring as opportunities to unlock additional transmission capacity using existing infrastructure.	PG&E indicated that this technology area is within the potential scope of Topic 5.1 and noted that teams have already begun evaluating some emerging technologies, including AI wildfire risk models. PG&E stated that these technologies could be strong candidates for EPIC 5 research and testing.
Workshop Participant	A participant asked whether PG&E has considered AI wildfire risk models and trenchless boring technologies under Topic 5.1.	PG&E indicated that teams have already begun evaluating some emerging technologies, including AI wildfire risk models. Wildfire risk modeling and novel undergrounding technologies are within the potential scope of Topics 4.1 and 5.1 in this plan. PG&E stated that these technologies could be strong candidates for EPIC 5 research and testing.
Workshop Participant	A participant expressed enthusiasm for PG&E's Initiative 6 and suggested several technology areas for consideration, including smart inverter and IEEE 1547 V2X protocols, digital substations, telemetry, mobile and modular substations, interim agreements, auto curtailment, decision-support software, dynamic operating envelopes, and solid-state transformers.	PG&E thanked the participant for the feedback and acknowledged the suggested technology areas and use cases as valuable input. PG&E noted that the comments would be shared with the broader audience and incorporated into the stakeholder feedback section of the EPIC 5 Investment Plan.
Workshop Participant	A participant noted that many large-load customers are pursuing behind-the-meter generation to address near-term capacity	PG&E thanked the participant for the feedback and acknowledged the potential role of behind-the-meter resources, VPPs and other flexibility

	constraints and suggested exploring how virtual power plants (VPPs), DIDF, and other utility-led programs could support bridging and long-term operational solutions that increase flexibility and infrastructure utilization.	solutions in addressing capacity constraints and improving infrastructure utilization. PG&E noted that the comments would be incorporated into the stakeholder feedback section of the EPIC 5 Investment Plan.
Workshop Participant	A participant recommended improving webinar access logistics, noting that they registered in advance but had to re-register shortly before the workshop because the join link had not been released.	PG&E appreciates this feedback and will coordinate with the other IOUs to improve webinar logistics for future workshops, including clearer and earlier communication of registration details and join links where feasible.
Workshop Participant	In post-event survey feedback, a participant emphasized that flexibility and infrastructure utilization are increasingly important as near-term load growth accelerates. The participant encouraged the IOUs to explore how flexible interconnection programs, non-wires solutions, and coordination with existing or planned DERs could help integrate large loads in capacity-constrained areas.	PG&E appreciates this feedback and agrees that flexibility, infrastructure utilization, non-wires solutions, and DER coordination are important tools for managing load growth affordably and reliably. PG&E will consider this input as project concepts are refined under Topics 2.2, 2.3, 6.1, and 6.2, and will continue coordinating with other EPIC Administrators on related research areas.
Workshop Participant	In post-event survey feedback, a participant suggested that IOUs hold a best-practices or lessons-learned exchange on AI, LLMs, and other emerging technologies, including discussion of their strengths, limitations, and appropriate use cases.	PG&E appreciates this suggestion and will consider opportunities, through EPIC Administrator coordination and technical working groups, to support knowledge-sharing on AI, LLMs, and other emerging technologies, including lessons learned, appropriate use cases, and limitations.
Workshop Participant	In post-event survey feedback, a participant recommended that the IOUs advocate for and co-develop a statewide research approach focused on grid-integrated flexibility for AI, data centers, and DERs, including solutions that could help reduce grid impacts associated with PSPS events.	PG&E appreciates this feedback and will consider it as part of ongoing EPIC Administrator coordination on flexible load, DER orchestration, large-load integration, and grid utilization. PG&E's proposed EPIC 5 topics include work that may help evaluate flexible resources and grid-integrated solutions for emerging load growth challenges.
Workshop Participant	A participant suggested co-locating future workshops with CEC events or rotating the workshop among IOUs to support more in-person interaction and cross-California collaboration.	PG&E appreciates this feedback on workshop format and collaboration. PG&E will share the suggestion with the other IOUs and consider opportunities for future EPIC workshops to include in-person, hybrid, co-located, or rotating formats where feasible and appropriate.
Workshop Participant	In post-event survey feedback, a participant supported PG&E Topics 2.2 and 2.3, emphasizing that more efficient use of existing grid infrastructure and flexible resource orchestration can help reduce grid upgrade costs, support DVCs, and enable smoother integration of growing EV and moderate-to-heavy loads.	PG&E appreciates the support for Topics 2.2 and 2.3. These topics are intended to improve use of existing grid infrastructure, reduce or defer grid upgrade costs, and advance flexible resource orchestration to support load growth, affordability, and benefits for DVCs and other customers.

5. Tribal Community Wildfire Safety Program, June 30, 2026

PG&E's Tribal Liaison team manages the Community Wildfire Safety Program for Tribal Lands and hosts an annual webinar for Tribes to share updates on operational safety tools and programs. The EPIC team was invited to participate in the webinar to introduce the EPIC program and identify opportunities to connect with Tribes pursuing projects aligned with EPIC research topics. While participants asked questions of other PG&E representatives during the webinar, no questions were directed to the EPIC team. PG&E invited Tribes to connect directly with the EPIC team following the webinar, and EPIC contact information was shared to support future coordination and input.

6. Resilient Together Advisory Group Meeting, July 8, 2026

Resilient Together is a PG&E initiative to learn how communities across California are affected by extreme heat, flooding and sea-level rise, wildfires, and other climate hazards, and to work with community members and the organizations that represent them to better meet their energy needs and keep communities safe. PG&E's CAVA team leads the Resilient Together Advisory Group (RTAG)[60], which convenes community partners, including community-based organizations representing the communities PG&E serves, to discuss resilience-related priorities, community needs, and ongoing programs. The EPIC team was invited to participate in an RTAG meeting to provide an overview of the EPIC program, its proposed EPIC 5 research areas, and opportunities for future engagement. Participants shared candid feedback on priority issues affecting their communities, including affordability, electrification, and climate resilience. PG&E discussed how participant input would be documented and considered as part of ongoing EPIC planning and outreach efforts. Over 35 attendees from community-based organizations (CBOs) participated in the RTAG meeting on July 8th, 2026, representing different regional perspectives. The following table summarizes the primary themes that emerged during the discussion:

Table 5: Participant Feedback at RTAG Meeting

Theme	Key Takeaway	PG&E Response
Climate Resilience and Cooling Centers	Participants highlighted the lack of cooling centers and heat-resilience resources in some communities, particularly in areas experiencing extreme heat, such as Bakersfield. Participants emphasized the need for solutions that provide tangible community benefits and asked how feedback from engagement activities would be used.	PG&E acknowledged the need and noted that cooling centers and resilience hubs could align with future EPIC projects when paired with innovative technologies or solutions. PG&E stated that participant feedback would be documented, reflected in the EPIC 5 Investment Plan, and considered during future project development. RTAG facilitators also indicated that community needs identified through the process would be shared with other relevant PG&E organizations, including emergency preparedness and customer program-focused teams.

[60] Learn more about PG&E's Resilient Together initiative, the Resilient Together Advisory Groups, and the member organizations at https://www.resilienttogether.us/.

Transportation Electrification Affordability and Access	Participants identified affordability as the primary barrier to EV adoption, citing vehicle costs, charging infrastructure availability, electricity costs, range anxiety, and various challenges faced by renters and underserved communities. Participants also suggested incentives, customer education, and expanded charging access to support adoption. One participant also voiced challenges for some underserved communities to focus attention on transportation electrification with many non-energy concerns that demand time, energy and attention such as cost of living, healthcare, etc.	PG&E acknowledged affordability as a major concern and explained that affordability is a key consideration across proposed EPIC 5 research topics. PG&E described current and proposed research focused on reducing customer costs, improving access to charging, streamlining upgrades, and expanding equitable access to transportation electrification. The team indicated that participant feedback would help inform future research priorities and project design.
Community Engagement and Use of Feedback	Participants expressed interest in understanding how community input would influence decision-making and whether local priorities would be reflected in future investments and programs. Some participants also raised concerns about smaller or rural communities being overlooked, and one person flagged that definitions of DACs, DVCs and low-income communities may not include all underserved populations. One participant asked how CBOs could be involved or reach out to discuss future EPIC projects.	PG&E explained that feedback gathered through workshops, meetings, interviews, and discussions would be summarized and incorporated into EPIC planning efforts. The team emphasized its interest in continued dialogue with CBOs, Tribal representatives, and local partners throughout investment planning, project development, and implementation. Participants were encouraged to share project ideas and continue engaging with the EPIC team through follow-up meetings and direct outreach.

7. Fresno CBO Listening Session, July 29, 2026

On July 29, 2026, PG&E hosted a Community-Based Organization (CBO) Listening Session at the Sunnyside Regional Library in Fresno to gather input on its EPIC 5 strategic initiatives. Unlike the larger public workshops described above, this session was designed as a facilitated, in-person dialogue — the intent was two-way discussion in which participants could respond to one another and to PG&E staff, rather than a presentation with a Q&A period. PG&E prioritized the Central Valley for this first CBO listening session because a high proportion of DAC census tracts in PG&E's service territory are located in the region, helping ensure DAC and vulnerable community perspectives were reflected early in investment planning. Given the tight timeframe between the CEP filing and the Investment Plan filing, PG&E was able to conduct one listening session in this cycle and will continue regional engagement across other service areas going forward, with findings reflected in future annual reporting.

PG&E distributed email invitations to 87 community-based organizations across the Central Valley; 16 organizations RSVP'd and 6 participated, including the Deaf and Hard of Hearing Center, Fresno EOC, Central California Hispanic Chamber of Commerce, San Joaquin River Parkway & Conservation Trust, Central California Food Bank, and West Fresno Family Resource Center. While the number of participants was small relative to the invitations distributed, the dialogue format benefited from the

smaller group. Participants had time and space to speak at length, respond to one another, and share feedback more candidly than a larger session would have allowed.

The session combined a brief EPIC overview with open discussion, written guiding worksheets, and interactive activities including dot-voting and sticky note exercises, with the primary purpose of hearing directly from community-based organizations. The input gathered was substantive and directly informative to EPIC 5 planning, consistent with the feedback shared during the session that hearing quality feedback from community organizations is more important than the overall number of attendees.

Table 6: Participant Feedback at Fresno Listening Session

Topic or Theme	Summarized Feedback	PG&E Response
Community Priorities in EPIC 5 Strategic Initiatives	Voting across the poster activity and response sheets distributed priority across several initiatives, including DER Integration (associated with the rise in older homes), Climate Adaptation (both planning/research and community resilience), Transportation Electrification, and Building Decarbonization. Participants noted that it was difficult to select only one initiative because multiple priorities could benefit the community.	This session was structured as a listening session, and PG&E's role was to hear directly from participants rather than respond to each comment in real time. PG&E thanked participants for identifying their community priorities and confirmed that the input would be documented, summarized in this appendix, and considered as PG&E refines its EPIC 5 strategic initiatives. Where priorities fall outside EPIC's research and demonstration scope, PG&E's EPIC team will share them with the PG&E organizations best positioned to act on them.
Transportation Electrification	Feedback tied this initiative closely to the air quality benefit and to supporting adoption of EVs at lower cost to customers. One organization selected it as a top priority, noting that facilitating the transition to EVs to meet transportation needs can improve air quality. Another organization highlighted challenges related to fleet electrification, including the costs associated with electric trucks, refrigerated vehicles, and charging infrastructure.	Consistent with the listening-session format, PG&E received this feedback without responding to individual comments during the session. PG&E confirmed that transportation electrification input, including the affordability, access, and air quality considerations raised, would be documented and carried into EPIC 5 investment planning and future project identification, and that PG&E would follow up with participants as this work progresses.
Climate Adaptation &	One organization selected community resilience as its top priority, explaining that the	Consistent with the listening-session format, PG&E received this feedback

Community Resilience	community experiences extreme heat, wildfire smoke, flooding, and power outages that affect families and small businesses, and that building resilience helps protect lives, reduce economic losses for small businesses, and ensure the community can recover more quickly after emergencies. Another organization ranked Climate Adaptation among its top priorities for both planning/research and community resilience.	without responding to individual comments during the session. PG&E confirmed that climate adaptation and community resilience input would be documented and considered in EPIC 5 planning, and noted that resilience-related needs raised by participants would also be shared with the relevant PG&E teams, including those focused on emergency preparedness and customer programs.
Affordability and Bill Savings as a priority	Affordability and bill savings emerged as the most consistent theme across participants. One organization ranked bill savings as its highest priority, citing residents struggling to manage utility bills after the loss of a spouse, gaps in assistance for older homes unable to support solar or other upgrades, and frustration that many existing funding opportunities do not address housing limitations. Another described affordability as one of the biggest challenges facing Latino communities, with families often facing difficult choices between paying utility bills and purchasing groceries. A third noted that cooling costs during Fresno summers create significant affordability challenges.	PG&E acknowledged affordability as a major concern and explained that affordability is a key consideration across proposed EPIC 5 Strategic Initiatives and Research Topic Areas. As EPIC 5 moves from investment planning into project identification and selection, PG&E intends to evaluate candidate projects in part on whether they show a clear, traceable line to customer cost impact — through bill savings, avoided cost, deferred infrastructure investment, or improved access to lower-cost energy options. This emphasis is aligned with PG&E's company-wide commitment to advancing safe, reliable, clean, and affordable energy service. PG&E will report on how affordability considerations shaped project selection through future EPIC reporting.
Customer Education and Understanding of Energy Usage	Participants emphasized the need for programs that improve customer understanding of energy usage and bill management. One organization emphasized the need for education around energy usage, suggested helping residents better understand the differences between electric and gas usage, and stated that bill savings are important but education is equally critical, and further suggested simplifying utility bills and communications. Another organization raised concerns about language access and the	Consistent with the listening-session format, PG&E received this feedback without responding to individual comments. PG&E appreciates the feedback and acknowledges the need for clearer, more accessible information to help customers understand and manage their electricity use, including materials offered in multiple languages. For EPIC 5, innovative solutions for customer electrification education and cost-reducing technologies for building electrification may be demonstrated

	need for professional translations beyond Spanish.	under PG&E's Initiative 3 (*see Section 5 for details*). Some of the participant feedback relates to work that is currently underway in EPIC 4 projects: EPIC 4.24 and 4.25 are testing customer-facing technology interventions that integrate a customer application with AMI 2.0 and billing data to give customers clearer insight into their usage and to encourage greater adoption of electric appliances and EVs, and EPIC 4.27 supports greater customer visibility into interconnection processes and costs for new or added electric load and streamlines processes. PG&E intends to build on these projects in EPIC 5 to support additional customer education and electrification support.
Guidance on Community Engagement Methods	Participants strongly favored meeting communities where they already are, noting that residents are more likely to participate when events are hosted within their own communities. One organization described the success of a Community Advisory Team model in which residents serve as trusted ambassadors who share information directly with neighbors, with small stipends helping encourage participation. Another highlighted the value of trusted messengers such as faith-based organizations, chambers of commerce, community organizations, and schools, and suggested evening events may improve participation. Regarding approaches that have been less effective, participants reported that QR codes have been largely ineffective, that phone outreach is generally ineffective, and that surveys may not work well for many members of the deaf community, where interviews and direct conversations are often more effective and accessible.	PG&E acknowledged the guidance participants shared on effective and ineffective engagement methods and noted that, consistent with the listening-session format, PG&E's role was to hear this input rather than respond during the session. PG&E confirmed that this feedback would be documented and taken into consideration as PG&E plans additional community engagement efforts.

PG&E is also sharing the guided discussion prompts used during this listening session, reproduced below. Time did not permit discussion of the third prompt during the meeting; PG&E plans to include

similar questions in future CBO listening sessions as the EPIC 5 program moves closer to project ideation and selection.

Participant Guide & Response Sheet

A Community-Based Organization (CBO) Listening Session: EPIC 5 Investment Plans

The 5 EPIC 5 Benefits for Your Community

As you listen today, keep these five benefits in mind:

- **Affordability:** lowering the cost of going electric and keeping bills manageable
- **Community Resilience:** keeping power on during outages, storms, and fires
- **Improved Air Quality & Sustainability:** cleaner transportation and buildings
- **Safety & Reliability:** a stronger, safer grid
- **Access:** removing barriers to participation, especially in disadvantaged and vulnerable communities

Round 1: Your Community's Energy Priorities (20 minutes)

First, cast your vote. Add a sticker to the ONE EPIC 5 Initiative that matters most to the community you serve:

- ❑ **Transportation Electrification** - Ensuring cost-effective and timely access to EV connection for the benefit of all Californians
- ❑ **DER Integration** - Affordable load growth through advanced planning and operating capabilities
- ❑ **DER Integration** - Exploring pathways to streamline interconnection for DERs and new load
- ❑ **Building Decarbonization & Achieving 100% Net Zero Carbon:** Accelerating affordable electrification across customer groups to enable community-scale decarbonization
- ❑ **Climate Adaptation:** Understanding and planning for climate and weather impacts on operations, assets & environment
- ❑ **Climate Adaptation:** Building community resilience from prevention through recovery

Then, talk it through at your table and jot your notes:

1. Why did you choose that priority initiative?

_____

_____

_____

2. Which benefits are most important to your community from innovation under that initiative? (bill savings, reduced outages, improved air quality, better access to clean energy technologies?)

_____

_____

_____

3. What's one thing you wish PG&E understood about your community with respect to this initiative or benefit?

_____

_____

_____

Report-back: Each table shares top priorities and context for why.

Round 2: Your Engagement Priorities, Your Experience, Your Work (20 minutes)

First, cast your vote. Add a sticker to the ONE engagement method that is most impactful to the community you serve:

Community Meetings | Workshops | Surveys & Interviews | Partner-led Engagement | Event Participation

1. Past Experience: What have you seen in past energy, resilience, or community projects that increased participation, trust, or long-term success? Alternatively, which practices don't work, and what should organizations do differently?

_____

_____

_____

2. Methods: Of the community engagement approaches we propose in our plan, which should be the highest priority for PG&E in the next phases of EPIC, and why?

_____

_____

_____

3. What's worked: What engagement methods have been successful in implementing similar energy or resilience projects in your community? What made it work?

_____

_____

_____

Report-back: each table shares a summary of the group discussion on these prompts.

Your Turn: Open Discussion

Open Mic Activity

Your work: Are you, as CBOs, already working on any energy projects? Tell us about them. What services does your CBO provide in collaboration?

_____

_____

_____

Round 3: Spotlight Topics Deep Dive Activity (15 minutes)

Now that you've seen more detail on some of the prioritized Initiatives in our EPIC 5 Investment Plan, share a bit more on the key focus areas and preparation for projects.

You've told us today that we should prioritize a specific Initiative in your community. Answer the following questions with that Initiative and its related Research Topics in mind.

1. Priorities: Of the proposed research topics for this initiative, which would have the greatest positive impact in your community and why?

_____

_____

_____

2. Outcomes: How would your community know whether a project was truly beneficial? What would make a project feel relevant and valuable to your community?

_____

_____

_____

3. Stakeholders & Partners: Who else should be part of these conversations and may not be represented today?

_____

_____

Report-back (5 min): Each table shares a summary of the discussion.

Stay Connected

Join the EPIC Proceeding (Docket R.19-10-005) by filing a motion for "party status" with the CPUC to receive updates and invitations to workshops and program updates.

Contact PG&E: Britt Shaw, EPIC_info@pge.com

Sign up for the PG&E Innovation Newsletter: email innovation@pge.com with subject line "Newsletter sign up"

One Last Thought: General Feedback

Is there anything else you'd like PG&E to know? Any idea, concern, hope, or question we didn't ask about today that matters to you and your community? Please share it here:

_____

_____

Thank you for your time, your voice, and your partnership.

8. Stakeholder Interview: Community Environmental Council (CEC), July 31, 2026

To complement its workshops and group engagements, PG&E conducted a key opinion leader interview with the Community Environmental Council (CEC), a community-based organization serving Lompoc, Santa Maria, Guadalupe, Ventura, Oxnard, Santa Barbara, and Goleta. The interview was intended to gather qualitative, community-specific input from a trusted organization that works directly with underserved populations, with a focus on the barriers, trust factors, and communication preferences that shape whether EPIC-supported technologies and demonstrations reach these communities. The feedback shared during the interview was broad and extended beyond the scope of what the EPIC program can address. The EPIC-related input is summarized below; feedback outside EPIC's research and demonstration mandate will be shared with the PG&E teams best positioned to act on it.

- In addition to focusing on technology demonstrations, projects in DAC/LI communities need to also look at structural and informational barriers to clean energy adoption, including cost, housing tenure, language, digital access, and trust, which are often more determinative of adoption than the technology itself.
- Financing structures requiring upfront payment can limit participation among low-income and renter households, which are among the populations EPIC seeks to serve.
- Sustained, in-person presence and embedded local partnerships are important to building community trust, and that brand recognition or standalone campaigns may be less effective.
- In outage-prone sub-regions, resilience planning is an important companion to electrification efforts.

9. Stakeholder Interview: Community Action Partnership of Kern (CAPK), August 4, 2026

To complement its workshops and group engagements, PG&E conducted a key opinion leader interview with the Community Action Partnership of Kern (CAPK), a community-based organization providing services throughout Kern County across approximately 20 programs, including energy weatherization, utility assistance, Head Start, food bank, family resource centers, and veterans support services. The interview was intended to gather qualitative, community-specific input from a trusted organization that works directly with low-income households, with a focus on the barriers,

trust factors, and communication preferences that will determine whether EPIC-supported technologies and demonstrations achieve equitable adoption. The feedback shared during the interview was broad and extended beyond the scope of what the EPIC program can address. The EPIC-related input is summarized below; feedback outside EPIC's research and demonstration mandate will be shared with the PG&E teams best positioned to act on it.

- Home infrastructure, rather than electrification technology itself, is often the primary barrier to adoption in low-income communities; funding frequently covers new equipment but not the underlying repairs, such as roofs, electrical panels, or plumbing, needed to make that equipment viable in older homes.
- Grid reliability and the absence of backup power make full electrification a risk rather than a clear benefit for low-income households, particularly during the frequent outages the Central Valley experiences during extreme heat.
- Cost remains the primary barrier to EV adoption, compounded by higher utility bills from at-home charging, the expense of electrical panel upgrades needed to support home charging, and safety concerns associated with public charging in some neighborhoods.
- Many low-income residents rely on unreliable, subsidized phones and limited broadband access, particularly in rural areas, which constrains the effectiveness of outreach that depends on QR codes, apps, or websites.
- The organization identified electrical panel upgrades and window replacement as two foundational, currently underfunded investments that could enable future electrification in older, low-income homes.

Appendix A2: Equity Matrix with Equity Funding Summary

This Equity Matrix implements the principles of the EPIC Equity in RD&D Framework and supports the objectives of the DACAG Equity Framework by identifying research topic areas where direct benefits to disadvantaged vulnerable communities (DVCs), disadvantaged communities (DACs), low-income communities (LICs), and Tribes are expected to be evaluated through quantitative metrics. The matrix links anticipated community benefits to measurable outcomes, supporting equitable project selection, performance evaluation, transparency, and accountability in EPIC investment planning and reporting. Additional detail regarding alignment with the EPIC Equity in RD&D Framework is provided in Section 5 at the initiative level and Section 7 at the individual research topic level.

Because EPIC 5 projects have not yet been selected and funding is currently planned at the initiative level, PG&E cannot estimate a specific anticipated funding amount for equity impacts by individual research topic at this time. However, across the overall EPIC 5 portfolio and total program budget, PG&E will meet the portfolio-level commitment to direct at least 25 percent of investments to DACs and an additional 10 percent to LICs. Consistent with PG&E's EPIC 5 Community Engagement Plan and the CPUC's direction, this appendix includes only those research topic areas where direct community benefits are expected to be evaluated through quantitative metrics for equity communities.

Equity Benefits by Research Topic Area	Quantitative Equity Metrics
Initiative 1: Ensuring Cost-Effective and Timely Access to EV Connections for the Benefit of All Californians	
Topic 1.1: Accelerating non-residential, MHDV, and fleet electrification **Summary of Benefits** *(See Section 7 for detail)* • Improve air quality in DAC, low-income, and Tribal communities by accelerating MHDV electrification in areas with high pollution burdens. • Reduce cost and deployment barriers that can limit transportation electrification for smaller fleet operators. • Prioritize demonstrations serving public transportation, refuse, delivery, and drayage fleets operating near DAC and low-income communities.	*Where projects are sited in and benefit ESJ communities, the following metrics can help quantify direct impact, as relevant:* 1. Reduction in EVSE installation times by phase and community, tracked using interconnection, work-management records or similar (Customer-focused solutions, months) 2. Estimated GHG reduction in non-attainment areas and DACs from MHDV electrification, modeled using established tools such as CARB's EMFAC or equivalent (Decarbonization, Equity, CO_2e)
Topic 1.2: Advancing residential TE with specific emphasis on ESJ Communities **Summary of Benefits** *(See Section 7 for detail)* • Expand access to residential EV charging for DAC, low-income, and Tribal households facing the greatest charging barriers.	*Where projects are sited in and benefit ESJ communities, the following metrics can help quantify direct impact, as relevant:* 1. Reduction in customer-side installation cost for residential EV charging (Affordability, $) 2. Number of residential EV charging connections completed without triggering panel, service, or upstream grid upgrades, and the estimated value of upgrades avoided (Affordability, count, $)

• Reduce customer costs and upgrade requirements associated with residential EV charging installations. • Improve air quality in DAC, low-income, and Tribal communities by accelerating EV adoption in areas with high pollution burdens.	3. Reduction in time from customer EV purchase to operational charging, compared to current PG&E timelines (Customer-focused solutions, %) 4. Estimated expansion of residential EV charging access, measured from pilot deployment data against the population of DAC households currently lacking access (Equity, %).
Initiative 2: Enabling Affordable Load Growth Through Advanced Planning and Operating Capabilities	
Topic 2.1: Smart planning tools to holistically optimize upgrades across the system **Summary of Benefits** *(See Section 7 for detail)* • Improve visibility into capacity risk and investment needs in DVC and Tribal communities. • Reduce outage risk through improved planning, forecasting, and climate-informed analysis. • Improve affordability by identifying lower-cost alternatives to traditional infrastructure investments.	For most projects under this topic, PG&E does not expect direct, quantitative equity metrics. The anticipated benefits are expected to accrue to all PG&E customers and ratepayers, including ESJ and Tribal communities. A subset of projects may contribute direct reliability improvement, where projects are sited in and serving ESJ communities and Tribes. The following metric can help quantify direct impact, as relevant: 1. Reduction in forecasting error between forecasted and actual load for circuits using enhanced tools relative to baseline methods, with separate reporting for circuits in DAC, low-income, and Tribal communities; Once successfully scaled, solutions validated under this Topic would also produce improvement in the Affordability Ratio for customers, which delivers outsized impact for low-income households.
Topic 2.2: Solutions to optimize the cost and scope of grid upgrades **Summary of Benefits** *(See Section 7 for detail)* • Lower upgrade costs for circuits serving DAC, low-income, and Tribal communities. • Increase available grid capacity through improved utilization of existing assets and rights-of-way. • Reduce reliability risks through improved asset health monitoring and earlier failure detection.	For most projects under this topic, PG&E does not expect direct, quantitative equity metrics. The anticipated benefits are expected to accrue to all PG&E customers and ratepayers, including ESJ and Tribal communities. A subset of projects may contribute direct reliability improvement, where projects are sited in and serving ESJ communities and Tribes. The following metric can help quantify direct impact, as relevant: 1. Reduction in DER capacity-limited feeders/circuits serving DAC, low-income and Tribal communities (count, miles; Customer Solutions)
Topic 2.3: Enabling orchestration of flexible resources and a framework for valuing flexibility **Summary of Benefits** *(See Section 7 for detail)* • Expand access to load flexibility programs for DAC, low-income, and Tribal customers. • Increase customer compensation through improved flexibility valuation frameworks.	*Where projects are sited in and benefit ESJ communities and Tribes, the following metrics can help quantify direct impact, as relevant:* 1. Customers enrolled in load flexibility programs supported by this Topic in DAC, Low Income and Tribal communities (Reliability and equitable access, count) 2. Load flexibility program savings and compensation received by DVC customers (Equity and Affordability, %, $) 3. Load energized on an accelerated schedule, with disaggregated metrics for load energized in DAC, low-income and Tribal communities (Customer-focused solutions, kWh, MWh)

• Lower ratepayer costs by deferring capacity investments through flexible resources. • Reduce emissions impacts and support community resilience through CBO and Tribal engagement.	
Initiative 3: Accelerating Affordable Building Electrification Across Customer Groups to Enable Community-Scale Decarbonization	
Topic 3.1: Lowering the cost and complexity of building electrification from assessment to installation **Summary of Benefits** *(See Section 7 for detail)* • Lower retrofit costs for ESJ, DVC, low-income, and Tribal households. • Reduce customer drop-off by simplifying the electrification journey. • Increase retrofit completion by addressing remediation barriers.	*Where projects are sited in and benefit ESJ communities and Tribes, the following metrics can help quantify direct impact, as relevant:* 1. Reduction in all-in installed cost of retrofits for each validated solution, measured against PG&E service area baseline costs. Near-term target is a validated cost-reduction methodology for retrofit demonstrations (Affordability, $) 2. Reduction in customer time-to-completion, measured by elapsed time from initial inquiry to completed installation, disaggregated by building type (e.g., multi-family homes), and categorized by planned versus emergency replacement scenarios (Affordability, days) 3. Reduction in customers exiting the journey between assessment and installation, including the share of homes proceeding to completion despite surfaced remediation needs (Affordability, Customer-focused solutions, % of customers) 4. Increase in share of retrofit demonstrations located in and benefiting DAC, low-income, and Tribal communities, including disaggregated cost reductions and satisfaction scores (Equity, %)
Topic 3.2: Planning and detection tools for zonal electrification readiness **Summary of Benefits** *(See Section 7 for detail)* • Prioritize zonal electrification in DAC, DVC, low-income, and Tribal communities. • Reduce household energy burden for DAC and DVC residents once validated solutions are scaled. • Improve targeting of electrification programs through neighborhood-level planning and barrier-mapping tools. • Avoid stranded gas asset costs and defer electric grid upgrades through coordinated electrification.	For most projects under this topic, PG&E does not expect direct, quantitative equity metrics. The anticipated benefits of scaled solutions validated under this Topic are expected to accrue to all PG&E customers and ratepayers, including ESJ and Tribal communities. For relevant project scopes that demonstrate zonal electrification activities in DAC, low-income and Tribal communities, the following metric can help quantify direct impact: 1. Reduction in household energy costs relative to income, measured via billing data and structured surveys (Equity, $)

Topic 3.3: Unlocking electrification pathways for hard-to-decarbonize end uses **Summary of Benefits** *(See Section 7 for detail)* • Reduce co-pollutant emissions in ESJ and DVC communities by prioritizing high-impact industrial facilities. • Target electrification pathways with the greatest air quality benefits per dollar invested. • Support affordable electrification for manufacturers while maintaining local jobs and economic opportunity.	*Where projects are sited in and benefit ESJ communities and Tribes, the following metrics can help quantify direct impact, as relevant:* 1. Reduction in criteria pollutants from identified electrification pathways in ESJ communities, using CalEnviroScreen or related health-burden indicators on industrial sites (Equity; tons/kg)
Initiative 4: Understanding and Planning for Climate Impacts on Operations, Assets, and the Environment	
Topic 4.1: Enhancing climate and weather analytics to reduce systemic risk **Summary of Benefits** *(See Section 7 for detail)* • Improve targeting of resilience investments for DVC and Tribal communities facing the greatest climate risks. • Reduce outage and safety risks through enhanced weather, wildfire, tree health, and climate hazard modeling. • Prioritize investments in communities with elevated survivability risk. • Incorporate community and Tribal input into climate adaptation planning, implementation, and reporting.	While direct, quantitative equity metrics are not expected to be measured for this Topic, the anticipated benefits are expected to accrue to all PG&E customers and ratepayers, including DVCs, LICs, and Tribal communities. Once validated solutions are scaled, PG&E anticipates more direct benefit to communities which could be measured with the following metric: • Increase in the share of mitigation investment directed to communities with high survivability risk, tracked via hardening, undergrounding, and resiliency assets sited, using modeled vulnerability-informed survivability metrics (Safety, Equity; %)
Initiative 5: Building Community Resilience from Prevention Through Recovery	
Topic 5.1: Prevent: Understanding & mitigating risk to communities & customers **Summary of Benefits** *(See Section 7 for detail)* • Reduce climate-driven outage, ignition, and safety risks through proactive monitoring and reactive protection strategies. • Lower long-term ratepayer costs through avoided ignitions, reduced outage impacts, improved asset reliability, and more efficient vegetation management. • Improve affordability by reducing the cost and complexity of prevention technologies and interventions.	*Where projects are sited in and benefit ESJ communities and Tribes, the following metrics may be used to help quantify direct impact, as relevant:* 1. Increase in number of technology demonstration deployments located in and benefiting DVCs and Tribes in HFTDs, and reduction in outage exposure for repeat-event customers (Equity, count) 2. Reduction in climate-driven fault, outage, and ignition events, including down-conductor events and high-impedance faults avoided through expanded coverage, and fault rate reductions on undergrounded segments relative to the overhead segments they replace (Reliability, Safety; count) Some projects under this Topic will not deliver direct benefits to specific communities, but the anticipated benefits of improved

• Support equitable and cost-effective distribution of climate resilience investments across PG&E's service territory.	affordability, safety and reliability are expected to accrue to all PG&E customers and ratepayers, including DVCs, LICs, and Tribal communities.
Topic 5.2: Withstand: Minimize community & customer impacts **Summary of Benefits** *(See Section 7 for detail)* • Reduce repeat outage exposure for rural, low-income, Tribal, and disadvantaged communities. • Shorten restoration times through advanced PSPS/EPSS restoration and grid automation solutions. • Maintain critical load during outages through community-scale microgrids and battery deployments. • Reduce fire consequences in HFTDs and WUI communities through improved detection, response, and suppression technologies.	*Where projects are sited in and benefit ESJ communities and Tribes, the following metrics may be used to help quantify direct impact, as relevant:* 1. Reduction in outage frequency and duration, against pre-intervention baselines, with specific attention to repeat-exposure customers (Reliability, SAIDI/SAIFI/CEMI) 2. Increase in number of strategies demonstrating outage ride-through/recovery and % of critical load maintained during outage events, measured by customer time to restoration and number of critical customers served by microgrids and/or batteries (Resilience; count, %)
Topic 5.3: Recover: Rebound from catastrophic events **Summary of Benefits** *(See Section 7 for detail)* • Reduce repeat outage exposure for disadvantaged, low-income, and Tribal communities through improved post-event recovery and resilience planning. • Improve recovery decisions for communities facing longer outages and slower restoration. • Preserve ecosystem value through improved fire-damaged tree assessment and risk-based removal decisions. • Reduce truck traffic and air quality impacts through localized wood densification and conversion pathways.	*Where projects are sited in and benefit ESJ communities and Tribes, the following metrics may be used to help quantify direct impact, as relevant* 1. Avoided GHG emissions from reduced transport and fossil fuel-powered equipment, tracked as an air quality benefit for DVCs (Environmental sustainability, Customer-focused solutions; CO_2e) Some projects under this Topic will not deliver direct benefits to specific communities within the project period, or will deliver benefits to ecosystem value that is not easily quantified. Once validated and scaled, the innovation under this topic is expected to deliver benefits in improved safety and reliability that accrue to all PG&E customers and ratepayers, including DVCs, LICs, and Tribal communities.
Initiative 6: Exploring Pathways to Streamline Interconnection & Energization for DERs and New Load	
Topic 6.1: Streamlining customer interconnection **Summary of Benefits** *(See Section 7 for detail)* • Reduce interconnection delays for DER, EV charging, and V2X projects in	For most projects under this topic, PG&E does not expect direct, quantitative equity metrics. The anticipated benefits are expected to accrue to all PG&E customers and ratepayers, including ESJ and Tribal communities. A subset of projects may contribute directly to building electrification and DER energization with cost and timeline improvements, where projects are sited in and serving ESJ

DACs, low-income, ESJ, and Tribal communities. • Accelerate access to electrification, demand flexibility, and resilience benefits in priority communities. • Lower customer costs by improving study processes, reducing rework, and increasing visibility into grid constraints. • Incorporate community, Tribal, and local government input to identify barriers and improve equitable interconnection outcomes.	communities and Tribes. The following metrics can help quantify direct impact, as relevant: 1. Decrease in interconnection time from application to Permission to Operate with separate reporting for projects in DACs and low-income communities (%; Customer Solutions) 2. Load interconnected on an accelerated schedule (kWh/MWh; Affordability) 3. DERs and EV charging installations in DACs and low-income communities interconnecting within CPUC-established energization target timeframes (count; Customer Solutions)
Topic 6.2: Accelerating speed-to-power **Summary of Benefits** *(See Section 7 for detail)* • Accelerate deployment of DERs, EV infrastructure, and building electrification technologies for disadvantaged, low-income, ESJ, and Tribal communities. • Reduce energization timelines for DVC and Tribal projects by enabling safe temporary service before permanent grid upgrades are complete. • Lower reliance on fossil-dependent interim solutions while supporting localized capacity needs. • Reduce the likelihood of load shed affecting vulnerable populations during grid stress events.	For most projects under this topic, PG&E does not expect direct, quantitative equity metrics. The anticipated benefits are expected to accrue to all PG&E customers and ratepayers, including ESJ and Tribal communities. A subset of projects may contribute directly to building electrification and DER energization with cost and timeline improvements, where projects are sited in and serving ESJ communities and Tribes. The following metrics can help quantify direct impact, as relevant: 1. Decrease in time to receive service for DVC and Tribal projects, measured from interconnection request to in-service date, relative to baselines where bridging solutions are not deployed (%; Customer Solutions) 2. Load energized in DAC, low-income and Tribal communities on an accelerated schedule (kWh/MWh; Affordability)

Appendix A3: Mapping of Planned Investments to the Electricity System Value Chain

The following table illustrates how the RD&D topics of the EPIC 5 Investment Plan map to the electricity system value chain, which CPUC specifies as including as grid operations/market design, generation, transmission, distribution, and demand-side management.

Topic Name	Grid Operations/ Market Design	Generation	Transmission	Distribution	Demand-Side Management
Accelerating non-residential & fleet electrification				X	X
Advancing residential transportation electrification with specific emphasis on ESJ Communities				X	X
Smart planning tools to holistically optimize upgrades across the system	X	X	X	X	
Solutions to optimize the cost and scope of grid upgrades	X	X	X	X	
Enabling orchestration of flexible resources and a framework for valuing flexibility	X	X	X	X	X
Lowering the cost and complexity of building electrification from assessment to installation				X	X
Planning and detection tools for zonal electrification readiness	X		X	X	X
Unlocking electrification pathways for hard-to-decarbonize end uses				X	X
Enhancing climate and weather analytics to reduce systemic risk	X		X		
Prevent: understanding & mitigating risk to communities & customers				X	
Withstand: minimize community & customer impact				X	
Recover: rebound from catastrophic events				X	
Streamlining Customer Interconnection	X	X		X	X
Accelerating speed-to-power					X

Appendix A4: Information Summary of Demand Response Research, Development and Demonstration Activities

The Electric Program Investment Charge (EPIC) Decision (D.) 13-11-025 requires informational summaries of the IOUs' Research, Development and Demonstration (RD&D) activities undertaken as part of their approved Energy Efficiency (EE) and Demand Response (DR) portfolios. Pacific Gas and Electric Company's (PG&E) understanding is that the California Public Utilities Commission (CPUC) requests this information to confirm non-duplication of efforts.

PG&E's EE, DR, and EPIC Programs Are Distinct Programs with Separate Objectives

PG&E established its EE Program in 1976 and its DR Program in 1959. Each program has a distinct program focus, which is described in further detail below and is separate from EPIC's focus. Both the EE and DR programs provide program updates to the CPUC on the progress of these projects through either written reports or in person meetings. A summary of RD&D-type activities, including the purpose, funding, deliverables and progress to date, has been provided below in Tables B-2, B-3 and B-4, including PG&E's EE-Emerging Technology Program (ETP) projects, the joint Statewide EE-ETP projects, and the DR Emerging Technology (DRET) projects, respectively. The EE, DR and EPIC program owners have developed program guidelines to delineate the differing focus areas, which is provided in Table B-1.

Summary of EE and DR RD&D–Type Activities

PG&E's EE Portfolio is part of California's statewide initiative to achieve the state's EE goals by providing EE products, services and process improvements to end customers, through the use of rebates and incentives, energy analyses, and workforce training and education. Activities in the Energy Efficiency–Emerging Technology Program (EE-ETP) are not generally considered "RD&D," as they are focused on assessing, demonstrating, and deploying commercially deployed technologies. This approach differs from the focus for EPIC which targets demonstrations for pre-commercial technologies. The EE-ETP facilitates customer adoption of commercially available new and underutilized EE technologies, practices, and tools. The program is designed to help California customer -funded EE programs meet the state's energy reduction needs by identifying cost--effective measures that deliver reliable energy savings.

In general, the distinction PG&E makes between EE-ETP and EPIC programs is that EE-ETP's focuses on customer-side EE technologies and individual customer adoption via incentives, whereas the Utility's EPIC program covers non-EE initiatives and/or initiatives that incorporate/integrate EE, as well as other types of demand management (e.g., Integrated Distributed Energy Resources). The market facilitation of new technologies, a component of EE-ETP, is explicitly disallowed in EPIC for the IOUs, thereby further delineating Utility EE and EPIC programs. Finally, while EE-ETP is for both electric and gas applications, the Utility EPIC program is for electric Technology Demonstration and Deployment (TD&D) only.

PG&E's Demand Response Emerging Technology (DRET) Program is part of California's statewide program, which provides an opportunity for customers to play a significant role in the operation of the grid by changing their electricity consumption during peak periods in response to either economic or reliability signals. PG&E's DRET Program explores new technologies and applications that have the potential to enable or enhance DR capabilities and can include hardware, software, design tools, strategies, and services. The EPIC program avoids DR-only technology demonstrations and instead focuses on more targeted technologies that might serve additional use cases, such as supporting customer electrification or improving secondary transformer life.

In order to further delineate the focus of each program, Table 4-A summarizes the differences and similarities of the EE-ETP, DRET, and EPIC programs described above.

Table 4-A: Comparison of EE-ETP, DRET, and EPIC Programs

Program Considerations	EE-ETP	DRET	EPIC
Does the program demonstrate grid optimization technologies or customer side technologies?	Customer Side	Customer Side	Both
Does the program demonstrate pre-commercial/not yet widely commercialized or commercialized technologies?	Not yet widely commercialized & commercially available	Commercially available	Pre-commercial or not yet widely commercialized
Does the program support electric or gas applications?	Electric & Gas	Electric only	Electric only
Does the program have a demand side focus or grid integration focus?	Demand-Side	Both (demand side for ultimate grid integration)	Both
Does the program focus on the site-specific net effect on load or aggregated effect on load?	Site-Specific	Both	Aggregated
What aspect of technologies does the program evaluate?	Energy savings & peak demand performance verification	Depends on assessment; Often load impact	Broad Range (Stronger focus on demonstration)
Does the program evaluate the existing program and process?	No	Sometimes	Sometimes
Does the program assess the technology capability of peak load reduction or load shifting?	Load reduction	Both	Both

Tables 4-B and 4-C list the activities in PG&E's EE-ETP portfolio and the Statewide EE-ETP portfolio respectively. These tables include each project's description/purpose, funding, deliverables, and progress to date. Table 4-D summarizes the DRET projects which include the projects' description/purpose, funding, deliverables, and progress to date.

Table 4-B: PG&E EE-ETP Projects

Project Start Year	Project Name	Purpose	Funding	Deliverables	Progress to Date
2017	APS2 Online Limited-Time-Offer ET Assessment	The project will assess the effectiveness of a downstream, self-install approach by selling 1,000 devices to interested customers, who will be surveyed to understand install and persistence rate.	$150,000	ET Report	Completed
2017	Agricultural-Industrial Controls Market Study	Review of market adoption of VSD/Control systems for possible expansion of product offering and re-write of Work Paper.	$7,500	WP Updates	Completed
2017	Airflow Management for Data Centers	Allowing cost-effective implementation of air management in small data centers is important since the vast majority of the remaining potential for savings in data centers is in small centers. We will test air management packages in live data centers to refine the packages and the energy modeling estimates from a 2016 PG&E study. LBNL will standardize the packages for large-scale deployment to allow deemed savings. The deliverables will include descriptions of the improved packages and a detailed implementation roadmap.	$125,000	N/A	Cancelled
2017	Water AMI Pilot	The effort was mandated by CPUC as part of Water/Energy Nexus; CPUC approved the scope of the project in D.16-06-010 on June 9, 2016. The project seeks to assess the value of providing customers with near real-time granular water use reporting as a means of determining how behavior and technology-based water interventions can reduce water usage, peak energy usage, and total energy usage. For the purpose of this study, PG&E and its partners, East Bay Municipal Utility District and UC Davis, will use customer meter data (at the highest resolution available) for residential electricity, gas, and water consumption, as well as targeted water and energy conservation messaging.	$400,000	ET Report	Complete
2017	Energy Management Circuit Breakers - EPRI	Eaton has recently developed a new type of circuit-breaker, the Energy Management Circuit Breaker (EMCB), that fits into a standard electrical sub-panel with embedded data monitoring and ability to remotely turn the breaker on or off. After running a lab test of the circuit-breaker, EPRI is using customer field deployments to gain further understanding of the technical and market potential of the circuit breaker, in collaboration with 12 other utilities with each utility defining their own scope, use	$375,000	N/A	Cancelled

		case, and learnings. The EMCB is potentially an integrated, turnkey solution for circuit-level monitoring that needs validation as a measurement and monitoring device.			
2017	Connected Home Market and Technical Characterization Study	The project will conduct a state of the industry study of the stacked effect? in the Connected Home space, with the goal being to have a deeper understanding of the market players and value when optimized energy consumption is provided, or not provided, to residential households.	$75,000	ET Report	Complete
2018	Connected Restaurant EMS	SMB customers are high EUI establishments who often don't understand where their energy consumption comes from and thus do not have the tools to reduce their energy use. Gridpoints Building Management Systems (BMS) technology includes sub-system controls and data analytics to provide the tools necessary for such establishments to understand and reduce their energy consumption. This project will test the energy savings potential of a the SiteSage BMS technology at a one specific SMB customer site.	$200,000	ET Report	Complete
2018	HVAC Monitoring and Controls for SMB	To Be Determined	$450,000	N/A	Cancelled
2018	Connected Home Product Bundle Field Study	The study will assess the technical and customer satisfaction aspects of bundles including smart thermostats, lights, switches, and other devices.	$300,000	ET Report	Complete
2018	Development of a Laboratory Data-Based Algorithm for Horizontal Drain Water Heat Recovery Devices, and Predictions of In-Field Performance	This project evaluated H-DWHR performance and practical issues through laboratory testing of three HDWHR devices, algorithm development, and simulation studies.	$0	ET Report	Complete

2020	Sensor Based Range Hoods	The project objective is to investigate the technical and market feasibility (including consumer acceptance) of different sensor-based range hoods, with the goal of using results to inform Title 24-2025 code change proposals and other programs supported by PG&E that could benefit from an understanding of how range hoods play a role in improving indoor air quality, especially in smaller dwelling spaces. Goals include: 1) Identify existing and emerging products that use or could be adapted with integrated sensors, including after-market products for automated control of kitchen range hoods that exhaust to outdoors; 2) Assess energy and indoor air quality (IAQ) performance, economics, adoption feasibility and consumer acceptability of these products; and 3) Recommend solutions that could be included in 2025 Title 24, Part 6 code change proposals and future utility work papers	$372,770	ET Report	Completed
2021	Thin-Glass Triple-Pane (TGTP) Windows Tech Intro Support	Evaluate the market-readiness, through production home builder demonstrations in climate zones 11, 12, or 13 with a limited number of incentivized homes per project, of triple-pane windows with a thin center pane of glass (≤ 2mm thick), fitting into a typical double-pane window frame with an NFRC-rated U-factor ≤ 0.22 and SHGC that will comply with the Energy Code. This project tests for procurement challenges, cost, and installation issues.	$485,000	Report	Completed
2021	Climate Wizard 3 (CW3) Modeling and Insulated Duct Analysis	The CW3 is a cooling system which provides 100 percent outdoor air. Since the system relies solely on evaporating water to produce cooling, there is no compressor energy use or associated refrigerant, which allows the system to achieve very high efficiencies. This project evaluates the CW3 for both residential and classroom applications and compliments the CVRH project.	$195,408	ET Report	Completed
2021	Central Valley Research Homes (CVRH)	The CVRH project converted four existing single-family buildings in Stockton, California into unoccupied laboratory houses to study residential energy saving opportunities. Current focuses include testing the performance of VCHPs (mini-split heat pumps) at two, one is evaluating a Sanden HPWH (for space heating and hot water) and a CW3, and the fourth focuses on air-to-water heat pump performance, coupled with radiant ceiling panels, hydronic fan coils, and thermal energy storage.	$2,093,990	ET Report	Completed

2021	Midstream Heat Pump Water Heater (HPWH)	The project will test various strategies to engage midstream market actors and conduct an assessment to accelerate the adoption of connected unitary heat pump water heaters with controls for load-shifting for retrofit applications. Data collected will include panel upgrade needs, cost, labor information and DR aspects. This project is supported by PG&E's EE and DR Programs and will build upon the knowledge gained during prior HPWH studies.	$1,000,000	ET Report	Completed
2021	Controlled Environment Horticulture Tech Evaluation	Investigate the energy reduction potential of lighting and controls systems that integrate HVAC with other energy end uses for CEH facilities;	$450,000	ET Report	Completed
2021	Villara Three-Function Heat Pump	Investigate Energy Savings Potential of three function HP system for Residential Heating, Cooling and Hot Water	$175,000	ET Report	Completed
2021	Induction Cooktop Loaner Program	To help support introduction of Induction Cooktops to both Residential and Commercial Market Segments. To help identify obstacles to adoption by allow customers to "try it before you buy it" Includes technical support to commercial food service customers utilizing the Food Service Technology Center	$257,000	ET Report	Completed
2021	Advanced Water Heating Initiative and Grid Optimal Support	To Transform Residential Water heating market to HP Technology by creating demand through awareness and incentives directed at multiple points through supply channel. (Direct to customer, Dealer & retailer incentives). Project also includes placement of brand new 120v HP water heater designs intended to overcome existing home panel capacity issues. Project also includes TOU research to ensure added electric load is minimized at peak demand periods	$509,990	Report Published by NBI	Completed
2021	Intertek Portable Battery Testing	Conduct Performance Testing on residential battery systems	$200,000	Expected FDAS CASE Report	Completed
2021	XeroHome/Vistar	Existing Home Energy Modeling in in SLO and Petaluma	$466,000	ET Report	Completed

Table 4-C: Statewide EE ETP Projects

Project Start Year	Project Name	Purpose	Deliverables	Progress to Date
2022	ET22SWE0023 - Occupancy-based Thermostats for Commercial Offices	The proposed project will assess the use of occupancy sensors in HVAC systems comprising single HVAC unit serving multiple building zones. By installing wireless connected occupancy sensors in each served space of a single system, the sensors can communicate with the system thermostat to shut off the system when all served spaces are unoccupied. For example, this could reduce energy consumption on days when teams are working from home, during lunchtime hours, or Fridays when many businesses offer modified work hours as an employee benefit. The technology can be used in both new and existing construction. For existing construction, occupancy-based thermostat will replace or be added onto existing thermostat that controls the single-zone HVAC unit. The thermostat can work with any type of single-zone HVAC units, which are typically constant speed units.	Expected ET Report	In Process
2022	ET22SWE0022 - Residential Housing Characteristics Study	This California Low-Income Residential Housing Characteristics Study project proposes to address the lack of complete data on housing structures in disadvantaged communities (DAC) and Hard-to-Reach (HTR) single family residential housing. While high level data such as number of homes in DACs and other key demographic and market information (housing age, access to broadband, etc.) can be pulled from census and other research, data on the baseline physical conditions of DAC and HTR homes is lacking (i.e., structural integrity, electrical panel and wire capacity, and code adherence). This data is foundational to being able to both size the total available market for emerging technologies and develop effective, properly budgeted program pathways to serve and transform these communities. The results will help facilitate deployment of emerging technologies including heat pump water heaters, heat pump HVAC, smart plug loads, efficient appliances including induction stove-tops, home networking equipment, and other decarbonization measures.	Expected ET Report	In Process

2022	ET22SWE0021 - Residential Multi-Function Heat Pumps: Product Search	This proposed technical market characterization project will complete a product search from the largest HVAC and hot water heating equipment manufacturers to identify what residential air-to-air multi-function heat pump products are commercially available or soon to be commercially available in California. This project will be a combination of primary research surveying manufacturers as well as secondary research through literature searches. This project will produce a list of available products and specifications including rated efficiency energy savings estimates compared to mixed fuel and all electric baselines. This product search will inform future projects to improve equipment design, validate energy efficiency through laboratory and field demonstrations, and determine costs for equipment and installation.	Expected ET Report	In Process
2022	ET22SWE0020 - Variable Refrigerant Flow (VRF) Refrigerant Management Market Assessment	This market assessment will provide clarity on anticipated market adoption of VRF systems, the lifetime GHG emissions potential of those systems if no action is taken, and the mitigation strategies that can be implemented to maximize that environmental, economic, and social benefits of commercial heat pumps. Additionally, the project will build upon and complement the current Commercial VRF Fuel Substitution measure development activity also being performed by Energy Solutions, by bringing in new market study activities including stakeholder engagement and a deeper focus on new system installations.	Expected ET Report	In Process
2022	ET22SWE0019 - Market Potential for Heat Pump Assisted Hot Water Systems in Food Service Facilities	Electrifying the building sector is a critical step towards meeting California's decarbonization goals. Water heating for food service applications represents 340M therms of gas consumption and thus presents a significant electrification opportunity through the application of heat pump (HP) assistance. For the proposed study we will conduct a market assessment of the potential for adoption of heat pump-assisted hot water systems (HPaHWS) in food service facilities. This market assessment will evaluate the total reachable market and the market penetration potential for HPaHWS. We will also address the market barriers and opportunities for adoption of HPaHWS as they currently exist. This study will occur in three phases: Literature search, Interviews, Numerical data collection and analysis.	Expected ET Report	In Process

2022	ET22SWE0017 - Commercial and MF CO2-based Heat Pump Water Heater Market Study and Field Demonstration	The study will build on existing research and non-residential HPWH initiatives with a focus on the California market, policies, rate structures, efficiency programs, demand flexibility programs, and market barriers. The field study will evaluate product performance and impacts on energy, cost, and greenhouse gas emissions (GHG) of the technology relative to baseline natural gas as well as load flexibility capabilities in the context of CA rates and the new Total System Benefit (TSB) metric for EE programs. The product will be installed, monitored, and analyzed at two participant MF sites.	Expected ET Report	In Process
2022	ET22SWE0010 - All-Electric Commercial Kitchen Electrical Requirements Study Evaluation	This study will identify the electrical service requirements for various sizes of foodservice facilities such as quick serve, full service, cafeterias, and hospitality. This will help understand the costs, electrical load requirements, electrical service upgrade costs, and potential electrical load growth for commercial foodservice facilities in CA in converting to all-electric kitchen designs. We would work with market actors such as design/build firms to develop prototype buildings for electrical service requirements. Once the electrical service requirements have been developed for multiple prototype foodservice facilities, cost research will be completed to determine the cost of upgrading electrical service for an all-electric kitchen. Based on the electrical service requirements for the foodservice prototypes, the study will estimate the increased load associated with converting all foodservice facilities in CA to all-electric kitchen designs.	Expected ET Report	In Process

Table 4-D: DRET Projects

Project Start Year	Project Name	Purpose	Funding	Deliverables	Progress to Date
2017	Lab Test to Understand Existing Technologies' Ability to meet CAISO Telemetry Requirements for PDR	To explore the technical feasibility of the second solution set: using a Zigbee to broadband gateway communicating to a cloud RIG. The lab study tested two devices: the Rainforest EAGLE and the Universal Devices ISY and used Olivine's CAISO approved RIG	$100,001 to $250,000	DRET Report	Completed

2017	Title 24 – Marketing Education and Outreach	To educate and inform key market actors who will be impacted by the requirement or can exert an impact throughout the compliance industry. These include equipment manufacturers and design professionals, installers that implement the designs, acceptance test technicians that verify the proper operation, and building department staff that enforce the requirements	$100,001 to $250,000	DRET Report	Completed
2017	Telemetry Field Study	To evaluate ability for Demand Response Providers (DRPs) to meet the telemetry requirements in a cost-effective manner could unlock more DR to be bid into the wholesale market and meet the various needs of the grid	$100,001 to $250,000	DRET Report	Completed
2017	Automated Demand Response (ADR) Assessment of Residential Incentives and Technologies	To conduct a review of the PG&E's current ADR program design and extract how the lessons learned to date can provide information for further enhancement to the ADR program	$250,001 to $500,000	DRET Report	Completed
2018	Expansion of the Deemed Auto-DR Express/Fast Track Solutions	To increase automated demand response market penetration of SMB customers by expanding SMB eligible measures, adding additional facility types	$100,001 to $250,000	DRET Report	Completed
2018	Secured Data Sharing to improve residential DR programs' enrollment process	To collect information in order to create a smooth and secure customer authentication, authorization, and enrollment framework for DR pilots and programs in the future	$100,001 to $250,000	DRET Report	Completed
2018	Watter Saver Pilot	To test program implementation approaches that can be used for an actual program if the AB 2868 proposal is approved or in the alternate if the EE or DR programs leverage water heating for Energy Efficiency (EE) and DR benefits in the future	$250,001 to $500,000	DRET Report	Completed
2018	Connected Home Product Bundle Field Study	To explore the way that customers are currently interacting, and could interact, with new Energy Management Technologies (EMTs) for a variety of different energy management-related applications	$100,001 to $250,000	DRET Report	Completed
2018	Testing Statistical Sampling Methodologies and Alternative Baseline	To develop and analyze a Type-II methodology so that all residential customers may be able to participate in CAISO's wholesale markets	$100,001 to $250,000	DRET Report	Completed

2018	GHG Grid signal indicator lab test	To confirm that smart devices can be automatically controlled by a continuous/high frequency dispatch Demand Response (DR) signal (based on a combination of near-real-time GHG data from power grid operators and a forecast of grid conditions over a 30-day planning horizon) in a lab environment	$100,001 to $250,000	DRET Report	Completed
2018	Integrated Energy Efficiency and Demand Response Programs: Breaking Down Silos	To review experiences with integrated EE/DR programs. Key objectives will be to assess promising opportunities, identify barriers, and recommend supportive policies for greater integration of utility EE and DR programs that yield greater benefits to customers at lower costs than would separate programs	$100,001 to $250,000	ACEEE Report	Completed
2018	Bundling Energy Efficiency with Distributed Energy Resources	To explore projects that have bundled technologies and look at existing program offerings for efficiency retrofits, distributed energy resources, energy storage, and electric vehicle integration	$100,001 to $250,000	ACEEE Report	Completed
2019	Research project on the approach to calculate ADR control incentives	To engage in an approximately one-year research project to identify the new deemed approach and values for ADR control incentives	$100,001 to $250,000	DRET Report	Completed
2019	Evaluate 3rd parties interest on residential digital rate	To evaluate 3rd party (example: IDSM aggregators and smart energy vendors) interest in receiving residential digital rate in order to help residential customers to be successful when enrolling a dynamic rate such as TOU, EV and Smart Rate	$500,001 and up	DRET Report	In process
2020	Develop a residential ADR incentive for EV Charging Controls	To develop a residential ADR incentive for EV charging controls, this study will test EV charging controls in a field setting and measure the DR impact of such technologies	$500,001 and up	DRET Report	Completed
2020	Using voice automation technology for load management	To leverage residential voice assistants technology (such as Amazon Alexa, Google Home) to educate residential customers on energy usage and bill forecast, rates and Time-Of-Use automation/optimization, available of Internet-of-Things (IoT) and connectivity, configuration, and notification on utility information	$250,001 to $500,000	DRET Report	In process

2020	Heat Pump Water Heater barriers and mid-stream solution study	To identify potential solutions to barriers on HPWH technology, with a focus on leveraging mid-stream channels such as contractors, distributors, and retailers to increase adoption of this technology	$250,001 to $500,000	DRET Report	In process
2021	BTM Battery for Load Management Study	To collect data such as customer load performance and effectiveness of different algorithm during 2021 and 2022 to inform optimal program design for aggregators and customers with a BTM battery, which would help the DR team to file the 2023-2027 DR funding application in November 2021	$500,001 and up	DRET Report	In process
2021	New DR Program/Rate designs for Ag customers	To collect data on new DR Program/Rate designs for Ag customers during 2021 in order to create a draft DR program design for agricultural and irrigation customers to be filed by PG&E in November 2021 for the 2023-2027 DR funding application	$250,001 to $500,000	DRET Report	Completed
2021	TOU optimization study with smart technologies	To evaluate if residential smart technologies such as smart thermostat can optimize TOU customers HVAC energy use in order to shift customers energy usage from peak to non-peak and potentially result in customers' bill saving	$500,001 and up	DRET Report	Completed
2021	Residential Battery as Virtual Power Plant (VPP) Study	To evaluate how BTM residential battery system can be used to provide value to the customers and the grid during grid emergency	$100,001 to $250,000	DRET Report	Completed
2022	Residential Smart Panel Lab and Field study	To evaluate the function of smart panel	$500,001 and up	DRET Report	In process

Appendix A5: Disadvantaged Communities Advisory Group Engagement

PG&E's engagement with the Disadvantaged Communities Advisory Group (DACAG) has served as an important input into the development of its EPIC 5 Community Engagement Plan and broader approach to equity-centered EPIC investment planning. The EPIC 5 Community Engagement Plan, dated June 26, 2026, describes alignment with the DACAG Equity Framework by incorporating key framework priorities, including access, outreach, education, community engagement, metrics, evaluation, and accountability, into PG&E's approach for engaging equity communities and Tribes throughout EPIC investment planning, project selection, implementation, and reporting.

As part of the EPIC 5 investment planning phase, PG&E presented draft Community Engagement Plan concepts to DACAG at its April 17, 2026 meeting and gathered advisory input on how engagement should be structured to better inform EPIC decisions. The feedback emphasized the need for clearer linkages between community input and program outcomes, transparent tracking of engagement themes, clearer expectations about what types of input are within EPIC's scope, stronger engagement with Tribal governance structures, greater awareness-building about EPIC, and sustained communication throughout the EPIC lifecycle.

Table 5-A: Feedback and PG&E Responses at DACAG Meeting

Stakeholder	Feedback/Question/Comment	PG&E Response
DACAG Member	Engagement should inform decisions, with clearer linkage between input and outcomes.	PG&E will implement a structured feedback loop to document, synthesize, and consider input at key decision points, including investment planning and project selection, and will report how input informed decisions through CEP reporting.
DACAG Member	Track engagement themes and clearly report how input is incorporated or why it is not.	PG&E will document engagement themes and incorporate them into reporting, using metrics and narrative summaries to show how input is considered and integrated into program decisions.
DACAG Member	Clearly set expectations about the types of input within EPIC scope, including program constraints.	PG&E will clearly define the purpose of engagement, the input sought, and any constraints in materials and workshops to support more focused and effective participation
DACAG Member	Increase engagement with Tribal governance structures through existing leadership forums to strengthen connections with Tribal communities.	PG&E will align with Tribal Liaisons and existing Tribal forums, including leadership convenings, to support relationship-building and engagement. PG&E has begun participating in these forums to better understand Tribal priorities and will continue to refine its approach in consultation with Tribal representatives.
DACAG Member	Stakeholders noted limited awareness of EPIC, including its purpose, customer bill impacts, and available benefits.	PG&E will expand use of plain-language materials, including EPIC overview content and CBO toolkits, to improve awareness, accessibility of information, and support informed participation.

DACAG Member	Maintain ongoing engagement and communication throughout the EPIC lifecycle, including follow-up updates and information on projects and outcomes.	PG&E will include engagement opportunities during project development and leverage advisory groups and CBO partnerships to support ongoing input, with continued evaluation of opportunities for deeper collaboration as projects are defined.

PG&E incorporated this DACAG feedback into the EPIC 5 Community Engagement Plan by committing to structured feedback loops that document, synthesize, and consider input at key decision points, including investment planning and project selection. PG&E also committed to reporting how input is incorporated into EPIC decisions, or explaining why it is not incorporated, through engagement summaries, metrics, narrative reporting, and public-facing materials. These commitments are intended to make EPIC engagement more transparent, accountable, and responsive to disadvantaged and vulnerable communities.

DACAG engagement also informed PG&E's approach to Tribal engagement and ongoing communication. In response to DACAG feedback, PG&E identified opportunities to work through Tribal Liaisons and existing Tribal leadership forums to support relationship-building and culturally appropriate engagement. PG&E also expanded its planned use of plain-language EPIC materials, including overview content and community-based organization toolkits, to improve awareness of EPIC's purpose, customer bill impacts, and potential community benefits.

Overall, PG&E's DACAG engagement within EPIC helped shape a more explicit accountability framework for community engagement. The resulting approach emphasizes early and ongoing engagement, clearer documentation of feedback, accessible materials, coordination with trusted community and Tribal channels, and reporting that connects community input to EPIC investment planning, project selection, implementation, and outcomes.

Appendix A6: Tribal Engagement

PG&E's Tribal engagement within the Electric Program Investment Charge (EPIC) program is designed to support early, ongoing, and meaningful collaboration with California Native American Tribes throughout the EPIC lifecycle. PG&E recognizes that engagement with Tribal governments is distinct from non-Tribal community outreach because Tribes are sovereign governments with unique protocols, cultural considerations, and decision-making structures. For that reason, PG&E's EPIC approach is guided by a government-to-government framework and coordinated through PG&E's established Tribal Liaisons, who help ensure engagement is culturally appropriate, respectful of Tribal preferences, and responsive to Tribal priorities.

PG&E's approach builds on its broader commitment to partnership with Tribal governments, communities, and organizations across its service area, which includes the ancestral territories of more than 100 unique Native American Tribes. Through EPIC, PG&E seeks to understand Tribal energy, resiliency, climate adaptation, safety, affordability, and sustainability priorities and to identify opportunities for Tribal perspectives to inform investment planning, project selection, implementation, metrics, and reporting. Tribal engagement is also intended to help ensure that EPIC investments produce measurable benefits for Tribal communities and Tribal lands, consistent with CPUC expectations for equitable research, development, and deployment.

PG&E has begun using multiple engagement channels to introduce the EPIC program to Tribal representatives, gather input on Tribal energy and resiliency priorities, and identify opportunities for partnership in future EPIC projects. PG&E's EPIC team participated in the Annual Tribal Leaders Energy and Safety Summit from May 18–20, 2026, where the team listened to priorities shared by panelists representing Tribes and CBOs, met with attendees from CBOs and Tribes, and distributed information about upcoming EPIC 5 engagement opportunities. PG&E also hosted regional ESJ Communities and Tribes workshops for Northern California on May 28, 2026, and Southern California on June 18, 2026, to share information about EPIC 5 investment planning, invite feedback on community and Tribal priorities, and support broader awareness of opportunities to participate in and benefit from EPIC projects. In addition, PG&E presented the EPIC program during PG&E's Tribal Webinar for the Community Wildfire Safety Program on June 30, 2026, using that existing Tribal engagement forum to describe EPIC's purpose, discuss potential areas of alignment with Tribal energy, resilience, and wildfire safety priorities, and seek interest from Tribes in partnering on upcoming EPIC projects.

PG&E's Tribal engagement practices emphasize accessibility, transparency, and respect for confidentiality. Engagement materials will be developed in plain language, and PG&E may provide optional pre-briefings, interpretation services, flexible scheduling, and compensation for Tribal participation where appropriate. PG&E also recognizes the sensitivity of Traditional Ecological Knowledge and other culturally specific information. The EPIC team will work with Tribal participants to understand what information is appropriate to document publicly and will rely on Tribal Liaison guidance regarding confidentiality, data sovereignty, and protocols for reporting feedback.

Throughout EPIC 5, PG&E intends to close the feedback loop by documenting Tribal input, considering it at key decision points, and reporting back on how it influenced investment planning, project development, implementation, and outcomes. Engagement conducted through the Annual

Tribal Leaders Energy and Safety Summit, Northern and Southern California ESJ Communities and Tribes workshops, the Tribal Community Wildfire Safety Program webinar, and future Tribal-specific touchpoints will help PG&E identify Tribal priorities, potential project partners, and opportunities for Tribes to participate directly in EPIC project development and implementation. This includes incorporating Tribal perspectives into community-informed metrics and baselines where feasible, tracking investments and benefits to Tribal lands, and using both quantitative reporting and narrative context to explain how EPIC projects align with Tribal priorities. By embedding Tribal engagement across the EPIC lifecycle, PG&E aims to strengthen trust, support more inclusive innovation planning, and increase direct benefits from EPIC-funded projects for Tribal communities.

Appendix A7: Regulatory and Legislative Background

The EPIC Program is designed to assist in the development of pre-commercialized, new, and emerging energy technologies in California, with a focus on commercially viable projects. Authorized by D.12-05-037, the EPIC Program funds investments in the following three areas:

1. Applied Research & Development;
2. Technology Demonstration & Deployment (TD&D); and
3. Market Facilitation, which consists of market research, regulatory permitting and streamlining, and workforce development activities.

The CEC is designated to administer funds in all areas, including a portion of TD&D. PG&E and the other IOU administrators are designated to administer EPIC funds only in the area of TD&D. The program was initially administered in triennial investment periods, while D.20-08-042 established five-year cycles for EPIC 4 and 5. PG&E's EPIC 4 Investment Plan, approved on November 30, 2023, included 23 Research Topic Areas and a TD&D budget of $82.9 million.

Through EPIC, PG&E develops and demonstrates innovative technologies that advance a broad array of objectives including grid safety, resiliency, and reliability as well as customer enablement, and integration of renewables and DERs. EPIC demonstration projects aid in identifying key requirements and insights to inform full deployment in a manner that strategically aligns the integration of technologies with existing operations. Given the rapidly evolving energy landscape and the impact of climate change in California, the continuation of technology innovation programs like EPIC is critical to the continued advancements of grid capabilities to further safety and resiliency.

Key Regulatory Milestones

- 2013: D.13-11-025 authorized the first triennial investment period of 2012-2014 (referred to as EPIC 1).
- 2015: D.15-04-020 approved the second triennial investment plan period of 2015-2017 (referred to as EPIC 2).
- 2017: Resolution (Res.) E-4863 approved two of the six new EPIC projects proposed by PG&E via a Tier 3 Advice Letter (AL) 5015-E filed on February 7, 2017, between triennial EPIC Applications as permitted by D.15-09-005.
- 2017: PG&E filed its application for EPIC 3 (A.17-04-028) for the third triennial investment plan period of 2018-2020.
- 2018: D.18-10-052 approved the third triennial investment plan period of 2018-2020 but directed utility administrators not to spend, commit or encumber one third of their respective EPIC program budgets until the commission approves their joint Research Administration Plan (RAP) application.
- 2019: The utilities filed their joint RAP application.
- 2019: The Commission initiated the EPIC Program Renewal OIR R.19-10-005 and, in Phase 1 of this rulemaking, D.20-08-042 established five-year cycles for EPIC 4 and 5 and set EPIC 4 funding levels for the CEC only.
- 2020: D.20-02-003 approved the RAP application and authorizing the utilities to encumber, commit, and spend the remaining one-third of their EPIC 3 budgets.

- 2021: Res.E-5151 approved all five new EPIC projects proposed by PG&E for its EPIC 3 program cycle via Tier 3 AL 6043-E.
- 2021: D.21-07-006 approved the CEC's Interim Investment plan. Later that year, the Commission issued D.21-11-028 and approved the continuation of the Utilities' role as EPIC administrators and directed them to file their investment plans at the Strategic Initiative level.
- 2022: PG&E filed its application for EPIC 4 (A.22-10-003), "EPIC 4 Investment Plan."
- 2023: D.23-04-042 Phase 2C formally extended the requirement for annual reporting, provided an updated outline for annual reports, as well as introduced requirements for TD&D funds to be located in and benefit disadvantaged and low-income communities. Renewed the EPIC Program through 2030.
- 2023: D.23-11-086 approved PG&E's EPIC 4 Investment Plan, which included 23 Research Topic Areas in which PG&E can pursue technology demonstrations. This approval authorized a PG&E program area (TD&D) budget of $82.9M.
- 2024: D.24-03-007 adopted the Strategic Goals for future EPIC program cycles, which were informed by a series of public workshops in 2023-2024.
- 2024: From March to July 2024, the Commission hosted series of workshops to solicit cross-sector engagement on EPIC 5 Strategic Initiatives.
- 2024: D.24-07-019 extended the statutory deadline for completion of Rulemaking 19-10-005 to March 31, 2025.
- 2024: PG&E launched nineteen EPIC 4 Projects.
- 2024: R.19-10-005 is ongoing.
- 2025: D.25-03-020 extended the statutory deadline for completion of Rulemaking 19-10-005 to February 6, 2026.
- 2026: D.26-02-016 extended the statutory deadline for completion of Rulemaking 19-10-005 to June 5, 2026.
- 2026: D.26-02-037 adopted 13 Strategic Objectives for the EPIC program and authorizes IOUs to collect rates to continue as EPIC Administrators for the EPIC 5 investment plan cycle. The decision also closes Rulemaking 19-10-005.

Key Legislative Direction and State Policy

- **Assembly Bill 523** emphasized the need for public-interest energy research programs to advance equity, transparency, and meaningful participation from disadvantaged and underserved communities.
- **Senate Bill 350** advanced California's goals for energy efficiency, clean energy adoption, and transportation electrification, highlighting the importance of investments in grid modernization, flexible demand management, and technologies that support electrification.
- **Senate Bill 100** established California's target of achieving 100 percent clean electricity, increasing the value of research and demonstration efforts focused on renewable integration, energy storage, grid flexibility, and system reliability.
- **Executive Order N-79-20** set ambitious statewide zero-emission vehicle objectives, helping shape innovation activities related to electric transportation, charging infrastructure, vehicle-grid integration, and electric distribution system planning.
- **Assembly Bill 32** and subsequent California climate planning efforts established long-term

greenhouse gas reduction and carbon neutrality goals, supporting research in areas such as building decarbonization, distributed energy resource integration, climate resilience and net-zero utility operations.

Key Regulatory Guidance for EPIC 5 Investment Plans

The following tables summarize the Strategic Goals and EPIC 5 Strategic Objectives from D.24-03-007 and D.26-02-037, respectively, that CPUC adopted to guide EPIC Administrator RD&D investment plans for the EPIC 5 period (2026-2030).

Table 7-A: EPIC 5 Strategic Goals

EPIC 5 Strategic Goals		
Strategic Goal 1	**Transportation Electrification**	The Electric Program Investment Charge (EPIC) Program will invest in research, development, and demonstration (RD&D) that supports the planning, integration, scaling, and commercialization of innovation that promotes the state's climate goals to: (1) transition all medium- and heavy-duty vehicles in the state to zero-emission vehicles (ZEV) by 2045; (2) realize 100 percent ZEV in-state new car sales by 2035; and (3) significantly reduce pollution from the transportation sector in disadvantaged, low-income, Environmental and Social Justice (ESJ), and tribal communities, and Environmental Protection Agency non-attainment air districts as soon as possible, by addressing identified gaps for this goal.
Strategic Goal 2	**Distributed Energy Resource (DER) Integration**	EPIC will invest in the cost-effective integration of high penetrations of distributed energy resources to support the state's goal to achieve a renewable and zero-carbon power sector by 2045, in part by building on the state's goal to deploy 7,000 megawatts of flexible load by 2030, by addressing identified gaps for this goal.
Strategic Goal 3	**Building Decarbonization**	EPIC will invest in the rapid acceleration of comprehensive, cost-effective, and equitable building decarbonization technologies and strategies to help achieve the state's goal to be carbon neutral by 2045 economy-wide, including achieving and sustaining a three percent annual building electrification retrofit rate (3.6 percent for affordable housing) by and beyond 2030, by addressing identified gaps for this goal.
Strategic Goal 4	**Achieving 100 Percent Net-Zero Carbon Emissions and the Coordinated Role of Gas**	EPIC will seek to identify cost-effective opportunities for reaching the "last 10%" of the state's goal to be carbon neutral by 2045 economy-wide, through investment in California-specific strategies for hard-to-decarbonize energy-consuming sectors that could be decarbonized through electrification and coordination with other California RD&D programs to align investments and activities for emerging strategies, by addressing identified gaps for this goal.
Strategic Goal 5	**Climate Adaptation**	EPIC Plans will seek to identify cost-effective, targeted research opportunities for improving grid resiliency and stability, particularly for adaptability of and impacts on ESJ and tribal communities during severe weather events, including preventing and mitigating the effects of wildfires, floods, and other climate-driven events; hardening the grid and improving resiliency especially in the most remote grid edge locations; reducing the number of customers experiencing long-duration outages; and reducing the duration of these outages,58 by addressing identified gaps for this goal.

Table 7-B: EPIC 5 Strategic Objectives

EPIC 5 Strategic Objectives		
Strategic Objective 1	**Reducing Medium and Heavy-Duty Vehicle Charging Infrastructure Costs**	The EPIC program will accelerate innovation, demonstration, and innovative approaches to deployment that support the reduction of the IOU cost of medium- and heavy-duty charging infrastructure installations, and associated IOU cost of grid upgrades by a stretch goal of 50% by 2035 to achieve the state's transportation electrification goals in a cost-effective manner.
Strategic Objective 2	**Overcoming Barriers to EV Benefits in Disadvantaged Communities**	The EPIC program will accelerate innovation, demonstration, and innovative approaches to deployment to overcome obstacles to equitable transportation electrification benefits (including alleviation of pollution, bridging transportation access, and addressing energy burden) in Disadvantaged and Vulnerable Communities, low-income communities, and non-attainment air districts.
Strategic Objective 3	**Smart Planning Tools for New Load and Clean Resources**	The EPIC program will support the development, integration, and updating of transparent, open-access grid planning tools that a) substantially increase the forecasting and predictability of intermittent resources, electric vehicles, building electrification, flexible load, and distributed energy resources, b) enable widespread adoption of demand flexibility, c) provide transparent and coordinated inputs into utility capital planning processes, and/or d) inform utility operations for the enablement of grid services and dynamic operation with the goal of reducing ratepayer costs over time and ensuring Disadvantaged and Vulnerable Communities are not left behind in benefits from the transition to zero-emission technologies.
Strategic Objective 4	**Reducing the Cost of Whole Home Electrification**	The EPIC program will accelerate innovation, demonstration, and reliable and scalable approaches to deployment that help reduce the all-in cost of whole-home electrification and enable demand flexibility / automated response to process signals or dynamic rates for single-family and multi-family buildings and manufactured housing by 50%, while decreasing residents' energy costs, by 2035.
Strategic Objective 5	**Innovative Approaches for Difficult-to-Decarbonize Sectors**	The EPIC program will accelerate innovative approaches, strategies, and business models to achieve lifecycle cost-parity for difficult-to-decarbonize commercial and industrial buildings and processes, with a specific focus on strategies that lead to the reduction of NOx, PM, and other surface-level pollutants impacting Disadvantaged and Vulnerable Communities.
Strategic Objective 6	**Community-Scale Decarbonization**	The Strategic Objective for EPIC that the program demonstrates technology, tools, deployment strategies, planning approaches and business models for achieving (100 percent) neighborhood-or community-scale electrification that considers the needs of participating and non-participating customers, and with a prioritization on addressing needs and obstacles of Disadvantaged and Vulnerable Communities.

Strategic Objective 7	**Impacts Research for New Generation and Storage**	The EPIC program will conduct new lifecycle and techno-economic analysis, as needed, to identify the emerging zero-carbon technologies with the lowest adverse and highest beneficial economic, land, air, water, net energy, health, and safety impacts on California communities, including DVCs.
Strategic Objective 8	**Increase Predictability of Weather Impact on Intermittent Resources, Climate Risks, and Load**	By 2030, the EPIC program will conduct data analysis and develop and/or advance data resources, modeling tools, and technologies to measurably improve: a) predictions to electric system operational climate risk; b) intermittent electric resource supply forecasts and electricity demand forecasts under climate uncertainty; c) open-access data on grid equipment condition and capability; and d) coordination between weather and climate observation/projections, forecasting, and grid operations.
Strategic Objective 9	**Leveraging Distributed Energy Resources for Grid and Community Resiliency**	The EPIC Program will support technology development, innovative deployment models, and real-world testing and evaluation for the demonstration of the use of clean distributed energy resources to reduce the impact of outage events, through strategies that allow critical and/or essential loads and services to remain powered through such events and that reduce power restoration time for vulnerable populations, with a specific focus on solving challenges related to critical loads and services identified by Disadvantaged and Vulnerable Communities as critical community resilience needs.
Strategic Objective 10	**Expediting and Streamlining Interconnection and Energization Processes**	The EPIC Program will support acceleration of the development, testing, and integration of innovative technology, communication protocols, and modeling approaches to streamlining interconnection and energization processes for DER and new load including electric vehicle charging infrastructure, with a goal to demonstrate the capability to significantly reduce interconnection and energization approval or online timelines under multiple high DER penetration and electrification scenarios, with a priority for addressing challenges in Disadvantaged and Vulnerable Communities.
Strategic Objective 11	**Providing Data Input into a Value of DER Framework**	The EPIC Program will conduct analysis, real-world demonstrations, and data collection to support the development and ongoing update of an evidence-based framework for the location-, time-, and performance-based values of grid services that are a) usable by grid operators to reduce costs to ratepayers and expand opportunities for distributed zero-emission technologies, and b) accessible by any DER, electric vehicle, or flexible load.
Strategic Objective 12	**Optimizing Feeder / Circuit Operations**	To support ratepayer affordability, the EPIC Program will accelerate innovation, demonstration, and deployment of innovative and replicable methods to increase the capacity utilization rate of circuits/feeders and reduce circuit and feeder peak loads, and/or dynamically optimize other feeder/circuit operations in order to avoid or defer costly grid upgrades, through the coordination of DERs, EVs, flexible load, and grid intelligence, with a focus on circuits serving Disadvantaged and Vulnerable Communities where increased adoption of zero-emission technologies can increase equitable benefits.

Strategic Objective 13	**Cost-Effective Grid Hardening for Long-Term Climate Impacts**	By 2033, the EPIC program will develop and demonstrate data, tools, technologies, and frameworks that improve long-term planning and achieve more cost-effective operational practices and capital investments for grid hardening to maintain grid resilience and reliability to long-term climate impacts, with a focus on increasing affordability, reducing outage risk, and reducing social burdens of outages.

Alignment with Relevant CPUC Proceedings

Table 7-C: Alignment with Relevant CPUC Proceedings

EPIC 5 Strategic Goal	Relevant CPUC Proceeding
Transportation Electrification	• R.23-12-008: Transportation Electrification Policy and Infrastructure • R.22-07-005: Advance Demand Flexibility Through Electric Rates • R.21-06-017: Modernize the Electric Grid for a High Distributed Energy Resources Future • R.18-12-006: Development of Rates and Infrastructure for Vehicle Electrification • R.24-01-018: Establish Energization Timelines.
Distributed Energy Resource Integration	• R.23-12-008: Transportation Electrification Policy and Infrastructure • R.22-07-005: Advance Demand Flexibility Through Electric Rates • R.21-06-017, Modernize the Electric Grid for a High Distributed Energy Resources Future • R.18-12-006: Development of Rates and Infrastructure for Vehicle Electrification • R.24-01-018, Establish Energization Timelines
Building Decarbonization	• R.26-04-009: Order Instituting Rulemaking on California Advanced Electric Rate Design • R.22-07-005: Advance Demand Flexibility Through Electric Rates • R.19-01-01: Building Decarbonization.
Achieving 100 Percent Net Zero Carbon and the Coordinated Role of Gas	• R.20-05-003: Continue Electric Integrated Resource Planning and Related Procurement Processes • R.20-01-007: Long-Term Gas System Planning
Climate Adaptation	• R.18-04-019: Strategies and Guidance for Climate Change Adaptation

Appendix A8: Acronyms and Abbreviations

AC	Alternating Current
AI	Artificial Intelligence
BESS	Battery Energy Storage System
BTM	Behind-the-meter
CalEnviroScreen	California Communities Environmental Health Screening Tool
California ISO	California Independent System Operator
CARB	California Air Resources Board
CAVA	Climate Adaptation Vulnerability Assessment
CBO	Community-Based Organization
CCA	Community-Choice Aggregator
CEC	California Energy Commission
CH4	Methane
CO2	Carbon dioxide
CRC	Community Resource Center
CPUC	California Public Utilities Commission
DAC	Disadvantaged Community
DACAG	Disadvantaged Community Advisory Group
DC	Direct current
DER	Distributed Energy Resource
DERMS	Distributed Energy Resource Management System
DVC	Disadvantaged Vulnerable Community
EFD	Electric Fault Data
EMS	Energy Management System
EPIC	Electric Program Investment Charge
EPRI	Electric Power Research Institute
ESJ	Environmental and social justice
EV	Electric Vehicle
EVSE	Electric vehicle supply equipment
GFO	Grant Funding Opportunity
GHG	Greenhouse Gas
IBR	Inverter-Based Resource
IDER	Integrated Distributed Energy Resources
IEEE	Institute of Electrical and Electronics Engineers
IOU	Investor-Owned Utility
IIJA	Infrastructure Investment and Jobs Act
IRA	Inflation Reduction Act
ITF	Integrated Testing Facility
kW	Kilowatt
L2	Level 2 Charging
LDES	Long-duration energy storage
LLNL	Lawrence Livermore National Laboratory
LSE	Linear State Estimation

LTE	Long-Term Evolution (wireless communication standard)
MBESS	Mobile Battery Energy Storage System
MHDV	Medium- and heavy-duty vehicle
MW	Megawatt
MWh	Megawatt-hour
OIR	Order Instituting Rulemaking
OP	Ordering Paragraph
PG&E	Pacific Gas and Electric Company
PICG	Policy and Innovation Coordination Group
PMU	Phasor Measurement Unit
PQ	Power Quality
PSPS	Public Safety Power Shutoff
PV	Photovoltaic
RAP	Research Administration Plan
REIC	Regional Energy Innovation Cluster
RD&D	Research, Development, and Demonstration
RTCA	Real Time Contingency Analysis
SCE	Southern California Edison
SDG&E	San Diego Gas & Electric Company
SG	Strategic Goal
SO	Strategic Objective
SST	Solid-State Transformer
TD&D	Transmission, Distribution, and Deployment
TRL	Technology readiness level
V2B	Vehicle-to-building
V2G	Vehicle-to-Grid
VGI	Vehicle-to-grid-integration
VM	Vegetation Management
V2X	Vehicle-to-Everything
VPP	Virtual power plant
WMP	Wildfire Mitigation Plan
WUI	Wildland-Urban Interface
ZEV	Zero-emission vehicle

Appendix A9: Glossary

Adaptive protection schemes: Grid protection settings that adjust dynamically based on operating conditions (e.g., high fire risk, load patterns), allowing utilities to more precisely detect and isolate faults without excessive outages.

Advanced conductor: High-capacity transmission line technology that carries more current than conventional conductors of the same size, enabling utilities to increase line capacity without major right-of-way changes or new towers.

Advanced Distribution Management System (ADMS): A software platform that integrates monitoring, control, and analytics for distribution grid operations, enabling utility management of distributed energy resources alongside DERMS.

Advanced Metering Infrastructure (AMI): The system of smart electric meters, communications networks, and data management systems that collect and analyze granular usage data at the customer premises, enabling near-real-time visibility into electricity consumption.

Alternating Current (AC): Electrical current that periodically reverses direction, in contrast to direct current (DC). Used in vehicle-to-everything and vehicle-to-grid applications where AC-based bidirectional charging systems can lower hardware and installation costs.

Ambient Adjusted Rating (AAR): Transmission line rating methodology that adjusts capacity based on real-time ambient conditions (temperature, wind), similar to DLR but with less granular sensing. Enables closer operation to true line capacity.

Artificial Intelligence (AI): Software approaches that use algorithms trained on data to make predictions, classifications, or decisions.

Asset Health Monitoring (AHM): Continuous sensor-based monitoring of grid asset condition to detect early warning signs of failure, enabling condition-based maintenance instead of time-based schedules.

Behind the Meter (BTM): Energy resources located on the customer side of the utility meter, including rooftop solar, home batteries, and EVs. Contrast with Front-of-the-Meter (FTM).

Beneficial load growth: New electric load (such as from EV charging and electrification) that spreads grid fixed costs across more energy sold, exerting downward pressure on rates and delivering ratepayer benefits. Contrast with load growth that requires costly grid upgrades disproportionate to its revenue contribution.

Bidirectional charging: EV charging capability that transfers energy in both directions: from grid to vehicle for charging, and from vehicle to grid, home, or loads for discharge. Enables V2G, V2H, and broader V2X use cases.

Biochar: Stable carbon material produced from woody biomass via pyrolysis. Long-term carbon storage pathway that supports both vegetation management and decarbonization goals.

Bridging solutions: Non-permanent technologies and operational practices (e.g., mobile generation, orchestrated demand flexibility, temporary energy storage) that allow customers to be energized

ahead of permanent grid infrastructure completion.

California Air Resources Board (CARB): California state agency responsible for reducing air pollution and setting emission standards.

Carbon dioxide (CO2): Carbon dioxide, a naturally occurring gas, also referred to as carbon, is also a by-product of burning fossil fuels (such as oil, gas, and coal), burning biomass, land use changes, and industrial processes (for example, cement production). It is the principal anthropogenic greenhouse gas (GHG) that affects the Earth's radiative balance. It is the reference gas against which other GHGs are measured and therefore has a global warming potential of 1.

Carbon neutrality: Carbon dioxide and other GHG emissions generated by sources such as transportation, power plants, and industrial processes must be less than or equal to the amount of carbon dioxide that is stored, both in natural sinks such as forests and mechanical sequestration such as carbon capture and sequestration. Executive Order B-55-18 established a target for California to achieve carbon neutrality by 2045 and maintain net negative emissions thereafter. For more information, see the CARB Carbon Neutrality Web page (https://ww2.arb.ca.gov/our-work/programs/carbon-neutrality).

Climate: Climate is the average course or condition of the weather at a place, usually over a period of years, as exhibited by temperature, wind velocity, and precipitation. The classical period for averaging these variables is 30 years, as defined by the World Meteorological 98 Organization. Climate in a wider sense is the state, including a statistical description, of the climate system.

Climate Adaptation Vulnerability Assessment (CAVA): PG&E's regulatory filing (under CPUC D.20-08-046 and D.24-08-005) that assesses grid vulnerability to climate change and identifies adaptation priorities.

Climate Change: Climate change refers to a change in the state of the climate that can be identified (for example, by using statistical tests) by changes in the mean or variability (or both) of its properties and that persists for an extended period, typically decades or longer. Climate change may be due to natural internal processes or external forcings such as modulations of the solar cycles, volcanic eruptions, and persistent anthropogenic (human- induced) changes in the composition of the atmosphere or in land use. Anthropogenic climate change is defined by the human impact on Earth's climate, while natural climate changes are the natural climate cycles that have been and continue to occur throughout Earth's history. Anthropogenic climate change is directly linked to the amount of fossil fuel burning, aerosol releases, and land alteration from agriculture and deforestation.

Community-Based Organization (CBO): Nonprofit or civic organization that serves specific communities, often as a partner for utility outreach and engagement in disadvantaged and low-income areas.

Community Engagement Plan (CEP): PG&E's engagement plan for EPIC 5 that establishes the foundation for community-informed research, development, and demonstration across the portfolio.

Community Microgrid Enablement Program (CMEP): California program supporting multi-customer microgrids that can operate independently during grid outages, providing resiliency at the community scale.

Compound and cascading events: Overlapping climate hazards (e.g., heat combined with wind, drought followed by extreme precipitation) that produce non-linear grid impacts greater than the sum of individual events. Requires modeling approaches beyond single-hazard analysis.

Customer Average Interruption Duration Index (CAIDI): Reliability metric measuring the average duration of outages experienced by customers affected by an interruption. Calculated as total customer minutes of interruption divided by total customers interrupted.

Customers Experiencing Long Interruption Durations (CELID): Reliability metric measuring the number of customers that have experienced a cumulative total of more than eight hours of outages.

Customer Minutes of Interruption (CMI): Reliability metric measuring the total minutes of outage experienced across all interrupted customers. Used to quantify outage impact and cost.

Customers Experiencing Multiple Interruptions (CEMI): Reliability metric measuring the number of customers who experience more than a defined threshold of outages within a given period. Highlights repeat outage exposure, particularly relevant for equity analysis.

CYME: Distribution power flow and analysis software widely used by utilities (including PG&E) for planning, load flow, protection, and reliability studies.

Decarbonization: The process by which countries, individuals, or other entities aim to reduce or achieve zero fossil carbon emissions. This typically refers to a reduction of the carbon emissions associated with electricity, industry, and transport. Decarbonization involves increasing the share of no- or low-carbon energy sources (renewables such as solar and wind) and decreasing the use of fossil fuels.

Demand flexibility: The ability of customers to reduce or increase load in response to grid conditions, usually through a proxy price signal or system operator or utility signal and facilitated by automation.

Disadvantaged Vulnerable Community (DVC): Communities identified as facing environmental, economic, and health burdens that limit access to clean energy benefits. Related to "Disadvantaged communities" and "Environmental social justice communities."

Disadvantaged communities: Disadvantaged communities refer to the areas throughout California that most suffer from a combination of economic, health, and environmental burdens. These burdens include poverty, high unemployment, air and water pollution, presence of hazardous waste, as well as high incidence of asthma and heart disease. One way that the state identifies these areas is by collecting and analyzing information from communities all over the state. CalEnviroScreen, an analytical tool created by the California Environmental Protection Agency (CalEPA), combines different types of census tract-specific information into a score to determine which communities are the most burdened or “disadvantaged.” When referenced in this EPIC 5 Investment Plan, Disadvantaged Communities (DACs) are communities designated by the CalEPA pursuant to Senate Bill 535 (De León, 2012) using CalEnviroScreen and related geographic, socioeconomic, public health, and environmental hazard criteria. These communities experience disproportionate environmental burdens and socioeconomic challenges and are prioritized for investments from California climate and clean energy programs. For more information, see the California Office of Environmental Health Hazard Assessment’s CalEnviroScreen Web page (https://oehha.ca.gov/calenviroscreen/sb535).

Disadvantaged Communities Advisory Group (DACAG): The Clean Energy and Pollution Reduction Act of 2015 (also known as Senate Bill 350) called upon the California Public Utilities Commission (CPUC) to help improve air quality and economic conditions in disadvantaged communities by, for example, changing the way the state plans the development and future operations of power plants, and rethinking the location of clean energy technologies to benefit burdened communities. In addition, SB 350 required the CPUC and the CEC to create a group representing disadvantaged communities to advise the agencies in understanding how energy programs impact these communities and could be improved to benefit these communities.

Distributed energy resource(s) (DER): Distributed energy resources are any resource with a first point of interconnection of a utility distribution company or metered subsystem. Distributed energy resources include:

- Demand response, which has the potential to be used as a low-GHG, low-cost, price responsive option to help integrate renewable energy and provide grid stabilizing services, especially when several distributed energy resources are used in combination and opportunities to earn income make the investment worthwhile.
- Distributed renewable energy generation, primarily rooftop photovoltaic energy systems.
- Vehicle-grid integration, or all the ways plug-in electric vehicles can provide services to the grid, including coordinating the timing of vehicle charging with grid conditions.
- Energy storage in the electric power sector to capture electricity or heat for use later to help manage fluctuations in supply and demand.

Distributed Energy Resource Management System (DERMS): A software platform that enables utilities to monitor, coordinate, and control distributed energy resources such as solar, batteries, and EV charging.

Downscaling: Statistical or physical techniques that translate coarse global or regional climate models into higher-resolution local projections usable for utility asset and community risk assessment.

Dynamic Line Rating (DLR): Technology that measures real-time environmental conditions (temperature, wind) to calculate actual transmission line capacity, allowing utilities to safely operate closer to true system limits than static ratings assume.

Electric Program Investment Charge (EPIC) Program: The CEC's EPIC Program invests in scientific and technological research to accelerate the transformation of the electricity sector to meet the state's energy and climate goals. Investments of about $150 million annually support research and development in renewable energy, energy storage, electric system resilience, and electric technologies for buildings, businesses, and transportation. For more information, see the CEC EPIC Web page (https://www.energy.ca.gov/programs-and topics/programs/electric-program-investment-charge-epic-program) and the CPUC Energy Research, Development, and Deployment Web page (https://www.cpuc.ca.gov/industries-and topics/electrical-energy/infrastructure/energy-research-development-and-deployment).

Electric Vehicle (EV): A vehicle propelled by electric motors powered by battery storage rather than internal combustion. Covers light-duty passenger vehicles, medium and heavy-duty vehicles, and fleet

applications.

Electric Vehicle Supply Equipment (EVSE): The hardware infrastructure that delivers electric energy from the grid to an electric vehicle, including chargers, plugs, and associated safety and communication components.

Electrification Impacts Study (EIS): CPUC-directed study (under R.21-06-017) that established distribution-level load forecasts and grid-impact analyses for transportation and building electrification across California's large IOU territories. Referenced as baseline foundation for zonal readiness analysis.

Emission Factor Model (EMFAC): CARB's tool for estimating emissions from on-road motor vehicles operating in California, including electric vehicles.

Energy burden: The percentage of household income spent on energy costs. High energy burden is a key equity indicator that identifies communities most impacted by rates and most benefiting from affordability improvements.

Energy efficiency: Energy efficiency means adapting technology to meet consumer needs while using less energy. The CEC adopts energy efficiency standards for appliances and buildings, which reduces air pollution and saves consumers money. The CPUC regulates ratepayer-funded energy efficiency programs and works with the IOUs, other program administrators, and vendors to develop programs and measures to transform technology markets within California using ratepayer funds. For more information, see the CEC Energy Efficiency Web page and the CPUC Energy Efficiency Web page.

Energy Management System (EMS): Software platform used by utilities and system operators to monitor, control, and optimize grid operations in real time.

Enhanced Powerline Safety Settings (EPSS): PG&E operational protocol that adjusts distribution circuit protection to trip faster on faults, reducing wildfire ignition risk during elevated hazard conditions. Causes more frequent short outages.

Environmental Social Justice (ESJ) communities: ESJ Communities are predominantly communities of color or low-income communities that are underrepresented in the policy setting or decision-making process, subject to a disproportionate impact from one or more environmental hazards, and likely to experience disparate implementation of environmental regulations and socioeconomic investments in their communities. It targets “Disadvantaged Communities” designated by the California Environmental Health Screening (CalEnviroScreen) Tool, all California tribal lands as defined in 18 U.S.C. 1151 subsection (a), low-income households with incomes below 80 percent of the area median income, and low-income census tracts with aggregated household incomes that are less than 80 percent of area or state median income.

EPC (CEC contract prefix): Prefix format used for CEC EPIC contract identifiers (e.g., EPC-25-025). Signifies research contracts awarded by CEC under its EPIC program.

Equity (energy equity): Energy equity is the principle of fairness in burden sharing and is a basis for understanding how the impacts and responses to climate change, including costs and benefits, are distributed in and by society in equal ways. It is often aligned with ideas of equality, fairness, and justice and applied with respect to equity in the responsibility for, and distribution of, climate impacts

and policies across society, generations, and gender, and in the sense of who participates and controls the processes of decision-making.

Front-of-the-Meter (FTM): Energy resources located on the utility side of the customer meter, including transmission-connected generation and utility-scale batteries. Contrast with Behind the Meter (BTM).

General Rate Case (GRC): The regulatory proceeding through which utilities like PG&E propose base rates to the CPUC.

Geographic Information System (GIS): Software system for capturing, storing, analyzing, and displaying geographically referenced data. Used in utilities for asset mapping, service territory analysis, and zonal planning.

Gigawatt-hour (GWh): Unit of electrical energy equal to one billion watt-hours, or 1,000 megawatt-hours. Used to measure large-scale electricity consumption, generation, or energy unlocked by grid capacity improvements.

Grant Funding Opportunity (GFO): CEC's competitive solicitation mechanism to award EPIC research grants to industry, academic, and other organizations. Similar in function to a Request for Proposals (RFP).

Greenhouse gas (GHG): GHGs are those gaseous constituents of the atmosphere, natural and anthropogenic, that absorb and emit radiation at specific wavelengths within the spectrum of terrestrial radiation emitted by the Earth's surface, the atmosphere itself, and clouds. This property causes the greenhouse effect. Water vapor, carbon dioxide, nitrous oxide, methane, and ozone are the primary GHGs in the Earth's atmosphere. Moreover, there are several entirely human-made GHGs in the atmosphere, such as the halocarbons and other chlorine- and bromine-containing substances, dealt with under the Montreal Protocol. Besides carbon dioxide, nitrous oxide, and methane, the Kyoto Protocol deals with the GHGs sulfur hexafluoride, HFCs, and perfluorocarbons. In response to Assembly Bill 32 (California Global Warming Solutions Act of 2006), the definition of GHGs defined in Health and Safety Code Section 38505 includes nitrogen trifluoride in addition to those defined under the Montreal and Kyoto Protocols.

Heating, Ventilation, and Air Conditioning (HVAC): Building systems that condition indoor air for temperature and quality. HVAC loads can be flexibly managed to shift electric demand in response to grid conditions.

High Fire Risk Area (HFRA): PG&E-designated geographic zones subject to elevated wildfire risk requiring enhanced monitoring, protection, and mitigation practices. Overlaps with but is distinct from the CPUC's HFTD designation

High Fire Threat District (HFTD): CPUC-designated geographic zones with elevated wildfire risk requiring enhanced electrical infrastructure standards, monitoring, and mitigation practices.

IEEE 2030.5: The Institute of Electrical and Electronics Engineers' standard communication protocol for smart grid device interoperability, enabling utilities, aggregators, and customer-owned devices to exchange operational and control signals.

Integrated Resource Planning (IRP): CPUC regulatory framework requiring IOUs to develop long-term integrated portfolios of resources (generation, storage, demand-side) to meet reliability, environmental, and cost objectives.

Interconnection: The process of physically and administratively connecting a new customer, generation resource, or large load to the utility grid, including engineering studies, approval, and construction activities.

Investor-owned utility (IOU): Investor-owned utilities (IOUs) provide transmission and distribution services to all electric customers in their service territory. The utilities also provide generation service for "bundled" customers, while "unbundled" customers receive electric generation service from an alternate provider, such as a CCA. California has three large IOUs offering electricity service: Pacific Gas and Electric Company, Southern California Edison, and San Diego Gas & Electric.

Load disaggregation: Analytical technique that identifies individual electric loads (e.g., EV charger, heat pump, water heater) from whole-home AMI meter data. Enables targeted electrification programs and detection of customer-driven adoption.

Low- and Moderate-Income (LMI): Category of customer households whose income is below defined thresholds, typically used to target equity programs and rate assistance. Broader than Low-income communities alone.

Low-income communities: This term refers to communities within California census tracts with median household incomes at or below either of the following levels: 1) 80 percent of the statewide median household income or 2) the applicable low-income threshold listed in the state income limits updated by the Department of Housing and Community Development and filed with the Office of Administrative Law pursuant to subdivision (c) of Section 50093 of the Health and Safety Code.

Major Event Day (MED): Reliability reporting classification for days with atypically large outage impacts driven by extreme weather or catastrophic events. MEDs are typically excluded or reported separately in standard reliability metrics.

Managed charging: Coordinated control of EV charging times to align with grid conditions, typically through utility signals, third-party orchestration platforms, or customer automation. Reduces peak load impact and enables higher EV penetration on the existing grid.

Measurement and Verification (M&V): Standardized protocols for confirming that energy efficiency or demand flexibility interventions delivered the expected savings, using metered data and baseline comparisons.

Medium- and Heavy-Duty Vehicle (MHDV): Class of vehicles including trucks, buses, and heavy-duty commercial vehicles. California has set a target of transitioning all MHDVs to zero-emission by 2045.

Megawatt (MW): Unit of electric power equal to one million watts, commonly used to measure generation capacity, load, and utility infrastructure scale.

Megawatt-hour (MWh): Unit of electrical energy equal to one thousand kilowatt-hours or one million watt-hours. Standard unit for measuring energy delivered or consumed.

Methane: Methane (CH4) is one of the six GHGs to be mitigated under the Kyoto Protocol and is the

major component of natural gas. Emissions also occur as a result of dairy and livestock operations and disposal of organics in landfills, and the management of these organics represents a major mitigation option. Methane is a short-lived climate pollutant. Unlike carbon dioxide, which lasts for about 100 years in the atmosphere, reductions of methane can create a relatively quick reduction in global warming.

Microgrid: Localized grid segment that can operate independently from the main grid during outages, powered by on-site generation and storage. Provides resiliency to critical facilities and community-scale customers.

Microgrid Incentive Program (MIP): California program providing financial incentives for microgrid deployment in vulnerable communities, complementing CMEP.

Natural Resources Conservation Service (NRCS): U.S. federal agency (part of USDA) that provides technical and financial assistance for conservation, including forest and vegetation management coordination.

Non-attainment area: Geographic area that fails to meet federal ambient air quality standards for one or more pollutants under the Clean Air Act. In PG&E's territory, MHDV electrification is prioritized in non-attainment areas to reduce pollution exposure in affected communities.

Non-wires alternatives (NWA): Non-traditional grid investments (e.g., demand flexibility, distributed energy resources, energy efficiency) that defer or replace conventional wire, transformer, or substation upgrades. Reduces capital costs while meeting reliability needs.

North American Industry Classification System (NAICS): Standard classification system used by federal agencies to categorize business establishments by industry sector. Used to segment industrial customers for hard-to-decarbonize analysis.

Order Instituting Rulemaking (OIR): CPUC procedural mechanism to open a formal regulatory proceeding on a specific topic (e.g., R.21-06-017 for Electric Distribution). Establishes the scope for parties to file testimony and evidence.

Original Equipment Manufacturer (OEM): Companies that produce the original equipment used in utility programs and demonstrations, such as EV charging equipment and meters.

Panel upgrade: The residential electrical process of increasing a home's main service panel amperage (typically from 100A to 200A or higher) to accommodate new loads like EV chargers, heat pumps, and induction cooking. Panel upgrades often trigger service and upstream distribution upgrades, adding cost and time to electrification projects.

Policy + Innovation Coordination Group (PICG): CPUC-established group comprised of a Project Coordinator, the four EPIC Administrators, and CPUC staff to increase alignment and coordination of California's EPIC investments and program execution.

Public Safety Power Shutoff (PSPS): PG&E operational practice of proactively de-energizing distribution circuits during elevated wildfire risk conditions to prevent ignitions from power lines. Causes planned outages in affected areas.

Remedial Action Scheme (RAS): Automated protection scheme that takes preplanned actions (load

shedding, generation curtailment, network reconfiguration) in response to specific grid contingencies, enabling faster response than manual operation.

Risk Assessment and Mitigation Phase (RAMP): CPUC-required regulatory phase where PG&E documents safety risks and proposed mitigations. Climate-adjusted hazard modeling from EPIC 5 will inform RAMP analysis.

Speed-to-power: How quickly a new customer or large load can begin drawing electricity from the grid after applying for service. A key metric for economic development and clean energy adoption, especially for data centers and manufacturing.

Supervisory Control and Data Acquisition (SCADA): Real-time monitoring and control system used by utilities to operate distribution and transmission infrastructure remotely, providing operational visibility into grid conditions.

Sustainability: A dynamic process that guarantees the persistence of natural and human systems equitably.

System Average Interruption Duration Index (SAIDI): Reliability metric measuring the average total outage duration per customer served over a specified period. Standard utility reliability measure.

System Average Interruption Frequency Index (SAIFI): Reliability metric measuring the average number of outages a customer experiences over a specified period. Standard utility reliability measure.

Time-of-Use (TOU): Retail electricity rate structure that charges different prices during different periods of the day (typically higher during peak demand, lower off-peak). Encourages load shifting to off-peak periods.

Technology Demonstration and Deployment (TD&D): EPIC-funded activities that test and validate emerging energy technologies at real-world scale and under operational conditions to demonstrate performance, reduce commercialization risk, and accelerate market adoption for the benefit of California ratepayers. [cpuc.ca.gov], [epicpartnership.org]

Torrefaction: Thermal process that converts woody biomass into a coal-like solid fuel with higher energy density, longer shelf life, and easier transport. Enables wood management as a viable disposal pathway for vegetation and post-fire debris.

Transmission and Distribution (T&D): The two systems that deliver electricity: transmission (high-voltage lines from generation) and distribution (lower-voltage lines to end customers). Together they form the utility grid.

Transportation electrification: This term refers to the replacement of fossil fuels in the transportation sector with electrical power.

Unmanned Aerial Vehicle (UAV): Drone platform for utility applications including inspection, monitoring, and emergency response. Used interchangeably with UAS in some contexts.

Unmanned Aircraft System (UAS): Drone-based technology used for asset inspection, wildfire monitoring, and rapid deployment during grid emergencies. Also referred to as UAV.

Utility: A utility is an organization supplying the community with electricity, gas, water, or sewage.

Vegetation Management (VM): PG&E's ongoing program of tree trimming, removal, and forest treatment around power lines to reduce wildfire ignition risk and outage exposure.

Vehicle Grid Integration (VGI): This term refers to any method of altering the time, charging level, or location at which grid-connected light-duty electric vehicles, medium-duty electric vehicles, heavy-duty electric vehicles, off-road electric vehicles, or off-road electric equipment charge or discharge in a manner that optimizes plug-in electric vehicle or equipment interaction with the electrical grid and provides net benefits to ratepayers.

Vehicle-to-Everything (V2X): This term refers to leveraging bidirectional energy transfer capability to discharge energy from an electric vehicle to a variety of destinations including the electric grid, buildings, homes, or loads.

Vehicle-to-Grid (V2G): This term refers to leveraging bidirectional energy transfer capability to discharge energy from an electric vehicle to the electric grid.

Virtual Power Plant (VPP): Coordinated aggregation of distributed energy resources (batteries, EVs, flexible loads) that can be dispatched as a single power resource, providing services comparable to a conventional power plant.

Wildfire Mitigation Plan (WMP): CPUC-required plan detailing PG&E's wildfire risk reduction activities, targets, and investments.

Wildland Urban Interface (WUI): Geographic area where developed land meets undeveloped wildland vegetation. WUI zones face elevated wildfire risk from ember spread and structure-to-structure fire propagation.

Zero Emission Vehicle (ZEV): A vehicle that produces no tailpipe emissions, including battery electric vehicles and fuel cell electric vehicles. California's 2035 goal requires 100% of new light-duty vehicle sales to be ZEV.

Zonal electrification: Approach to electrification that targets specific geographic zones for coordinated conversion of buildings and equipment, allowing planning and infrastructure decisions to align with local dynamics rather than one-off customer-driven changes.

Appendix A10: EPIC 5 Budget Inflation Adjustment Justification

Budget Inflation Adjustment Request

This appendix serves as PG&E's request to adjust its portion of the EPIC budget for the EPIC 5 Investment Cycle (2026–2030) by 9% to restore some of the investment value eroded by inflation since the last budget adjustment for the EPIC 3 period (2018-2020) and direct this additional funding toward PG&E's EPIC 5 Strategic Initiatives expected to drive significant future affordability benefits.

After careful consideration of the reduction of EPIC's purchasing power since 2021, the significant rate reduction benefits expected to be delivered by PG&E's EPIC 4 program, and the impact of an EPIC 5 budget increase, PG&E recommends a balanced approach instead of raising the budget to match the total forecasted compound inflation impact for the EPIC 5 period (roughly 18%). PG&E proposes a 9% increase to the EPIC 5 budget to limit further erosion of the program's purchasing power. This equates to a rounded increase of $8,342,000. This additional funding supports PG&E's EPIC 5 Strategic Initiatives and Research Topics that will prioritize funding demonstrations of solutions that have high potential to significantly reduce customer rates once scaled.

The cross-section of examples of active EPIC 4 projects provided in the list below illustrates the significant return PG&E customers should expect from EPIC program investments in innovation. While individual projects' outcomes and lifecycle benefits are not fully certain at the RD&D stage and estimates are based on early analysis in demonstration phase, we expect that our portfolio of EPIC 4 projects will cover the program's cost many times over. PG&E has matured its practice of innovation and enhanced our impact with each successive EPIC cycle, and we expect the affordability impact of EPIC 5 to surpass EPIC 4 portfolio benefits while also delivering critical safety, reliability, sustainability and equity solutions for customers.

Example Projected Benefits from EPIC 4 Portfolio

The summaries below describe a selection of active EPIC 4 projects and the forecasted net benefits over the next 10 years from scaling these technologies into standard operations or sustained programs, assuming successful project demonstration outcomes[61]:

- **EPIC 4.02A and 4.02B** (EPIC Budget: $12.5M) - *Socket of the Future & Residential Single-Family Home (SFH) EV* ("ChargeBoost") and *Panel Upgrade Avoidance* ("PanelBoost") – These projects aim to solve a key barrier to electrification for customers with 100-150A panels who wish to add Level 2 EV home charging (the

[61] For clarity, the estimated future benefits from the EPIC 4 projects listed in this section are based on early-stage analysis in RD&D phase, not actual measured values. They project the hypothetical magnitude of impact if the technologies are proven successful for their target use-case and adopted into scaled operations.

focus of ChargeBoost) and/or any other electric loads to their homes (the focus of PanelBoost). These projects have completed lab validation stage and are now deploying cost-efficient smart load management hardware and software solutions that can help participating customers avoid panel and service upgrades, which can vary in customer-side costs from $3,000 to $50,000/site with 2-to-12-month durations. The combined deployment of grid edge computing with AMI 2.0 meters and supporting hardware to manage load intelligently can prevent equipment overloads and maintains or extends asset useful life while accelerating residential customer electrification. If these technologies perform as expected, the total anticipated savings from scaled deployment and related reduction in transformer failures and replacement costs over the next 10 years is estimated at roughly $1.1 billion.

- **EPIC 4.05** (EPIC Budget: $5.8M) – *Dynamic Line Rating (DLR) and Asset Health Monitoring* – This project tests and evaluates tools for visibility into a transmission line's dynamic rating and overall asset health with a focus on potential degradation. If successful, the DLR solutions being demonstrated in the field today could be scaled up to meaningfully reduce market congestion and curtailment of generation on transmission lines by improving visibility into management of power flows on constrained lines. Our projected benefit to cost ratio for DLR is in the 5-10x range and could yield benefits of $50-$100M over ten years relative to today's baseline congestion costs and curtailments.
- **EPIC 4.27** (EPIC Budget: $2.4M) – *Service Planning and Design (SP&D) Customer Service Delivery Operations Automation Tool* – Though still in early stages of development, this project seeks to develop an AI-enabled tool to improve the application intake process for customer requested electrification projects. If successful, this can reduce the duplicative labor hours for resubmissions of missing information, improve the cost estimates for customer projects and decrease the amount of cancelled projects due to delays and cost overruns. The combined forecasted improvements in labor and cost estimation are projected to save $500+ million over 10 years on operating expenses and would accelerate customer electrification timelines.
- **EPIC 4.30** (EPIC Budget $2.0M) – *Pole Design Automation* – This project is in early-stage development and testing of novel technology designed to accelerate pole design, improve output quality, and streamline production. If successful and scaled, this solution could generate nearly $260 million in savings over 10 years.

Regulatory Background

CPUC Decision D.21-11-028 permits all EPIC Administrators to propose budget adjustments in their EPIC 5 Investment Plan applications by the rate of inflation, as calculated using the California Department of Finance's (DOF) California Consumer Price Index for Urban Wage Earners and Clerical

Workers (CPI-W) method.[62] D.26-02-037, which adopted the EPIC 5 Strategic Objectives, reiterated and confirmed this ability for Administrators to propose EPIC 5 budget adjustments to account for inflation using the CPI-W method.[63]

The last inflation adjustment for the EPIC Program was approved in the transition from the EPIC 2 funding cycle (2015–2017) to the EPIC 3 funding cycle (2018–2020), more than eight years ago. EPIC Administrators were not authorized to propose an inflation adjustment to the budget for the EPIC 4 investment period (2021-2025), so the annual budget for Administrators has been fixed at the same amount since 2018 (EPIC 3).

Inflation Calculation Approach

In Appendix B of D.15-04-020, the Commission specified the methodology Administrators should use to calculate the appropriate inflation adjustment to the EPIC program budget by determining compound average annual growth rate and the compound escalation rate using CPI-W data. In response to the CEC's proposed EPIC 3 budget adjustment calculation method, the Commission updated prior guidance in D.18-01-008 by approving the use of a forecasted California-specific CPI-W to calculate inflation adjustments, as opposed to a backward-looking average originally required by D.12-05-037[64]. In this section, PG&E presents the calculated inflation impact for the EPIC 5 investment period (2026-2030) using the California DOF's forecasted CPI-W values for the five-year period and the calculation methodology advised in D.15-04-020 for finding the compound inflation escalation rate over time and using the forward-looking approach from D.18-01-008.

The California Department of Finance reports the following historical and forecast California CPI-W indices for the EPIC 4 and EPIC 5 investment periods:[65]

Year	California CPI-W Indices
2021	288.71
2022	310.57
2023	321.23
2024	330.85
2025	341.54
2026	355.25
2027	366.24

[62] D.21-11-028, OP 2.

[63] D.26-02-037, OP 2.

[64] D.18-01-008, at 33 and OP 6.

[65] Data is from the May 2026 forecast revision version of the California Department of Finance Consumer Price Index Calendar Year Averages (https://dof.ca.gov/forecasting/economics/economic-indicators/inflation/). Actual data through 2025 are from U.S. Bureau of Labor Statistics (BLS) and California Department of Industrial Relation (DIR); projected levels and growth rates are from the 2026-27 May Revision forecast.

2028	377.95
2029	390.12
2030	402.59

Based on these CPI-W values, the California DOF forecasts the compounded annual California CPI-W inflation rate from the end of EPIC 4 (2025) to the end of EPIC 5 (2030) will be 3.34%. Compounding this inflation rate over the 5 years of EPIC 5 (2026-2030) implies that, to maintain purchasing power through the end of EPIC 5 in 2030, EPIC Administrators would need to raise their budgets by (1.0334^5 – 1) = 17.88%. Applied to PG&E's share of the EPIC Budget authorized for collection in D.26-02-037, which is $92,685,000, this would require an addition of $16.6 million, amounting to a total PG&E EPIC budget of $109.3 million to maintain purchasing power.

Looking back to the EPIC 4 cycle further illustrates the significant erosion of purchasing power EPIC would experience without an adjustment. From the end of EPIC 3 (2020) through the EPIC 4 cycle (from 2021-2025), the compounded annual California CPI-W inflation rate was approximately 4.38%. Compounding this inflation rate over the 5-year EPIC 4 period shows an inflation impact of (1.0438^5 – 1) = 23.91%. Though Administrators were not authorized to propose budget inflation adjustments for EPIC 4, it should be noted that PG&E would have needed to increase its EPIC 4 budget from $92.7M to $114.8M to account for this 23.91% inflation increase to maintain the program's purchasing power. In other words, keeping the program budget static over this period equated to a 24% loss of purchasing power for advancing new technology and innovation during the EPIC 4 period. Added to the forecasted EPIC 5 inflation impact, the total PG&E EPIC Budget adjustment increase that would be needed to recover lost purchasing power since 2021 and maintain purchasing power through 2030 amounts to $38.7 million.

Focusing only on the forecasted EPIC 5 inflation impact eligible for proposed increase, PG&E's EPIC budget would require an additional $16.6 million. However, as stated above, PG&E proposes a more modest 9% ($8.342 million) increase to the EPIC 5 budget. The proposed increase limits further erosion of the program's purchasing power, while considering the ratepayer impact, and drives enhanced impact through a focus on delivering innovation under every proposed EPIC 5 Strategic Initiative that has the potential to significantly reduce customer rates once scaled.

EXHIBIT A

PACIFIC GAS AND ELECTRIC COMPANY
CONDENSED CONSOLIDATED STATEMENTS OF INCOME
(in millions)

	(Unaudited)			
	Three Months Ended June 30,		Six Months Ended June 30,	
	2026	2025	2026	2025
Operating Revenues				
Electric	$ 4,388	$ 4,414	$ 9,355	$ 8,549
Natural gas	1,514	1,484	3,428	3,332
Total operating revenues	**5,902**	**5,898**	**12,783**	**11,881**
Operating Expenses				
Cost of electricity	800	599	1,361	998
Cost of natural gas	115	111	585	607
Operating and maintenance	2,537	2,854	5,641	5,492
Wildfire-related claims, net of recoveries	—	50	—	99
Wildfire Fund expense	126	109	228	185
Depreciation, amortization, and decommissioning	1,062	1,073	2,228	2,170
Total operating expenses	**4,640**	**4,796**	**10,043**	**9,551**
Operating Income	**1,262**	**1,102**	**2,740**	**2,330**
Interest income	107	179	223	293
Interest expense	(699)	(713)	(1,416)	(1,368)
Other income, net	100	83	218	154
Income Before Income Taxes	**770**	**651**	**1,765**	**1,409**
Income tax provision (benefit)	(61)	39	(20)	102
Net Income	**831**	**612**	**1,785**	**1,307**
Preferred stock dividend requirement	4	4	7	7
Income Available for Common Stock	**$ 827**	**$ 608**	**$ 1,778**	**$ 1,300**

See accompanying Notes to the Condensed Consolidated Financial Statements.

PACIFIC GAS AND ELECTRIC COMPANY
CONDENSED CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME
(in millions)

	(Unaudited)			
	Three Months Ended June 30,		Six Months Ended June 30,	
	2026	2025	2026	2025
Net Income	**$ 831**	**$ 612**	**$ 1,785**	**$ 1,307**
Other Comprehensive Income				
Pension and other postretirement benefit plans obligations (net of taxes of $0, $0, $0, and $0 respectively)	—	—	—	1
Net unrealized gains (losses) on available-for-sale securities (net of taxes of $1, $3, $4, and $5 respectively)	(3)	8	(9)	14
Total other comprehensive income (loss)	**(3)**	**8**	**(9)**	**15**
Comprehensive Income	**$ 828**	**$ 620**	**$ 1,776**	**$ 1,322**

See accompanying Notes to the Condensed Consolidated Financial Statements.

PACIFIC GAS AND ELECTRIC COMPANY
CONDENSED CONSOLIDATED BALANCE SHEETS
(in millions)

	(Unaudited) Balance at	
	June 30, 2026	**December 31, 2025**
ASSETS		
Current Assets		
Cash and cash equivalents	$ 256	$ 353
Restricted cash and restricted cash equivalents (includes $215 million and $225 million related to VIEs at respective dates)	248	258
Accounts receivable		
Customers (net of allowance for doubtful accounts of $402 million and $408 million at respective dates) (includes $1.6 billion and $1.9 billion related to VIEs, net of allowance for doubtful accounts of $400 million and $408 million at respective dates)	1,884	2,267
Accrued unbilled revenue (includes $1.7 billion and $1.3 billion related to VIEs at respective dates)	1,909	1,463
Regulatory balancing accounts	5,380	6,300
Other (net of allowance for doubtful accounts of $19 million and $69 million at respective dates)	1,830	1,725
Regulatory assets	196	305
Inventories		
Gas stored underground and fuel oil	70	75
Materials and supplies	785	745
Wildfire Fund asset	291	297
Wildfire self-insurance asset	1,059	1,043
Other	804	643
Total current assets	**14,712**	**15,474**
Property, Plant, and Equipment		
Property, Plant, and Equipment	133,883	128,989
Construction work in progress	4,809	4,626
Financing lease ROU asset and other	—	2
Total property, plant, and equipment	**138,692**	**133,617**
Accumulated depreciation	(38,511)	(37,269)
Net property, plant, and equipment	**100,181**	**96,348**
Other Noncurrent Assets		
Regulatory assets	16,125	15,981
Customer credit trust	553	804
Nuclear decommissioning trusts	4,431	4,230
Operating lease ROU asset	481	445
Wildfire Fund asset	3,508	3,728
Other (includes noncurrent accounts receivable of $77 million and $67 million related to VIEs, net of noncurrent allowance for doubtful accounts of $19 million and $15 million at respective dates)	4,192	4,073
Total other noncurrent assets	**29,290**	**29,261**
TOTAL ASSETS	**$ 144,183**	**$ 141,083**

See accompanying Notes to the Condensed Consolidated Financial Statements.

PACIFIC GAS AND ELECTRIC COMPANY
CONDENSED CONSOLIDATED BALANCE SHEETS
(in millions, except share amounts)

	(Unaudited) Balance at	
	June 30, 2026	**December 31, 2025**
LIABILITIES AND SHAREHOLDERS' EQUITY		
Current Liabilities		
Short-term borrowings	$ 1,375	$ 2,675
Long-term debt, classified as current (includes $226 million and $221 million related to VIEs at respective dates)	1,075	821
Accounts payable		
Trade creditors	3,006	3,352
Regulatory balancing accounts	2,142	3,119
Other	876	844
Operating lease liabilities	91	90
Interest payable (includes $70 million and $72 million related to VIEs at respective dates)	716	673
Wildfire-related claims	309	524
Other	2,725	3,710
Total current liabilities	**12,315**	**15,808**
Noncurrent Liabilities		
Long-term debt (includes $11.6 billion and $11.7 billion related to VIEs at respective dates)	55,155	51,766
Regulatory liabilities	20,385	20,188
Pension and other postretirement benefits	450	482
Asset retirement obligations	5,581	5,439
Deferred income taxes	5,352	4,732
Operating lease liabilities	390	355
Financing lease liabilities	—	2
Other	4,902	4,474
Total noncurrent liabilities	**92,215**	**87,438**
Shareholders' Equity		
Preferred stock	258	258
Common stock, $5 par value, authorized 800,000,000 shares; 800,000,000 shares outstanding at respective dates	1,322	1,322
Additional paid-in capital	38,802	37,505
Reinvested earnings	(697)	(1,225)
Accumulated other comprehensive loss	(32)	(23)
Total shareholders' equity	**39,653**	**37,837**
TOTAL LIABILITIES AND SHAREHOLDERS' EQUITY	**$ 144,183**	**$ 141,083**

See accompanying Notes to the Condensed Consolidated Financial Statements.

EXHIBIT B

PACIFIC GAS AND ELECTRIC COMPANY
REVENUE, EXPENSE, RATE BASE AND RATE OF RETURN
YEAR 2025 SUMMARY OF EARNINGS
RECORDED ADJUSTED FOR RATEMAKING
$000

Line No.		FERC Transmission Operations	CPUC Electric Operations	CPUC Gas Operations	Total Utility Operations
1	**Operating Revenue**	2,797,089	17,419,053	6,848,524	27,064,666
2	**Expenses**				
3	Operation & Maintenance Expense	718,794	11,144,874	3,618,014	15,481,682
4	Depreciation	669,282	3,039,748	991,628	4,700,658
5	Taxes	386,821	301,042	496,977	1,184,840
6	Other	97,516	319,257	(12,343)	404,431
7	**Total Expenses (Line 3 to Line 6)**	1,872,413	14,804,921	5,094,276	21,771,611
8	Total Utility adjustments (after tax)	-	(114,004)	(91,352)	(205,356)
9	**Operating Income (Line 1 less Line 7)**	**924,675** (a)	**2,500,128**	**1,662,896**	**5,087,699**
10	Total Weighted Average Rate Base [b]	12,251,510	37,737,431	19,358,058	69,347,000
11	**Return on Rate Base (Line 8/Line 9) [c]**	**7.55%**	**6.85%**	**8.59%**	**7.34%**
12	**Return on Equity [c]**	**10.38%**	**8.72%**	**12.06%**	**9.65%**

Notes:

(a) FERC Operating income represents the total return on capital as filed in the FERC TO annual filing.

(b) 2025 Total AB1054 $3.21B is excluded from the recorded rate base and reflects the reclassification of FERC 898 functionalization from Common, General, and Intangible assets.

(c) Earned rate of return (ROR) and return on equity (RoE) is based on the FERC Form 1 and 2 on a ratemaking basis, adjusted to eliminate material distortive items and re-state certain financial items from GAAP to a ratemaking basis.

EXHIBIT C

SERVICE OF NOTICE OF APPLICATION

In accordance with Rule 3.2(b), Applicant will mail a notice to the following, stating in general terms its proposed change in rates.

State of California

To the Attorney General and the Department of General Services.

State of California
Office of Attorney General
1300 I St Ste 1101
Sacramento, CA 95814

and

Director of General Services
State of California
707 3rd St
West Sacramento, CA 95605

Counties

To the County Counsel or District Attorney and the County Clerk in the following counties:

Alameda
Alpine
Amador
Butte
Calaveras
Colusa
Contra Costa
El Dorado
Fresno
Glenn
Humboldt
Kern
Kings
Lake
Lassen
Madera
Marin
Mariposa
Mendocino
Merced
Modoc
Monterey
Napa
Nevada
Placer
Plumas
Sacramento
San Benito
San Bernardino
San Francisco
San Joaquin
San Luis Obispo
San Mateo
Santa Barbara
Santa Clara
Santa Cruz
Shasta
Sierra
Siskiyou
Solano
Sonoma
Stanislaus
Sutter
Tehama
Trinity
Tulare
Tuolumne
Yolo
Yuba

Municipal Corporations

To the City Attorney and the City Clerk of the following municipal corporations:

Alameda
Albany
Amador City
American Canyon
Anderson
Angels Camp
Antioch
Arcata
Arroyo Grande
Arvin
Atascadero
Atherton
Atwater
Auburn
Avenal
Bakersfield
Barstow
Belmont
Belvedere
Benicia
Berkeley
Biggs
Blue Lake
Brentwood
Brisbane
Buellton
Burlingame
Calistoga
Campbell
Capitola
Carmel
Ceres
Chico
Chowchilla
Citrus Heights
Clayton
Clearlake
Cloverdale
Clovis
Coalinga
Colfax
Colma
Colusa
Concord
Corcoran
Corning
Corte Madera
Cotati
Cupertino
Daly City
Danville
Davis
Del Rey Oakes
Dinuba
Dixon
Dos Palos
Dublin
East Palo Alto
El Cerrito
Elk Grove
Emeryville
Escalon
Eureka
Fairfax
Fairfield
Ferndale
Firebaugh
Folsom
Fort Bragg
Fortuna
Foster City
Fowler
Fremont
Fresno
Galt
Gilroy
Gonzales
Grass Valley
Greenfield
Gridley
Grover Beach
Guadalupe
Gustine
Half Moon Bay
Hanford
Hayward
Healdsburg
Hercules
Hillsborough
Hollister
Hughson
Huron
Ione
Isleton
Jackson
Kerman
King City
Kingsburg
Lafayette
Lakeport
Larkspur
Lathrop
Lemoore
Lincoln
Live Oak
Livermore
Livingston
Lodi
Lompoc
Loomis
Los Altos
Los Altos Hills
Los Banos
Los Gatos
Madera
Manteca
Maricopa
Marina
Mariposa
Martinez
Marysville
McFarland
Mendota
Menlo Park
Merced
Mill Valley

Millbrae
Milpitas
Modesto
Monte Sereno
Monterey
Moraga
Morgan Hill
Morro Bay
Mountain View
Napa
Newark
Nevada City
Newman
Novato
Oakdale
Oakland
Oakley
Orange Cove
Orinda
Orland
Oroville
Pacific Grove
Pacifica
Palo Alto
Paradise
Parlier
Paso Robles
Patterson
Petaluma
Piedmont
Pinole
Pismo Beach
Pittsburg
Placerville
Pleasant Hill
Pleasanton
Plymouth
Point Arena
Portola
Portola Valley
Rancho Cordova
Red Bluff
Redding
Redwood City
Reedley
Richmond
Ridgecrest
Rio Dell
Rio Vista
Ripon
Riverbank
Rocklin
Rohnert Park
Roseville
Ross
Sacramento
Saint Helena
Salinas
San Anselmo
San Bruno
San Carlos
San Francisco
San Joaquin
San Jose
San Juan Bautista
San Leandro
San Luis Obispo
San Mateo
San Pablo
San Rafael
San Ramon
Sand City
Sanger
Santa Clara
Santa Cruz
Santa Maria
Santa Rosa
Saratoga
Sausalito
Scotts Valley
Seaside
Sebastopol
Selma
Shafter
Shasta Lake
Soledad
Solvang
Sonoma
Sonora
South San Francisco
Stockton
Suisun City
Sunnyvale
Sutter Creek
Taft
Tehama
Tiburon
Tracy
Trinidad
Turlock
Ukiah
Union City
Vacaville
Vallejo
Victorville
Walnut Creek
Wasco
Waterford
Watsonville
West Sacramento
Wheatland
Williams
Willits
Willows
Windsor
Winters
Woodland
Woodside
Yountville
Yuba City