BEFORE THE PUBLIC UTILITIES COMMISSION OF THE

STATE OF CALIFORNIA

Application of Southern California Edison Company (U 338-E) for Approval of Its 2026-2030 Investment Plan for the Electric Program Investment Charge.	Application 26-08-___

APPLICATION OF SOUTHERN CALIFORNIA EDISON COMPANY (U 338-E) FOR APPROVAL OF ITS 2026-2030 INVESTMENT PLAN FOR THE ELECTRIC PROGRAM INVESTMENT CHARGE

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Dated: **August 26, 2026**

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I.

INTRODUCTION

Southern California Edison Company (SCE) respectfully submits this application requesting approval of its fifth Investment Plan for the Electric Program Investment Charge (EPIC) covering 2026 through 2030, which is attached hereto. In the California Public Utilities Commission's (Commission) Decision D.26-02-037, the Commission required that the EPIC program administrators file applications for their investment plans by August 26, 2026.[1] The EPIC program administrators are SCE, Pacific Gas & Electric Company, San Diego Gas & Electric Company, and the California Energy Commission (CEC). SCE files this application in compliance with D.26-02-037, as well as previous Commission EPIC proceeding decisions.[2]

SCE respectfully requests that the Commission:

- Find that SCE's EPIC 5 Application and Investment Plan comply with the requirements of past EPIC decisions.

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1 D.26-02-037, Ordering Paragraph (OP) 5.

2 D.12-05-037; D.13-11-025; D.15-04-020; D.18-10-052; D.21-07-006; Research Administration Plan (RAP) approval decisions such as D.20-02-003; and D.26-02-037, which established the framework and requirements for EPIC 5.

- Approve SCE's EPIC 5 Plan as reasonable, appropriate, and in the interest of electric utility ratepayers.
- Authorize SCE to file Tier 3 Advice Letter(s) to request approval to add any additional research topics to its plan, after its plan is approved.[3]
- Render other Findings of Fact, Conclusions of Law, and issue Orders consistent with the foregoing requests; and
- Provide any other relief as is necessary and proper.

II.

BACKGROUND

The Commission established the EPIC in 2011 and renewed the Program in 2019. On March 2, 2026, the Commission issued its decision authorizing the investor-owned utilities (IOUs or utilities) to continue to serve as EPIC program administrators, along with the CEC.[4]

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."[5]

EPIC is composed of three areas: (1) research and development, (2) technology demonstration and deployment, and (3) market support and market facilitation programs for the benefit of the IOUs' ratepayers.[6] The IOUs are authorized only to administer funds for technology demonstration and deployment.[7]

Approximately 80% of the total EPIC funding is administered by the CEC, with the remaining 20% administered by the IOUs. Additionally, 0.5% of the budget funds Commission

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[3] This would be consistent with the previous process for requesting approval to pursue additional projects for investment plans filed at the project level in EPIC 1 through EPIC 4.
[4] D.26-02-037.
[5] D.21-11-028, Appendix A.
[6] D.12-05-037, at OP 1.
[7] *Id*., at OP 5.

oversight of the EPIC.[8] SCE's EPIC budget for 2026-2030 is $76 million.[9] The utility-administered portion of EPIC serves a distinct role within the broader innovation portfolio by demonstrating and validating emerging technologies under actual utility operating conditions. These technology demonstration and deployment activities help evaluate performance, reliability, safety, interoperability, and implementation considerations before technologies are deployed at broader scale.

SCE's fifth EPIC plan covers the period of 2026 through 2030. The Commission instructed the IOUs to file investment plan applications for EPIC 5 by August 26, 2026.[10] The Commission further directed all administrators to file EPIC 5 investment plans at the Strategic Initiative level.[11] Strategic Initiatives are defined as the strategies EPIC administrators employ to meet their high-level Strategic Objectives. The Commission ordered EPIC administrators to propose funding levels for the Strategic Initiatives and specify how these initiatives will be operationalized, including the proposed activities.[12]

The Strategic Initiative framework provides administrators with greater flexibility to respond to emerging technology opportunities and lessons learned over the course of the program cycle while maintaining transparency regarding intended outcomes, funding priorities, and ratepayer benefits. By focusing on Strategic Initiatives, the Commission enables administrators to develop more adaptive innovation portfolios that can evolve alongside California's rapidly changing energy landscape.

Stakeholder engagement plays a central role in EPIC program administration by helping ensure that investment priorities, research areas, and project selection reflect stakeholder perspectives and evolving customer needs.[13] Consistent with these requirements, SCE's EPIC 5

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8 *Ibid*.
9 D.26-02-037, Appendix B, at B-4.
10 D.26-02-037, OP 5.
11 D.21-11-028, OP 8.
12 *Ibid*.
13 SCE Advice Letter 5838-E, "Electric Program Investment Charge 5 Community Engagement Plan," submitted June 26, 2026.

Investment Plan reflects stakeholder input, aligns with Commission-established Strategic Goals and Objectives, and proposes a portfolio of Strategic Initiatives designed to advance technologies capable of delivering measurable benefits to customers and ratepayers.

III.

SUMMARY OF INVESTMENT PLAN

SCE's EPIC 5 Investment Plan for the 2026-2030 program cycle represents a collaborative effort between SCE and the other program administrators. It incorporates the input of stakeholders and addresses the requirements of D.26-02-037, as well as Energy Division guidance.

SCE's EPIC 5 Investment Plan consists of the following sections:

1. Executive Summary
2. Background
3. Funding Overview
4. Strategic Goals and Strategic Objectives
5. Strategic Initiatives
6. Strategic Roadmap
7. Research Topic Areas
8. Appendices

The Executive Summary provides an overview of SCE's EPIC 5 Investment Plan, including the Plan's alignment with Commission objectives, SCE's technology strategy, affordability considerations, proposed Strategic Initiatives, and program administration framework.

The Background section describes the regulatory, strategic, and stakeholder context for EPIC 5, including SCE's alignment with the Commission's EPIC Strategic Goals and SCE's broader Technology Roadmap.

The Funding Overview explains SCE's proposed EPIC 5 budget, SCE's decision not to request an inflation adjustment, and the preliminary, estimated allocation of administrative funding.

The Strategic Goals and Strategic Objectives section explains how SCE's proposed initiatives support each of the Commission's five EPIC Strategic Goals and identifies the expected ratepayer benefits, metrics, and coordination considerations associated with those goals.

The Strategic Initiatives section describes SCE's four proposed initiatives, including their strategic purpose, equity alignment, relationship to EPIC Strategic Goals and Objectives, coordination with related proceedings and administrators, and unique role within SCE's EPIC 5 portfolio.

The Strategic Roadmap illustrates how SCE's EPIC 5 initiatives build on prior EPIC investments and support future technology deployment.

The Research Topic Areas section provides additional detail on the specific technology areas SCE expects to explore under each initiative, including the gaps addressed, unique role for EPIC funding, prior research, development, and demonstration (RD&D) leveraged, coordination, metrics, expected outcomes, equity outcomes, and deployment considerations.

The EPIC administrators coordinated closely with one another and Energy Division throughout development of their respective EPIC 5 Investment Plans. Consistent with the template provided by Energy Division and the Commission's direction to improve transparency and comparability across investment plans. SCE's EPIC 5 Investment Plan demonstrates how its proposed portfolio supports the Commission's five Strategic Goals: (1) Transportation Electrification, (2) Distributed Energy Resource Integration, (3) Building Decarbonization, (4) Achieving 100% Net-Zero Carbon Emissions and the Coordinated Role of Gas, and (5) Climate Adaptation.

To advance these goals and their associated Strategic Objectives, SCE proposes four Strategic Initiatives that represent the primary areas of investment and innovation within its

EPIC 5 portfolio. Each Strategic Initiative is operationalized through a set of Research Topics, which identify the technology areas SCE expects to explore through future EPIC projects. Collectively, SCE proposes 17 Research Topics across its four Strategic Initiatives.

SCE includes in its Plan the following appendices:

- Appendix 1 – Summary of Investment Plan Development Stakeholder Comments and Correlated Administrator Responses
- Appendix 2 – Equity Matrix with Equity Funding Summary
- Appendix 3 – Mapping of Planned Investments to the Electricity System Value Chain
- Appendix 4 – Information Summary of Demand Response Research, Development and Demonstration Activities
- Appendix 5 – Disadvantaged Communities Advisory Group Engagement
- Appendix 6 – Tribal Engagement
- Appendix 7 – Regulatory and Legislative Background
- Appendix 8 – Acronyms and Abbreviations
- Appendix 9 – Glossary
- Appendix 10 – Inflation Table

IV.

PROCEDURAL REQUIREMENTS

A. Statutory Authority (Rule 2.1)

This application is made pursuant to D.26-02-037, the Public Utilities Code, the Commission's Rules of Practice and Procedure, and prior decisions, orders, resolutions of the Commission.

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

SCE is a corporation organized and existing under the laws of the State of California, and is primarily engaged in the business of generating, purchasing, transmitting, distributing and selling electric energy for light, heat and power in portions of central and southern California as a public utility subject to the jurisdiction of the California Public Utilities Commission. SCE's properties, which are located primarily within the State of California, consist mainly of hydroelectric and thermal electric generating plants, together with transmission and distribution lines and other property necessary in connection with its business.

SCE's principal place of business is 2244 Walnut Grove Avenue, Rosemead, California, and its post office address and telephone number are:

Southern California Edison Company
Post Office Box 800
Rosemead, California 91770
Telephone: (626) 302-1212

C. Correspondence (Rule 2.1(b))

Communications regarding this Application should be addressed to the attention of:

Zachary T. Elsea Southern California Edison Company P.O. Box 800 2244 Walnut Grove Avenue Rosemead, CA 91770 Telephone: (626) 785-0562 Email: zachary.elsea@sce.com	SCE Case Administration Southern California Edison Company P.O. Box 800 8631 Rush Street Rosemead, CA 91770 Telephone: (626) 302-0449 Email: case.admin@sce.com

D. Proposed Categorization (Rule 2.1(c))

SCE proposes to characterize this proceeding as rate-setting, as defined in Rule 1.3(d). SCE acknowledges that, given that SCE is not requesting an inflation adjustment to its budget, the outcome of this application should not affect ratepayer rates. Nonetheless, as between the quasi-legislative and rate-setting categorizations, SCE believes that this application is nonetheless more appropriately characterized as rate-setting.[14]

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[14] SCE does not believe that the notice provisions of Public Utilities Code section 454 apply to this application because the application does not request any inflation adjustment to SCE's budget for EPIC 5, which was set by the Commission in prior decisions.

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

The need for hearings and the issues to be considered depend upon the degree to which other parties might contest SCE's application. If other parties contest SCE's application, SCE recommends the Commission hold workshops to seek public comment on SCE's and the other administrators' investment plans. The workshops held during the investment plan development process facilitated stakeholder input and efficiently addressed the IOU EPIC administrators' investment plans. The same benefits would result from workshops held during the application process. In addition, the Commission has recognized the utility of workshops for the EPIC program by requiring the administrators to continue consulting with stakeholders at least twice per year.

Timely approval of SCE's EPIC 5 Investment Plan is particularly important given the pace and complexity of issues being addressed in several Commission proceedings.[15] Of note, the High DER proceeding[16] is evaluating near-term challenges associated with increasing DER adoption, interconnection, energization, grid visibility, flexible load integration, and the operational tools needed to manage a more dynamic distribution system. EPIC 5 is designed to complement those policy and implementation efforts by demonstrating and validating the technologies, planning capabilities, and operational approaches that can help translate proceeding outcomes into scalable grid solutions. Prompt approval will allow SCE to begin developing EPIC 5 projects without delay, coordinate those demonstrations with evolving regulatory priorities, and help ensure that customer-funded innovation keeps pace with the urgent reliability, affordability, and decarbonization needs facing California's electric system. SCE proposes the following schedule:

Event	**Proposed Date**
Application Filed	August 26, 2026
Protests and Responses	September 28, 2026

[15] For an overview of all related CPUC proceedings, please see Attachment A, Appendix 7, Table 2.
[16] Order Instituting Rulemaking R.21-06-17, High DER Future Grid Proceeding.

Reply to Protests and Responses	October 8, 2026
Workshops	October 2026
Opening Briefs	January 11, 2027
Reply Briefs	February 1, 2027
ALJ Proposed Decision	March 5, 2027
Comments on Proposed Decision	March 19, 2027
Reply Comments	March 26, 2027
Commission Decision	April 2027

F. Organization and Qualification to Transact Business (Rule 2.2)

A copy of SCE's Certificate of Amended and Restated Articles of Incorporation, effective on August 28, 2023, and presently in effect, certified by the California Secretary of State, was filed with the Commission on December 15, 2023, in connection with Application No. A.23-12-011, and is incorporated herein by this reference.

A copy of SCE's Certificate of Determination of Preferences of the Series M Preference Stock filed with the California Secretary of State on November 17, 2023, and presently in effect, certified by the California Secretary of State, was filed with the Commission on December 15, 2023, in connection with Application No. A.23-12-011, and is incorporated herein by this reference.

A copy of SCE's Certificate of Determination of Preferences of the Series N Preference Stock filed with the California Secretary of State on May 8, 2024, and presently in effect, certified by the California Secretary of State, was filed with the Commission on May 15, 2024, in connection with Application No. A.24-05-007, and is incorporated herein by this reference.

Copies of SCE's latest Annual Report to Shareholders and Edison International's latest proxy statement were sent to its respective stockholders and have been submitted to the Commission with an Energy Division Central Files Document Coversheet dated March 13, 2026, pursuant to General Order Nos. 65-A and 104-A of the Commission, and are incorporated herein by this reference.

G. **<u>Service List</u>**

As directed by D.26-02-037, Ordering Paragraph 5, SCE is serving this application on the service lists for rulemaking R.19-10-005, and SCE's most recent General Rate Case (A.23-05-010).

Respectfully submitted,

WILLIAM K. BRIGGS
ZACHARY T. ELSEA

/s/ Zachary T. Elsea
By: Zachary T. Elsea

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SOUTHERN CALIFORNIA EDISON COMPANY

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August 26, 2026

VERIFICATION

I am a Senior Vice President of Southern California Edison Company and am authorized to make this verification on its behalf. I am informed and believe that the matters stated in the foregoing pleading are true.

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

Executed on August 20, 2026, at Pomona, California

/s/ Shinjini Menon
Shinjini Menon
Senior Vice President
System Planning & Engineering
Southern California Edison Company

Attachment A

SCE EPIC 5 INVESTMENT PLAN

Southern California Edison
Electric Program Investment Charge (EPIC)
EPIC 5 (2026-2030) Administrator Investment Plan Application
August 26, 2026

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

Table of Contents

Appendices

1. Executive Summary

The California Public Utilities Commission (Commission or CPUC) established the Electric Program Investment Charge (EPIC) to support energy innovation that delivers measurable benefits to California electric ratepayers. EPIC's mission is to "invest[] in innovation to ensure equitable access to safe, affordable, reliable, and environmentally sustainable energy for electricity ratepayers,"[1] with guiding principles focused on customer benefits, including safety, reliability, affordability, environmental sustainability, and equity. Southern California Edison Company's (SCE) Fifth Electric Program Investment Charge Investment Plan (EPIC 5) builds on prior EPIC investment cycles by identifying technology demonstration and deployment activities that can help address the operational, affordability, reliability, resilience, safety, and equity challenges associated with California's transition to an increasingly electrified and climate-resilient energy system. Through this Plan, SCE seeks to develop, validate, and share innovative technologies, operational capabilities, and planning tools that can provide scalable benefits to customers and support California's long-term energy, climate, and equity objectives. Pursuant to D.26-02-037, the Commission authorized SCE's EPIC 5 budget of $76 million.[2]

While D.26-02-037 permits SCE to propose an inflation adjustment for EPIC 5, SCE has elected not to request an increase in this application in recognition of the pressure inflation is putting on its ratepayers. This approach reflects SCE's focus on affordability and its commitment to advancing EPIC objectives within the same overall budget level authorized for EPIC 4.

SCE's EPIC 5 Investment Plan is closely aligned with SCE's longer-term clean energy and resiliency strategy. SCE identified key areas of innovation in its Pathway 2045 White Paper, and these areas align with CPUC's five EPIC 5 Strategic Goals.[3] More importantly, the EPIC 5 Investment Plan leverages SCE's Technology Roadmap, which it published externally to share a comprehensive vision of the technologies to transform SCE's energy system and enable greater collaboration with innovators and other industry stakeholders.[4]

EPIC 5 will continue to be a key component of SCE's overall technology strategy. This alignment with SCE's broader Technology Roadmap helps ensure that successful EPIC projects have strong internal sponsorship and a clear path toward implementation across the grid. As a result, EPIC investments are positioned to translate innovative concepts into scalable solutions that deliver measurable benefits to customers and ratepayers.

The EPIC 5 Investment Plan was developed through coordination with other EPIC administrators, Energy Division, community stakeholders, and consideration of the Commission's strategic direction for EPIC. The Plan incorporates the EPIC mission to advance innovation for the benefit of electric ratepayers and reflects the EPIC Equity in Research, Development, and Demonstration Framework by incorporating equity considerations into portfolio development, stakeholder engagement, project evaluation, and benefit assessment. SCE will

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1 D.21-11-028, Decision Approving the Utilities as Electric Program Investment Charge Administrators with Additional Administrative Requirements, issued November 18, 2021, Appendix A.

2 D.26-02-037, Decision Adopting Electric Program Investment Charge Strategic Objectives, issued February 26, 2026, Appendix B.

3 SCE, "Pathway 2045," November 2019, available at www.edison.com/clean-energy/pathway-2045.

4 SCE, "Partner's Guide to the SCE Technology Roadmap," January 2025, available at https://on.edison.com/techroadmap.

continue to prioritize opportunities to demonstrate technologies and approaches that improve outcomes for disadvantaged, low income, and Tribal communities while delivering broader statewide benefits.

EPIC 5 is designed to address emerging challenges that cannot be fully met through traditional utility investments or commercial market activities alone. California's rapid adoption of transportation electrification, distributed energy resources (DERs), and clean energy technologies is increasing demands on grid infrastructure and utility operations. At the same time, climate-driven impacts, including extreme weather events and evolving reliability risks, require new approaches to grid planning, operations, resilience, and workforce safety.

Like the other IOU Administrators, SCE's EPIC investments fund only technology demonstration and deployment projects.[5] A central objective of these types of projects is to demonstrate emerging technologies under real-world grid conditions, helping accelerate the transition from innovation to broader deployment while reducing implementation risk for customers and utilities.

To address these needs, SCE proposes four Strategic Initiatives that together form an integrated innovation portfolio.

1. **Enhanced Grid Efficiency, Utilization & Flexibility (EGEUF)** focuses on increasing the capability, utilization, and flexibility of existing grid infrastructure through advanced grid-enhancing technologies and flexible energy solutions. Through demonstrations of advanced conductors, grid-edge sensing technologies, adaptive protection systems, flexible load management solutions, and intelligent grid devices, EGEUF seeks to improve system visibility and situational awareness, increase DER hosting capacity, support electrification, and reduce the need for traditional infrastructure expansion.

2. **Intelligent Grid Planning & Orchestration (IGPO)** focuses on improving planning, forecasting, connectivity, and operational coordination through advanced digital tools and grid orchestration capabilities. This initiative will evaluate advanced planning tools, communications architectures, digital platforms, forecasting capabilities, and operational technologies that improve visibility across the grid and enable more integrated decision-making. These efforts will help support the efficient integration of new loads, DERs, and emerging technologies while improving planning accuracy and operational performance.

3. **Field Intelligent Technologies (FIT)** focuses on improving visibility into asset and technology performance through advanced sensing, monitoring, and field intelligence solutions. By enhancing situational awareness and enabling more effective deployment of field resources, FIT seeks to improve outage response, accelerate infrastructure deployment, and strengthen resilience during increasingly frequent extreme weather events.

4. **Safe and Advanced Field Execution (SAFE)** focuses on improving reliability, reducing operational risks, enabling execution of grid modernization activities under increasingly complex operating conditions,

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[5] D.12-05-037, Decision Establishing Purposes and Governance for Electric Program Investment Charge and Establishing Funding Collections for 2013-2020, issued May 24, 2012, Ordering Paragraph (OP) 5.

and improving safety. SAFE will evaluate advanced communications, augmented field tools, connected workforce technologies, and rapid response technologies.

Collectively, these initiatives support the five EPIC Strategic Goals of (1) Transportation Electrification, (2) Distributed Energy Resource Integration, (3) Building Decarbonization, (4) Achieving 100 Percent Net-Zero Carbon Emissions and the Coordinated Role of Gas, and (5) Climate Adaptation. The Investment Plan emphasizes opportunities to improve the utilization of existing infrastructure, support customer participation in the clean energy transition, enhance system reliability and resilience, and develop technologies and operational approaches that can be scaled for broader deployment across California.

The EPIC 5 Investment Plan also establishes a framework for program administration, stakeholder engagement, portfolio management, knowledge transfer, and performance evaluation. SCE will continue to coordinate with other EPIC administrators, share lessons learned, and disseminate project results to maximize ratepayer value and support broader market adoption of successful technologies and practices. Through rigorous evaluation and transparent reporting, SCE will assess project outcomes and ensure that EPIC investments continue to advance innovation in a manner that is aligned with Commission objectives and responsive to California's evolving energy needs.

Through this EPIC 5 Investment Plan, SCE proposes a portfolio of strategic investments that will help accelerate the development and demonstration of technologies and operational capabilities needed to provide California customers with a cleaner, safer, more reliable, more resilient, and more affordable energy future.

SCE's EPIC 5 Investment Plan is set forth at the high-level Strategic Initiative level.[6] Upon approval of SCE's EPIC 5 Investment Plan, SCE will begin defining its EPIC 5 projects. EPIC projects play a critical role in de-risking the technologies SCE expects will drive future grid innovation, with the goal of deploying successful demonstrations across the grid to deliver meaningful value for all ratepayers. Integration to the grid is a critical step in validating technology demonstration and deployment (TD&D) investments.[7] Future EPIC projects that do not provide a path to integration with the grid risk remaining stranded in the "valley of death."[8]

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6 D.21-11-028, OP 8.

7 D.12-05-037, OP 3.

8 D.12-05-037, p. 32. The Commission recognized EPIC's role in helping technologies move beyond the gap between research/demonstration and commercial deployment, described by the Commission as the "valley of death."

2. Background

The Electric Program Investment Charge (EPIC) is a ratepayer-funded research, development, demonstration, and deployment (RD&D) program designed to advance innovative technologies and approaches that support a safe, reliable, affordable, equitable, and environmentally sustainable energy system. EPIC investments help bridge the gap between early-stage innovation and broader market adoption by supporting the demonstration and validation of technologies and operational solutions under real-world utility conditions.

The California Energy Commission (CEC) administers 80% of EPIC funds. California's three Investor-Owned Utilities (IOUs), including SCE, administer the remaining 20%. The IOUs' administration of EPIC funds is limited to technology demonstration and deployment (TD&D).[9]

SCE's EPIC 5 Investment Plan is set forth at the high-level Strategic Initiative level.[10] Upon approval of SCE's EPIC 5 Investment Plan, SCE will begin defining its EPIC 5 projects. EPIC projects are a key step to de-risking the key technologies that SCE expects to drive future innovation of the grid, and SCE's goal is to deploy successful EPIC projects across the grid to unlock significant value for all ratepayers.

SCE's Technology Strategy Integration with EPIC

As an EPIC program administrator, SCE is responsible for developing and implementing an investment portfolio consistent with its technology strategy that advances Commission-established strategic goals and objectives while delivering measurable benefits to ratepayers. SCE's EPIC activities support and are informed by SCE's broader, long-term technology strategy. In addition, foundational SCE whitepapers and the SCE Technology Roadmap align with the Commission's EPIC 5 Strategic Goals and Strategic Objectives, illustrating how EPIC investments contribute to system-level outcomes.

EPIC is a critical part of SCE's technology strategy. SCE released a series of whitepapers that outline its overall technology strategy, starting with the 2017 paper "The Clean Power and Electrification Pathway,"[11] which introduces SCE's blueprint to reduce greenhouse gas emissions and air pollutants. SCE further refined its vision in 2019 when it published "Pathway 2045,"[12] an in-depth analysis to identify a feasible and economical route to realizing California's GHG reduction goals and achieving carbon neutrality in California at the lowest reasonable cost by 2045. SCE subsequently released its whitepaper "Reimagining the Grid" in December 2020, which examines the grid modernization, technology innovation, and infrastructure transformation needed to support California's clean energy future.[13] Collectively, the priorities outlined in these and subsequent SCE whitepapers align closely with the CPUC's five EPIC 5 Strategic Goals, demonstrating that EPIC investments support SCE's broader long-term clean energy and technology strategy. For more information about SCE's clean energy whitepapers, visit www.edison.com/clean-energy.

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9 D.12-05-037, OP 5.

10 D.21-11-028, OP 8.

11 SCE, "The Clean Power and Electrification Pathway," November 2017, available at www.edison.com/content/dam/eix/documents/our-perspective/g17-pathway-to-2030-white-paper.pdf.

12 SCE, "Pathway 2045," November 2019, available at www.edison.com/clean-energy/pathway-2045.

13 SCE, "Reimagining the Grid," December 2020, available at https://www.edison.com/clean-energy/reimagining-the-grid.

SCE established a Technology Roadmap to further define its overall technology strategy. Recognizing the importance of sharing this vision with the broader industry and the vendor community, SCE published its "Partner's Guide to the SCE Technology Roadmap." The Technology Roadmap is SCE's actionable plan to drive innovation in the grid and is a signal to the industry of the core areas that SCE believes are most beneficial to customers.[14] The Technology Roadmap plays a defining role in shaping the EPIC 5 Investment Plan.

EPIC is therefore not a standalone research effort, but a core enabler of SCE's long-term technology and decarbonization strategy. The alignment between longstanding SCE strategic priorities, the Technology Roadmap, and CPUC's EPIC 5 Strategic Goals demonstrates continuity across past, present, and future investment decisions. At SCE, EPIC does not pursue technology innovation as an end in itself; rather it supports the evaluation and demonstration of solutions that may provide measurable benefits to customers, the electric system, and California's clean energy goals.

Figure 1: Alignment between SCE Strategic Initiatives and CPUC Strategic Goals

	CPUC EPIC 5 Strategic Goals				
SCE EPIC 5 Strategic Initiatives	**Climate Adaptation**	**Transportation Electrification**	**DER Integration**	**Building Decarbonization**	**Achieving 100% Net Zero and the Coordinated Role of Gas**
Enhanced Grid Efficiency, Utilization & Flexibility (EGEUF)	✓	✓	✓	✓	✓
Intelligent Grid Planning & Orchestration (IGPO)	✓	✓	✓	✓	✓
Field Intelligent Technologies (FIT)	✓		✓		✓
Safe and Advanced Field Execution (SAFE)	✓		✓		✓

Consistent with the approach of driving technology toward measurable outcomes, SCE's EPIC 5 Investment Plan began with a technology-based approach that combined the overall strategy from the Technology Roadmap with a bottom-up analysis of key technologies SCE plans to explore. The bottom-up analysis was driven by detailed discussions with SCE's technology subject matter experts (SMEs) and was further informed by vendor project proposals from SCE's 2025 Grid Digitalization summit.[15] This rigorous, iterative process forged an alignment between SCE's longer-term strategic vision and the technologies with the highest support from internal SMEs and the private sector. SCE's EPIC 5 technology-based Initiatives are cross-cutting and have strong alignment with CPUC's EPIC 5 Strategic Goals, as seen in Figure 1.

This strong alignment in SCE's EPIC 5 Investment Plan ensures that future EPIC 5 projects will have strong support from internal business units, providing successful EPIC 5 projects an internal champion to drive successful EPIC projects forward toward implementation across SCE's grid. As such, SCE's EPIC projects not only emerge from the valley of death, but they also have a clear and direct path to benefit ratepayers at scale.

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14 SCE, "Partner's Guide to the SCE Technology Roadmap," January 2025, available at https://on.edison.com/techroadmap.

15 2025 Grid Digitalization Summit, held on Dec. 4, 2025, https://sceinnovation.brightidea.com/2025GDSummit. The Summit described SCE's grid digitalization priorities and sought collaboration and innovative solutions from vendors in areas including Operational Data & Digital Twin, Strategic Asset Management, Autonomous & Adaptive Grid Operations, Capacity Planning & Energization, and Project Initiation to Execution.

Prioritizing Transparency

SCE works closely with fellow EPIC administrators, research institutions, technology providers, governmental entities, Tribal representatives, community-based organizations, and other stakeholders to identify innovation opportunities, evaluate emerging technologies, and promote knowledge sharing across the energy sector. This collaborative approach helps ensure that investments address critical needs, leverage existing efforts, and maximize statewide benefits.

Stakeholder engagement is a core element of EPIC administration and investment planning. Consistent with Commission direction, EPIC administrators engage stakeholders throughout both investment plan development[16] and portfolio execution. These engagements help identify priority challenges, inform research roadmaps, incorporate community perspectives, and improve understanding of opportunities to advance equity and customer benefits.

Beyond meeting the Commission's engagement requirements, SCE presented its EPIC 5 Investment Plan to its EPIC Advisory Panel (Panel), which is composed of community-based organization (CBO) leaders. The Panel provided feedback that SCE incorporated into this Plan, including the importance of prioritizing safety and reliability as communities face a growing number of increasingly severe natural events. Several of SCE's Research Topics are responsive to these priorities, and the FIT and SAFE Initiatives received particularly strong support. The Panel also identified affordability as a key concern, reinforcing SCE's decision not to request an inflation adjustment for EPIC 5.

The Panel also highlighted the practical challenges of using EPIC as a vehicle to deliver community benefits. Panel members emphasized that building trust with communities is essential, but that trust-building can be complicated by the inherent uncertainty of technology demonstration projects. Because demonstrations may not ultimately deliver the community outcomes anticipated at the outset, SCE must be careful to set realistic expectations and maintain transparent engagement throughout the project lifecycle. The Panel also underscored that communities have diverse and localized needs, reinforcing the importance of engaging different constituencies to identify specific priorities – some of which may not be fully addressed through technology demonstrations alone.

Stakeholder input has played an important role in shaping EPIC 5 priorities and ensuring alignment with California's evolving energy needs. SCE submitted its EPIC 5 Community Engagement Plan (CEP) through Advice Letter 5838-E in compliance with Ordering Paragraph 7 of D.26-02-037, describing the objectives, engagement approaches, and methods that will be used to promote meaningful stakeholder participation and incorporate community perspectives throughout the EPIC 5 lifecycle.[17]

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[16] SCE, together with PG&E and SDG&E, hosted the two required DAC-focused workshops (D.18-10-052, OP 11), a Joint Utilities Northern California ESJ Communities and Tribes Workshop on May 28, 2026 and a Joint Utilities Southern California ESJ Communities and Tribes Workshop on June 18, 2026, and an additional public workshop on EPIC 5 Investment Plans on June 23, 2026.

[17] SCE Advice Letter 5838-E, "Electric Program Investment Charge 5 Community Engagement Plan," submitted June 26, 2026.

Evolving Toward Measurable Impact
As the EPIC program has matured, the Commission and program administrators have increasingly emphasized the importance of measuring and communicating the benefits produced by EPIC investments. This evolution reflects a broader commitment to transparency, accountability, and evidence-based decision making. While technology advancement remains a central objective of EPIC, the program increasingly focuses on demonstrating how innovation contributes to desired public-interest outcomes and delivers value to ratepayers.

EPIC's current framework emphasizes the evaluation of projects against clearly defined strategic goals, strategic objectives, and performance outcomes. This approach enables project and portfolio-level assessment of benefits related to reliability, resilience, affordability, safety, customer participation, decarbonization, and equity. By establishing consistent evaluation mechanisms and benefit assessment methodologies, EPIC enhances the ability of stakeholders, policymakers, and the public to understand the impact of program investments.

The Commission's decision in D.26-02-037 further advances this approach through the establishment of common strategic objectives and the EPIC Equity in RD&D Framework, which provides a consistent structure for planning, implementing, and evaluating EPIC investments. These frameworks are intended to improve transparency regarding how investments support broader Commission objectives while enabling comparisons across projects and investment portfolios. They also strengthen accountability by linking project outcomes to clearly defined program goals and measurable performance indicators.

The EPIC 5 Investment Plan builds upon this foundation by incorporating measurable outcomes, stakeholder-informed priorities, equity considerations, and benefit assessment throughout the investment lifecycle. By emphasizing both technological advancement and demonstrable customer benefits, EPIC 5 continues the program's evolution toward a transparent and accountable innovation model that supports informed decision-making and long-term value creation for California ratepayers. Through this approach, EPIC serves not only as a source of innovation funding, but also as a framework for understanding how innovation can contribute to California's clean energy future.

3. Funding Overview

The Commission authorizes EPIC administrators to propose an inflation adjustment to their EPIC 5 budgets using the California Consumer Price Index for Urban Wage Earners and Clerical Workers (California CPI-W) methodology.[18] While SCE appreciates the Commission's decision to provide administrators with that flexibility, SCE is not requesting an inflation adjustment in this Application. Instead, SCE proposes to maintain its EPIC 5 budget at the same overall funding level approved for EPIC 4 in recognition of the affordability challenges facing customers and the importance of prudent stewardship of ratepayer funds.

SCE recognizes that inflation has reduced the purchasing power of EPIC budgets. Based on California CPI-W data and forecasts, maintaining equivalent purchasing power would support a higher budget level than authorized for EPIC 4. According to the State of California Department of Finance, during the EPIC 4 cycle (from 2021-2025), the compounded annual California CPI-W inflation rate was 4.38%.[19] To offset the compounded, actual inflation rate from 2021-2025 and maintain the same purchasing power, the EPIC Administrators needed to increase their EPIC 4 budgets by 1.0438^5 - 1 = 23.91%;[20] for SCE, this 23.91% increase to maintain purchasing power would have increased its EPIC 4 budget from $76 million to $94 million.

Relatedly, looking ahead to EPIC 5, at its May 2026 update, the California Department of Finance forecasts the compounded annual California CPI-W inflation rate from 2026 to 2030 will be 3.34%.[21] Compounding this inflation rate over the 5 years of EPIC 5 implies that, to maintain purchasing power to the end of EPIC 5 in 2030, EPIC Administrators will need to raise their budgets by 1.0334^5 – 1 = 17.88%.[22] This implies that SCE would need to increase its EPIC 5 budget from $76 million to $90 million to avoid losing its current purchasing power by 2030.

SCE notes that the Commission has modified and applied inflation adjustment methodologies across prior EPIC cycles. A comprehensive overview of the evolution of EPIC inflation adjustment authority and methodologies is provided in Appendix 7, Regulatory and Legislative Background.

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18 D.26-02-037, OP 2 states "…D.21-11-028 permits all Administrators to propose to increase their EPIC 5 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. Administrators may propose increases to account for inflation in their EPIC 5 investment plan applications." See Appendix 10 for more information on the California CPI-W.

19 See Appendix 10 for more information on the California CPI-W.

20 This is consistent with the methodology described in D.15-04-020, Appendix B. The 23.91% inflation rate is also consistent with the methodology described in the State Department of Finance's "How to use CPI data" document (https://dof.ca.gov/media/docs/forecasting/economics/economic-indicators/inflation/How-To-Use-CPI-Data.pdf." See Appendix 10 for more information.

21 See Appendix 10 for more information on the California CPI-W.

22 This is consistent with the methodology described in D.15-04-020, Appendix B. The 17.88% inflation rate is also consistent with the methodology described in the State Department of Finance's "How to use CPI data" document (https://dof.ca.gov/media/docs/forecasting/economics/economic-indicators/inflation/How-To-Use-CPI-Data.pdf." See Appendix 10 for more information.

However, after considering these impacts, SCE determined that maintaining the current budget level is the more appropriate outcome given ongoing customer affordability concerns. In fact, SCE has received direct feedback from the Equity Advisory Panel that affordability is among the most critical priorities in their communities.

SCE believes that maintaining the EPIC 4 funding level remains sufficient to support a meaningful portfolio of technology demonstration and deployment activities. The EPIC 5 Investment Plan prioritizes initiatives that are closely aligned with SCE's technology roadmap and utility operational needs, helping ensure that available funding is directed to projects with a clear path to delivering scalable benefits for customers and ratepayers. SCE also recognizes that inflationary pressures affect all aspects of EPIC program administration. For example, D.26-02-037 increased funding from $1.8M to $3.5M for the Policy + Innovation Coordination Group Project Coordinator to support expanded program coordination activities during EPIC 5.[23]

Affordability is a core principle in EPIC. Thus, SCE looks at affordability not only in the context of its EPIC projects but also in the EPIC program as a whole. Consequently, SCE will continue its efforts to offset statewide and industry-wide inflation, and SCE will not request an inflation increase to its EPIC 5 budget.

Table 1. Investment Plan Funding Summary

Strategic Initiative (Funding Item)	Amount	Primary Strategic Goal Addressed	Strategic Objectives Addressed*
Enhanced Grid Efficiency, Utilization, and Flexibility (EGEUF)	$19,054,371	Transportation Electrification, Building Decarbonization	1. Reducing Medium and Heavy-Duty Vehicle Charging Infrastructure Costs; 2. Overcoming Barriers to EV Benefits in DVCs; 4. Reducing Cost of Whole Home Electrification; 5. Innovative Approaches for Difficult-to-Decarbonize Sectors; 6. Community-Scale Decarbonization; 7. Impacts Research for New Generation and Storage; 9. Leveraging DERs for Grid and Community Resiliency; 10. Expediting and Streamlining Interconnection and Energization Processes; 12. Optimizing Feeder / Circuit Operations; 13. Cost-Effective Grid Hardening for Long-Term Climate Impacts

[23] D.26-02-037, OP 8 highlights that the Policy + Innovation Coordination Group Project Coordinator (PICG Coordinator)'s budget will almost double to $3.5M during EPIC 5 from $1.8M in EPIC 4.

Strategic Initiative (Funding Item)	Amount	Primary Strategic Goal Addressed	Strategic Objectives Addressed*
Intelligent Grid Planning & Orchestration (IGPO)	$14,971,292	Distributed Energy Resource Integration	2. Overcoming Barriers to EV Benefits in DVCs; 3. Smart Planning Tools for New Load and Clean Resources; 4. Reducing Cost of Whole Home Electrification; 6. Community-Scale Decarbonization; 8. Increase Predictability of Weather Impact on, Intermittent Resources, Climate Risks, and Load; 9. Leveraging DERs for Grid and Community Resiliency; 10. Expediting and Streamlining Interconnection and Energization Processes; 11. Providing Data Input into a Value of DER Framework; 13. Cost-Effective Grid Hardening for Long-Term Climate Impacts
Field Intelligent Technologies (FIT)	$17,012,831	Climate Adaptation	8. Increase Predictability of Weather Impact on, Intermittent Resources, Climate Risks, and Load; 9. Leveraging DERs for Grid and Community Resiliency; 13. Cost-Effective Grid Hardening for Long-Term Climate Impacts
Safe and Advanced Field Execution (SAFE)	$17,012,831	Achieving 100% Net-Zero Carbon Emissions and the Coordinated Role of Gas	6. Community-Scale Decarbonization; 9. Leveraging DERs for Grid and Community Resiliency; 10. Expediting and Streamlining Interconnection and Energization Processes; 13. Cost-Effective Grid Hardening for Long-Term Climate Impacts
Administration and Oversight[24]			
CPUC Oversight Budget	$380,175		
Administrative Budget	$7,603,500		
Total Request	$76,035,000		

[24] Values from D.26-02-037, Appendix B.

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

EPIC STRATEGIC OBJECTIVE	EPIC STRATEGIC GOAL: 1. Transportation Electrification	2. Distributed Energy Resource Integration	3. Building Decarbonization	4. Achieving 100 Percent Net-Zero Carbon Emissions and the Coordinated Role of Gas	5. Climate Adaptation
1. Reducing Medium and Heavy-Duty Vehicle Charging Infrastructure Costs	EGEUF				
2. Overcoming Barriers to EV Benefits in DVCs	EGEUF, IGPO				
3. Smart Planning Tools for New Load and Clean Resources	IGPO		IGPO	IGPO	IGPO
4. Reducing Cost of Whole Home Electrification			EGEUF, IGPO		
5. Innovative Approaches for Difficult-to-Decarbonize Sectors				EGEUF, IGPO, SAFE	EGEUF, IGPO
6. Community-Scale Decarbonization	EGEUF, IGPO,	EGEUF, IGPO, SAFE	EGEUF, IGPO	EGEUF, IGPO, SAFE	EGEUF, IGPO, SAFE
7. Impacts Research for New Generation and Storage		EGEUF		EGEUF	
8. Increase Predictability of Weather Impact on, Intermittent Resources, Climate Risks, and Load					IGPO, FIT
9. Leveraging DERs for Grid and Community Resiliency	EGEUF, IGPO, SAFE	EGEUF, IGPO, FIT, SAFE	EGEUF, IGPO		EGEUF, IGPO, FIT, SAFE
10. Expediting and Streamlining Interconnection and Energization Processes	EGEUF, IGPO,	EGEUF, IGPO, SAFE			
11. Providing Data Input into a Value of DER Framework		IGPO	IGPO	IGPO	IGPO
12. Optimizing Feeder / Circuit Operations		EGEUF	EGEUF	EGEUF	EGEUF
13. Cost-Effective Grid Hardening for Long-Term Climate Impacts					EGEUF, IGPO, FIT, SAFE

Table 3. Anticipated Allocation of SCE EPIC 5 Annual Administrative Budget

EPIC Administrative Budget Category[25]	Preliminary Estimate of Anticipated Share of Annual Administrative Expenses over EPIC 5 Period (%) *
Labor	20
General and Administrative Expense and Overhead	5
Travel	5
Event Fees for Hosted and Attended Events	5
Supplies and Materials	5
Contracted Services	60
Total	100

* *Actual expenses to be reported in each administrator's following year EPIC Annual Report. This estimated budget includes only EPIC administrative costs—specifically, 10% of each IOU Admin EPIC budget and 15% of the CEC EPIC budget. It does not include project-specific costs, even if similarly labeled, which are funded through the Program Area budgets.*

SCE evaluates all administrative expenditures in the context of their contribution to EPIC program goals. SCE prioritizes expenditures that enable program delivery, stakeholder engagement, and measurable public benefits, while avoiding unnecessary or duplicative costs.

SCE will select EPIC 5 projects only after CPUC approves this EPIC 5 Investment Plan. Accordingly, these budget estimates are preliminary and are subject to, and are likely to, change pending final EPIC 5 project selection. Actual spending percentage across administrative categories may shift during the EPIC 5 cycle, even as total administrative spending stays within the approved budget. For example, administrative spending may deviate from these initial, very preliminary estimates on an annual basis because:

- Projects may experience different types of community engagement preferences, such as the need to adjust outreach approaches, formats, or levels of participation to better serve stakeholders, including disadvantaged, low income, and Tribal communities;
- A project may have different administrative needs/spend over its individual project life cycle; and
- The administrative needs of specific projects may require different mixes of labor, contracted services, or event-related support.

Thus, these preliminary estimates may see significant change once SCE identifies EPIC 5 projects. Even after SCE confirms EPIC 5 projects, the percentage allocation of administrative spend may still deviate materially on an annual basis. Any such adjustments will remain within the overall approved budget and will be guided by the same principles of program alignment and prudent stewardship.

This adaptive approach ensures that resources are directed where they are most effective in advancing EPIC objectives, while maintaining transparency through category-based tracking and annual reporting.

[25] Per administrator response to D.21-11-028, OP 16.

4. Strategic Goals and Objectives

CPUC requires that EPIC Administrators align their EPIC 5 Investment Plans with CPUC's five Strategic Goals and 13 Strategic Objectives.[26] In addition, the EPIC Administrators will file their EPIC 5 Investment Plans at the broad-based Initiative and Research Topic level.[27] As a result, there could appear to be overlap across Administrators at this high level. Following CPUC approval of this EPIC 5 Investment Plan, SCE will begin selecting specific projects and will coordinate with the other EPIC Administrators to avoid any duplication in actual projects.

The EPIC Administrators are exploring new coordination approaches under which the IOUs would work closely with the CEC to develop meaningful Grant Funding Opportunities (GFOs) that incorporate built-in IOU partnerships with vendors selected through the competitive solicitation process. Integration to the grid is a critical step in validating TD&D investments.[28] Future EPIC projects that do not provide a path to integration with the grid risk remaining stranded in the "valley of death."[29]

EPIC Strategic Goal 1. Transportation Electrification (TE) - Investment Plan Alignment and Impact: Enhanced Grid Efficiency, Utilization & Flexibility (EGEUF) and Intelligent Grid Planning & Orchestration (IGPO) address two complementary barriers to TE: creating usable grid capacity for concentrated charging loads and knowing when, where, and how those loads should be served. Fleet depots, public charging hubs, and widespread residential charging can create large new peaks at specific feeders and substations. EGEUF can test ways to add capacity faster, enable managed charging and vehicle-grid integration, and maintain safe operation as charging and bidirectional power flows change system conditions. IGPO can forecast charging clusters and compare upgrade and flexibility alternatives, support secure use of Electric Vehicle Supply Equipment (EVSE), vehicle, aggregator, and utility data.

Meaningful outcomes and estimated magnitude: SCE's efforts supporting TE can support SCE's industry-wide need for approximately 3.7 GW of additional demand response and flexibility and help validate planning assumptions that up to 50 percent of EV charging may be flexible.[30] SCE planning scenarios anticipate that approximately 67 percent of medium-duty vehicles, 38 percent of heavy-duty vehicles, and 85 percent of buses may be electric by 2045.[31] Together, EGEUF and IGPO can identify scalable approaches that serve more charging load while preserving reliability.

Key operational metrics include: MW of charging load enabled and reliably served without a major conventional infrastructure upgrade; improved service continuity, or maintenance of applicable reliability standards; MWh of charging shifted from constrained periods and resulting peak-demand or feeder-load-factor improvement; improvement in charging-load forecast accuracy, reliability, hosting-capacity assessment,

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[26] D.26-02-037, at page 2, footnote 1.
[27] D.21-11-028, OP 8.
[28] D.12-05-037, OP 3.
[29] D.12-05-037, p. 32. The Commission recognized EPIC's role in helping technologies move beyond the gap between research/demonstration and commercial deployment, described by the Commission as the "valley of death."
[30] SCE, "Pathway 2045," November 2019, available at www.edison.com/clean-energy/pathway-2045.
[31] *Ibid.*

or energization cycle time relative to existing baselines; and avoided or deferred charging-infrastructure and distribution-upgrade cost.

SCE will coordinate with EPIC administrators, EV manufacturers, EVSE providers, aggregators, fleets, and community partners. SCE will also coordinate with related High DER efforts on managed charging, vehicle-grid integration, hosting-capacity analysis, grid visibility, and flexible load orchestration to ensure EPIC demonstrations build on, rather than duplicate, existing planning, and implementation work.

EPIC Strategic Goal 2. Distributed Energy Resource Integration - Investment Plan Alignment and Impact: Enhanced Grid Efficiency, Utilization & Flexibility (EGEUF), Intelligent Grid Planning & Orchestration (IGPO), Field Intelligent Technologies (FIT), and Safe and Advanced Field Execution (SAFE) address different points in the DER integration chain. EGEUF addresses challenges from high penetrations of solar, storage, flexible load, and vehicle-grid resources that create bidirectional flows, changing fault conditions, and localized capacity constraints and can increase hosting capacity and use DER flexibility instead of relying only on conventional upgrades. IGPO will validate technologies that improve visibility and coordination across thousands of devices, improve forecasting and scenario-based hosting-capacity analysis, and support secure data exchange and Distributed Energy Resource Management System (DERMS)/Advanced Distribution Management System (ADMS) orchestration. FIT adds field evidence needed to understand how DER-rich conditions affect equipment and can monitor transformer loading, thermal conditions, and other indicators at locations with high DER penetration. SAFE addresses field work that can become a bottleneck to scale, improving site verification, inspection, and commissioning while reducing worker exposure.

Meaningful outcomes and estimated magnitude: Pathway 2045 estimates the grid will need 80 gigawatts (GW) of clean generation and 30 GW of utility-scale energy storage in the next 25 years.[32] Together, the four initiatives provide coordinated improvements in grid capacity, hosting capacity, forecast accuracy, asset visibility, field execution, flexibility valuation, and interconnection consistency, which can avoid unnecessary feeder or breaker upgrades, reduce curtailment, shorten deployment timelines, and improve utilization of existing assets.

Key operational metrics include: MW of DER or flexible load enabled without major conventional upgrades; DER visibility improvement, and MWh of curtailment avoided; reduction in interconnection, inspection, commissioning, or troubleshooting time and cost; and improvement in asset-condition or fault visibility and quantified value of DER flexibility, reliability, resilience, or grid services.

SCE will coordinate with other EPIC administrators, DER vendors, and aggregators on common data, cybersecurity, communications, fault-duty, interoperability, field practices, and valuation questions. SCE will also coordinate with related High DER efforts involving hosting-capacity analysis, interconnection improvements, grid visibility, DERMS/ADMS orchestration, flexible load integration, and field validation of DER-rich operating conditions.

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[32] *Ibid.*

EPIC Strategic Goal 3. Building Decarbonization - Investment Plan Alignment and Impact:
Enhanced Grid Efficiency, Utilization & Flexibility (EGEUF) and Intelligent Grid Planning & Orchestration (IGPO) address the two grid-side barriers most likely to affect building decarbonization at scale: accommodating new electric load affordably and planning for where that load will materialize. Building electrification can increase feeder and transformer peaks. EGEUF can test ways to increase usable capacity, enable loads to shift away from constrained periods, and maintain safe operation as load shapes and distributed resources change. IGPO's integrated digital capabilities address the challenge that building electrification adoption will not occur uniformly across the system, and can evaluate the timing of grid needs, compare infrastructure and flexibility options, and support coordination of building loads and behind-the-meter DERs.

Meaningful outcomes and estimated magnitude: SCE planning scenarios anticipate approximately 75 percent residential space-heating electrification, 81 percent residential water-heating electrification, and 73 percent commercial space-heating electrification by 2045, while assuming that up to 10 percent of building load may be flexible.[33] By reducing peak impacts, improving forecasts and grid visibility, and increasing asset utilization, EGEUF and IGPO can contribute to broader affordability pathways that target approximately 40 percent lower household energy bills by 2045.[34]

Key operational metrics include: MW of electrified building load enabled and number of buildings served; peak MW reduction, MWh shifted, grid reliability, and flexible-load response; distribution upgrades avoided or deferred; and customer bill or total-energy-cost impacts.

SCE will coordinate with other EPIC administrators, local governments, and building-technology providers.

EPIC Strategic Goal 4. Achieving 100% Net-Zero Carbon Emissions and the Coordinated Role of Gas - Investment Plan Alignment and Impact:
Enhanced Grid Efficiency, Utilization & Flexibility (EGEUF), Intelligent Grid Planning & Orchestration (IGPO), Field Intelligent Technologies (FIT), and Safe and Advanced Field Execution (SAFE) address the infrastructure and operational gaps that can constrain the transition to a net-zero energy system. EGEUF can test new ways to move and serve power safely and align large loads with periods of abundant clean energy. IGPO can model changing supply and demand, compare resource and infrastructure scenarios, identify local constraints, and improve the data and control foundation for coordinated operation. SAFE can deliver step changes in service more quickly while also increasing worker safety.

Meaningful outcomes and estimated magnitude: California's broader pathway includes a net-zero electric sector by 2045 and industrial-sector emissions declining from approximately 101 MMT CO_2e to 37 MMT CO_2e by 2045.[35] Achieving those outcomes requires both grid capacity and flexibility to serve new loads, planning and orchestration tools to manage intermittency and changing demand, and non-pipeline alternatives to address difficult-to-decarbonize applications.

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[33] *Ibid.*
[34] *Ibid.*
[35] *Ibid.*

Key operational metrics include: MW of clean generation, storage, electrification, or cross-sector load enabled; improvement in forecast accuracy, flexibility utilization, curtailment reduction; improvement in data accuracy, condition-detection lead time, reliability; and estimated CO_2e or criteria-pollutant benefits.

SCE will coordinate with other EPIC administrators, gas RD&D program administrators, industry, and communities on industrial applications, non-pipeline alternatives, grid capacity, forecasting, field sensing, and performance measurement. Joint scoping, shared measurement frameworks, technical advisory participation, and early exchange of results will accelerate the innovation pipeline and avoid duplicative demonstrations.

EPIC Strategic Goal 5. Climate Adaptation - Investment Plan Alignment and Impact:
Enhanced Grid Efficiency, Utilization & Flexibility (EGEUF), Intelligent Grid Planning & Orchestration (IGPO), Field Intelligent Technologies (FIT), and Safe and Advanced Field Execution (SAFE) cover the climate-adaptation pathway from anticipating risk to operating through an event and restoring service safely. EGEUF addresses reductions in equipment capability and changing protection needs caused by extreme climate conditions and changing load patterns, and can evaluate ways to retain more usable capacity and adapt operation as conditions change. IGPO's integrated digital capabilities are critical to incorporating localized climate information into long-lived investment planning. FIT provides direct field evidence that can detect thermal stress, changing environmental conditions, or early degradation. SAFE addresses hazardous event response and service restoration. These initiatives create a closed loop, adapting equipment to changing climate conditions, forecasting and prioritization, monitoring and adaptive operation, and safe response and restoration.

Meaningful outcomes and estimated magnitude: SCE's Climate Adaptation Vulnerability Assessment (CAVA) identifies increasing risks to electric infrastructure, operations, and customers from extreme heat, wildfire, flooding, and other climate-related hazards.[36] Collectively, SCE's initiatives can reduce long-duration interruptions, restoration times, and worker exposure, while improving community resilience and informing cost-effective adaptation strategies.

Key operational metrics include: improvement in climate or hazard forecast resolution and risk identification; MW, miles, or number of assets monitored or operated under climate-stress conditions; reduction in damage-assessment, field-deployment, restoration time and reliability; increase in inspection coverage or productivity; outage minutes avoided; and reduction in worker exposure hours or safety events.

SCE will coordinate with climate adaptation and vulnerability assessment efforts, including work developed through SCE's CAVA, to build on existing climate-risk assessments, community vulnerability analysis, and resilience planning while maintaining a distinct focus on technology validation, field demonstration, operational decision-support, and scalable utility implementation.

[36] See Rulemaking (R.) 18-04-019, Order Instituting Rulemaking to Consider Strategies and Guidance for Climate Change Adaptation, and Decision (D.) 24-08-005, Phase 2 Decision Updating Climate Change Adaptation Modeling Requirements and Refining the Climate Adaptation and Vulnerability Assessments.

5. Strategic Initiatives

SCE's four technology-based Strategic Initiatives integrate SCE's technology strategy with CPUC's EPIC 5 Strategic Goals and Objectives. SCE's EPIC 5 Investment Plan begins with high-level Strategic Initiatives. Each initiative has a distinct role: EGEUF addresses physical grid capacity and flexibility; IGPO provides the digital planning and orchestration layer; FIT provides field-level sensing, monitoring, and performance evidence; and SAFE advances safe, connected field execution. While SCE's Initiatives and Research Topics guide EPIC 5 project selection, SCE will not select specific EPIC 5 projects until after CPUC approves the EPIC 5 Investment Plan.[37]

Initiative Title: 1. Enhanced Grid Efficiency, Utilization & Flexibility (EGEUF)
Initiative Funding Amount: $19 million
Strategic Objective(s) & Goal(s) Supported: *The directly supported Strategic Goals and Strategic Objectives are identified in Table 2. The discussion below explains how this initiative supports those mapped goals and objectives.*

Strategic Priority:
California's transition to a highly electrified, distributed, and climate-exposed energy system is creating two simultaneous challenges: substantially more electricity must move through the grid, and the usable capability of existing equipment can vary with weather, loading, bidirectional power flow, and changing resource behavior. Conventional responses often rely on reconductoring, larger transformers, substation expansion, and other long-lead construction projects. Those investments will remain necessary in many locations, but relying on conventional buildout alone can increase customer costs and energization timelines and can miss opportunities to use existing assets more effectively.

SCE's Pathway 2045[38] estimates that economy-wide electrification and growth could increase electricity sales from the grid by about 60 percent and peak load by about 40 percent by 2045. Transportation electrification alone could add nearly 130 TWh of annual electric load, more than one-third of grid-served load, while the clean-energy transition may require up to $75 billion in grid investment from 2030 to 2045 to integrate resources and serve transportation and building electrification.[39] At the same time, Edison International's Adapting for Tomorrow identifies locations where higher temperatures could reduce grid capacity by up to 20 percent.[40] These trends justify testing whether new conductors, power electronics, adaptive protection, flexible loads, and other grid-enhancing approaches can safely create additional usable capacity before larger conventional upgrades.

EGEUF will evaluate next-generation physical hardware that maximizes grid utilization, allowing utilities to better meet electrification goals within existing infrastructure footprint. Research Topics include Next Generation Conductors, Advanced Grid Upgrades, DC Power Networks, Adaptive Grid Protection and Control,

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[37] D.21-11-028, OP 8.

[38] SCE, "Pathway 2045," November 2019, available at www.edison.com/clean-energy/pathway-2045.

[39] *Ibid.*

[40] SCE, "Adapting for Tomorrow: Powering a Resilient Future," May 2022, available at www.edison.com/clean-energy/adapting-for-tomorrow.

Smart Grid Sensors, Flexible Energy & Load on Demand. Projects will identify where a technology provides measurable value, operating limits, and whether the resulting capacity, reliability, safety, and cost benefits are impactful to inform standards and future investment.

EGEUF efforts will produce practical outputs like tested designs, operating guidelines, and cost and performance evidence that can be used directly in future planning and investment decisions. The impact is measured by clear outcomes such as more load and renewable resources being connected, better use of existing grid capacity, lower costs, and faster project delivery. These results come from applying solutions across different parts of the grid rather than testing them one at a time.

Alignment with EPIC Equity in RD&D Framework:
EGEUF project scoping will apply prioritization, engagement, metrics, access, and outreach where applicable for ESJ and Tribal communities. Potential metrics will include customer and system costs avoided, MW enabled, energization time, reliability outcomes, distribution of benefits and burdens, accessibility of information, issues resolved through engagement, and community or participant satisfaction. Following CPUC approval of this EPIC 5 Investment Plan, SCE's Community Engagement Plan will guide SCE's engagement with communities during project selection and execution.[41]

Alignment with EPIC Strategic Goals and Strategic Objectives:
EGEUF supports all five EPIC Strategic Goals (see Table 2 for alignment with Goals and Objectives). Its distinct contribution is the physical grid layer: increasing the amount of clean generation, DER, and new electric load that can be safely served; improving how existing equipment is utilized; and enabling flexible demand to reduce the size or timing of conventional upgrades. EGEUF's Research Topics address the crosscutting principles of reliability, resilience, and safety. For example, Flexible Energy & Load on Demand addresses customer-focused solutions directly, and the section above discussed equity alignment. EGEUF complements IGPO's planning and orchestration tools, FIT's field evidence, and SAFE's field-execution capabilities rather than replacing them.

Strategic Goal 1 - Transportation Electrification. *(Primary)* SCE's Pathway 2045 estimates that three-quarters of light-duty vehicles, two-thirds of medium-duty vehicles, and one-third of heavy-duty vehicles may need to be electric by 2045, with transportation electrification adding nearly 130 TWh of load.[42] EGEUF will address the resulting concentrated charging demand by testing Next Generation Conductors, Advanced Grid Upgrades, DC Power Networks, Adaptive Grid Protection and Control, and Flexible Energy & Load on Demand. The objective is to quantify how much charging load can be served before a conventional upgrade is required, the cost per MW enabled, and whether vehicle flexibility can reduce local peaks. Pathway 2045 notes that access to even 5-10 percent of a large EV fleet's battery capacity could materially affect resource needs;[43] EGEUF demonstrations can test the grid-side controls, protection, and interoperability needed to translate that potential into usable capacity without assuming every vehicle will participate.

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[41] SCE Advice Letter 5838-E, "Electric Program Investment Charge 5 Community Engagement Plan," submitted June 26, 2026.

[42] SCE, "Pathway 2045," November 2019, available at www.edison.com/clean-energy/pathway-2045.

[43] *Id*.

Strategic Goal 3 - Building Decarbonization. *(Primary)* SCE's Pathway analyses call for substantial electrification of space and water heating, with the 2030 pathway targeting nearly one-third of residential and commercial space and water heating and the 2045 pathway approaching three-quarters.[44] EGEUF will test whether Flexible Energy & Load on Demand or DC Power Networks can accommodate that growth without a proportional increase in conventional infrastructure. For example, coordinated heat-pump water heating or HVAC could shift demand away from local peaks, while advanced conductors or modular power electronics could address locations where flexibility alone is insufficient. The measurable question is not simply whether electrification occurs, but whether the grid-side cost per building or MW served can be reduced while preserving reliability and customer comfort.

Strategic Goal 2 - Distributed Energy Resource Integration. SCE's Pathway 2045 projects approximately 30 GW of customer-sited solar and 10 GW of customer-sited storage by 2045.[45] EGEUF will validate the physical capabilities needed for those resources to connect and operate safely at scale, including Adaptive Grid Protection and Control, Smart Grid Sensors, Smart-Meter Evolution, Flexible Energy & Load on Demand that support bidirectional power flow. Success means more DER can be interconnected or operated without unnecessary equipment replacement, curtailment, or conservative operating limits while maintaining voltage, power quality, and protection performance.

Strategic Goal 4 - Achieving 100% Net-Zero Carbon Emissions and the Coordinated Role of Gas. Pathway 2045 estimates a need for roughly 80 GW of new utility-scale clean generation and 30 GW of utility-scale storage, in addition to customer-sited resources.[46] EGEUF will address physical constraints that can limit renewable integration, storage, industrial electrification, and other difficult-to-decarbonize loads. Next Generation Conductors, Smart Grid Sensors, Flexible Energy & Load on Demand, and Advanced Grid Upgrades can reduce overbuilding and curtailment and provide electric-infrastructure evidence needed to evaluate non-pipeline alternatives or coordinated electric-gas transition decisions. EGEUF will not conduct gas-technology research; its role is to establish what the electric grid can reliably serve, at what cost, and with what flexibility.

Strategic Goal 5 - Climate Adaptation. Adapting for Tomorrow projects an approximately 5 degrees Fahrenheit increase in average maximum temperature by 2050 and identifies transmission and subtransmission circuits that could experience 10-20 percent capacity reductions under heightened extreme temperature.[47] EGEUF will test whether Next Generation Conductors, Flexible Energy & Load on Demand, Adaptive Grid Protection and Control, and Advanced Grid Upgrades can preserve usable capacity or provide lower-cost alternatives to immediate hardening. Results will compare adaptive operation with conventional reinforcement and identify when monitoring and flexibility are sufficient, when physical hardening is required, and how those choices affect customer reliability and affordability.

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[44] *Ibid.*
[45] *Ibid.*
[46] *Ibid.*
[47] SCE, "Adapting for Tomorrow: Powering a Resilient Future," May 2022, available at www.edison.com/clean-energy/adapting-for-tomorrow.

Coordination and Alignment with CPUC Proceedings:
EGEUF will inform transportation electrification and energization, high-DER grid modernization and interconnection, demand flexibility, building decarbonization, climate adaptation, integrated resource planning, and future GRC processes. Ratepayer benefits include minimizing the need for customer upgrades and energization costs, future bill reductions by avoided or deferred capital investments, reduced peak impacts and curtailment against outages, improved reliability, and reduced risk of scaling technologies before their safety and cost-effectiveness are demonstrated.

Coordination with EPIC and Gas RD&D Program Administrators:
SCE will coordinate with the CEC and other utility EPIC administrators to distinguish foundational research, component development, and utility-system demonstrations. The EPIC Administrators are exploring new innovations where IOUs will work closely with CEC to craft meaningful GFOs with built-in IOU partnerships for winning vendors selected through the competitive process. Integration to the grid is a critical step in validating TD&D investments.[48] Future EPIC projects that do not provide a path to funding integration with the grid risk remaining stranded in the "valley of death." [49]

Unique Role:
EGEUF is unique because it evaluates how emerging and advanced grid enhancing technologies work within an integrated system, rather than testing them in isolation. This includes combinations such as Next Generation Conductors, Advanced Grid Upgrades, DC Power Networks, Adaptive Grid Protection and Control, Smart Grid Sensors, Flexible Energy & Load on Demand operating under real grid constraints. These controlled demonstrations produce evidence of performance and cost that neither vendors nor traditional pilots can provide.

Thus, even where promising technologies exist, utilities often lack the field data, operational experience, and regulatory alignment needed to confidently begin pilot projects to system-wide deployment. EPIC funding allows utilities to demonstrate performance within the utility's actual grid infrastructure and environments, providing the vital link from promising technology on the shelf to an actual solution utility can deploy with scale to benefit ratepayers.

Initiative Title: 2. Intelligent Grid Planning & Orchestration (IGPO)
Initiative Funding Amount: $15 million
Strategic Objective(s) & Goal(s) Supported: *The directly supported Strategic Goals and Strategic Objectives are identified in Table 2. The discussion below explains how this initiative supports those mapped goals and objectives.*

Strategic Priority:
The future grid cannot be planned or operated using separate, static assumptions for load, DER, weather, resource availability, and asset capability. EV charging, electrified buildings, rooftop solar and storage, flexible

[48] D.12-05-037, OP 3.

[49] D.12-05-037, p. 32. The Commission recognized EPIC's role in helping technologies move beyond the gap between research/demonstration and commercial deployment, described by the Commission as the "valley of death."

loads, aggregations, and climate-driven variability interact dynamically at different times and locations. Existing forecasts, hosting-capacity views, data exchanges, and planning-to-operations handoffs will not provide the localized and forward-looking information needed to decide where infrastructure is required, where flexibility can substitute for infrastructure, how DERs can provide grid value, or how operating decisions should change as conditions evolve.

Pathway 2045 describes a system with roughly 80 GW of new utility-scale clean generation, 30 GW of utility-scale storage, about 30 GW of customer-sited solar, and 10 GW of customer-sited storage, while grid electricity sales increase about 60 percent and peak load about 40 percent.[50] Solar and wind are projected to provide about 68 percent of annual energy needed to serve grid demand, making forecasting, storage dispatch, flexible load, and coordination increasingly central to reliability.[51] Adapting for Tomorrow separately finds that historical climate data are no longer sufficient for long-lived planning and recommends extending planning horizons from the typical 10 years or less to at least 20 years.[52] IGPO is intended to close the gap between these long-term system changes and the circuit-, substation-, and customer-level decisions that utilities and regulators must make in the EPIC 5 timeframe.

IGPO will evaluate digital platforms, AI-driven analytics, and real-time orchestration systems that respond faster to energy demand and orchestrate the grid in real time. IGPO will demonstrate integrated digital capabilities that convert utility and external data into auditable, operationally useful decisions. Research Topics will include Digital Substations, Enhanced Grid Operations, Grid-Wide Connectivity, and Intelligent Grid Computing. The initiative will test not only whether a model is accurate in isolation, but whether it receives the right data, communicates with relevant systems, reflects protection and operating constraints, produces understandable recommendations, and remains secure and useful under real utility workflows.

Alignment with EPIC Equity in RD&D Framework:
IGPO project scoping will apply prioritization, engagement, metrics, access, and outreach to improve visibility into localized grid constraints, DER opportunities, resilience needs, costs, and service outcomes in ESJ and Tribal communities. Metrics will include forecast accuracy and hosting-capacity visibility by location, interconnection time and cost, DER or flexible load enabled, resilience and critical-load benefits, distribution of costs and benefits, completeness of community-relevant data, accessibility of outputs, issues resolved through engagement, and participant or community satisfaction. Following CPUC approval of this EPIC 5 Investment Plan, SCE's Community Engagement Plan will guide SCE's engagement with communities during project selection and execution.[53]

Alignment with EPIC Strategic Goals and Strategic Objectives: EPIC's crosscutting principles of equity, customer-focused solutions, reliability, resilience, emerging strategies, and safety (including cybersecurity).

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[50] SCE, "Pathway 2045," November 2019, available at www.edison.com/clean-energy/pathway-2045.
[51] *Ibid.*
[52] SCE, "Adapting for Tomorrow: Powering a Resilient Future," May 2022, available at www.edison.com/clean-energy/adapting-for-tomorrow.
[53] SCE Advice Letter 5838-E, "Electric Program Investment Charge 5 Community Engagement Plan," submitted June 26, 2026.

IGPO supports all five EPIC Strategic Goals. Its distinct contribution is the digital planning and coordination layer: determining what is likely to happen, where and when it will happen, what capacity or flexibility is available, and how resources can be coordinated. Across all five goals, IGPO will incorporate equity, customer-focused solutions, reliability, resilience, emerging strategies, safety, and cybersecurity through data governance, model validation, role-based access, secure interfaces, bias and error testing, human review, and documented fallback procedures. AI or machine learning will be used only when it materially improves a defined use case and can be independently validated and explained to decision-makers. IGPO does not replace EGEUF's physical grid solutions; rather, it helps determine where those solutions are needed and how they should operate. It also converts FIT field data into planning and operational insight and provides SAFE with more complete information for field execution.

Strategic Goal 2 - Distributed Energy Resource Integration. *(Primary)* Pathway 2045's projection of approximately 30 GW of customer-sited solar and 10 GW of customer-sited storage underscores the need to move beyond static maps and one-time interconnection studies.[54] IGPO will demonstrate Digital Substations, Grid-Wide Connectivity, Intelligent Grid Computing, and Enhanced Grid Ops so DERs can be treated as a coordinated portfolio rather than isolated devices. Research Topics in IGPO support faster and more consistent interconnection, better valuation of DER flexibility, reduced curtailment, and improved ability to use DERs for feeder peak reduction, grid services, and community resilience.

Strategic Goal 1 - Transportation Electrification. Pathway 2045 estimates nearly 130 TWh of transportation-related electric load by 2045.[55] The challenge is not only the total energy, but the location and coincidence of fast charging, fleet depots, public hubs, and residential charging. IGPO, through Research Topics, will improve localized forecasts of EV adoption and charging demand, model fleet and charging-hub impacts, and evaluate managed or bidirectional charging against actual circuit constraints. The resulting tools can help identify where upgrades are unavoidable, where load can be shifted, and what information customers and planners need earlier in the energization process. Measures can include forecast-error reduction, changes in estimated upgrade need, MW of flexible charging incorporated into planning, and reduction in study or energization cycle time.

Strategic Goal 3 - Building Decarbonization. Building electrification shifts space heating, water heating, cooking, and commercial processes onto the electric system. The Clean Power and Electrification Pathway called for nearly one-third of residential and commercial space and water heating to be electrified by 2030, with deeper electrification by 2045.[56] IGPO will provide the forecasting and coordination needed to understand when and where these loads appear, their coincidence with other growth, and how much of the demand can be shifted. For example, planning models can compare unmanaged versus controlled heat-pump water heating or multi-building flexibility and translate those differences into feeder capacity and upgrade timing. The outcome is more targeted infrastructure investment and a clearer basis for valuing building flexibility.

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[54] SCE, “Pathway 2045,” November 2019, available at www.edison.com/clean-energy/pathway-2045.

[55] *Ibid*.

[56] SCE, “The Clean Power and Electrification Pathway,” November 2017, available at www.edison.com/content/dam/eix/documents/our-perspective/g17-pathway-to-2030-white-paper.pdf.

Strategic Goal 4 - Achieving 100% Net-Zero Carbon Emissions and the Coordinated Role of Gas. Pathway 2045 projects that solar and wind could provide about 68 percent of annual grid energy while natural gas generation contributes a much smaller share but continues to provide reliability during certain conditions.[57] IGPO, through its Research Topics, will test forecasting, scenario analysis, storage and flexible-load coordination, and digital operations needed to manage a system with more variable resources and changing demand. It can also provide common electric-load and infrastructure assumptions for evaluating industrial electrification, non-pipeline alternatives, and transition sequencing. IGPO will not determine gas policy or model gas networks; its role is to provide transparent electric-system scenarios, uncertainty ranges, and operational evidence that allow coordinated decisions across programs.

Strategic Goal 5 - Climate Adaptation. Adapting for Tomorrow recommends using future climate states in utility planning and extending planning horizons to at least 20 years.[58] IGPO will help translate climate projections into decision-ready inputs at the scale where utility investments are made. Examples include localized temperature projections that change conductor or transformer ratings, wildfire scenarios that alter contingency assumptions, and flood exposure that affects substation siting or resilience options. IGPO, through its Research Topics, will create climate-informed digital twins and scenario tools to improve risk-based investment decisions, reduce reliance on historical averages, and quantify customer-facing resilience benefits such as avoided outage exposure or improved recovery time.

Coordination and Alignment with CPUC Proceedings:

IGPO will align with transportation electrification and energization, distribution resource planning and high-DER modernization, interconnection, demand flexibility, value-of-DER, microgrids and community resilience, building decarbonization, integrated resource planning, climate adaptation, and future GRC proceedings. Ratepayer benefits will include fewer unnecessary infrastructure upgrades, more targeted infrastructure, improved reliability, better use of flexible resources, and greater transparency for customers, developers, communities, and regulators. Following CPUC approval of this EPIC 5 Investment Plan, SCE's Community Engagement Plan will guide SCE's engagement with communities during project selection and execution.[59]

Coordination with EPIC and Gas RD&D Program Administrators:

SCE will coordinate common research questions on forecasting, hosting capacity, interoperability, cybersecurity, orchestration, and climate data with the CEC and other utility EPIC administrators. The EPIC Administrators are exploring new innovations where IOUs will work closely with CEC to craft meaningful GFOs with built-in IOU partnerships for winning vendors selected through the competitive process. Integration to the grid is a critical step in validating TD&D investments.[60] Future EPIC projects that do not provide a path to funding integration with the grid risk remaining stranded in the "valley of death." [61]

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[57] SCE, "Pathway 2045," November 2019, available at www.edison.com/clean-energy/pathway-2045.

[58] SCE, "Adapting for Tomorrow: Powering a Resilient Future," May 2022, available at www.edison.com/clean-energy/adapting-for-tomorrow.

[59] SCE Advice Letter 5838-E, "Electric Program Investment Charge 5 Community Engagement Plan," submitted June 26, 2026.

[60] D.12-05-037, OP 3.

[61] D.12-05-037, p. 32. The Commission recognized EPIC's role in helping technologies move beyond the gap between research/demonstration and commercial deployment, described by the Commission as the "valley of death."

Administrators will use shared benchmark datasets, test scenarios, Application Programming Interfaces (APIs), and metrics or divide demonstrations across complementary utility conditions. Gas RD&D coordination will focus on shared forecasting assumptions, integrated planning scenarios, non-pipeline-alternative analysis, and community transition questions. IGPO will remain focused on electric-system planning, data, connectivity, and orchestration and will not duplicate gas network models or gas technology demonstrations.

Unique Role:
The value of advanced planning and orchestration cannot be proven by software functionality alone. Credible validation requires representative utility data, protection and operating constraints, customer resources, communications, cybersecurity controls, and actual decision workflows. Vendors can build individual algorithms or platforms, but they generally cannot establish whether those tools are accurate, interoperable, explainable, secure, transferable, and useful across the full utility context. EPIC funding allows utilities to demonstrate performance within the utility's actual grid infrastructure and environments, providing the vital link from promising technology on the shelf to an actual solution utilities can deploy with scale to benefit ratepayers.

Initiative Title: 3. Field Intelligent Technologies (FIT)
Initiative Funding Amount: $17 million
Strategic Objective(s) & Goal(s) Supported: *The directly supported Strategic Goals and Strategic Objectives are identified in Table 2. The discussion below explains how this initiative supports those mapped goals and objectives.*

Strategic Priority:
A more distributed, decarbonized, and climate-exposed grid requires better evidence about what is actually happening to assets and technologies in the field. Traditional inspection cycles, laboratory specifications, and vendor claims may not capture changing thermal stress, environmental exposure, equipment degradation, bidirectional power flow, inverter behavior, or long-duration performance. Without credible field data, utilities and regulators can act too late, replace equipment prematurely, or scale technologies before their reliability and lifecycle value are understood.

Adapting for Tomorrow projects an approximately 5 degrees Fahrenheit increase in average maximum temperature by 2050 and finds that 24 percent of SCE transmission and subtransmission circuits could be exposed and sensitive to heightened extreme temperature, with line capacity reductions of about 10-20 percent.[62] It also identifies about 4 percent of distribution substation transformers as potentially vulnerable to four-day heat waves by 2030.[63] At the same time, Pathway 2045 anticipates approximately 30 GW of customer-sited solar, 10 GW of customer-sited storage, and major additions of utility-scale generation and storage.[64] These changes make field visibility a planning input, not simply an operations convenience: utilities

[62] SCE, "Adapting for Tomorrow: Powering a Resilient Future," May 2022, available at www.edison.com/clean-energy/adapting-for-tomorrow.
[63] *Ibid.*
[64] SCE, "Pathway 2045," November 2019, available at www.edison.com/clean-energy/pathway-2045.

need measured evidence of condition, loading, degradation, and performance to decide whether to maintain, modify, replace, or scale assets and technologies.

FIT will demonstrate intelligent sensing, inspection, remote monitoring, mobile monitoring, rapid-deploy systems, and field data integration that improve visibility into grid assets and clean-energy technologies under representative conditions. Research Topics include Advanced Drones & Robotics, Dynamic Grid Edge Visibility, and Intelligent Asset Sensors. FIT is focused on the question, "What is happening to the asset or system, and what evidence is needed to act?" This distinguishes FIT from SAFE, which focuses on resolving the issues FIT identifies, and from IGPO, which focuses on planning and orchestration using the resulting data.

Alignment with EPIC Equity in RD&D Framework:
FIT project scoping will apply prioritization, engagement, metrics, access, and outreach where poor asset visibility, climate exposure, long-duration outages, or technology-transition risks may disproportionately affect remote, ESJ and Tribal communities. Metrics will include localized reliability and service-continuity outcomes, critical facilities supported, distribution of lifecycle costs and benefits, accessibility of project information, concerns incorporated into project design, issues resolved through engagement, and community or participant satisfaction. Following CPUC approval of this EPIC 5 Investment Plan, SCE's Community Engagement Plan will guide SCE's engagement with communities during project selection and execution.[65]

Alignment with EPIC Strategic Goals and Strategic Objectives:
Consistent with Section 4, FIT supports three EPIC Strategic Goals. Its distinct role is to provide field-level visibility and measured evidence so emerging risks and technology performance are understood before broader deployment decisions are made. FIT will incorporate EPIC crosscutting principles by connecting field measurements to customer and system outcomes, validating reliability and resilience benefits, testing emerging technologies under controlled conditions, and protecting safety and cybersecurity through calibrated measurement, secure data flows, device authentication, role-based access, human review, and fail-safe procedures. AI or machine learning will support pattern detection or diagnostics, but projects will document training data, error rates, uncertainty, and human decision authority. FIT complements EGEUF by measuring whether physical grid solutions perform as intended and complements IGPO by providing higher-quality data for planning and operational models.

Strategic Goal 5 - Climate Adaptation. *(Primary)* Adapting for Tomorrow shows why climate adaptation requires better asset-condition and environmental data: hotter conditions can reduce line capacity, increase transformer stress, and shorten equipment life, while wildfire, flooding, and other hazards can create rapidly changing conditions.[66] FIT, through Advanced Drones & Robotics, Dynamic Grid Edge Visibility, and Intelligent Asset Sensors, will test sensors, remote inspection, environmental monitoring, and rapid-deploy field intelligence that identify deterioration or hazard exposure earlier and quantify how assets actually perform under future-relevant conditions. Results can inform whether an asset needs hardening, replacement,

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[65] SCE Advice Letter 5838-E, "Electric Program Investment Charge 5 Community Engagement Plan," submitted June 26, 2026.

[66] SCE, "Adapting for Tomorrow: Powering a Resilient Future," May 2022, available at www.edison.com/clean-energy/adapting-for-tomorrow.

changed operating limits, or more frequent inspection and can support risk-based decisions that compare the cost of intervention with expected reliability and customer consequences.

Strategic Goal 2 - Distributed Energy Resource Integration. As customer-sited solar and storage scale toward the levels contemplated in Pathway 2045,[67] utilities need reliable field visibility into voltage, loading, reverse power flow, inverter behavior, equipment condition, and local constraints. FIT, through Advanced Drones & Robotics, Dynamic Grid Edge Visibility, and Intelligent Asset Sensors, will test sensors and monitoring methods that make these conditions observable and actionable. This evidence can improve interconnection assumptions, identify when modeled hosting-capacity limits are overly conservative or insufficient, detect emerging power-quality or protection issues, and verify whether DERs or flexible resources are delivering expected grid services. Measures can include MW or devices monitored, data availability and latency, difference between modeled and observed conditions, detection of constraint conditions, and reduction in unnecessary field inspections or equipment upgrades.

Strategic Goal 4 - Achieving 100% Net-Zero Carbon Emissions and the Coordinated Role of Gas. Pathway 2045 identifies major additions of clean generation and storage and difficult decarbonization challenges in industrial sectors, where lifecycle performance and reliability can determine whether a technology is practical at scale.[68] FIT, through Advanced Drones & Robotics, Dynamic Grid Edge Visibility, and Intelligent Asset Sensors, will generate real-world evidence for storage, industrial electrification, large electric loads, and supporting grid assets over representative operating periods. SCE may provide measured electric-load profiles, infrastructure requirements, reliability impacts, lifecycle cost inputs, and field performance relevant to non-pipeline alternatives or transition decisions, while gas RD&D administrators retain responsibility for gas-specific technology and network research. The value of FIT is a neutral evidence base that can demonstrate where technologies are ready, where performance gaps remain, and where scaling could create unacceptable cost or reliability risk.

Coordination and Alignment with CPUC Proceedings:

FIT will align with high-DER modernization and interconnection, integrated resource planning and new generation or storage integration, climate adaptation, wildfire mitigation, asset management, building and industrial decarbonization, and future GRC proceedings. Ratepayer benefits will include earlier identification of emerging risk, avoided failures and outages, fewer unnecessary inspections or replacements, better-targeted capital investment, more accurate lifecycle costs, and reduced risk of scaling technologies that do not perform as expected.

Coordination with EPIC and Gas RD&D Program Administrators:

SCE will coordinate FIT work with CEC, other utility EPIC, federal, and relevant market-funded research by comparing application, technology maturity, operating environment, measurement duration, dataset, metric, and intended decision. The EPIC Administrators are exploring new avenues to coordination with CEC to craft meaningful GFOs with built-in IOU partnerships for winning vendors selected through the competitive process.

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[67] SCE, "Pathway 2045," November 2019, available at www.edison.com/clean-energy/pathway-2045.

[68] *Ibid.*

Integration to the grid is a critical step in validating TD&D investments.[69] Future EPIC projects that do not provide a path to funding integration with the grid risk remaining stranded in the "valley of death." [70]

Shared measurement protocols and complementary sites may improve comparability on complementary activities. Gas RD&D coordination will focus on comparable assumptions, non-pipeline alternatives, transition sequencing, and customer or community effects while keeping electric field monitoring separate from gas technology and gas network research.

Unique Role:
FIT fills a gap between device-level product testing and field evidence needed for utility and regulatory decisions. Credible validation often requires access to representative utility assets, customer and system operating data, environmental exposure, maintenance records, and long-duration observation that individual vendors cannot readily provide. EPIC can test emerging sensing and inspection technologies under real conditions, publish both limitations and benefits, and connect measurements to planning, reliability, climate adaptation, and customer outcomes. EPIC funding allows utilities to demonstrate performance within the utility's actual grid infrastructure and environments, providing the vital link from promising technology on the shelf to an actual solution utility can deploy with scale to benefit ratepayers.

Initiative Title: 4. Safe and Advanced Field Execution (SAFE)
Initiative Funding Amount: $17 million
Strategic Objective(s) & Goal(s) Supported: *The directly supported Strategic Goals and Strategic Objectives are identified in Table 2. The discussion below explains how this initiative supports those mapped goals and objectives.*

Strategic Priority:
The grid is becoming more distributed and complex while climate-driven hazards are increasing the difficulty and risk of field work. SAFE will improve response times, outage restoration, construction, and re-energization timelines. Commercial productivity tools exist, but emerging wearables, augmented work, connected platforms, field equipment, and rapid deployment systems still raise unresolved questions about safety, human factors, autonomy limits, interoperability, cybersecurity, and performance when normal communications or access are unavailable.

Adapting for Tomorrow projects that extreme heat conditions will become more frequent and intense and estimates that days meeting OSHA-defined extreme exposure thresholds could increase on average from 29 to 61 days per year across SCE's service area.[71] The same report notes that extreme heat comparable to or hotter than the historical 99th-percentile temperature could become about seven times more likely on average.[72] These conditions directly affect how and when field work can be performed, while wildfire, flooding, and

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[69] D.12-05-037, OP 3.

[70] D.12-05-037, p. 32. The Commission recognized EPIC's role in helping technologies move beyond the gap between research/demonstration and commercial deployment, described by the Commission as the "valley of death."

[71] SCE, "Adapting for Tomorrow: Powering a Resilient Future," May 2022, available at www.edison.com/clean-energy/adapting-for-tomorrow.

[72] *Ibid.*

storms increase the need for rapid damage assessment and restoration. In parallel, Pathway 2045's[73] projected growth in customer-sited DER and electrification means more new equipment, interconnections, inspections, commissioning tasks, and grid-edge work. SAFE is intended to test whether advanced field technologies can deliver or restore service more quickly, making this growing workload safer and timelier without automating human accountability.

SAFE will demonstrate connected, automated, and augmented field capabilities that improve safe execution, situational awareness, assessment, commissioning, and restoration while keeping humans responsible for safety-critical decisions. Research Topics include Augmented Field Operations, Advanced Fleet & Field Gear, Rapid Deployable Field Systems, and Safety Systems and Hazard Response. SAFE is focused on the question, "How can utilities respond to issues on the grid more safely and effectively?" This distinguishes it from FIT, which focuses on sensing and evidence about asset or system condition.

Alignment with EPIC Equity in RD&D Framework:
SAFE project scoping will prioritize engagement, metrics, access, and outreach in communities disproportionately affected by long outages, climate hazards, access constraints, or delayed grid work, including remote, ESJ, and Tribal communities, as well as critical facilities. Access will be evaluated through more timely assessment, restoration, field execution, and resilience support rather than project location alone. Metrics may include restoration or service timelines by community, critical facilities supported, hazardous exposure avoided, distribution of cost and reliability benefits, accessibility of information, concerns resolved, and community or participant satisfaction. Following CPUC approval of this EPIC 5 Investment Plan, SCE’s Community Engagement Plan will guide SCE’s engagement with communities during project selection and execution.[74]

Alignment with EPIC Strategic Goals and Strategic Objectives:
SAFE supports DER Integration and Climate Adaptation. Its distinct role is to translate planning, sensing, and grid modernization into safe and timely field execution. SAFE will leverage advanced fleet and field gear, augmented field operations, rapid-deploy field systems, and safety systems and hazard response to enhance human-machine interactions and enable safe inspection, installation, commissioning, maintenance, and restoration of capabilities. SAFE will incorporate EPIC crosscutting principles of safety, resilience, reliability and emerging strategies in AI through formal hazard analysis, human-factors review, human-in-command operation, geofencing and autonomy limits, secure device identity and communications, least-privilege access, protected customer and infrastructure data, and documented manual and fail-safe procedures. Technologies that cannot demonstrate safe fallback behavior or measurable customer value will not be advanced simply because they automate an existing task.

Strategic Goal 4 - Achieving 100% Net-Zero Carbon Emissions and the Coordinated Role of Gas. *(Primary)*
Pathway 2045 identifies major additions of clean generation and storage and difficult decarbonization challenges in industrial sectors, where lifecycle performance and reliability can determine whether a

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[73] SCE, “Pathway 2045,” November 2019, available at www.edison.com/clean-energy/pathway-2045.
[74] SCE Advice Letter 5838-E, “Electric Program Investment Charge 5 Community Engagement Plan,” submitted June 26, 2026.

technology is practical at scale.[75] Electrifying these large load customers often requires material step changes in load. SAFE, through Advanced Fleet & Field Gear, Augmented Field Operations, Rapid-Deployable Field Systems, and Safety Systems and Hazard Response, will explore innovative technologies that, when applied to grid operations, could accelerate the process of delivering large increases in load to industrial customers transitioning from gas to electricity. SCE may provide measured electric-load profiles, infrastructure requirements, reliability impacts, lifecycle cost inputs, and field performance relevant to non-pipeline alternatives or transition decisions, while gas RD&D administrators retain responsibility for gas-specific technology and network research. The value of SAFE is a neutral evidence base that can demonstrate where technologies are ready, where performance gaps remain, and where scaling could create unacceptable cost or reliability risk.

Strategic Goal 2 - Distributed Energy Resource Integration. High penetrations of DER require more than digital interconnection studies. New devices and control schemes must be inspected, commissioned, verified, maintained, and sometimes troubleshot in the field. SAFE, through Advanced Fleet & Field Gear, Augmented Field Operations, Rapid-Deployable Field Systems, and Safety Systems and Hazard Response, will test technologies to reduce site visits, expedite construction and rework while improving safety and consistency. The objective is to support faster, safer DER integration without lowering engineering, cybersecurity, or worker-safety requirements.

Strategic Goal 5 - Climate Adaptation. Climate adaptation requires the ability to assess damage, deploy crews, work in hazardous or inaccessible areas, and restore critical service under conditions that differ from normal operations. Adapting for Tomorrow identifies increasing heat exposure and the potential for wildfire, flooding, and other climate hazards to affect grid infrastructure and field operations.[76] SAFE, through Advanced Fleet & Field Gear, Augmented Field Operations, Rapid-Deployable Field Systems, and Safety Systems and Hazard Response will test whether crews can reduce exposure to high-risk environments, restore customers or critical facilities faster, maintain safe work when communications are degraded, and assess more assets before mobilizing. Results will be tied to customer-facing resilience metrics such as assessment time, restoration time, customer minutes interrupted, and service continuity.

Coordination and Alignment with CPUC Proceedings:

SAFE will align with high-DER modernization and interconnection, energization, climate adaptation, wildfire mitigation, utility safety, emergency response, community resilience, and future GRC proceedings. Each project will identify the baseline field workflow, safety review, ratepayer-facing use case, expected output, and timing for informing a filing or decision. Deliverables may include field-assessment and restoration benchmarks, safety cases, human-factors and training requirements, performance under degraded communications, DER commissioning protocols, critical-facility restoration methods, and evidence on whether a field capability materially changes the cost, safety, or effectiveness of an adaptation or integration approach. Ratepayer benefits will include reduced outage duration and customer harm, faster restoration of critical services, safer and more consistent DER field work, reduced repeat visits, improved worker and public safety, and reduced risk of scaling autonomous or AI-enabled tools before their performance is demonstrated.

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[75] *Ibid.*

[76] SCE, "Adapting for Tomorrow: Powering a Resilient Future," May 2022, available at www.edison.com/clean-energy/adapting-for-tomorrow.

Coordination with EPIC and Gas RD&D Program Administrators:
The EPIC Administrators are exploring new innovations to coordination, particularly a new structure where IOUs will work closely with CEC to craft meaningful GFOs with built-in IOU partnerships for winning vendors selected through the competitive process. Integration to the grid is a critical step in validating TD&D investments.[77] Future EPIC projects that do not provide a path to funding integration with the grid risk remaining stranded in the "valley of death." [78]

Common safety principles, degraded-condition test scenarios, cybersecurity requirements, and comparable restoration metrics may be developed wherever useful. Gas RD&D coordination may address common emergency-response, hazardous-environment, communications, robotics, and workforce-qualification questions while retaining separate electric and gas asset use cases and avoiding duplicate demonstrations.

Unique Role:
SAFE, through Advanced Fleet & Field Gear, Augmented Field Operations, Rapid-Deployable Field Systems, and Safety Systems and Hazard Response addresses a gap that neither commercial product testing nor routine utility deployment can fully cover. Safety-critical field technologies must be validated in consequential conditions that may include energized equipment, damaged infrastructure, extreme heat, wildfire or storm environments, restricted access, communications loss, and emergency decision-making. A vendor demonstration cannot by itself establish human attention requirements, privacy boundaries, training needs, sensor fidelity, autonomy limits, fallback behavior, integration with utility procedures, or the effect on customer restoration. EPIC funding allows utilities to demonstrate performance within the utility's actual grid infrastructure and environments, providing the vital link from promising technology on the shelf to an actual solution utilities can deploy with scale to benefit ratepayers.

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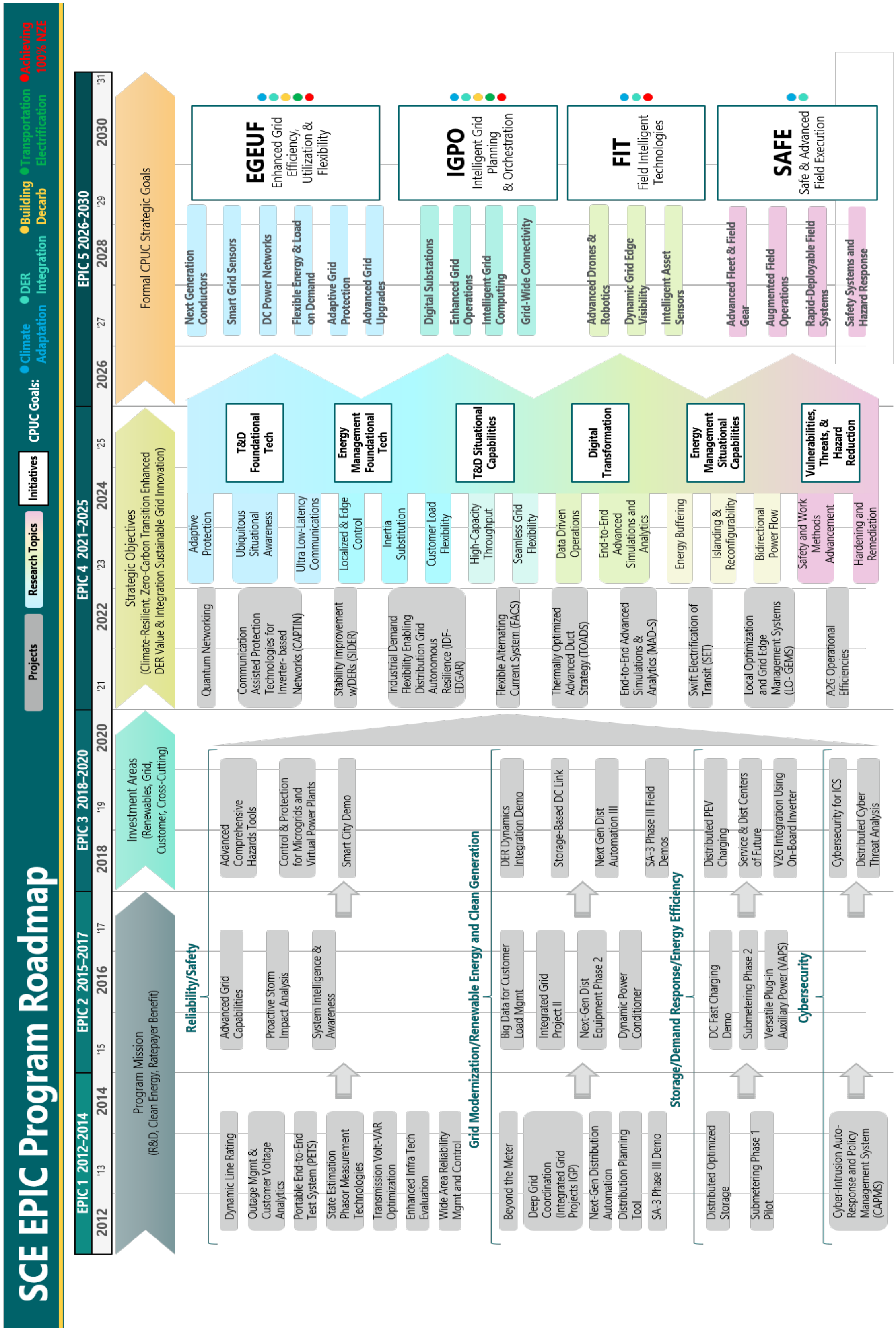
[77] D.12-05-037, OP 3.

[78] D.12-05-037, p. 32. The Commission recognized EPIC's role in helping technologies move beyond the gap between research/demonstration and commercial deployment, described by the Commission as the "valley of death."

6. Strategic Roadmap



7. Research Topic Areas

Initiative Title	Enhanced Grid Efficiency, Utilization, and Flexibility (EGEUF)
Research Topic Area Title	1. Adaptive Grid Protection and Control
Primary CPUC Strategic Goal	Transportation Electrification; Building Decarbonization
Secondary Alignment	Distributed Energy Resource Integration; Climate Adaptation; Achieving 100 Percent Net-Zero Carbon Emissions and the Coordinated Role of Gas

Gaps Addressed

Adaptive Grid Protection and Control includes tools like power flow controllers, phase balancers, frequency stabilizers, flexible AC transmission, and flexible AC distribution technologies to manage the growing grid complexity. In addition, it will evaluate upgrading the underlying protection systems with new advanced protection technologies that provide fast, accurate fault clearance for bidirectional power and low inertia grids.

The distribution grid is increasingly constrained by localized thermal, voltage, and protection limits that prevent full utilization of existing infrastructure, particularly in areas with high penetration of distributed energy resources (DERs). Conservative static ratings, limited system visibility, and legacy protection schemes restrict the ability to safely operate closer to actual system limits. As a result, grid assets are underutilized, and traditional capital upgrades are often triggered prematurely.

Successful demonstrations allow utilities to optimize high DER penetration across the grid without requiring traditional capital upgrades. As noted in Section 5, SCE's Pathway 2045 estimates that the clean-energy transition may require up to $75 billion in grid investment from 2030 to 2045.[79] Adaptive Grid Protection and Control aligns closely with EGEUF's aim of leveraging next-generation physical hardware to maximize grid utilization of existing infrastructure.

Unique Role

Individual technologies such as advanced conductors, Power Quality Conditioners, DC links, and advanced switching devices are available, however, their deployment is often project-specific and not consistently integrated into standardized distribution-level solutions. Utilities face challenges in combining these technologies into field-proven frameworks due to integration complexity, protection coordination requirements, and limited validated deployment models. Vendors focus on individual advanced technologies but do not address system-level integration or utility deployment frameworks. Federal programs emphasize early-stage research or large-scale transmission solutions, with less focus on distribution-level deployment under real utility constraints. GRC funding supports proven, low-risk investments, but does not accommodate validation of emerging hybrid solutions.

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[79] SCE, "Pathway 2045," November 2019, available at www.edison.com/clean-energy/pathway-2045.

Thus, even where promising technologies exist, utilities often lack the field data, operational experience, and regulatory alignment needed to confidently transition pilot projects to system-wide deployment. EPIC funding allows utilities to demonstrate Adaptive Grid Protection and Control technologies' performance within the utility's actual grid infrastructure and protection systems, providing the vital link from promising technology on the shelf to an implementable solution utilities can deploy with scale to benefit ratepayers.

Leveraging Past RD&D

This topic builds directly on SCE's prior EPIC work in adaptive protection, virtual protection, substation automation, process bus architectures, and DER dynamics integration. EPIC 4 and earlier projects (see Section 6) established the foundation for modern protection and communications concepts but left open questions around field performance, native Ethernet-based tele-protection, interoperability, cybersecurity, and standardized deployment in operational networks. EPIC 5 extends that work by validating integrated protection, communications, and control schemes under real distribution conditions and high-DER use cases.

Coordination with EPIC and/or Gas RD&D Program Administrators

As in EPIC 4, SCE will meet regularly with the EPIC Administrators to discuss coordination. After CPUC approves SCE's EPIC 5 Investment Plan, SCE will identify EPIC 5 projects and will coordinate with Administrators through this process.

The EPIC Administrators are exploring new innovations to coordination where IOUs will work closely with CEC to craft meaningful GFOs with built-in IOU partnerships for winning vendors selected through the competitive process. Integration to the grid is a critical step in validating technology demonstration and deployment (TD&D) investments.[80] Future EPIC projects that do not provide a path to funding integration with the grid risk remaining stranded in the "valley of death."[81]

Metrics and Impact Assessment

SCE will assess ratepayer benefits using baseline protection performance, outage impacts, and DER integration limits to evaluate alignment with EPIC goals of affordability, reliability, and grid modernization. Metrics may include:

- Reductions in customer minutes interrupted, false or delayed trips, and improved speed and accuracy of fault detection, location, and isolation.
- Avoided outage-related costs and reduced need for redundant protection or communications infrastructure through interoperable, standards-based solutions.
- Increases in DER hosting capacity and reductions in DER curtailment enabled by more adaptive and responsive protection schemes.
- Communications performance (e.g., latency, availability) and protection of reliability under degraded or failover conditions, supporting consistent grid operations.
- Demonstrated compatibility across relays, vendors, and communications platforms, and validated adaptive settings or schemes that can be deployed systemwide.

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80 D.12-05-037, OP 3.

81 D.12-05-037, p. 32. The Commission recognized EPIC's role in helping technologies move beyond the gap between research/demonstration and commercial deployment, described by the Commission as the "valley of death."

Equity-focused metrics will evaluate whether improved protection performance reduces outage frequency, duration, or exposure for disadvantaged, low-income, and Tribal communities on demonstration circuits, relative to baseline conditions.

Expected Outcomes

Near-term outcomes include validated protection use cases, communications requirements, and operating criteria for adaptive schemes. Mid-term outcomes include standardized designs and evidence that adaptive protection can support bidirectional flows, DER integration, and dynamic feeder operations without compromising safety. Long-term outcomes include a scalable pathway for protection systems that enable a more flexible, reliable, and affordable grid as California advances electrification and experiences significant DER growth; Pathway 2045 estimates the grid will need 80 gigawatts (GW) of clean generation and 30 GW of utility-scale energy storage in the next 25 years.

Equity Outcomes

Adaptive Grid Protection and Control works at a substation and grid level, which means potential projects would benefit large segments of ratepayers downstream of the front of the meter projects, including those from disadvantaged, low income and Tribal communities. Candidate demonstrations should consider outage history, climate exposure, customer burden, and grid needs. Benefits will be assessed through outcomes such as improved reliability, reduced outage exposure, faster diagnosis or restoration, improved electrification readiness, or reduced cost impacts for customers in affected areas. Following CPUC approval of this EPIC 5 Investment Plan, SCE's Community Engagement Plan will guide SCE's engagement with communities during project selection and execution.[82]

Marketing and Deployment Plans

Deployment will proceed through modeling, hardware-in-the-loop testing, lab validation, controlled field pilots, relay and communications interoperability testing, cybersecurity assessment, operator and protection-engineer review, and development of standards and deployment playbooks. Successful outcomes will inform future protection standards, telecom requirements, and capital planning, to advance the longer-term target of deploying advanced protection across the grid. Key barriers such as protection coordination, regulatory alignment, and workforce readiness will be addressed through standardization, stakeholder engagement, and targeted training to support scalable, system-wide adoption.

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[82] SCE Advice Letter 5838-E, "Electric Program Investment Charge 5 Community Engagement Plan," submitted June 26, 2026.

Initiative Title	Enhanced Grid Efficiency, Utilization, and Flexibility (EGEUF)
Research Topic Area Title	2. Advanced Grid Upgrades
Primary CPUC Strategic Goal	Transportation Electrification; Building Decarbonization
Secondary Alignment	Distributed Energy Resource Integration; Climate Adaptation; Achieving 100 Percent Net-Zero Carbon Emissions and the Coordinated Role of Gas

Gaps Addressed

Advanced Grid Upgrades include technologies such as Mobile Energy Storage, Commercial & Industrial Utility Scale Storage, Grid Edge Storage, Solid State Power Conversion Technology and Power Conditioning Technology. These technologies can provide local grid capacity faster than traditional grid upgrades and enable key utility capabilities at the grid edge to address emerging challenges, such as higher energy densities, increased reliability demands, and more power quality disturbances due to supply decarbonization and electrification.

Distribution and secondary systems face increasing stress from EV charging, building electrification, DER adoption, and localized load growth. Traditional upgrade pathways often rely on replacing transformers, reconductoring, or expanding facilities based on peak demand needs. Advanced Grid Upgrades' technologies could scale up across distribution and subtransmission grids to enhance grid utilization and flexibility while expediting transportation electrification, DER integration and advancing toward achieving a 100% net zero grid.

Advanced Grid Upgrades will evaluate the use of energy storage and related flexible infrastructure as grid assets. Technologies may include, but are not limited to, mobile and stationary battery energy storage systems, commercial, industrial and utility-scale storage, grid-edge kW-scale storage, transformer- or secondary-level storage, inverter controls, mobile substations or modular equipment, power electronics, storage-enabled non-wires alternatives, microgrid-capable storage, and interconnection facilities that provide isolation, power quality, protection, and communications functions. The topic will evaluate demand-based and energy-based planning, storage form factors, mobile versus stationary deployment, benefit stacking, market versus grid services, fire and permitting requirements, and impacts on asset life.

Unique Role

Large numbers of vendors are already offering products that could provide various grid benefits from integrated energy storage; however, these products are usually targeting a specific grid need rather than comprehensively prioritizing a group of needs and finding suitable hybrid solutions. On the other hand, efforts in integrated assessment and solution hybridization require utility demonstrations to validate viable deployment approaches and real-world economics before they can be scaled across the grid. EPIC funding allows utilities to demonstrate Advanced Grid Upgrades within the utility's actual grid infrastructure and environments, providing the vital link from promising technology on the shelf to an actual solution utilities can deploy with scale to benefit ratepayers.

Leveraging Past RD&D

This topic builds on prior EPIC and industry work on energy buffering, energy storage, DER integration, non-wires alternatives, microgrids, power electronics, and grid modernization. EPIC 5 will avoid duplication by focusing on integrated solutions, deployment procedures, decision matrices, benefit quantification, interconnection facilities, operations, and economic evidence needed to scale.

Coordination with EPIC and/or Gas RD&D Program Administrators

As in EPIC 4, SCE will meet regularly with the EPIC Administrators to discuss coordination. After CPUC approves SCE's EPIC 5 Investment Plan, SCE will identify EPIC 5 projects and will coordinate through this process.

The EPIC Administrators are exploring new innovations to coordination where IOUs will work closely with CEC to craft meaningful GFOs with built-in IOU partnerships for winning vendors selected through the competitive process. Integration to the grid is a critical step in validating technology demonstration and deployment (TD&D) investments.[83] Future EPIC projects that do not provide a path to funding integration with the grid risk remaining stranded in the "valley of death."[84]

Metrics and Impact Assessment

SCE will assess ratepayer benefits using baseline costs, interconnection data, development timelines, and performance outcomes from comparable deployments of traditional wires solutions and flexible capacity resources. Metrics may include:

- Avoided or deferred capital spend (e.g., substation upgrades), normalized $/kW and $/kWh, and benefit–cost ratio across stacked use cases.
- Time to interconnection and energization (e.g., months vs. years), permitting and construction duration, and schedule certainty relative to traditional projects.
- MW/MWh of capacity provided, peak reduction achieved, and effectiveness in addressing identified thermal or voltage constraints.
- Voltage support (e.g., VAR capability), reduction in overload events, and responsiveness/dispatchability during grid events.
- Avoided or shortened outages, contribution during contingencies, and improvement in restoration time or service continuity.
- Relocation time/cost for mobile assets, asset-life extension of existing infrastructure, and realized value from stacked services (capacity, reliability, power quality).
- Reductions in service equipment footprint, civil construction cost and duration, and avoided or deferred distribution upgrades.

Equity-focused metrics will evaluate reliability, resilience, construction disruption, and affordability impacts in disadvantaged, low-income, and Tribal communities, with attention to differential benefits and burdens relative to traditional infrastructure approaches.

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[83] D.12-05-037, p. 32. The Commission recognized EPIC's role in helping technologies move beyond the gap between research/demonstration and commercial deployment, described by the Commission as the "valley of death."

[84] *Id*., p. 32.

Expected Outcomes
Near-term outcomes focus on technical validation, improved operational visibility, and a clear understanding of deployment costs, performance limitations, and architectural tradeoffs. As deployments scale up, mid-term outcomes include ratepayer benefits through reduced capital and maintenance costs of traditional wires solutions enabled by increased utilization of existing assets before upgrades are required. Long term outcomes include reduced rates through reduced variability of load, improved grid stability, including voltage and frequency, further reduction of capital and maintenance costs due to reduction in voltage-optimizing devices, improved service reliability, and grid resilience during abnormal events.

Equity Outcomes
Equity will be evaluated using measurable community benefits rather than project location alone. Benefits include improved affordability from reduced capital investment, reduced construction project scopes that lower the impact of construction on a community, and the potential for improved service reliability. Following CPUC approval of this EPIC 5 Investment Plan, SCE's Community Engagement Plan will guide SCE's engagement with communities during project selection and execution.

Marketing and Deployment Plans
This project will advance grid readiness by comprehensively assessing and standardizing energy storage deployment procedures through lab and field demonstrations, establishing deployment guidance that can be integrated into future system planning and operating practices. While market capabilities exist today, lack of standardization and proven deployment models remain barriers to scale; these will be addressed through utility led evaluation of interoperability, operational integration, and economic viability to inform broader adoption.

Initiative Title	Enhanced Grid Efficiency, Utilization, and Flexibility (EGEUF)
Research Topic Area Title	3. DC Power Networks
Primary CPUC Strategic Goal	Transportation Electrification; Building Decarbonization
Secondary Alignment	Distributed Energy Resource Integration; Climate Adaptation; Achieving 100 Percent Net-Zero Carbon Emissions and the Coordinated Role of Gas

Gaps Addressed
Many fast-growing loads and resources, including EV charging, data centers, battery energy storage, solar PV, and some industrial or building electrification applications, operate internally on direct current (DC) even though utility service is generally delivered as alternating current (AC). DC Power Networks will evaluate grid equipment that can provide direct DC service.

This Research Topic will demonstrate DC Power Networks and supporting power electronics. Technologies may include, but are not limited to, medium-voltage DC equipment, solid-state transformers, solid-state circuit breakers, DC switchgear, AC/DC hybrid architectures, DC service configurations, DC microgrids, converter-based protection, power quality controls, voltage and reactive support, power-flow control, storage and EV charging integration, and interfaces with flexible service programs. The research will aim to evaluate both customer-side and utility-side architectures, including where DC service or DC links may reduce footprint, improve efficiency, shorten energization timelines, or increase usable capacity.

The problem this topic solves is the uncertainty over whether DC power architectures can be safely, reliably, and affordably integrated into utility distribution systems and service offerings. The transition to power electric-based systems will relieve long lead time demand on distribution equipment and minimize the footprint of electrical service for large customers. Beyond their direct operational applications, these intelligent devices can provide broader grid value through volt/var support, power flow control, renewable integration, and integration with flexible service programs. Successful demonstrations can inform interconnection requirements, service rules, tariffs, protection standards, and cost-benefit frameworks needed for broader deployment.

Unique Role
DC power network technologies are at a critical demonstration-to-deployment gap stage: many enabling components, such as solid-state transformers, DC switchgear, converter-based protection, and AC/DC hybrid architectures, are advancing commercially, but they have not yet been sufficiently demonstrated as integrated utility distribution solutions under California operating conditions. Without EPIC-funded technology demonstration and deployment, these technologies may remain limited to vendor-specific pilots or customer-side applications, with unresolved questions around protection coordination, interoperability, safety, cybersecurity, service rules, cost-effectiveness, and ratepayer value. EPIC can bridge this gap by funding utility-led demonstrations that test how DC architectures perform in real grid applications, establish the technical and operational evidence needed for IOU adoption, and develop transferable guidance for interconnection, tariffs, standards, and deployment criteria. This role is distinct from commercial vendor deployment or federal component-level RD&D because EPIC can focus specifically on California utility workflows, CPUC policy needs,

and scalable pathways that allow successful technologies to move from isolated demonstrations into broader IOU planning and deployment decisions.

Thus, even where promising technologies exist, utilities often lack the field data, operational experience, and regulatory alignment needed to confidently transition pilot projects to system-wide deployment. EPIC funding allows utilities to demonstrate DC Power Networks' performance within the utility's actual grid infrastructure and environments, providing the vital link from promising technology on the shelf to an actual solution utilities can deploy with scale to benefit ratepayers.

Leveraging Past RD&D

Solid-state power electronics and DC architectures have advanced significantly due to improvements in silicon carbide and gallium nitride devices, but utility distribution demonstrations remain limited. SCE had DC related projects in EPIC 2 and EPIC 3 and has engaged vendors and evaluated technology readiness (see Section 6). EPIC 5 provides a timely opportunity to test devices moving toward commercial availability. This work builds on prior EPIC grid modernization, power electronics, EV charging, storage, and DER integration efforts, while avoiding duplication by focusing on utility integration, DC service models, protection, operations, and regulatory readiness.

Coordination with EPIC and/or Gas RD&D Program Administrators

As in EPIC 4, SCE will meet regularly with the EPIC Administrators to discuss coordination. After CPUC approves SCE's EPIC 5 Investment Plan, SCE will identify EPIC 5 projects and will coordinate through this process.

The EPIC Administrators are exploring new innovations to coordination where IOUs will work closely with CEC to craft meaningful GFOs with built-in IOU partnerships for winning vendors selected through the competitive process. Integration to the grid is a critical step in validating technology demonstration and deployment (TD&D) investments.[85] Future EPIC projects that do not provide a path to funding integration with the grid risk remaining stranded in the "valley of death."[86]

Metrics and Impact Assessment

SCE will assess ratepayer benefits using baseline AC service designs, construction practices, and operational performance as comparison points. Metrics may include:

- Reductions in service equipment footprint, civil construction cost and duration, and avoided or deferred distribution upgrades.
- Improvements in design, permitting, and energization timelines for new or upgraded service connections.
- Energy conversion efficiency, cost per MW of served DC load, and effective use of installed infrastructure.
- Power quality, protection speed and selectivity, equipment availability, and reduction in disturbances or outages.

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85 D.12-05-037, OP 3.

86 D.12-05-037, p. 32. The Commission recognized EPIC's role in helping technologies move beyond the gap between research/demonstration and commercial deployment, described by the Commission as the "valley of death."

- Interoperability with storage, EV charging, flexible loads, and expanded access to electrification services (e.g., EV charging).

Equity-focused metrics will evaluate whether DC Power Networks reduce cost, footprint, and deployment barriers for electrification in disadvantaged, low-income, and Tribal communities, including improvements in access, affordability, and time to service.

Expected Outcomes

Near-term outcomes include lab and field evidence on DC equipment performance, protection approaches, interconnection needs, and service configurations. Mid-term outcomes include utility guidance on when DC architectures may reduce cost, space, or energization barriers compared with conventional AC service. Long-term outcomes include a scalable pathway for DC power networks that improve grid throughput, reduce conversion losses, accelerate electrification, and improve affordability for customers.

Equity Outcomes

DC equipment often has a smaller footprint and shorter lead time, which could benefit communities by facilitating more penetration of EVs, improving access and air quality. Candidate demonstrations should consider outage history, climate exposure, customer burden, and local operational need. Benefits will be assessed through outcomes such as improved reliability, reduced outage exposure, faster diagnosis or restoration, improved electrification readiness, or reduced cost impacts for customers in affected areas. Following CPUC approval of this EPIC 5 Investment Plan, SCE's Community Engagement Plan will guide SCE's engagement with communities during project selection and execution.[87]

Marketing and Deployment Plans

Deployment will proceed through technology screening, lab validation, pilot service configurations, protection and safety assessment, coordination with authorities having jurisdiction, tariff or Rule 2 considerations where applicable, and development of standards and deployment criteria. The lack of rules and tariffs for IOUs to provide DC as a Service (DCaaS) is a market barrier. Interim approaches may include added-facilities arrangements or controlled pilots while broader DC service rules and tariff structures are evaluated.

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[87] SCE Advice Letter 5838-E, "Electric Program Investment Charge 5 Community Engagement Plan," submitted June 26, 2026.

Initiative Title	Enhanced Grid Efficiency, Utilization, and Flexibility (EGEUF)
Research Topic Area Title	4. Flexible Energy & Load on Demand
Primary CPUC Strategic Goal	Transportation Electrification; Building Decarbonization
Secondary Alignment	Distributed Energy Resource Integration; Climate Adaptation; Achieving 100 Percent Net-Zero Carbon Emissions and the Coordinated Role of Gas

Gaps Addressed

Flexible Energy & Load on Demand will explore dynamic, flexible load shaping technologies that improve grid reliability under increasing DER penetration and unlock new demand-side value streams aligned with California's decarbonization and electrification goals. Enabling customer load flexibility requires a strategic, comprehensive approach to integrating Virtual Power Plants (VPPs), Smart Panels, Dynamic Operating Envelopes, and Vehicle-to-Grid Integration (VGI). The goal is to transform aggregated customer loads into predictable, dispatchable resources, optimizing the buildout of Generation, Transmission, and Distribution. These technologies can enhance demand flexibility through intelligent service points, while Dynamic Operating Envelopes provide customized interconnection solutions, such as partial capacity or generation export limits. A flexible technology architecture is essential, accommodating all demand management approaches to maximize flexibility across the grid.

California needs flexible load and distributed energy resources to operate as dependable grid resources, not only as customer or aggregator assets. Current demand response, managed charging, storage, and distributed generation programs remain fragmented, and many are optimized at the device, customer, or aggregator level rather than coordinated across distribution constraints and wholesale market conditions. Utilities have limited ability to align local grid needs with CAISO dispatch, demand flexibility programs, customer preferences, and aggregator behavior in near real time.

This Research Topic will demonstrate market-aware and grid-aware orchestration of flexible energy and load on demand. Technologies and approaches may include, but are not limited to, DERMS/DFMS/ADMS integration, aggregator interfaces, CAISO signal awareness, managed EV charging, VGI/V2X coordination, behind-the-meter and front-of-meter storage dispatch, smart thermostat and building load flexibility, industrial and commercial flexible load, distributed generation coordination, flexible service agreements, telemetry and settlement data exchanges, and cybersecurity and interoperability frameworks.

Unique Role

Sophisticated Flexible Energy & Load on Demand technologies are still in the early stages of commercialization. The private sector is primarily focused on device-level optimization or single-asset aggregation aligned with existing market products, and lacks incentives to develop open, scalable orchestration capabilities that deliver system-wide reliability, equity, and grid optimization benefits. This Research Topic addresses system-level orchestration challenges that are not currently incentivized or fully addressed by market actors, federal RD&D programs, or utility GRC mechanisms. Specifically, the integration of multi-type DER coordination with real-time CAISO dispatch requires foundational research, pilot validation, and interoperability frameworks that extend beyond commercially viable solutions and near-term operational investments.

Thus, even where promising technologies exist, utilities often lack the field data, operational experience, and regulatory alignment needed to confidently begin pilot projects to system-wide deployment. EPIC funding allows utilities to demonstrate Flexible Energy & Load on Demand technologies' performance within the utility's actual grid infrastructure and environments, providing the vital link from promising technology on the shelf to an actual solution utilities can deploy with scale to benefit ratepayers.

Leveraging Past RD&D

This work builds on prior EPIC and related RD&D on DER communications, IEEE 2030.5, device-level controls, demand response, managed charging, customer load flexibility, and grid modernization. Earlier efforts focused on foundational elements to help establish individual capabilities for DER control and customer participation. EPIC 5 advances those capabilities by testing coordinated multi-resource orchestration across the distribution/bulk system interface. The topic will avoid duplication by focusing on interoperability, utility integration, market-aware control, equity assessment, and operational evidence needed for CPUC proceedings and future programs.

Coordination with EPIC and/or Gas RD&D Program Administrators

As in EPIC 4, SCE will meet regularly with the EPIC Administrators to discuss coordination. After CPUC approves SCE's EPIC 5 Investment Plan, SCE will identify EPIC 5 projects and will coordinate through this process. The EPIC Administrators are exploring new innovations in coordination where IOUs will work closely with CEC to craft meaningful GFOs with built-in IOU partnerships for winning vendors selected through the competitive process. Integration to the grid is a critical step in validating technology demonstration and deployment (TD&D) investments.[88] Future EPIC projects that do not provide a path to funding integration with the grid risk remaining stranded in the "valley of death."[89]

Metrics and Impact Assessment

SCE will assess ratepayer benefits using baseline load profiles, infrastructure costs, and DER performance to evaluate alignment with EPIC goals of affordability, reliability, and equitable grid modernization. Metrics may include:

- Avoided or deferred distribution upgrade costs, reduced procurement or curtailment costs, and net customer bill impacts.
- Peak load reduction (MW and %), improved load factor and ramping, and increased DER utilization and incremental hosting capacity.
- Reductions in overloads, voltage violations, and emergency demand response events, including performance during grid stress conditions.
- Improvements in load and DER forecast accuracy, dispatch performance, and alignment with planning and operational needs.

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[88] D.12-05-037, OP 3.

[89] D.12-05-037, p. 32. The Commission recognized EPIC's role in helping technologies move beyond the gap between research/demonstration and commercial deployment, described by the Commission as the "valley of death."

- Number of controllable devices or MW enrolled and the ability to expand flexible load programs across customer segments.

Equity-focused metrics will evaluate participation by disadvantaged, low-income, and Tribal communities; customer bill savings, access to flexible load programs, and retention. Evaluation methods may include power-flow modeling, production-cost or market simulation, pre/post pilot comparison, A/B testing, DERMS/ADMS telemetry analytics, and application of equity overlays.

Expected Outcomes
Near-term outcomes include demonstration of multi-DER orchestration capabilities across flexible load, EVs, storage, and distributed generation, with validation of performance aligned with local grid needs and CAISO-aware signals. Mid-term outcomes include scalable orchestration architectures and program designs that increase DER utilization, improve load shape efficiency, reduce reliance on traditional upgrades, and expand customer participation. Long-term outcomes include a market-aware flexible load ecosystem capable of dynamic grid optimization, lower total system costs, improved affordability, reduced curtailment, and increased hosting capacity for DER and electrification growth.

Equity Outcomes
While EPIC does not allow funding of customer incentive programs, the successful demonstration of demand flexibility technologies is a key underpinning of any customer-focused programs that provide demand-related bill savings, including to disadvantaged, low-income, and Tribal communities. Benefits include customer bill savings, access to flexible load programs, and retention. Following CPUC approval of this EPIC 5 Investment Plan, SCE's Community Engagement Plan will guide SCE's engagement with communities during project selection and execution.[90]

Marketing and Deployment Plans
Deployment will proceed through targeted pilots, validation and standardization of interfaces, program and market integration, and scaled adoption across circuits or customer segments where benefits are demonstrated. Deliverables may include orchestration reference architectures, performance requirements, interoperability specifications, data-sharing protocols, cybersecurity requirements, and implementation playbooks for utility programs, aggregators, and CPUC proceedings. Key barriers include a lack of defined frameworks for DER orchestration and compensation mechanisms that may slow adoption, as well as fragmented communication protocols. Mitigation strategies include developing standardized frameworks and advancing agreed open, interoperable architectures and leveraging existing standards (e.g., IEEE 2030.5) to ensure consistent integration across devices, aggregators, and utility systems.

[90] SCE Advice Letter 5838-E, "Electric Program Investment Charge 5 Community Engagement Plan," submitted June 26, 2026.

Initiative Title	Enhanced Grid Efficiency, Utilization, and Flexibility (EGEUF)
Research Topic Area Title	5. Next Generation Conductors
Primary CPUC Strategic Goal	Transportation Electrification; Building Decarbonization
Secondary Alignment	Distributed Energy Resource Integration; Climate Adaptation; Achieving 100 Percent Net-Zero Carbon Emissions and the Coordinated Role of Gas

Gaps Addressed

Next Generation Conductors are designed to enhance the efficiency, capacity, and reliability of electrical transmission and distribution systems. Utilizing materials such as high-temperature superconductors (HTS), composite cores, and novel alloys, these conductors reduce energy losses, increase current-carrying capacity, and improve mechanical strength compared to traditional aluminum or copper conductors.

Transportation electrification, building electrification, DER interconnection, and climate-driven load growth are increasing the need for distribution and subtransmission capacity faster than traditional infrastructure projects can often be planned, permitted, and built.

Conventional reconductoring and line rebuilds can require pole replacements, easement work, long outages, high construction costs, and community disruption. At the same time, many circuits are constrained by thermal or clearance limits that may be addressed more cost-effectively through advanced conductor technologies if performance, constructability, wildfire considerations, and life-cycle costs can be validated under utility conditions.

SCE's Pathway 2045 forecasts that electricity sales from the grid will increase 60% and peak loads will increase 40%. The core gap is not the technology itself, but the absence of clear, utility-grade evidence showing when and how advanced conductors can be deployed with confidence. Utilities still lack validated understanding of real-world performance, installation constraints, protection and safety implications, and life-cycle value under operating conditions. This uncertainty limits adoption, even where these technologies could meaningfully increase usable capacity and reduce the need for more intrusive infrastructure upgrades.

Meeting the State's electrification goals will require generating the field evidence needed to move advanced conductors from promising concepts to practical solutions, enabling faster, less disruptive, and more targeted capacity expansion where it is most needed.

Unique Role

Technologies in Next Generation Conductors have a range of commercial maturities. For example, HTS requires continued innovations in cooling cost and complexity to unlock viability, and if O&M challenges can be overcome, it may soon be ready for commercialization. To date, HTS has limited domestic traction from the private sector given cooling requirements and superconducting tape cost, but has undergone demonstrations in the US, EU, and East Asia.

Next Generation Conductors' technologies like HTS are near commercialization but still face challenges and need to be evaluated under applicable utility conditions. EPIC funding allows utilities to demonstrate Next Generation Conductors' performance within the utility's actual grid infrastructure, providing the vital link from promising technology on the shelf to an actual solution utilities can deploy with scale to benefit ratepayers.

Leveraging Past RD&D

This topic builds on prior EPIC grid modernization, dynamic ratings, advanced sensing, and grid utilization work, as well as industry experience with grid-enhancing technologies. Prior efforts have shown that capacity can sometimes be unlocked through improved equipment, sensing, and operational methods, but many demonstrations have been technology-specific and have not produced standardized utility deployment criteria. EPIC 5 will avoid duplication by focusing on field validation, constructability, wildfire and resilience considerations, protection integration, and decision frameworks for comparing advanced conductors to traditional wires and non-wires alternatives.

Coordination with EPIC and/or Gas RD&D Program Administrators

As in EPIC 4, SCE will meet regularly with the EPIC Administrators to discuss coordination. After CPUC approves SCE's EPIC 5 Investment Plan, SCE will identify EPIC 5 projects and will coordinate through this process. The EPIC Administrators are exploring new innovations in coordination where IOUs will work closely with CEC to craft meaningful GFOs with built-in IOU partnerships for winning vendors selected through the competitive process. Integration to the grid is a critical step in validating technology demonstration and deployment (TD&D) investments.[91] Future EPIC projects that do not provide a path to funding integration with the grid risk remaining stranded in the "valley of death."[92]

Metrics and Impact Assessment

SCE will assess ratepayer benefits using baseline capacity limits, construction practices, and reliability outcomes to evaluate alignment with EPIC goals of affordability, reliability, and grid modernization. Metrics may include:

- Avoided or deferred capital expenditures and cost per MW of incremental capacity relative to traditional rebuilds.
- Incremental ampacity or MW enabled, improvements in DER hosting capacity or load-serving capability, and ability to meet identified system needs.
- Reductions in construction duration, outage duration, permitting complexity, and number of pole replacements or major rebuild activities avoided.
- Impacts on circuit-level reliability indices and improvements in conductor performance (e.g., sag, clearance margins) and operational limits.
- Wildfire and safety performance indicators where applicable and demonstrated replicability across circuit types and operating environments.

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[91] D.12-05-037, OP 3.

[92] D.12-05-037, p. 32. The Commission recognized EPIC's role in helping technologies move beyond the gap between research/demonstration and commercial deployment, described by the Commission as the "valley of death."

Equity-focused assessment will evaluate whether reduced construction disruption, faster energization, and improved reliability outcomes benefit disadvantaged, low-income, and Tribal communities relative to traditional infrastructure approaches.

Expected Outcomes
Near-term outcomes include field and/or laboratory evidence on conductor performance, installation methods, protection impacts, cost ranges, and deployment constraints to adopt the technologies in transmission and sub-transmission new builds and re-builds to address immediate power density challenges. Mid-term outcomes include standardized screening criteria and engineering guidance for when next generation conductors are a cost-effective alternative to traditional reconductoring or rebuilding. Long-term outcomes include broader use of validated conductor solutions to accelerate service to new load, increase DER hosting capacity, reduce construction costs and timelines, and support a more affordable path to California's electrification and net-zero goals.

Equity Outcomes
Next Generation Conductors will have an impact at the transmission or distribution level, which means potential projects would benefit large segments of ratepayers downstream of the front of the meter projects, including those from disadvantaged, low income, and Tribal communities. Equity will be evaluated using measurable benefits to communities served rather than by than project location alone. Benefits include improved reliability, reduced outage exposure, or reduced cost impacts for customers in affected areas. Following CPUC approval of this EPIC 5 Investment Plan, SCE's Community Engagement Plan will guide SCE's engagement with communities.[93]

Marketing and Deployment Plans
The path to grid readiness will include technology screening, lab or controlled-environment validation, limited field demonstrations, comparison with traditional rebuild alternatives, development of engineering standards and construction guidance, and integration into planning and capital decision processes. Results will inform future procurement, design standards, and potential GRC or programmatic deployment where benefits are demonstrated.

[93] SCE Advice Letter 5838-E, "Electric Program Investment Charge 5 Community Engagement Plan," submitted June 26, 2026.

Initiative Title	Enhanced Grid Efficiency, Utilization, and Flexibility (EGEUF)
Research Topic Area Title	6. Smart Grid Sensors
Primary CPUC Strategic Goal	Transportation Electrification; Building Decarbonization
Secondary Alignment	Distributed Energy Resource Integration; Climate Adaptation; Achieving 100 Percent Net-Zero Carbon Emissions and the Coordinated Role of Gas

Gaps Addressed

Smart Grid Sensors is a broad, interoperable sensing layer for grid utilization and capacity enablement that extends beyond traditional power flow monitoring to provide system-level visibility into grid conditions and stability. Technologies may include, but are not limited to, high-accuracy voltage and current sensors, power quality meters, system fault detection with location sensors, local advanced equipment monitoring, AI-enabled anomaly detection, and inertia monitoring.

Utilities are rotating from mass generation to variable output, inverter-based renewable generation with battery storage to decarbonize and decelerate long-term impacts of climate change. As utility grids operate with less rotational inertia, the grid becomes more susceptible to electrical disturbances at sub-cycle to multi-cycle levels, including fast voltage transients, rapid changes in power flow direction that reduce reliability, fault-initiated instability, and post-switching recovery challenges.

Smart Grid Sensors addresses the lack of scalable, real-time grid visibility. Successful demonstrations can show when sensing and analytics allow targeted upgrades, faster energization, improved DER hosting capacity, and earlier detection of abnormal conditions at lower cost than replacing infrastructure based on conservative assumptions alone. The value of Smart Grid Sensors comes not from sensors alone, but from integrating grid-wide sensing, centralized data, analytics, enterprise systems, and operational decision-making workflows. Research is needed to determine how these capabilities can improve grid visibility, stability, resiliency, DER integration, hosting capacity, and cost-effective grid planning and operations at scale.

Unique Role

The physical sensor hardware is fairly mature, but communications reception, bandwidth, and integrated data management remain a challenge and inhibit the industry from realizing the full value of sensors on the grid. EPIC is the appropriate funding source because the principal uncertainty is not whether individual products or methods exist, but whether they can be integrated, demonstrated, and measured under California utility operating conditions in a manner that produces transferable ratepayer value. EPIC funding allows utilities to demonstrate performance within the utility's actual grid infrastructure and protection systems, providing the vital link from promising technology on the shelf to an actual solution utilities can deploy with scale to benefit ratepayers.

Leveraging Past RD&D

This work builds on prior EPIC DER integration projects, like the EPIC 4 project Stability Improvement with DERs (SIDER). Smart Grid Sensors extends this base of knowledge by validating a broader grid-utilization sensing architecture, including how sensor outputs can support planning, operations, protection, and capacity decisions without duplicating asset health-focused or substation-focused research topics.

Coordination with EPIC and/or Gas RD&D Program Administrators
As in EPIC 4, SCE will meet regularly with the EPIC Administrators to discuss coordination. After CPUC approves SCE's EPIC 5 Investment Plan, SCE will identify EPIC 5 projects and will coordinate through this process.

The EPIC Administrators are exploring new innovations to coordination where IOUs will work closely with CEC to craft meaningful GFOs with built-in IOU partnerships for winning vendors selected through the competitive process. Integration to the grid is a critical step in validating technology demonstration and deployment (TD&D) investments.[94] Future EPIC projects that do not provide a path to funding integration with the grid risk remaining stranded in the "valley of death."[95]

Metrics and Impact Assessment
SCE will assess ratepayer benefits using baseline system visibility, outage performance, and infrastructure costs to evaluate alignment with EPIC goals of affordability, reliability, and grid modernization. Metrics may include:

- Improvements in fault detection and location speed and accuracy, reductions in unknown events, and decreased outage exposure and duration.
- Avoided or deferred infrastructure upgrades, reduced truck rolls, sensor installation cost and time, and cost per actionable grid insight.
- MW of load or DER accommodated without traditional upgrades, improved feeder utilization, and reductions in overloads and voltage violations.
- Increased observability of voltage, current, power quality, thermal, and DER conditions, along with improvements in data latency and availability.
- Number of feeders or assets monitored and ability to expand sensing and analytics capabilities across circuits and operating environments.

Equity-focused assessment will compare improvements on feeders serving disadvantaged, low-income, and Tribal communities, including reductions in outage exposure, faster restoration, improved power quality, and enhanced readiness for electrification.

Expected Outcomes
Near-term outcomes include validated sensor packages, data quality requirements, and high-value use cases for feeder and grid-edge visibility. Mid-term outcomes include integration of sensor outputs into planning and operations workflows, better prioritization of upgrades, and improved ability to use existing infrastructure before building new assets. Long-term outcomes include a scalable sensing platform that supports higher DER and load penetration, improves reliability and safety, reduces unnecessary capital expenditures, and provides data for CPUC proceedings and future grid modernization investments.

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[94] D.12-05-037, OP 3.

[95] D.12-05-037, p. 32. The Commission recognized EPIC's role in helping technologies move beyond the gap between research/demonstration and commercial deployment, described by the Commission as the "valley of death."

Equity Outcomes
Smart Grid Sensors evaluates technologies that provide overall grid visibility, but deployment will scale over time, providing benefits to individual communities. Benefits include improved reliability, reduced outage exposure, faster diagnosis or restoration, improved electrification readiness, or reduced cost impacts for customers in affected areas. Following CPUC approval of this EPIC 5 Investment Plan, SCE's Community Engagement Plan will guide SCE's engagement with communities during project selection and execution.[96]

Marketing and Deployment Plans
The deployment pathway will include use-case screening, lab testing, limited field installations, integration with operational and planning systems, validation of analytics, and development of design standards and deployment criteria. Projects should allow multiple sensors, communications, and analytics approaches to be evaluated against performance, cost, and interoperability requirements.

[96] SCE Advice Letter 5838-E, "Electric Program Investment Charge 5 Community Engagement Plan," submitted June 26, 2026.

Initiative Title	Intelligent Grid Planning & Orchestration (IGPO)
Research Topic Area Title	7. Digital Substations
Primary CPUC Strategic Goal	Distributed Energy Resource Integration
Secondary Alignment	Transportation Electrification; Building Decarbonization; Achieving 100 Percent Net-Zero Carbon Emissions and the Coordinated Role of Gas; Climate Adaptation

Gaps Addressed

The Digital Substation Research Topic explores how advanced sensing, digital communications, virtualized applications, and integrated analytics can modernize substation monitoring and control while enabling improved asset management, grid resilience, operational flexibility, and security. Digital Substations optimize space, improve efficiency and support greater levers of operational flexibility. This architecture can use common sensing, process-bus data, and virtualized applications to support protection, power quality, incipient fault detection, event analysis, and emerging security monitoring in an integrated and cost-effective manner.

This Research Topic represents a new emerging class of technology designed to enhance grid resilience, efficiency, and adaptability to address emerging infrastructure replacement and power density challenges while also meeting the emergence of new external threats to the grid (e.g., physical security, climate adaptation, etc.). Projects will evaluate higher-fidelity voltage and current sensors, merging units, substation network design, edge analytics, centralized analytics, and virtualized monitoring functions. Additionally, asset life extension and enhancement technologies focus on prolonging the operational life of critical infrastructure through retrofitting and rejuvenating technologies. Grid hardening technologies further reinforce the system against extreme weather and other threats by incorporating durable materials and innovative designs. Together, these advancements are key components to ensuring a robust, future-ready grid.

Key gaps include limited bandwidth and fidelity of conventional CT/PT measurements for advanced waveform analysis; lack of standardized architecture for virtualizing non-protection functions such as digital fault recording, power quality analysis, phasor measurement, and incipient fault detection; uncertainty over which analytics should run at the substation edge versus centralized systems; limited ability to detect early-stage fault signatures before protective operation; and the need to observe high-frequency or abnormal signals that may be introduced by grid-connected devices or adversarial activity. Addressing these gaps supports DER integration priorities by improving resilience, reducing customer outage risk, and informing long-term grid investment decisions with better data.

Unique Role

EPIC is the appropriate funding source because the main uncertainty is not whether individual products exist, but whether an integrated digital substation architecture can be demonstrated safely, interoperably, and economically in utility conditions. Vendors are beginning to offer products that enable virtual grid monitoring functions for digital substations; however, refinement of these capabilities requires utility partnership to assess real world practicality, integration, and cost effectiveness. Federal and national laboratory research generally does not provide the utility field evidence needed to inform CPUC decision-making, future standards, or investment pathways. EPIC can reduce technology, integration, cybersecurity, and cost-effectiveness risk before any future scalable deployment is considered. EPIC funding provides the vital link from promising technology on the shelf to an actual solution utilities can deploy at scale to benefit ratepayers.

Leveraging Past RD&D

This Research Topic builds on SCE's prior EPIC substation automation and digital protection work, including demonstrations that advanced IEC 61850-based communications, process-bus concepts, and virtualized protection architectures. Those efforts established the foundation for digital substations and identified interoperability, vendor-integration, and cybersecurity considerations. Digital Substations extend that learning beyond protection by testing whether the same shared digital architecture can support monitoring and analytics functions that historically required separate physical devices.

The topic also leverages external RD&D on high-fidelity waveform analytics, incipient fault detection, power quality analysis, and secure grid monitoring. EPIC 5 demonstrations will avoid duplication by focusing on utility integration, architecture validation, performance measurement, and lessons that can be shared with other EPIC administrators, vendors, standards bodies, and CPUC proceedings.

Coordination with EPIC and/or Gas RD&D Program Administrators

As in EPIC 4, SCE will meet regularly with the EPIC Administrators to discuss coordination. After CPUC approves SCE's EPIC 5 Investment Plan, SCE will identify EPIC 5 projects and will coordinate through this process. The EPIC Administrators are exploring new innovations to coordination where IOUs will work closely with CEC to craft meaningful GFOs with built-in IOU partnerships for winning vendors selected through the competitive process. Integration to the grid is a critical step in validating technology demonstration and deployment (TD&D) investments.[97] Future EPIC projects that do not provide a path to funding integration with the grid risk remaining stranded in the "valley of death."[98]

Metrics and Impact Assessment

SCE will assess ratepayer benefits using baseline costs, reliability performance, outage and event records, and deployment data from comparable substations or circuits. Metrics may include:

- Capital and life-cycle cost avoidance versus discrete power quality monitors, digital fault recorders, phasor measurement devices, and specialty sensors.
- Cost per substation for virtualized monitoring functions compared with traditional physical-device deployments.
- Number and type of monitoring functions successfully virtualized or integrated through shared sensing infrastructure.
- Improvement in event diagnosis, root-cause analysis, and time to actionable information using high-fidelity waveform and power quality data.
- Number of incipient or abnormal conditions detected earlier than traditional protection-based or event-triggered methods.
- Reliability and resilience indicators, including avoided or shortened outages where monitoring enables earlier intervention.

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[97] D.12-05-037, OP 3.

[98] D.12-05-037, p. 32. The Commission recognized EPIC's role in helping technologies move beyond the gap between research/demonstration and commercial deployment, described by the Commission as the "valley of death."

Equity benefits will be assessed through improved detection of abnormal conditions, reduced time to diagnose events, reduced outage duration or customer minutes interrupted where attributable, and improved ability to prioritize corrective action.

Expected Outcomes

Near-term outcomes include validated reference architecture for Digital Substations, including sensing requirements, data quality requirements, network design considerations, cybersecurity controls, and criteria for determining which analytics should run at the substation edge versus centralized systems. SCE expects to produce practical lessons on performance, interoperability, data volume, operational integration, and implementation cost. Mid-term outcomes include demonstration evidence that can inform digital substation standards, future procurement requirements, and investment planning. If successful, Digital Substations can reduce duplicative monitoring devices, improve power quality and fault analysis, and support earlier identification of abnormal conditions before they become larger reliability or safety events. Long-term outcomes include a scalable pathway for substation monitoring architectures that improve resilience, reliability, and affordability. Better visibility into grid conditions and equipment stress can help SCE and CPUC evaluate targeted grid investments, reduce unnecessary infrastructure costs, and support a more resilient grid as California advances electrification and carbon neutrality goals.

Equity Outcomes

Projects could improve reliability, reduce costs, and achieve faster issue detection in areas with higher outage or asset risk, including disadvantaged, low-income, and Tribal communities where improved monitoring could provide measurable resilience or reliability benefits. Following CPUC approval of this EPIC 5 Investment Plan, SCE's Community Engagement Plan will guide SCE's engagement with communities during project selection and execution.[99]

Marketing and Deployment Plans

Digital Substations will follow a staged path to grid readiness. SCE will define priority use cases, data requirements, cybersecurity requirements, and interoperability criteria in coordination with operations, protection, cybersecurity, planning, and engineering stakeholders; conduct lab validation of sensors, merging units, network architecture, virtualized applications, and analytics workflows; demonstrate field applications against baseline device deployments and operational requirements; and document results, cost ranges, interoperability lessons, cybersecurity controls, and deployment criteria for use in future standards and potential GRC-supported deployment. While market capabilities exist today, lack of standardization and proven deployment models remain barriers to scale; these will be addressed through utility led evaluation of interoperability, operational integration, and economic viability to inform broader adoption.

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[99] SCE Advice Letter 5838-E, "Electric Program Investment Charge 5 Community Engagement Plan," submitted June 26, 2026.

Initiative Title	Intelligent Grid Planning & Orchestration (IGPO)
Research Topic Area Title	8. Enhanced Grid Operations
Primary CPUC Strategic Goal	Distributed Energy Resource Integration
Secondary Alignment	Transportation Electrification; Building Decarbonization; Achieving 100 Percent Net-Zero Carbon Emissions and the Coordinated Role of Gas; Climate Adaptation

Gaps Addressed

Enhanced Grid Operations includes digital planning, engineering, and grid management tools to manage the grid.

Grid operations are becoming more complex as DERs, flexible load, grid-edge devices, wildfire risk, major events, and electrification increase the number and speed of decisions required in control room and field operations. Current workflows for outage response, switching, dispatch, alarm triage, event logging, planned outage impact review, and major event readiness remain manual, fragmented across systems, and dependent on operator experience. Operators need better situational awareness and decision support, but safety-critical decisions must remain human-supervised. These limitations also reduce the utility's ability to maintain real-time situational awareness of evolving grid conditions and to detect anomalous system behavior before it leads to operational impacts.

This Research Topic will demonstrate capabilities for AI-assisted grid management, planning, and orchestration. Technologies and methods include, but are not limited to, AI-assisted operations logging, Digital Twins, AI-Driven Simulations, and Integrated Resource Planning. Enhanced Grid Ops addresses this gap by developing structured planning evaluation outputs that represent key planning signals such as severity, timing, and relative exposure in consistent and explainable forms. These outputs are designed to feed unified integrated grid planning environments, enabling capacity-driven and risk-driven considerations to be assessed together and supporting clearer investment prioritization while preserving planner judgment.

Enhanced Grid Operations addresses the gap between growing grid complexity and the ability of current operational workflows to support timely, consistent, data-informed decisions. Successful demonstrations can reduce outages and improve restoration performance, strengthen major-event readiness, and create the foundation for adaptive grid operations while maintaining operator control.

Unique Role

Grid modeling simulators are mature technologies. The industry now requires high-speed simulation platforms to enable more complex analysis, including scenario planning and advanced analytical functions. The availability of digital twin platforms marks the early stages of new grid engineering technologies. Grid management systems are evolving to include more advanced analytical functions and are beginning to incorporate AI-driven analytics. Vendors may offer individual analytics, outage, dispatch, or AI tools, but they generally do not validate how those tools operate together within SCE's regulated distribution operations environment. GRC investments are better suited for proven production systems, and private-sector RD&D typically does not have access to utility-specific operating data, procedures, grid models, and field execution requirements. EPIC funding allows utilities to demonstrate Enhanced Grid Operations' performance within the utility's actual grid infrastructure and environments, providing the vital link from promising technology on the shelf to a solution that utilities can deploy and scale to benefit ratepayers.

Leveraging Past RD&D

This topic builds on prior EPIC and related investments in distribution automation, outage management, DER integration, advanced metering, grid sensing, power quality analytics, digital substations, and AI-enabled operational tools. Those efforts established foundational data sources, sensing capabilities, communications pathways, and operational platforms. EPIC 5 advances them by integrating data, analytics, and AI-assisted workflows into control room and field use cases, moving from standalone tools and after-the-fact analytics toward coordinated operational decision support.

Coordination with EPIC and/or Gas RD&D Program Administrators

As in EPIC 4, SCE will meet regularly with the EPIC Administrators to discuss coordination. After CPUC approves SCE's EPIC 5 Investment Plan, SCE will identify EPIC 5 projects and will coordinate through this process. The EPIC Administrators are exploring new innovations to coordination where IOUs will work closely with CEC to craft meaningful GFOs with built-in IOU partnerships for winning vendors selected through the competitive process. Integration to the grid is a critical step in validating technology demonstration and deployment (TD&D) investments.[100] Future EPIC projects that do not provide a path to funding integration with the grid risk remaining stranded in the "valley of death."[101]

Metrics and Impact Assessment

SCE will assess ratepayer benefits using baseline outage management performance, operating costs, and customer impacts to evaluate alignment with EPIC goals of affordability, reliability, and grid modernization. Metrics may include:

- Reductions in outage duration, restoration time, and error in estimated time of restoration (ETR), along with improved accuracy of outage cause, fault location, and incident classification.
- Reductions in manual operator, dispatcher, and analyst actions; decreased event logging, validation, and switching review cycle time; and avoided truck rolls or field exposure.
- Improvements in dispatch accuracy, alarm prioritization, and consistency of planned outage impact analysis and execution workflows.
- Improved major event response through more accurate damage forecasting, faster situational awareness, and coordinated restoration execution.
- Improved accuracy and timeliness of customer outage communications and measurable reduction in customer interruption impacts.

Equity-focused metrics will evaluate whether these improvements translate into faster outage response, more consistent restoration, and improved customer communication and service reliability for disadvantaged, low-income, and Tribal communities.

[100] D.12-05-037, OP 3.

[101] D.12-05-037, p. 32. The Commission recognized EPIC's role in helping technologies move beyond the gap between research/demonstration and commercial deployment, described by the Commission as the "valley of death."

Expected Outcomes
Near-term outcomes include validated use cases, data requirements, AI-assisted workflow prototypes, and operator-reviewed pilots for logging, alarm triage, outage analysis, planned outage review, and dispatch support. Mid-term outcomes include measurable reductions in manual work, faster and more consistent outage and switching workflows, improved dispatch recommendations, better major-event readiness, and clearer integration requirements. Long-term outcomes include a scalable operating model for adaptive grid operations in which trusted data, AI-assisted decision support, and operator-supervised automation improve reliability, safety, affordability, resilience, and customer service.

Equity Outcomes
Future projects under this Research Topic Area can benefit disadvantaged, low-income, and Tribal communities by improving outage response, restoration prioritization, major event readiness, and customer communications in areas that may be more vulnerable to outages, climate impacts, or delayed service restoration. Benefits include improved reliability, reduced outage exposure, faster diagnosis or restoration, improved electrification readiness, or reduced cost impacts for customers in affected areas. Following CPUC approval of this EPIC 5 Investment Plan, SCE's Community Engagement Plan will guide SCE's engagement with communities during project selection and execution.[102]

Marketing and Deployment Plans
Deployment will follow a staged approach: define priority use cases and success metrics; identify data, system, cybersecurity, and operator requirements; develop prototypes; test in simulation, shadow mode, or controlled pilots; evaluate results; and transition successful capabilities to broader pilots, vendor roadmaps, or future GRC deployment planning. Key barriers include data quality, system integration complexity, incomplete grid models, AI model governance, cybersecurity requirements, workforce adoption, and difficulty quantifying avoided costs. These barriers will be addressed through phased demonstrations, operator-in-the-loop validation, clear data governance, integration requirements, model lifecycle controls, and documented cost-benefit assessment.

[102] SCE Advice Letter 5838-E, "Electric Program Investment Charge 5 Community Engagement Plan," submitted June 26, 2026.

Initiative Title	Intelligent Grid Planning & Orchestration (IGPO)
Research Topic Area Title	9. Grid-Wide Connectivity
Primary CPUC Strategic Goal	Distributed Energy Resource Integration
Secondary Alignment	Transportation Electrification; Building Decarbonization; Achieving 100 Percent Net-Zero Carbon Emissions and the Coordinated Role of Gas; Climate Adaptation

Gaps Addressed
This Research Topic covers technologies such as wired communications, wireless technologies network management (AI-driven automation and SD-WAN), network virtualization and optimization (NFV, MPLS) and grid control & IoT protocols for managing grid devices. These are essential for enhancing the capacity, performance, and management of the electric grid's telecommunications systems, supporting critical functions such as real-time monitoring, control, and optimization.

The future grid is becoming increasingly reliant on communications to enhance operational agility, support DER integration, and ensure reliable, secure connectivity across the grid. As SCE deploys millions of connected devices, sensors, and DERs, current communications infrastructure is limited by insufficient coverage, bandwidth, and latency to support real-time grid control, analytics, and automation. Gaps also exist in the ability to maintain connectivity and situational awareness during extreme events, when networks are degraded or offline, and in the lack of unified, interoperable communications standards across field devices, substations, and enterprise systems. Closing these gaps is essential to support real-time operations, DER coordination, and the transition toward a more autonomous and resilient grid.

Grid-Wide Connectivity addresses critical gaps in the ability to securely, reliably, and at scale connect and coordinate an increasingly digital and distributed grid.

Unique Role
EPIC funding plays a unique role in advancing grid communications by enabling utilities to demonstrate and validate emerging, utility-specific communications architectures, including advanced field area networks, edge and substation connectivity, and next-generation wireless and fiber solutions, within real grid operating conditions. These technologies require validation under California’s scale, reliability expectations, and extreme climate and outage scenarios, where performance, latency, cybersecurity, and interoperability are critical but not yet proven.

Private-sector development is largely focused on commercial telecommunications use cases and does not address the full set of utility requirements for grid control, resilience, and integration with OT systems such as DERMS, OMS, and SCADA. EPIC fills this gap by supporting real-world demonstrations that generate the evidence required to scale secure, high-performance communications across the grid on timelines aligned with grid modernization and climate adaptation needs, providing the vital link from promising technology on the shelf to an actual solution utility can deploy with scale to benefit ratepayers.

Leveraging Past RD&D

This Research Topic Area builds on prior EPIC and DOE-funded efforts that advanced SCE's capabilities in DER integration, grid visibility, communications, analytics, and operational coordination. For example, SCE's EPIC-supported Integrated Grid Project, including the EASE field demonstration, helped validate DERMS-enabled operations, dynamic hosting capacity, automated DER onboarding, and interoperability using IEEE 2030.5 standards, while the DOE-funded GRIP project advanced AI-enabled planning and operational analytics to improve forecasting, study automation, and decision support. Grid-Wide Connectivity extends these efforts by focusing on the secure, resilient, and interoperable communications layer needed to scale prior demonstrations across grid assets, DERs, substations, field devices, control systems, and planning platforms, supporting the next stage of utility readiness under IGPO and the EPIC 5 Strategic Roadmap.

Coordination with EPIC and/or Gas RD&D Program Administrators

As in EPIC 4, SCE will meet regularly with the EPIC Administrators to discuss coordination. After CPUC approves SCE's EPIC 5 Investment Plan, SCE will identify EPIC 5 projects and will coordinate through this process. The EPIC Administrators are exploring new innovations to coordination where IOUs will work closely with CEC to craft meaningful GFOs with built-in IOU partnerships for winning vendors selected through the competitive process. Integration to the grid is a critical step in validating technology demonstration and deployment (TD&D) investments.[103] Future EPIC projects that do not provide a path to funding integration with the grid risk remaining stranded in the "valley of death."[104]

Metrics and Impact Assessment

SCE will assess ratepayer benefits using baseline communications performance and grid operations data to evaluate alignment with EPIC goals of reliability, resilience, affordability, and equity. Metrics may include:

- Improvements in communications performance (availability, latency, bandwidth, coverage, and restoration time) to support real-time grid operations.
- Increased DER and grid-edge device connectivity and coordination through scalable, interoperable communications architectures.
- Demonstrated interoperability with key utility systems (DERMS, ADMS, SCADA, OMS, and substation platforms) using standard protocols.
- Reduced communications-related constraints and improved resilience during outages, wildfires, and degraded conditions.
- Lower operational effort and cost through reduced manual data handling and faster information exchange.
- Verified cybersecurity performance, including compliance with utility security, access control, and monitoring requirements.
- Reduced cost per connected device and per enabled use case and avoided costs from improved grid visibility and control.
- Equity outcomes measured by improved communications coverage and operational capability in disadvantaged, low-income, and Tribal communities.

[103] D.12-05-037, OP 3.

[104] D.12-05-037, p. 32. The Commission recognized EPIC's role in helping technologies move beyond the gap between research/demonstration and commercial deployment, described by the Commission as the "valley of death."

Equity success will be measured by better outage performance and faster response in these communities, improved communications coverage, and grid visibility.

Expected Outcomes

Near-term outcomes include demonstration of secure and interoperable communications architectures, validated technical requirements, and priority use cases for DER integration, digital substations, grid-edge visibility, and intelligent grid orchestration. Mid-term outcomes include improvements in the integration of DERs, field devices, substations, and operational platforms, with measurable gains in communications performance, operational visibility, automation readiness, cybersecurity posture, and resiliency during grid stress conditions. Long-term outcomes include scalable grid-wide communications capabilities that enable dynamic DER coordination, electrification readiness, resilient grid operations, advanced planning and orchestration, and improved reliability and service quality across SCE's territory. Together, these outcomes support improved DER hosting and coordination, reduced operational friction, enhanced resiliency, and a stronger foundation for California's clean energy transition.

Equity Outcomes

Grid-Wide Connectivity aims to improve reliability, clean energy access, and the ability to use new grid technologies for communities that are often most affected by outages, wildfire risk, extreme weather, and limited access to infrastructure. These include disadvantaged, low-income, and Tribal communities. Following CPUC approval of this EPIC 5 Investment Plan, SCE's Community Engagement Plan will guide SCE's engagement with communities during project selection and execution.[105]

Marketing and Deployment Plans

Deployment will progress from initial architecture design and lab validation to field pilots and then full-scale integration into grid operations where feasible. Early work focuses on extending the current Field Area Network (FAN). SCE will then test communications technologies in controlled environments and real field conditions to confirm they can reliably support grid communications, automation, and data exchange across devices, substations, and operational systems. Successful solutions are refined, standardized, and prepared for broader deployment across networks through integration with existing utility platforms and workflows. Key barriers to scaling include constraints related to spectrum, permitting, procurement, supply chain, and cost recovery, cybersecurity risks, and coverage challenges in remote areas. These will be addressed through standards-based design, cybersecurity-by-design principles, phased pilots, early engagement with operations and field teams, vendor interoperability testing, and clear criteria for scaling from demonstration to systemwide deployment.

[105] SCE Advice Letter 5838-E, "Electric Program Investment Charge 5 Community Engagement Plan," submitted June 26, 2026.

Initiative Title	Intelligent Grid Planning & Orchestration (IGPO)
Research Topic Area Title	10. Intelligent Grid Computing
Primary CPUC Strategic Goal	Distributed Energy Resource Integration
Secondary Alignment	Transportation Electrification; Building Decarbonization; Achieving 100 Percent Net-Zero Carbon Emissions and the Coordinated Role of Gas; Climate Adaptation

Gaps Addressed

Intelligent Grid Computing focuses on incorporating advanced computing technologies to monitor, manage, and optimize the electric grid. Technologies include Accelerated Computing, Quantum Computing, Neuromorphic Computing, Optical/Photonic Computing, Substation Computing and Edge Computing. This research topic focuses on emerging approaches that improve speed, efficiency, and decision-making across grid operations. These applications can provide distributed analytics, monitoring, and control. For example, SCE is currently developing an AMI2.0 architecture that will introduce edge computing capabilities across more than 5 million meters. Together, these technologies will support real-time analytics, improve grid stability, and enhance resilience by efficiently managing the growing scale and complexity of grid data.

Intelligent Grid Computing addresses the growing gap between the complexity of modern grid operations and the ability of existing systems to process, analyze, and act on data fast enough to support real-time decision-making. As DER adoption, transportation electrification, building electrification, flexible loads, grid-edge devices, advanced sensors, and climate-driven operating variability increase, SCE requires scalable computing architectures that can support faster analytics, secure data exchange, real-time decision support, and coordinated grid operations from the edge of the system to centralized enterprise and operational platforms.

Advanced computing technologies like AI/ML, and heterogeneous computing (CPUs, GPUs) are rapidly maturing and available today through major cloud service providers. This opened a path to demonstrate these new technologies' capabilities to integrate into grid infrastructure for real-time decision-making and autonomous operations and to evolve utility capabilities in long-term system planning, power flow analysis, and asset/emergency event management. Advances in edge and distributed computing will enable utilities to decentralize data analysis, reduce latency, and eventually support more autonomous grid optimization and control.

Unique Role

EPIC funding plays a unique role in advancing grid computing by enabling utilities to validate near commercial computing architectures—within real grid operations and control environments. These technologies are not yet fully mature or integrated for utility-scale use, and private-sector development is largely focused on commercial or non-grid applications, while federal RD&D does not address the full range of utility-specific requirements such as interoperability with DERMS, OMS, and SCADA, cybersecurity, and real-time operational constraints. EPIC bridges this gap by supporting utility-led demonstrations that test performance, latency, reliability, and integration across the grid computing stack, producing the evidence needed to transition from centralized processing to decentralized, real-time, and eventually autonomous grid optimization on timelines aligned with California's grid modernization needs.

Leveraging Past RD&D

This Research Topic Area builds on prior EPIC and industry investments in grid modernization, distribution automation, DER integration platforms, advanced sensing, digital substations, grid communications, advanced analytics, forecasting, and grid-edge visibility. Intelligent Grid Computing extends these advancements by focusing on the computing layer needed to scale data-driven planning and real-time orchestration across the grid. It avoids duplication by emphasizing where and how data should be processed, analyzed, secured, governed, and exchanged across edge devices, substations, field systems, control platforms, planning tools, and cloud or enterprise environments.

Coordination with EPIC and/or Gas RD&D Program Administrators

As in EPIC 4, SCE will meet regularly with the EPIC Administrators to discuss coordination. After CPUC approves SCE's EPIC 5 Investment Plan, SCE will identify EPIC 5 projects and will coordinate through this process. The EPIC Administrators are exploring new innovations to coordination where IOUs will work closely with CEC to craft meaningful GFOs with built-in IOU partnerships for winning vendors selected through the competitive process. Integration to the grid is a critical step in validating technology demonstration and deployment (TD&D) investments.[106] Future EPIC projects that do not provide a path to funding integration with the grid risk remaining stranded in the "valley of death."[107]

Metrics and Impact Assessment

SCE will assess ratepayer benefits using baseline grid computing performance, data availability, and operational visibility to evaluate alignment with EPIC goals of reliability, affordability, and grid modernization. Metrics may include:

- Improvements in data processing latency, throughput, and scalability across edge, substation, and cloud environments, enabling faster analytics and decision-making.
- Increases in data quality and timeliness, including more complete, accurate, and frequently updated information for planning and operations.
- Enhanced interoperability with DERMS, ADMS, SCADA, OMS, GIS, and other utility systems, supporting integrated and automated grid functions.
- Reductions in manual data processing, reconciliation, and time required to generate operational insights, improving efficiency.
- Maintained or improved system performance during outages, extreme weather, or degraded communications conditions, supporting resilience.

Equity-focused metrics will evaluate whether improved computing and analytics capabilities enhance visibility, planning, and operational outcomes for disadvantaged, low-income, and Tribal communities.

Expected Outcomes

Near-term outcomes include pilot demonstrations of edge, cloud, and hybrid computing architectures that improve data ingestion, processing, analytics, interoperability, and operational visibility across selected grid

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[106] D.12-05-037, OP 3.

[107] D.12-05-037, p. 32. The Commission recognized EPIC's role in helping technologies move beyond the gap between research/demonstration and commercial deployment, described by the Commission as the "valley of death."

use cases. Mid-term outcomes will build integrated computing workflows that support improved DER coordination, forecasting, planning analysis, digital twin capabilities, real-time operational decision support, and more efficient use of grid data across planning and operations. Long-term outcomes include a standardized, scalable, secure, and interoperable edge-to-cloud computing capability that supports a more dynamic, distributed, decarbonized, and climate-resilient electric system.

Equity Outcomes

Intelligent Grid Computing supports equity by improving the data, analytics, and operational visibility needed to better understand and address grid needs in disadvantaged, low-income, and Tribal communities. These communities may face disproportionate impacts from outages, extreme heat, wildfire risk, air quality burdens, transportation electrification barriers, building electrification constraints, and limited access to clean energy benefits. By improving how grid data is processed and used, this Research Topic Area can support more informed planning, more targeted resilience investments, and more transparent assessment of localized benefits. Benefits include better resilience and faster response times. Following CPUC approval of this EPIC 5 Investment Plan, SCE's Community Engagement Plan will guide SCE's engagement with communities during project selection and execution.[108]

Marketing and Deployment Plans

Deployment will follow a structured path from architecture definition to pilot validation, deployment readiness, and scalable grid integration. Key steps include: define priority use cases, technical requirements, cybersecurity requirements, data governance needs, interoperability requirements, and success metrics; evaluate candidate platforms, cloud services, hybrid architectures, data pipelines, analytics tools, interoperability frameworks, and grid control/data exchange protocols; conduct lab validation and integration testing, implement field or operational pilots; validate performance; and share lessons learned. Barriers include cybersecurity and data governance requirements, legacy system constraints and integration complexity across information technology and operational technology environments, interoperability gaps among vendor platforms, and data quality. These barriers can be addressed through standards-based design, cybersecurity-by-design practices, phased demonstrations, vendor interoperability testing, data governance requirements, cross-functional governance, early engagement with operations and field teams, cost controls, and clear criteria for transitioning successful innovations from EPIC demonstration to broader deployment planning.

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[108] SCE Advice Letter 5838-E, "Electric Program Investment Charge 5 Community Engagement Plan," submitted June 26, 2026.

Initiative Title	Field Intelligent Technologies (FIT)
Research Topic Area Title	11. Advanced Drones & Robotics
Primary CPUC Strategic Goal	Climate Adaptation
Secondary Alignment	Distributed Energy Resource Integration; Achieving 100 Percent Net-Zero Carbon Emissions and the Coordinated Role of Gas

Gaps Addressed

Advanced Drones & Robotics include technologies such as unmanned aerial vehicles (UAVs), autonomous ground vehicles (AGVs), autonomous underwater vehicles (AUVs), and collaborative robots (cobots). They may operate semi-autonomously or autonomously in geofenced areas or integrate with GIS and a digital twin for larger area operations as individual units or in collectives / swarms.

Many inspections, damage assessments, construction, and energization-readiness activities still rely on direct field access, ground patrols, and fragmented data collection. These processes can delay restoration or interconnection decisions, produce inconsistent information, and expose workers to hazards when the grid is under the greatest stress.

Key gaps include limited standardized criteria for selecting the appropriate drone or robotic platform by use case; limited validation of long-range, automated, or robotic inspection methods under utility field conditions; fragmented data integration with inspection, asset, mapping, and operations systems; uncertainty over how AI-assisted analytics should be governed before operational use; limited evidence connecting advanced field technologies to measurable ratepayer benefits such as fewer truck rolls, shorter outage duration, faster energization, improved worker safety, and lower lifecycle inspection costs; and limited evidence connecting advanced field technologies to faster grid construction timelines, reduced construction delays, and improved build-out efficiency for new infrastructure and upgrades. Additional gaps include limited understanding of how layered sensing strategies, cross-sensor data correlation, centralized monitoring architectures, digital twins, and AI-enabled operational workflows should be designed and integrated to maximize the value of drone and robotic deployments.

This Research Topic will demonstrate whether Advanced Drones & Robotics can improve the speed, safety, consistency, and decision value of field operations that support DER integration, energization, outage restoration, and climate resilience. The value of Advanced Drones & Robotics comes not from sensors alone, but from integrating layered sensing, centralized data, analytics, enterprise systems, and digital-twin-enabled workflows. Research is needed to determine how these capabilities can improve decision-making, safety, resiliency, and operational efficiency at scale.

Because SCE has an approximately 50,000-square-mile service territory, the opportunity is scale: faster inspections and damage assessments with fewer truck rolls and less exposure. EPIC demonstrations can show where these technologies materially reduce time and cost while producing accurate real-time data. Industry benchmarks cite drone-to-operator ratios as high as 30:1, but utilities need to prove where these technologies can scale.[109]

Unique Role

Commercial platforms exist, but the gap is proving how they work safely and reliably within actual grid operations. As noted in the project detail for the EPIC 3 Wildfire Prevention & Resiliency Technology Demonstration project of the 2025 Annual Report, SCE faced challenges finding drone vendors who could meet SCE's requirements. SCE must validate the data quality, system integration, cybersecurity, and human oversight needed before scaling to broader scope. EPIC can help advance drones and robotics from common but limited use cases to scalable tools for safer work, faster restoration, and more efficient grid build-out. EPIC funding allows utilities to demonstrate performance within the utility's actual grid infrastructure and environments, providing the vital link from promising technology on the shelf to an actual solution utility can deploy with scale to benefit ratepayers.

Leveraging Past RD&D

This Research Topic builds on SCE's existing use of drones and related field technologies for targeted inspections, asset assessment, and situational awareness. Advanced Drones & Robotics extends prior experience by moving from technology availability and ad hoc use toward validated, repeatable utility workflows. Rather than duplicating existing inspection programs, EPIC 5 demonstrations will focus on unresolved integration questions: how mission planning, autonomy, payload selection, data quality, analytics, cybersecurity, aviation compliance, and operational handoffs should be designed so that results can be used by engineering, planning, operations, emergency response, and interconnection teams.

Coordination with EPIC and/or Gas RD&D Program Administrators

As in EPIC 4, SCE will meet regularly with the EPIC Administrators to discuss coordination. After CPUC approves SCE's EPIC 5 Investment Plan, SCE will identify EPIC 5 projects and will coordinate through this process. The EPIC Administrators are exploring new innovations to coordination where IOUs will work closely with CEC to craft meaningful GFOs with built-in IOU partnerships for winning vendors selected through the competitive process. Integration to the grid is a critical step in validating technology demonstration and deployment (TD&D) investments.[110] Future EPIC projects that do not provide a path to funding integration with the grid risk remaining stranded in the "valley of death."[111]

Metrics and Impact Assessment

SCE will assess ratepayer benefits using baseline inspection costs, crew deployment records, outage and restoration data, energization and interconnection cycle times, safety records, and asset assessment outcomes from comparable manual or existing drone-supported workflows. Metrics may include:

- Inspection or assessment cost per asset, structure, circuit mile, or work package compared with baseline manual methods.

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[109] Florida Power and Lighting, "Drones: taking to the skies with innovative technology," available at fpl.com/reliability/drones.html, accessed August 2026.

[110] D.12-05-037, OP 3.

[111] D.12-05-037, p. 32. The Commission recognized EPIC's role in helping technologies move beyond the gap between research/demonstration and commercial deployment, described by the Commission as the "valley of death."

- Reduction in time from inspection request, outage event, or energization milestone to actionable field assessment.
- Number of truck rolls, helicopter flights, difficult-access field entries, or hazardous worker exposure hours avoided.
- Improvement in data completeness, geospatial accuracy, defect detection, and engineering usability of field assessment outputs.
- Accuracy of AI-assisted image, LiDAR, thermal, ultraviolet, acoustic, or other sensor analytics, including false positive and false negative rates where applicable.
- Reduction in outage duration, restoration assessment time, customer minutes interrupted, or energization-readiness cycle time where advanced field assessments enable faster decision-making.
- Safety and environmental indicators, including reduced exposure to extreme heat, wildfire smoke, remote terrain, energized facilities, confined spaces, vehicle miles traveled, or higher-cost inspection methods.
- Reduction in construction cycle time, including time from design readiness to field completion, compared with baseline construction approaches.
- Reduction in construction-related delays, rework, or site access constraints through improved monitoring, verification, and coordination enabled by drone and robotic systems.

Equity benefits include reduced time to inspect damaged facilities, improved ability to identify hazards, reduced outage duration or customer minutes interrupted where attributable, improved field data supporting energization or interconnection, and reduced need for prolonged manual access in sensitive or difficult-to-reach areas.

Expected Outcomes

Near-term outcomes include validated use cases, platform selection criteria, payload and data quality requirements, safety and aviation procedures, cybersecurity and data governance requirements, and early field evidence on which drone and robotic approaches provide decision-grade information for utility workflows. Mid-term outcomes include demonstration evidence that can inform field operation standards, inspection procedures, emergency response practices, and energization or interconnection support workflows. If successful, these outcomes can reduce manual field delays, improve assessment consistency, shorten outage or damage assessment timelines, support faster, safer connection of clean energy resources and electrified loads, and support faster, more efficient construction and upgrade of grid infrastructure needed for DER integration and electrification. Long-term outcomes include a scalable pathway for advanced field technologies that improve safety, reliability, resilience, and affordability. Better field intelligence can help SCE and the CPUC evaluate when drones and robotics are lower-cost or safer alternatives to conventional inspection, patrol, and assessment methods, supporting more resilient operations during climate events and lower total costs for customers, including the ability to accelerate infrastructure build-out timelines and reduce project delivery costs for ratepayers.

Equity Outcomes

Projects may prioritize field assessments, circuits, substations, or corridors serving disadvantaged, low-income, Environmental and Social Justice, and Tribal communities where faster inspection, damage assessment, or energization support could provide measurable reliability, resilience, or affordability benefits. Candidate locations should be evaluated using community vulnerability, outage history, climate exposure, DER and electrification readiness, and operational need. Following CPUC approval of this EPIC 5 Investment Plan, SCE's Community Engagement Plan will guide SCE's engagement with communities during project selection and execution.[112]

Marketing and Deployment Plans

Advanced Drones & Robotics will follow a staged path to grid readiness. SCE will define priority use cases, platform requirements, payload requirements, safety and aviation requirements, data requirements, cybersecurity controls, and interoperability criteria in coordination with field operations, inspection, engineering, emergency response, interconnection, cybersecurity, legal/regulatory, and planning stakeholders. Initial work may include lab or controlled-environment validation of sensors, autonomy features, mission planning, docking or charging systems, data pipelines, and analytics workflows. These barriers will be addressed through staged testing, standards-based vendor-neutral requirements, human-in-the-loop review, and clear criteria for broader deployment. Deployment pathways will also evaluate integration with construction planning, project management, and field execution workflows to support faster and more coordinated grid build-out.

[112] SCE Advice Letter 5838-E, "Electric Program Investment Charge 5 Community Engagement Plan," submitted June 26, 2026.

Initiative Title	Field Intelligent Technologies (FIT)
Research Topic Area Title	12. Dynamic Grid Edge Visibility
Primary CPUC Strategic Goal	Climate Adaptation
Secondary Alignment	Distributed Energy Resource Integration; Achieving 100 Percent Net-Zero Carbon Emissions and the Coordinated Role of Gas

Gaps Addressed
Dynamic Grid Edge Visibility provides advanced communication platforms enabling seamless connection between field workers and grid operations through LTE, private 5G, mesh radio networks, and integrated sensor-to-worker interfaces.

Field crews, operators, and emergency response teams increasingly need decision-grade information during extreme heat, wildfire conditions, flooding, high winds, PSPS events, and other rapidly changing hazards. Existing field communications, sensing, and safety-information flows were not designed for a highly electrified, DER-rich, climate-stressed distribution system. Operators and crews need localized, real-time visibility into hazard conditions, feeder status, field constraints, and execution risks to restore service quickly, protect workers, and make cost-effective operational decisions. Utilities should seek integrated approaches that explicitly connect grid edge sensing and advanced field communications to operational and planning decisions to optimize capital intensive upgrades, reduce outage durations, accelerate electrification, and drive long-term ratepayer costs lower.

Dynamic Grid Edge Visibility ensures a unified operational view of grid and workforce in real time. This Research Topic will demonstrate integrated field communications, grid-edge IoT, hazard monitoring, and safety decision-support frameworks. Technologies may include, but are not limited to, field communications platforms, grid-edge IoT sensors, environmental sensors, wildfire/smoke/heat/wind/flood monitoring, automated hazard alerts, emergency shutdown or isolation logic, field crew location or status integration where appropriate, mobile situational awareness tools, edge analytics, mobile workflow tools, field knowledge capture, emergency response playbooks, human-in-the-loop governance for AI-assisted support, and interfaces to operations, outage, and safety workflows. The value of Dynamic Grid Edge Visibility comes not from communications networks or sensors alone, but from integrating grid-edge data, field communications, analytics, and operational workflows. Research is needed to determine how these capabilities can improve situational awareness, decision-making, worker safety, outage restoration, and grid resiliency at scale.

Unique Role
For utilities, it is not a lack of individual sensors or applications, but the lack of validated, interoperable frameworks that translate field and grid-edge data into decisions that reduce safety risk, outage duration, and unnecessary infrastructure costs. For example, while grid-edge data may be available, it is not consistently translated into actionable thresholds or frameworks that operators, planners, and regulators can confidently use. This work is not suitable for GRC funding because it involves unresolved technical and regulatory risks such as validating performance under climate stress, developing decision frameworks, and testing capital deferral potential. The private sector lacks incentives to evaluate interoperable, cross-vendor solutions, quantify system-level ratepayer benefits, or generate regulator-usable evidence. This uncertainty increases

reliance on conservative assumptions, slows response during extreme events, and undermines the potential value of grid-edge investments. EPIC funding allows utilities to demonstrate Dynamic Grid Edge Visibility's performance within the utility's actual grid infrastructure and protection systems, providing the vital link from promising technology on the shelf to an actual solution utilities can deploy with scale to benefit ratepayers.

Leveraging Past RD&D

This topic builds on prior SCE and EPIC work that established foundational capabilities in grid-edge sensing, communications, analytics, and digital substations. Dynamic Grid Edge Visibility will focus on how existing grid-edge capabilities are applied in operations, planning, adaptive safety execution, and regulatory decision-making, rather than developing individual technologies.

Coordination with EPIC and/or Gas RD&D Program Administrators

As in EPIC 4, SCE will meet regularly with the EPIC Administrators to discuss coordination. After CPUC approves SCE's EPIC 5 Investment Plan, SCE will identify EPIC 5 projects and will coordinate through this process. The EPIC Administrators are exploring new innovations to coordination where IOUs will work closely with CEC to craft meaningful GFOs with built-in IOU partnerships for winning vendors selected through the competitive process. Integration to the grid is a critical step in validating technology demonstration and deployment (TD&D) investments.[113] Future EPIC projects that do not provide a path to funding integration with the grid risk remaining stranded in the "valley of death."[114]

Metrics and Impact Assessment

SCE will assess ratepayer benefits using baseline environmental sensing, emergency response performance, and outage outcomes to evaluate alignment with EPIC goals of affordability, reliability, and climate resilience. Metrics may include:

- Reliability improvements, reductions in outage duration during extreme events, faster response and restoration sequencing, and improved coordination between field and operations.
- Avoided equipment damage and reduced emergency response and rework costs enabled by earlier hazard detection and proactive actions.
- Decreases in crew exposure to hazardous conditions and reductions in safety incidents or near misses during high-risk events.
- Avoided or deferred capital investments, assessed by comparing baseline upgrade plans with alternatives enabled by validated grid-edge visibility and operational strategies.
- Improvements in environmental data latency, availability, and accuracy, and timeliness of hazard alerts supporting proactive grid operations.
- Reductions in rework, corrective actions, change orders, and avoided outage costs using standard interruption cost methodologies.
- Demonstrated ability to operate effectively under climate-driven stress conditions and applicability across diverse circuits and geographies.

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[113] D.12-05-037, OP 3.

[114] D.12-05-037, p. 32. The Commission recognized EPIC's role in helping technologies move beyond the gap between research/demonstration and commercial deployment, described by the Commission as the "valley of death."

Equity-focused metrics will evaluate whether these capabilities improve outage response, restoration time, and hazard mitigation for disadvantaged, low-income, and Tribal communities.

Expected Outcomes

Near-term outcomes include decision-grade, feeder-level visibility that improves operational decision-making at low incremental cost, which avoids interruption costs without committing ratepayers to new capital infrastructure. Mid-term outcomes include validated grid-edge visibility that enables deferred or avoided capital upgrades by supporting feeder-level operational alternatives such as dynamic load management and targeted DER coordination. Improved data quality shortens interconnection and energization timelines, accelerating DER, EV, and building electrification while improving system utilization and affordability. Long-term outcomes include a scalable safety innovation framework that reduces worker and public safety risk, supports climate-resilient operations, lowers outage and emergency-response costs, and improves service outcomes for vulnerable communities.

Equity Outcomes

Dynamic Grid Edge Visibility will deliver measurable, localized benefits to ESJ and Tribal communities by improving reliability, accelerating equitable electrification, and reducing the social and economic burden of outages, particularly during climate-driven extreme events. Decision-grade grid-edge visibility supports faster fault localization, improved restoration sequencing, and faster outage response during heat waves, wildfires, flooding, and PSPS events, reducing impacts on medically vulnerable customers, critical facilities, and essential services. Improved feeder-level flexibility and hosting capacity also enable DER, EV, and building electrification in DVCs without triggering costly upgrades, while emphasis on capital deferral and non-wires alternatives helps protect affordability. Following CPUC approval of this EPIC 5 Investment Plan, SCE's Community Engagement Plan will guide SCE's engagement with communities during project selection and execution.[115]

Marketing and Deployment Plans

Deployment will proceed through hazard/use-case selection, lab validation, controlled field pilots, integration with safety and operations workflows, performance assessment during real or simulated events, and documentation of deployment requirements. Successful approaches may inform emergency-response procedures, safety standards, operating practices, and future investments in field communications and grid-edge safety systems. Deployment risks such as technology uncertainty, regulatory confidence, lack of interoperability, and cybersecurity are addressed through EPIC pilots that validate performance under extreme conditions, produce decision grade metrics aligned to CPUC proceedings, emphasize standards-based designs, and embed cybersecurity and data governance.

[115] SCE Advice Letter 5838-E, "Electric Program Investment Charge 5 Community Engagement Plan," submitted June 26, 2026.

Initiative Title	Field Intelligent Technologies (FIT)
Research Topic Area Title	13. Intelligent Asset Sensors
Primary CPUC Strategic Goal	Climate Adaptation
Secondary Alignment	Distributed Energy Resource Integration; Achieving 100 Percent Net-Zero Carbon Emissions and the Coordinated Role of Gas

Gaps Addressed
Next-generation Intelligent Asset Sensors provide continuous, data-driven visibility into the health, condition, and utilization of critical grid infrastructure, enabling utilities to optimize asset performance, extend asset life, and address emerging risks.

Advanced sensors are rapidly evolving to meet the demands of a more dynamic and decentralized energy landscape. Technologies may include, but are not limited to Asset Monitoring, Early Fault Detection and Electric Field Sensors.

Climate change, aging infrastructure, high DER/IBR (Distributed Energy Resources/Inverter Based Resources), and higher utilization of existing assets are increasing the need to understand asset conditions before failures occur. Underground cables, duct banks, vaults, transformers, switches, capacitors, and other grid assets often lack continuous condition visibility. Monitoring today is distributed across inspections, offline studies, event-triggered waveform capture, and asset risk models. By integrating these data sources, SCE can improve its ability to detect early indicators of equipment anomalies, thermal stress, partial discharge, abnormal vibration, moisture intrusion, and changing short-circuit-duty exposure, enabling more proactive maintenance and reliability management. This can also improve asset-level situational awareness and visibility into localized grid conditions, including thermal loading, insulation degradation, and fault evolution, which are critical to proactive system management. This becomes increasingly important with high DER/IBR penetration, where fault current levels may dynamically change due to inverter behavior, potentially reducing or increasing available short circuit levels and impacting both protection coordination and equipment rating margins. Additional gaps include limited understanding of how intelligent asset sensors, asset condition data, analytics, anomaly detection, digital twins, and operational workflows should be designed and integrated to maximize asset-level visibility and predictive asset management capabilities.

This Research Topic will demonstrate Intelligent Asset Sensors that provide continuous or targeted visibility into equipment health and asset risk. These capabilities inherently rely on anomaly detection techniques to identify deviations from normal asset behavior, enabling earlier identification of failure modes that are not detectable through traditional inspection practices. The focus is on integrating sensor data into operational and planning decisions. The value of Next-generation Intelligent Asset Sensors comes not from sensors alone, but from integrating continuous monitoring, centralized data, analytics, enterprise systems, and asset-management workflows. Research is needed to determine how these capabilities can improve asset health visibility, failure prediction models, operational decision-making, grid resiliency, and cost-effective asset lifecycle management at scale.

Unique Role
The physical hardware behind supporting sensor technology is fairly mature. However, communications reception, bandwidth, and integrated data management remain a challenge to utilities realizing sensor technology's full value. Federal RD&D focuses on early-stage research, not distribution-level deployment. The private sector lacks incentives for system-wide, non-monetizable benefits (reliability, safety, equity). GRC funding is suited for proven technologies, not pilot/demonstration phases. EPIC funding allows utilities to demonstrate Intelligent Asset Sensor technologies' performance within the utility's actual grid infrastructure and environments, providing the vital link from promising technology on the shelf to an actual solution utilities can deploy with scale to benefit ratepayers.

Leveraging Past RD&D
This topic builds on prior SCE and EPIC work involving power quality management, digital fault recording, waveform analytics, advanced asset risk modeling, SCADA/ADMS data, and grid sensing. Prior efforts established that high-resolution data could improve event analysis and fault detection but focused on individual technologies. Intelligent Asset Sensors advances this foundation by integrating existing data streams with new asset-level sensing and predictive analytics to validate whether multi-sensor fusion can support scalable, proactive asset management without duplicating prior individual-device pilots.

Coordination with EPIC and/or Gas RD&D Program Administrators
As in EPIC 4, SCE will meet regularly with the EPIC Administrators to discuss coordination. After CPUC approves SCE's EPIC 5 Investment Plan, SCE will identify EPIC 5 projects and will coordinate through this process.

The EPIC Administrators are exploring new innovations to coordination where IOUs will work closely with CEC to craft meaningful GFOs with built-in IOU partnerships for winning vendors selected through the competitive process.

Integration to the grid is a critical step in validating technology demonstration and deployment (TD&D) investments.[116] Future EPIC projects that do not provide a path to funding integration with the grid risk remaining stranded in the "valley of death."[117]

Metrics and Impact Assessment
SCE will assess ratepayer benefits using baseline asset performance, maintenance costs, and outage impacts to evaluate alignment with EPIC goals of affordability, reliability, and grid resilience. Metrics may include:

- Reductions in outage duration, unplanned failures, and customer-impacting power quality events, including improvements in SAIDI, SAIFI, MAIFI, and CAIDI.
- Avoided replacement, repair, and emergency response costs, along with reduced need for reactive field interventions.
- Early detection of incipient asset conditions, improvements in asset health indices, and extended remaining useful life estimates.

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[116] D.12-05-037, OP 3.
[117] D.12-05-037, p. 32. The Commission recognized EPIC's role in helping technologies move beyond the gap between research/demonstration and commercial deployment, described by the Commission as the "valley of death."

- Improved fault location accuracy and monitoring of equipment duty (e.g., short-circuit exposure), supporting reliable and safe grid operation.
- Reductions in safety risks such as arc flash exposure or equipment overstress, contributing to more resilient infrastructure and fewer service disruptions.

Equity-focused methods will evaluate whether these improvements reduce outage burden and vulnerability for disadvantaged, low-income, and Tribal communities.

Expected Outcomes

Near-term outcomes include validated sensor configurations, data requirements, integration needs, and analytics workflows that improve asset visibility, fault identification, maintenance targeting, and operational awareness. Mid-term outcomes include predictive asset health models, improved maintenance prioritization, asset life extensions, and field evidence supporting condition-based interventions. Long-term outcomes include more adaptive grid operations, targeted asset replacement, lower lifecycle costs, fewer outages, improved safety, and better planning data for climate adaptation and risk-based investment decisions.

Equity Outcomes

Advances in Intelligent Asset Sensors improve visibility at the asset-level, which improves reliability and response times in disadvantaged, low-income, and Tribal communities. Benefits include improved reliability, reduced outage exposure, faster diagnosis or restoration, improved electrification readiness, or reduced cost impacts for customers in affected areas. Following CPUC approval of this EPIC 5 Investment Plan, SCE's Community Engagement Plan will guide SCE's engagement with communities during project selection and execution.[118]

Marketing and Deployment Plans

Deployment will follow a staged path from lab validation to limited field pilots, enterprise data integration, model validation, standardization, and broader deployment planning. Deliverables may include sensor selection criteria, data quality thresholds, cybersecurity requirements, integration patterns with Advanced Distribution Management System (ADMS), power quality and asset systems, maintenance decision frameworks, and cost-effectiveness criteria for future scalable deployment. Key barriers include data integration, high deployment costs, data/AI maturity, workforce adoption, and regulatory gaps. These barriers are addressed by using standardized data models, a phased rollout using hybrid sensors, building labeled datasets, enhanced training and embedding process in existing tools, and pilot validation with alignment with IEEE/NERC standards.

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118 SCE Advice Letter 5838-E, "Electric Program Investment Charge 5 Community Engagement Plan," submitted June 26, 2026.

Initiative Title	Safe and Advanced Field Execution (SAFE)
Research Topic Area Title	14. Advanced Fleet & Field Gear
Primary CPUC Strategic Goal	Climate Adaptation
Secondary Alignment	Distributed Energy Resource Integration, Achieving 100% Net Zero and the Coordinated Role of Gas

Gaps Addressed

Advanced Fleet and Field Gear includes technologies such as semi-autonomous vehicles, advanced subsurface surveying, and trenchless boring and trenching systems that enhance how utilities approach construction and maintenance. These tools address a critical and growing gap in utilities' ability to execute field work safely, quickly, and at scale as electrification, DER interconnection, and climate-driven events increase the volume and complexity of infrastructure work.

Traditional field methods are becoming a limiting factor. They are labor-intensive, slow to deploy, and often involve significant safety risks, costly road disruptions, and extended outages. At the same time, utilities face increasing uncertainty and risk in underground environments, where inaccurate mapping can lead to utility strikes, delays, and damage. Advanced Fleet and Field Gear incorporates advanced technologies to accelerate delivery or restoration of service, a critical step to California's electrification goals; Pathway 2045 forecasts a 60% increase in electricity sales from the grid and a 40% increase in peak load by 2045.[119]

Unique Role

EPIC funding is uniquely positioned to address this gap because it enables utilities to move beyond vendor-driven development and evaluate advanced fleet and field technologies in real-world conditions that reflect California's specific climate risks, operational constraints, and safety requirements. Unlike federal RD&D programs, which are often broader in scope and longer in timeline, or private-sector investment, which prioritizes near-term commercial returns, EPIC can support utility-led demonstrations that validate performance, usability, and integration within actual field workflows. It also complements IOU GRC funding by focusing on pre-commercial innovation rather than established capital projects, allowing these technologies to be tested and refined before widespread deployment. This ensures that emerging solutions for field execution are proven where it matters most, under actual utility operating conditions, so they can be confidently scaled to improve safety, resilience, and the speed of grid modernization.

Leveraging Past RD&D

This Research Topic Area builds on prior EPIC, DOE, and industry investments in grid modernization, field sensing, asset monitoring, mobile workforce technologies, wildfire mitigation, emergency response, and grid intelligence. Notable examples include the DOE-funded GRIP (Grid Resilience and Intelligence Platform) initiative, which developed AI-enabled planning, operational analytics, decision support, and grid intelligence capabilities that support more autonomous and resilient grid operations. Advanced Fleet & Field Gear extends these advancements into the physical field execution layer by focusing on the vehicles, tools, mobile

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119 SCE, "Pathway 2045," November 2019, available at www.edison.com/clean-energy/pathway-2045.

platforms, telematics, and field equipment needed to act on improved intelligence. This topic translates grid visibility, predictive insights, and climate resilience planning into field-ready capabilities that improve how crews prepare for, access, assess, and complete work in complex operating environments. It avoids duplication by emphasizing mobility, crew readiness, worksite intelligence, advanced field equipment, and scalable integration with operational workflows rather than routine fleet replacement or established utility work practices, ultimately improving field safety, productivity, restoration effectiveness, climate resilience, DER integration, and operational readiness.

Coordination with EPIC and/or Gas RD&D Program Administrators

As in EPIC 4, SCE will meet regularly with the EPIC Administrators to discuss coordination. After CPUC approves SCE's EPIC 5 Investment Plan, SCE will identify EPIC 5 projects and will coordinate through this process. The EPIC Administrators are exploring new innovations to coordination where IOUs will work closely with CEC to craft meaningful GFOs with built-in IOU partnerships for winning vendors selected through the competitive process. Integration to the grid is a critical step in validating technology demonstration and deployment (TD&D) investments.[120] Future EPIC projects that do not provide a path to funding integration with the grid risk remaining stranded in the "valley of death."[121]

Metrics and Impact Assessment

SCE will assess ratepayer benefits using baseline field performance, safety exposure, and outage and work execution data to evaluate alignment with EPIC goals of climate resilience, reliability, affordability, and equity. Metrics may include:

- Reductions in the time required to deploy field crews, complete inspections, and execute construction, repair, and restoration activities, measured from assignment to readiness or completion.
- Improvements in field productivity through fewer repeat visits, reduced rework, lower truck rolls, and streamlined handoffs, resulting in faster and more efficient work execution.
- Decreases in outage restoration and emergency response cycle times during wildfire, PSPS, extreme heat, storm, and other climate-related events.
- Reductions in safety risks, including fewer exposures, near misses, and improved hazard identification and mitigation in field environments.
- Enhancements in the quality and usability of field data, including improved completeness, accuracy, timeliness, and integration with utility systems such as GIS, OMS, asset management, and mobile workforce platforms.
- Avoided costs and improved resource utilization driven by faster deployment, reduced manual effort, and more effective use of fleet and field equipment.
- Demonstrated ability to support resilient operations and faster recovery in climate-driven events, improving service continuity for customers.

Equity-focused metrics will evaluate whether improved field execution outcomes, such as faster restoration, reduced outage duration, and safer work conditions, are realized in disadvantaged, low-income, and Tribal communities compared to baseline conditions.

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[120] D.12-05-037, OP 3.

[121] D.12-05-037, p. 32. The Commission recognized EPIC's role in helping technologies move beyond the gap between research/demonstration and commercial deployment, described by the Commission as the "valley of death."

Expected Outcomes
Advanced Fleet & Field Gear will deliver near-term pilot demonstrations of mobile platforms, intelligent field tools, telematics-enabled equipment, and subsurface and worksite assessment technologies that improve crew readiness, situational awareness, and field data capture. In the mid-term, these capabilities will be integrated into field workflows to enhance inspection efficiency, restoration response, worksite planning, and safety during climate-driven events. Long-term, they will enable standardized, scalable field operations that are faster, safer, lower-emission, and better aligned with electrification, DER integration, and grid modernization. Collectively, these advancements improve reliability, accelerate restoration, reduce costs, increase visibility into field conditions, and strengthen operational readiness across the clean energy transition.

Equity Outcomes
Advanced Fleet & Field Gear will improve outcomes for all ratepayers. Any community in which SCE crews deploy these technologies will benefit from more rapid delivery and restoration of service, allowing the communities to benefit from an increase in electrification. Following CPUC approval of this EPIC 5 Investment Plan, SCE's Community Engagement Plan will guide SCE's engagement with communities during project selection and execution.[122]

Marketing and Deployment Plans
Deployment will proceed through market scans, lab and controlled-environment validation, and targeted field pilots to test safety, usability, interoperability, communications, and data capture. Successful technologies will then be integrated into mobile workforce, GIS, OMS, asset management, and emergency response systems, with development of standards, procurement pathways, and deployment playbooks to enable scale. Outcomes will inform broader adoption of advanced field capabilities across inspection, construction, restoration, and response operations.

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[122] SCE Advice Letter 5838-E, "Electric Program Investment Charge 5 Community Engagement Plan," submitted June 26, 2026.

Initiative Title	Safe and Advanced Field Execution (SAFE)
Research Topic Area Title	15. Augmented Field Operations
Primary CPUC Strategic Goal	Climate Adaptation
Secondary Alignment	Distributed Energy Resource Integration; Achieving 100 Percent Net-Zero Carbon Emissions and the Coordinated Role of Gas

Gaps Addressed

Augmented Field Operations includes technologies such as Power-Assistance, Exoskeletons, Smart Tools, and Advanced Handheld Devices. These collectively provide an additional layer to field work to improve construction, re-energization, and speed to power. With zero serious injury or fatality events as a long-term goal, the key question is whether worker augmentation tools can reduce strain and fatigue without creating new safety or ergonomic risks.

The effort required to maintain and modernize the grid is becoming more challenging as the grid responds to extreme weather, aging infrastructure, complex DER and electrification work, and more frequent restoration events. Traditional tools and manual work practices may not be sufficient to maintain safety, productivity, and consistency during prolonged or high-stress events. Physical fatigue, repetitive strain, injury risk, and difficult work environments can contribute to slower restoration and construction, execution errors, and higher costs.

This Research Topic will demonstrate Augmented Field Operations using power-assistance, exoskeletons, smart tools, and advanced handheld devices designed or adapted for utility field conditions. Technologies may include, but are not limited to, passive and powered exoskeletons, lift-assist devices, tool-balancing equipment, smart torque and cutting tools, advanced handheld diagnostic devices, robotics-assisted material handling, ergonomics sensors, and integration with field safety protocols and job planning. The topic will evaluate utility-specific use cases such as pole work, underground/vault work, extended tool use, storm restoration, material handling, and construction support.

Unique Role

Existing research and development on these technologies focuses on industrial or medical applications, not on public interest needs of electric utilities; it is not designed or tested for the unique hazards of IOU work, such as climbing poles, confined space vaults, energized environments, and wildfire-prone terrain. These technologies are at the forefront of innovation and require real-world demonstrations to understand whether they are safe, durable, and useful across real utility requirements. These technologies will inherently increase utilities' ability to connect with digital twins to get a better sense of situational awareness, expedite construction or field work, and provide valuable information to emergency responders during real-world scenarios.

EPIC funding allows utilities to demonstrate Augmented Field Operation technologies' performance within the utility's actual grid infrastructure and protection systems, providing the vital link from promising technology on the shelf to an actual solution that utilities can deploy with scale to benefit ratepayers.

Leveraging Past RD&D

This topic builds on workforce safety, ergonomics, digital field operations, and equipment modernization efforts, but does not duplicate prior EPIC projects. Existing commercial technologies tend to target industrial, warehouse, or medical applications, and have not been sufficiently validated for utility hazards such as energized environments, pole climbing, confined spaces, rough terrain, extreme heat, and wildfire response. EPIC 5 will establish utility-specific evidence on safety, usability, durability, operational benefit, and deployment requirements.

Coordination with EPIC and/or Gas RD&D Program Administrators

As in EPIC 4, SCE will meet regularly with the EPIC Administrators to discuss coordination. After CPUC approves SCE's EPIC 5 Investment Plan, SCE will identify EPIC 5 projects and will coordinate through this process.
The EPIC Administrators are exploring new innovations to coordination where IOUs will work closely with CEC to craft meaningful GFOs with built-in IOU partnerships for winning vendors selected through the competitive process. Integration to the grid is a critical step in validating technology demonstration and deployment (TD&D) investments.[123] Future EPIC projects that do not provide a path to funding integration with the grid risk remaining stranded in the "valley of death."[124]

Metrics and Impact Assessment

Metrics may include reduction in worker strain, fatigue indicators, ergonomic risk scores, injuries, near misses, and lost-time incidents; reduction in time spent on high-strain tasks; task completion time; productivity during storm or emergency response; reduction in execution errors attributable to fatigue; restoration time impacts; avoided injury-related costs; workforce acceptance; durability and maintenance performance; and cost per use case.
Metrics may include:

- Reduction in outage duration and improved productivity during storms or emergency responses.
- Improved outage response time.
- Reduction in cost to complete field activities.
- Reductions in field worker injuries and fatigue-related incidents and time spent performing high-risk tasks and lower lost time related injuries for field workers.
- Reduced safety risks of crews working in high-heat or high-risk areas.

Equity assessment will include evaluating improved safety and reduced outage duration or restoration delays in disadvantaged, low-income, or Tribal communities, especially in high-heat or high-risk areas.

Expected Outcomes

Near term outcomes focus on confirming that exoskeletons, power-assistance devices, and smart tools work safely and reliably in utility field conditions. Early use will help reduce worker fatigue and prevent injuries during physically demanding tasks. These improvements support faster restoration and fewer service disruptions, providing immediate benefits to the ratepayers. Medium term outcomes continue to expand on the near-term benefits and lower operational and injury related costs. Crews can work more efficiently,

[123] D.12-05-037, OP 3.

[124] D.12-05-037, p. 32. The Commission recognized EPIC's role in helping technologies move beyond the gap between research/demonstration and commercial deployment, described by the Commission as the "valley of death."

especially during storms or extreme heat, reducing outage durations and improving reliability. Earlier detection of worker strain and safer task execution help prevent delays caused by injured or fatigued field workers and reduce the risk of errors that can lead to unplanned outages. Long term outcomes include a safer, more capable field workforce supported by proven augmentation technologies. These tools help SCE maintain reliable service as grid conditions become more demanding. Establishing standards for how field workers utilize augmentation technologies, along with clear deployment strategies helps avoid unnecessary future costs and supports a more resilient grid, delivering a more reliable service and lowering system costs for customers.

Equity Outcomes

Augmented Field Operations technologies can help crews work more safely and efficiently in areas that often experience longer outages or more severe weather impacts. Benefits include faster restoration of service, improved reliability in communities that are historically more vulnerable and fewer delays caused by worker fatigue or injury. Community benefits will be assessed through reliability metrics, safety improvements for workers, and operational outcomes of tasks in these high-risk areas. Following CPUC approval of this EPIC 5 Investment Plan, SCE's Community Engagement Plan will guide SCE's engagement with communities during project selection and execution.[125]

Marketing and Deployment Plans

Deployment will proceed through use-case selection, ergonomics and safety review, lab validation, controlled field demonstrations, worker feedback, operating procedure development, and cost-benefit analysis. Barriers such as workforce acceptance, fit, durability, safety certification, training, and integration with existing safety practices will be addressed through SCE-led evaluations of usability, operability, and cost effectiveness to build a clear path towards broader adoption across the service territory.

[125] SCE Advice Letter 5838-E, "Electric Program Investment Charge 5 Community Engagement Plan," submitted June 26, 2026.

Initiative Title	Safe and Advanced Field Execution (SAFE)
Research Topic Area Title	16. Rapid Deployable Field Systems
Primary CPUC Strategic Goal	Climate Adaptation
Secondary Alignment	Distributed Energy Resource Integration, Achieving 100% Net Zero and the Coordinated Role of Gas

Gaps Addressed
Rapid Deployable Field Systems constitutes technology that enables emergency response and temporary service with rapid deployment capabilities. It is used for upgrades, repairs, disaster response, or new construction. The Research Topic includes technologies such as Mobile Microgrids, Rapid Poles & Towers, Ground-Level Distribution Systems, and Mobile Command Centers. These technologies address critical gaps in utilities' ability to respond to climate-driven grid emergencies with modular, low-emission, quickly deployable systems. Current gaps include the lack of scalable energy assets that can be operational within hours of dispatch, slow and complex interconnection processes for temporary DER-based emergency systems, limited interoperability between mobile systems and utility platforms such as DERMS, OMS, and SCADA, insufficient field intelligence, automation, and communications in degraded or low-connectivity environments, and continued reliance on diesel-based generation that creates emissions and air quality impacts.

This research topic is a top priority because it directly enables utilities to maintain reliability and restore service during increasingly frequent and severe climate-driven events, where delays in field execution translate into prolonged customer outages, safety risks, and higher costs. Without rapid deployment capabilities, utilities remain constrained by traditional infrastructure timelines and diesel-based emergency solutions, limiting their ability to respond effectively to wildfire, PSPS, and extreme weather conditions. Investing in these capabilities now ensures that emergency response can keep pace with evolving grid demands and climate risks, rather than lagging behind them.

Unique Role
Rapid Deployable Field Systems are not typically developed or tested for utility-specific conditions, such as integration with DERMS, OMS, and SCADA, operation in degraded communications environments, or deployment under wildfire, PSPS, and extreme weather constraints. Capabilities need to be mobile and able to function in environments that replicate the challenges utility crews would face. Existing private-sector solutions are generally designed for commercial applications and lack validation within real utility emergency workflows.

EPIC funding enables utilities to bridge this gap by demonstrating and validating these technologies in actual grid dynamics and field conditions, providing the critical link between promising concepts on the shelf and scalable, utility-ready solutions that improve resilience, reduce emissions, and support rapid restoration for ratepayers.

Leveraging Past RD&D
This Research Topic Area builds on prior EPIC and DOE-supported RD&D that has advanced microgrid controls, mobile battery storage, DER integration, and resilience applications, while extending those capabilities into

modular systems designed for faster emergency deployment, field operability, and lower-emission response. For example, SCE's Integrated Grid Project (IGP) – Field Demonstration demonstrated next-generation grid infrastructure to improve the management, operation, and optimization of DERs on SCE's system, including controls and protocols needed to manage DERs and understand their locational value. SCE's Service and Distribution Centers of the Future EPIC III project further evaluated whether microgrid control, energy storage, and modern protection schemes could support resilient, grid-supportive EV charging operations at service centers, including islanding, outage response, black start, and reconnection capabilities. Rapid Deployable Field Systems leverage these prior learnings and avoid duplication by focusing specifically on mobility, speed, decarbonized emergency response, and hybrid energy solutions that combine electric resources with low-carbon fuels where needed, consistent with the FIT initiative and EPIC 5 Strategic Roadmap priorities.

Coordination with EPIC and/or Gas RD&D Program Administrators

As in EPIC 4, SCE will meet regularly with the EPIC Administrators to discuss coordination. After CPUC approves SCE's EPIC 5 Investment Plan, SCE will identify EPIC 5 projects and will coordinate through this process. The EPIC Administrators are exploring new innovations to coordination where IOUs will work closely with CEC to craft meaningful GFOs with built-in IOU partnerships for winning vendors selected through the competitive process. Integration to the grid is a critical step in validating technology demonstration and deployment (TD&D) investments.[126] Future EPIC projects that do not provide a path to funding integration with the grid risk remaining stranded in the "valley of death."[127]

Metrics and Impact Assessment

Metrics will emphasize climate resilience, outage mitigation, emissions reduction, cost effectiveness, interoperability, and clean energy transition:

- Deployment Speed: Time (hours) from dispatch to operational readiness
- Outage Mitigation: Customers served and outage duration avoided (SAIDI/SAIFI improvements)
- Emissions Reduction: Tons of CO_2 avoided compared to diesel-based alternatives
- Clean Energy Penetration: Percentage of energy served by renewable, storage, or low-carbon fuel sources during deployments
- Cost Effectiveness: Cost per kW/kWh deployed and cost per customer served relative to baseline solutions
- Grid Integration Performance: Interoperability with DERMS/OMS, response time, and dispatch accuracy
- Resilience Value: Ability to support critical facilities during outages
- Equity Outcomes: Percentage of deployments benefiting disadvantaged, low income and Tribal communities.

Equity impact will be measured through reliability improvements in targeted areas and reductions in local air pollution exposure during outage events.

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[126] D.12-05-037, OP 3.

[127] D.12-05-037, p. 32. The Commission recognized EPIC's role in helping technologies move beyond the gap between research/demonstration and commercial deployment, described by the Commission as the "valley of death."

Expected Outcomes

Expected outcomes include near-term pilot deployments of modular, low-emission emergency energy systems, including renewable-plus-storage and hybrid configurations; mid-term integration of DER-enabled and low-carbon emergency response capabilities that improve PSPS execution and deliver measurable resilience and emissions reductions; and long-term development of standardized, scalable, near-zero-emission rapid deployment systems capable of dynamically responding to climate-driven grid events. Together, these outcomes are expected to improve reliability, reduce climate-related outage impacts, and accelerate progress toward California's net-zero goals.

Equity Outcomes

Rapid Deployable Field Systems benefits include improving air quality, accelerating response times to unplanned events, and improving affordability including communities disproportionately impacted by outages, pollution, and extreme weather. Following CPUC approval of this EPIC 5 Investment Plan, SCE's Community Engagement Plan will guide SCE's engagement with communities during project selection and execution.[128]

Marketing and Deployment Plans

Deployment will follow a structured path from concept validation to scalable emergency response integration, beginning with prototype development and lab validation of modular mobile microgrids, trailer-mounted storage, and portable solar-plus-storage systems, followed by field pilots in wildfire zones, PSPS-prone circuits, disadvantaged communities, and other high-risk areas. The deployment approach will include integration with DERMS, OMS, SCADA, communications systems, and emergency response workflows; operational validation of logistics, crew training, safety protocols, and response timelines; and development of standardization, vendor partnerships, and procurement pathways to enable repeatable deployments. The long-term goal is full integration into utility emergency response portfolios and broader grid planning processes, while addressing barriers such as interconnection and permitting processes not designed for temporary rapidly deployed systems, lack of standardization across equipment, controls, and communications, cost and procurement constraints for mobile systems, operational complexity in logistics, staffing, training, and real-time emergency control, and regulatory or market gaps that may not fully recognize or compensate mobile, temporary DER contributions.

[128] SCE Advice Letter 5838-E, "Electric Program Investment Charge 5 Community Engagement Plan," submitted June 26, 2026.

Initiative Title	Safe and Advanced Field Execution (SAFE)
Research Topic Area Title	17. Safety Systems and Hazard Response
Primary CPUC Strategic Goal	Climate Adaptation
Secondary Alignment	Distributed Energy Resource Integration; Achieving 100 Percent Net-Zero Carbon Emissions and the Coordinated Role of Gas

Gaps Addressed
Safety Systems and Hazard Response technologies provide real-time awareness, protection, and emergency response capabilities that continuously monitor worker and field conditions to detect hazards, enhance situational awareness, and enable rapid protective actions during high-risk operations.

Utility field work is becoming more complex as crews respond to extreme heat, wildfire risk, storm damage, DER backfeed, electrification work, confined spaces, and other dynamic hazards. Crews can operate with limited situational awareness, making it harder to maintain safety and reliable operations during emergencies. Existing safety tools often depend on manual observation, periodic check-ins, or post-event reporting, and may not capture worker-level physical, environmental, and situational information.

Safety Systems and Hazard Response will demonstrate wearables and hazard detection tools for utility field applications. Technologies may include, but are not limited to smartwatches, smart eyewear, hazard response and protection, biometric sensors, automated hazard detection and integrated alerts, heat-stress and fatigue monitors, advanced environmental monitoring, gas or air-quality sensors, fall and motion detection, location-aware safety alerts, smart clothing, sensorial suits, heads-up displays, hands-free procedures, augmented guidance, and integration with tailboards, emergency response, and field work management systems. The topic will also evaluate privacy, labor, cybersecurity, data governance, false-alarm management, and human factors requirements.

Successful demonstrations can reduce incidents, shorten restoration, improve field execution, enhance worker protection, and create evidence-based requirements for broader adoption.

Unique Role
While wearable technologies, environmental sensors and shutdown technologies exist in the commercial market, they are not designed for the specific hazards faced by electric utilities, such as wildfire, energized equipment risks, and remote field conditions. Private sector wearable companies have not focused on utility specific hazards, grid operation workflows, or public interest outcomes. Federal programs rarely address the unique California context of wildfire risk, extreme heat, DER saturation, and equity requirements. Utilities are uniquely positioned to test these technologies in real operating environments, integrate them with the grid, and evaluate their impact on emergency responses and service continuity. EPIC funding allows utilities to demonstrate the technologies' performance within the utility's actual grid infrastructure and protection systems, providing the vital link from promising technology on the shelf to an actual solution that utilities can deploy with scale to benefit ratepayers.

Leveraging Past RD&D
This Research Topic builds on past EPIC 3 projects that helped centralize hazards and forecasting data and/or explored automated detection during hazardous conditions. Research previously focused on preventative and planning rather than real-time monitoring for field crews. In EPIC 5, Safety Systems and Hazard Response will build toward delivering a real-time, unified environmental monitoring system for both workers and operators.

Coordination with EPIC and/or Gas RD&D Program Administrators
As in EPIC 4, SCE will meet regularly with the EPIC Administrators to discuss coordination. After CPUC approves SCE's EPIC 5 Investment Plan, SCE will identify EPIC 5 projects and will coordinate through this process. The EPIC Administrators are exploring new innovations to coordination where IOUs will work closely with CEC to craft meaningful GFOs with built-in IOU partnerships for winning vendors selected through the competitive process. Integration to the grid is a critical step in validating technology demonstration and deployment (TD&D) investments.[129] Future EPIC projects that do not provide a path to funding integration with the grid risk remaining stranded in the "valley of death."[130]

Metrics and Impact Assessment
SCE will assess ratepayer benefits using baseline workforce safety performance, outage outcomes, and cost impacts to evaluate alignment with EPIC goals of affordability, reliability, and societal benefit. Metrics may include:

- Improvements in response time to outages and disruptions, faster identification of issues, and reduction in task errors affecting grid operations.
- Decreases in heat-related incidents, fatigue or ergonomic events, and lost-time claims that could lead to service disruptions or delays.
- Reductions in restoration or job completion time for pilot use cases, contributing to improved outage duration and consistency.
- Avoided safety-related delays and operational costs, including reduced rework or disruption tied to worker fatigue or error.

Equity-focused assessment will evaluate reductions in outage duration and improved restoration outcomes for disadvantaged, low-income, and Tribal communities.

Expected Outcomes
Near-term outcomes include field validation of wearable performance, advanced environmental sensors, emergency shutdown systems, hazard-response tools, data governance, and worker acceptance. Mid-term outcomes include evidence of reduced incidents, faster hazard response, and improved execution consistency during climate and emergency events. Long-term outcomes include a safer, more resilient grid supported by proven environmental monitoring and hazard response technologies as grid work becomes more complex, supporting lower system costs and more reliable service for customers.

Equity Outcomes

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[129] D.12-05-037, OP 3.
[130] D.12-05-037, p. 32. The Commission recognized EPIC's role in helping technologies move beyond the gap between research/demonstration and commercial deployment, described by the Commission as the "valley of death."

Advanced Safety Systems and Hazard Response tools can help reduce outage durations and improve safety in areas that often face higher climate-related risks. Benefits include faster restoration, fewer emergency-related delays, and improved reliability to communities that are historically more vulnerable. Benefits will be assessed through improved reliability, reduced outage exposure, faster diagnosis or restoration, improved electrification readiness, or reduced cost impacts for customers in affected areas. Following CPUC approval of this EPIC 5 Investment Plan, SCE's Community Engagement Plan will guide SCE's engagement with communities during project selection and execution.

Marketing and Deployment Plans

Deployment will proceed through device screening, safety and privacy review, lab and controlled field testing, representative field pilots, worker feedback, cybersecurity and data governance validation, and development of operating procedures. Results will inform whether and how wearable technologies should be incorporated into safety programs, training, field applications, and future scalable deployment plans. While commercial products exist today, barriers include integration with grid systems, data accuracy, cybersecurity, and workforce adoption. These barriers will be addressed through SCE-led evaluations of operability, field usability, and cost effectiveness, helping build a clear path towards broader adoption across the service territory and provide the energy needed for what is ahead.

Appendix 1

Summary of Investment Plan Development Stakeholder Comments and Correlated Administrator Responses

Appendix 1 – Summary of Investment Plan Development Stakeholder Comments and Correlated Administrator Responses

SCE facilitated and participated in several discussions with internal and external stakeholders in preparation of the EPIC 5 Investment Plan. This interactive process was an integral part of designing SCE's EPIC 5 Investment Plan. SCE began an internal process, combining a top-down review of SCE's Technology Roadmap with a bottom-up analysis that combined discussions with SCE's technical SMEs as well as a review of key technologies presented by the vendor community at SCE's Technology Summit in December 2025. This process laid the foundation that eventually created SCE's four Strategic Initiatives and 17 Research Topics.

In compliance with D.26-02-037,[1] SCE filed its EPIC 5 Community Engagement Plan on June 26, 2026.[2] In compliance with D.23-04-042, SCE presented its proposed EPIC 5 Community Engagement Plan to CPUC's Disadvantaged Communities Advisory Group (DACAG) on April 17, 2026 (see Appendix 5). Consistent with its EPIC 5 Community Engagement Plan, SCE presented its EPIC 5 framework to the public to incorporate public feedback into the Investment Plan.

The EPIC IOU administrators shared their EPIC 5 Investment Plans at two workshops to focus on Northern California ESJ (Equity and Social Justice) Communities and Southern California ESJ Communities on May 28, 2026, and June 18, 2026, respectively.[3]

Beyond the required workshops, the IOU Administrators also held an additional public workshop on June 23, 2026. See Table 1 for comments from the Joint IOU workshops and how the comments were incorporated into SCE's Investment Plan. There were several comments indicating interest in broad technology areas during the workshop. SCE's Initiatives also address these technologies.

As noted in Section 4, according to D.26-02-037[4], CPUC requires the EPIC Administrators to align their EPIC 5 Investment Plans with CPUC's five Strategic Goals and 13 Strategic Objectives. Because the EPIC Administrators are filing their investment plans at the Strategic Initiative and Research Topic level, some overlap among administrators' plans may appear at this high level. However, following CPUC approval of the Investment Plans, SCE will identify specific EPIC 5 projects and coordinate with the other EPIC Administrators to avoid duplication of project activities.

Finally, SCE shared its EPIC 5 Investment Plan in a workshop with its EPIC Advisory Panel (Panel) on July 2, 2026. The Panel emphasized the importance of prioritizing safety and reliability,

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1 D.26-02-037, OP 7.

2 SCE Advice Letter 5838-E, "Electric Program Investment Charge 5 Community Engagement Plan," submitted June 26, 2026.

3 The IOUs shared their EPIC 5 Investment Plans in accordance with D.12-05-037, OP 15 and D.18-10-052, OP 11.

4 D.26-02-037, at page 2, footnote 1.

particularly in the face of a rising number of powerful natural events. Many of SCE's Research Topics address these areas, and the FIT and SAFE Initiatives received very strong support. The Panel discussed affordability as another key issue, and this feedback reinforced SCE's decision to forgo the inflation adjustment in EPIC 5.

The Panel also provided perspectives on the challenges of delivering community benefits through EPIC. Panel members emphasized that building and maintaining trust with communities is critical, particularly because technology demonstration projects inherently involve uncertainty and may not always achieve the anticipated outcomes. Some panelists also noted that infrastructure investments can be viewed with skepticism in certain communities due to concerns about displacement and gentrification. In addition, the Panel highlighted that community priorities are diverse and often vary by location and stakeholder group, underscoring the importance of ongoing engagement to identify and understand community-specific needs. These discussions reinforced the value of a thoughtful and inclusive engagement process throughout project development and implementation. Additional comments from the Panel and SCE's consideration of that feedback are summarized in Table 2.

Table 1: Joint IOU Workshops

Stakeholder Event	Date	Comments	Consideration of comment in EPIC 5 Investment Plan
DACAG Meeting	April 17, 2026	See Appendix 5.	See Appendix 5.
Northern California ESJ Communities and Tribes Joint Utilities Workshop (25 virtual attendees)	May 28, 2026	No questions or feedback	N/A
		Post-workshop feedback: 2 respondents. • Do more outreach to communities and get feedback	SCE held another ESJ-focused workshop, a public workshop, and a workshop with its EPIC Advisory Panel. SCE incorporated feedback from these events in its EPIC 5 Investment Plan.
Southern California ESJ Communities and Tribes Joint Utilities Workshop (15 virtual attendees)	June 18, 2026	How do IOUs select project partners?	Answered in the workshop. This does not relate to the EPIC 5 Investment Plan, so no additional incorporation into the Plan.
		Can non-profit organizations benefit from EPIC projects?	Answered in the workshop. This does not relate to the EPIC 5 Investment Plan, so no additional incorporation into the Plan.

Stakeholder Event	Date	Comments	Consideration of comment in EPIC 5 Investment Plan
		Post-workshop feedback: 1 respondent. • Provide more detail on community benefits • Community resilience was the most valuable topic/project discussed	SCE included equity impacts of its Initiatives and Research Topics in Sections 5 and 7, respectively, of this Investment Plan. Increasing resilience is a big part of SCE's technology strategy. Enhanced Grid Efficiency, Utilization & Flexibility (EGEUF), Intelligent Grid Planning & Orchestration (IGPO), Field Intelligent Technologies (FIT) and SAFE all contribute to increasing resilience.
Joint IOU Public Workshop: EPIC 5 Investment Plans (87 virtual attendees)	June 23, 2026	Interest in using EPIC 5 to fund software-driven approaches to congestion management.	SCE's Intelligent Grid Planning & Orchestration (IGPO) Initiative would address this area.
		Interest in DLR (*Dynamic Line Rating*), GET (*Grid-Enhancing Technology*) and HTLS (*High Temperature, Low Sag*)	SCE's Enhanced Grid Efficiency, Utilization & Flexibility (EGEUF) Initiative would address these areas.
		Interest in AI wildfire risk models and trenchless boring.	SCE's Intelligent Grid Planning & Orchestration (IGPO) and Safe and Advanced Field Execution (SAFE) Initiatives would address these areas.
		Interest in smart protocols, digital substations, and solid state transformers.	SCE's Intelligent Grid Planning & Orchestration (IGPO) and Enhanced Grid Efficiency, Utilization & Flexibility (EGEUF) Initiatives would address these areas.
		Interest in bridging or long-term operational solutions to electrify large load customers.	SCE's Intelligent Grid Planning & Orchestration (IGPO) and Enhanced Grid Efficiency, Utilization & Flexibility (EGEUF) and Safe and Advanced Field Execution (SAFE) Initiatives would address these areas.

Stakeholder Event	Date	Comments	Consideration of comment in EPIC 5 Investment Plan
		Post-workshop feedback: 5 respondents. • Improve event registration. • Interest in non-wire solutions to integrate large loads. • Interest in a statewide policy on grid integrated flexibility. • Highlighted the value of optimizing existing resources. • Value of grid orchestration tools.	SCE will incorporate feedback on registration in future events, but this does not relate to the EPIC 5 Investment Plan. SCE's Enhanced Grid Efficiency, Utilization & Flexibility (EGEUF), Intelligent Grid Planning & Orchestration (IGPO), and Field Intelligent Technologies (FIT) Initiatives address these technologies and/or the value of maximizing use of existing resources.

Table 2: Comments from SCE EPIC Advisory Panel

Comments	Consideration of comment in EPIC 5 Investment Plan
Strong emphasis on the importance of Safety, as many on the community work for utilities.	Improving safety is a critical value to SCE and an EPIC guiding principle. Safe and Advanced Field Execution (SAFE) has Research Topics that allow for faster delivery and restoration of service with technologies that improve crew safety.
Real concern about climate/earthquakes causing more unexpected outages, and a real desire to see investment that improves reliability and speeds up restoration of power, particularly in rural areas	Increasing reliability is a big part of SCE's technology strategy, and it is an EPIC guiding principle. Enhanced Grid Efficiency, Utilization & Flexibility (EGEUF), Intelligent Grid Planning & Orchestration (IGPO), Field Intelligent Technologies (FIT) and SAFE all contribute to increasing reliability.
Affordability is a big issue	SCE recognizes the affordability challenges ratepayers currently face and has therefore waived its right to apply an inflation escalation to its EPIC 5 budget. EGEUF, IGPO, FIT and SAFE can contribute to improving affordability.
Key to show how EPIC Initiatives and Research Topics could impact Communities	SCE has included equity impacts of its Initiatives and Research Topics in Sections 5 and 7, respectively, of this Investment Plan.

Comments	Consideration of comment in EPIC 5 Investment Plan
It is important that EPIC projects scale to deliver the promised benefits	As discussed in Section 2, the integration of SCE's EPIC 5 Investment Plan and its technology strategy means successful EPIC projects have a clear path to deployment. Moreover, any SCE EPIC project demonstrates not only the technology but also the integration to SCE's grid, which validates the ability to scale.
Critical that Projects "work," otherwise the community will dismiss EPIC as just another program targeting them. Fear of being treated as "guinea pigs."	This is a challenge, given that EPIC does demonstrations of near-commercial technologies, and so there is a real risk that any project may not be successful.
Big infrastructure projects have sometimes been a precursor to gentrification, and so some communities may be wary of EPIC investments.	SCE recognizes this concern, and notes that not all communities may even want an EPIC project, irrespective of the benefit/impact. SCE will continue to work with the EPIC Advisory Panel once SCE begins project selection.
Tribal needs are complex and diverse	SCE has had detailed discussions with the Tribal Liaison about EPIC and will continue to work with the Tribal Liaison to search for ways that EPIC demonstration projects might overlap with a Tribal Nation's needs.
Recognizing the longer-term potential of workforce development in energy technology, and also highlighting the opportunity to become vendors at SCE (of EPIC and other projects)	SCE tracks classifications of vendors across multiple equity classifications.
Recognizing the challenges of leveraging EPIC in multifamily/rental units.	The challenge of incentivizing landlords to participate in EPIC projects, or programs, is one that technology demonstration alone may not be able to solve. This challenge is most prevalent for customer technologies which are primarily not demonstrated by the IOUs.
Value in leveraging work the panelists are doing in other efforts at SCE	SCE will look to leverage other work as it begins project ideation (after CPUC approves SCE's EPIC 5 Investment Plan)

Appendix 2

Equity Matrix with Equity Funding Summary

Appendix 2: Equity Matrix with Equity Funding Summary

As noted in Section 2, SCE's EPIC 5 Investment Plan is at the Strategic Initiative and Research Topic Area level. SCE will not identify any EPIC 5 projects until after CPUC approves this Investment Plan. Thus, it is not possible to identify funding levels associated with each Research Topic Area. SCE shared its budget request for its four Initiatives in Section 3.

EPIC 5 Research Topic	Equity Benefits	Metrics to Demonstrate Benefits
Enhanced Grid Efficiency, Utilization and Flexibility (EGEUF)		
Adaptive Grid Protection	Benefits include improved reliability, reduced outage exposure, faster diagnosis or restoration, improved electrification readiness, or reduced cost impacts for customers in affected areas.	• Reductions in customer minutes interrupted, false or delayed trips, and improved speed and accuracy of fault detection, location, and isolation. • Avoid outage-related costs and reduced need for redundant protection or communications infrastructure through interoperable, standards-based solutions. • Increases in DER hosting capacity and reductions in DER curtailment enabled by more adaptive and responsive protection schemes.
Advanced Grid Upgrades	Benefits include improved affordability from reduced capital investment, reduced construction project scopes that lower the impact of construction on a community, and the potential for improved service reliability.	• Avoided or deferred capital spend (e.g., substation upgrades), normalized $/kW and $/kWh, and benefit–cost ratio across stacked use cases. • Time to interconnection and energization (e.g., months vs. years), permitting and construction duration, and schedule certainty relative to traditional projects. • Avoided or shortened outages, contribution during contingencies, and improvement in restoration time or service continuity. • Reductions in service equipment footprint, civil construction cost and duration, and avoided or deferred distribution upgrades.

EPIC 5 Research Topic	Equity Benefits	Metrics to Demonstrate Benefits
DC Power Networks	Benefits include improved reliability, reduced outage exposure, faster diagnosis or restoration, improved electrification readiness, or reduced cost impacts for customers in affected areas.	• Reductions in service equipment footprint, civil construction cost and duration, and avoided or deferred distribution upgrades. • Improvements in design, permitting, and energization timelines for new or upgraded service connections. • Power quality, protection speed and selectivity, equipment availability, and reduction in disturbances or outages.
Flexible Energy and Load on Demand	Benefits include customer bill savings, access to flexible load programs, and retention.	• Avoided or deferred distribution upgrade costs, reduced procurement or curtailment costs, and net customer bill impacts. • Peak load reduction (MW and %), improved load factor and ramping, and increased DER utilization and incremental hosting capacity.
Next Generation Conductors	Benefits include improved reliability, reduced outage exposure, or reduced cost impacts for customers in affected areas.	• Avoided or deferred capital expenditures and cost per MW of incremental capacity relative to traditional rebuilds. • Incremental ampacity or MW enabled, improvements in DER hosting capacity or load-serving capability, and ability to meet identified system needs. • Impacts on circuit-level reliability indices and improvements in conductor performance (e.g., sag, clearance margins) and operational limits.
Smart Grid Sensors	Benefits will be assessed through outcomes such as improved reliability, reduced outage exposure, faster diagnosis or restoration, improved electrification readiness, or reduced cost impacts for customers in affected areas.	• Improvements in fault detection and location speed and accuracy, reductions in unknown events, and decreased outage exposure and duration. • Avoided or deferred infrastructure upgrades, reduced truck rolls, sensor installation cost and time, and cost per actionable grid insight. • MW of load or DER accommodated without traditional upgrades, improved feeder utilization, and reductions in overloads and voltage violations.

EPIC 5 Research Topic	Equity Benefits	Metrics to Demonstrate Benefits
Intelligent Grid Planning & Orchestration (IGPO)		
Digital Substations	Benefits include improved reliability, faster issue detection in areas with higher outage or asset risk, and lower costs.	• Capital and life-cycle cost avoidance versus discrete power quality monitors, digital fault recorders, phasor measurement devices, and specialty sensors. • Improvement in event diagnosis, root-cause analysis, and time to actionable information using high-fidelity waveform and power quality data. • Reliability and resilience indicators, including avoided or shortened outages where monitoring enables earlier intervention.
Enhanced Grid Operations	Benefits include improved reliability, reduced outage exposure, faster diagnosis or restoration, improved electrification readiness, or reduced cost impacts for customers in affected areas.	• Reductions in outage duration, restoration time, and error in estimated time of restoration (ETR), along with improved accuracy of outage cause, fault location, and incident classification. • Reductions in manual operator, dispatcher, and analyst actions; decreased event logging, validation, and switching review cycle time; and avoided truck rolls or field exposure. • Improved major event response through more accurate damage forecasting, faster situational awareness, and coordinated restoration execution. • Improved accuracy and timeliness of customer outage communications and measurable reduction in customer interruption impacts.
Grid-Wide Connectivity	Benefits include better outage performance and faster response in these communities, improved communications coverage, and grid visibility.	• Improvements in communications performance (availability, latency, bandwidth, coverage, and restoration time) to support real-time grid operations. • Reduced communications-related constraints and improved resilience during outages, wildfires, and degraded conditions. • Reduced cost per connected device and per enabled use case and avoided costs from improved grid visibility and control.

EPIC 5 Research Topic	Equity Benefits	Metrics to Demonstrate Benefits
Intelligent Grid Computing	Benefits include better resilience and faster response times.	• Maintained or improved system performance during outages, extreme weather, or degraded communications conditions, supporting resilience. • Improvements in data processing latency, throughput, and scalability across edge, substation, and cloud environments, enabling faster analytics and decision-making.
Field Intelligent Technologies (FIT)		
Advanced Drones & Robotics	Benefits include reduced time to inspect damaged facilities, improved ability to identify hazards, reduced outage duration or customer minutes interrupted where attributable, improved field data supporting energization or interconnection, and reduced need for prolonged manual access in sensitive or difficult-to-reach areas.	• Inspection or assessment cost per asset, structure, circuit mile, or work package compared with baseline manual methods. • Reduction in outage duration, restoration assessment time, customer minutes interrupted, or energization-readiness cycle time where advanced field assessments enable faster decision-making. • Safety and environmental indicators, including reduced exposure to extreme heat, wildfire smoke, remote terrain, energized facilities, confined spaces, vehicle miles traveled, or higher-cost inspection methods. • Reduction in construction cycle time, including time from design readiness to field completion, compared with baseline construction approaches.
Dynamic Grid Edge Visibility	Benefits include faster fault localization to improve reliability, faster outage response and increased affordability.	• Reliability improvements, reductions in outage duration during extreme events, faster response and restoration sequencing, and improved coordination between field and operations. • Avoided equipment damage and reduced emergency response and rework costs enabled by earlier hazard detection and proactive actions. • Avoided or deferred capital investments, assessed by comparing baseline upgrade plans with alternatives enabled by validated grid-edge visibility and operational strategies

EPIC 5 Research Topic	Equity Benefits	Metrics to Demonstrate Benefits
Intelligent Asset Sensors	Benefits include improved reliability, reduced outage exposure, faster diagnosis or restoration, improved electrification readiness, or reduced cost impacts for customers in affected areas.	• Reductions in outage duration, unplanned failures, and customer-impacting power quality events, including improvements in SAIDI, SAIFI, MAIFI, and CAIDI. • Avoided replacement, repair, and emergency response costs, along with reduced need for reactive field interventions. • Early detection of incipient asset conditions, improvements in asset health indices, and extended remaining useful life estimates.
Safe and Advanced Field Execution (SAFE)		
Advanced Fleet & Field Gear	Benefits include more rapid delivery and restoration of service.	• Reductions in the time required to deploy field crews, complete inspections, and execute construction, repair, and restoration activities, measured from assignment to readiness or completion. • Decreases in outage restoration and emergency response cycle times during wildfire, PSPS, extreme heat, storm, and other climate-related events. • Reductions in safety risks, including fewer exposures, near misses, and improved hazard identification and mitigation in field environments.
Augmented Field Operations	Benefits include faster restoration of service, improved reliability in communities that are historically more vulnerable, improved affordability, and increased safety.	• Reduction in outage duration and improved productivity during storms or emergency responses. • Improved outage response time. • Reduction in cost to complete field activities. • Reductions in field worker injuries and fatigue-related incidents and time spent performing high-risk tasks and lower lost time related injuries for field workers. • Reduced safety risks of crews working in high-heat or high-risk areas.

EPIC 5 Research Topic	Equity Benefits	Metrics to Demonstrate Benefits
Rapid-Deployable Field Systems	Rapid Deployable Field Systems benefits include improving air quality, accelerating response times to unplanned events, and improving affordability including communities disproportionately impacted by outages, pollution, and extreme weather	• Deployment Speed: Time (hours) from dispatch to operational readiness • Outage Mitigation: Customers served and outage duration avoided (SAIDI/SAIFI improvements) • Resilience Value: Ability to support critical facilities during outages • Emissions Reduction: Tons of CO_2 avoided compared to diesel-based alternatives Cost Effectiveness: Cost per kW/kWh deployed and cost per customer served relative to baseline solutions • Equity Outcomes: Percentage of deployments benefiting disadvantaged, low income and Tribal communities.
Safety Systems and Hazard Response	Benefits include faster restoration, fewer emergency-related delays, and improved reliability to communities that are historically more vulnerable.	• Improvements in response time to outages and disruptions, faster identification of issues, and reduction in task errors affecting grid operations. • Reductions in restoration or job completion time for pilot use cases, contributing to improved outage duration and consistency. • Avoided safety-related delays and operational costs, including reduced rework or disruption tied to worker fatigue or error.

Appendix 3

Mapping of Planned Investments to the Electricity System Value Chain

Appendix 3 – Mapping of Planned Investments to the Electricity System Value Chain

EPIC 5 Research Topic	Electricity System Value Chain[1]				
	Grid operations/ market design	Generation	Transmission	Distribution	Demand-side management
Enhanced Grid Efficiency, Utilization, and Flexibility (EGEUF)					
Adaptive Grid Protection and Control			X	X	
Advanced Grid Upgrades			X	X	X
DC Power Networks			X	X	
Flexible Energy and Load on Demand	X			X	X
Next Generation Conductors			X	X	
Smart Grid Sensors	X		X	X	
Intelligent Grid Planning & Orchestration (IGPO)					
Digital Substations	X		X	X	
Enhanced Grid Operations	X		X	X	
Grid-Wide Connectivity	X		X	X	
Intelligent Grid Computing	X		X	X	
Field Intelligent Technologies (FIT)					
Advanced Drones & Robotics	X		X	X	
Dynamic Grid Edge Visibility	X		X		
Intelligent Asset Sensors	X		X	X	
Safe and Advanced Field Execution (SAFE)					
Advanced Fleet & Field Gear			X	X	
Augmented Field Operations			X	X	
Rapid-Deployable Field Systems	X		X	X	
Safety Systems and Hazard Response			X	X	

[1] D.12-05-037, 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.

Appendix 4

Information Summary of Demand Response Research, Development, and Demonstration Activities

Appendix 4 – Information Summary of Demand Response Research, Development, and Demonstration Activities

Project Number	Project Name	Status	Project Funding Year	Description	Project Start	Project End
DR18.09	Flexible DR Integration	Complete	2018	Flexible DR opportunities with GRID integrated water technologies and systems	2019	2023
DR19.03	Smart Speakers	Complete	2019	This project's goals are to test optimization of connected thermostats and other loads via voice commands based on TOU rate peak times and customer preferences. Voice interactions related to energy (usage, estimated bills, best times to use appliances, etc.) will undergo evaluation to determine most common and additional desired interactions. The system will use meter-based home-by-home M&V methodology to understand energy usage impacts and potentially develop a deemed measure.	2019	2022
DR19.05	Virtual Power Plant Projects	Complete	2019	The VPP project will enroll 200-500 customers in the project from a population of approximately 1,000 customers with existing or new Sunrun PV-paired battery systems. This project provided M&V funding to assess the projects load impacts.	2019	2022
DR19.07	Measuring Builder Installed Electrical Loads	Complete	2019	The aim of this sub-project is to collect data on electricity consumed by equipment in newly constructed homes that are either required by health and safety codes or are considered necessary to make the house attractive to buyers.	2019	2022
DR19.08	Grid Responsive Heat Pump Water Heater Study	Complete	2019	As part of SJV Pilot, SCE included a study to deploy HPWHs equipped with communication technology that will allow the water heater to be used as a grid-responsive heating technology element of the pilot to electrify homes and reduce emissions within the SJV.	2019	2024
DR19.11	LOC-GFO-19-301-4 Optimizing Heat Pump Load Flexibility	Complete	2019	Develop, test, and demonstrate an open-source, add-on, advanced heat pump load control system for both water heating and space conditioning that does all of the following: 1. Responds to hourly or sub-hourly price and demand response signals to minimize cost and grid impacts 2. Optimizes energy use based on marginal GHG emission data 3. Optimizes energy use based on building owner/occupant preferences, and 4. Provides reliable and cost-effective load flexibility as a grid resource.	2021	2025
DR20.03	DR Technology Enhancements Using Dynamic Prices	Complete	2020	The objective of this project is to study the value and assess the gaps in dynamic-pricing-based ADR. This objective is approached by evaluating the tariffs and their characteristics, how these tariffs can be communicated to different customers using different communication technologies and the impact of the emerging trends (such as IoT, energy storage systems, etc.) in improving the ADR.	2020	2022
DR21.03	Dynamic Rate Pilot	Complete	2021	The Pilot will combine real time pricing design and transactional subscription elements from both the RATES and UNIDE tariff concepts and will investigate how customer- based distributed energy resources can act as both flexible assets and grid interactive resources when these new pricing signals are transmitted to end use customers as proposed in the UNIDE model.	2021	2025

Project Number	Project Name	Status	Project Funding Year	Description	Project Start	Project End
DR22.01	Hardware in the Loop Flexible Modeling DOE FOA-0002090	Complete	2022	The overall project objectives are to measure demand flexibility for different grid services and system/building types (commercial) and generate data for researchers/policy makers. SCE provided a Letter of Commitment (LOC), intending cost share of $300,000 to supplement the DOE's grant.	2019	2024
DR22.02	HP-Flex: Next Generation Heat Pump Load Flexibility DR (GFO-19-301)	Active	2022	The goal of the project is to develop open-source control algorithms and educational curricula to train the next generation of engineers and technicians, to help promote the large-scale deployment of replicable, demand- flexible heat pump installations in small to medium-sized commercial buildings, and to increase benefits to both individual building owners and the distribution grid by enhancing heat pump demand flexibility.	2019	2025
DR23.01	DR-TTC Dynamic HVAC Test Chamber	Active	2023	This project will construct an environmental test chamber capable of advanced dynamic HVAC testing, demonstrate a dynamic test and generate sample test data, and identify and prioritize near-term potential test projects, which may include but is not limited to the Advanced Heat Pump Coalition's Heat Pump Rating Representativeness Validation Project, LBNL CEC projects to supplement laboratory testing, F-Gas Reduction Incentive Program (FRIP), and parallel EPRI laboratory testing.	2023	2025
DR23.02	Flick Power Study	Complete	2023	SCE's Emerging Technologies Program (ETP) and Emerging Markets and Technology (EM&T) Program jointly initiated a field pilot study to demonstrate and assess the effectiveness of customer behavioral change from a novel communicating light switch technology that displays visual signals to residential consumers about the price of electricity. This evaluation will address key research questions relating to TOU response across customer groups and the incremental impact of customer load shifting beyond what behavior change customers normally provide on a time-variant pricing program or rate.	2023	2024
DR23.03	Achieving Integrated and Equitable Decarbonized Loads with the CalFlexHub (GFO-19-309)	Complete	2023	The overarching goal of the CalFlexHub is to accelerate the understanding of how customer electrical end-use loads could provide dynamic load flexibility and to advance the capability of smart building technologies to provide flexible energy load. CalFlexHub will achieve this understanding by demonstrating the technologies and incentives needed to provide that flexibility and then increasing knowledge and understanding of specific customer needs through field research and customer surveys.	2023	2025
DR24.01	Behind the Meter Optimization of Load Technologies (BOLT) Study	Active	2024	This strategic assessment study is investigating emerging consumer technologies that have load management capabilities, including electric vehicles (EVs), behind-the meter (BTM) batteries, heat pump water heaters (HPWHs), pool pumps, and other potentially flexible, dispatchable appliances and systems. The BOLT study is also designing and testing new incentive models that are specifically crafted to boost customer participation and performance of these advanced technologies in new models of demand response.	2024	2025

Project Number	Project Name	Status	Project Funding Year	Description	Project Start	Project End
DR25.03	EPRI IAW FlexHub SPA (GFO-23-316)	Active	2025	The FlexHub aims to address these gaps by demonstrating scalable, cyber-secure DF technologies that can provide real-time response to price, grid, or emissions signals and help customers reduce their operating costs. SCE is participating as both a research collaborator and cost-share partner, committed to supporting the field demonstrations within SCE territory.	2025	2025
DR25.04	EPRI LAUSD-FLEX SPA (GFO-23-309)	Active	2025	The LAUSD-FLEX project is designed to demonstrate, at a school-district scale, the capability of interoperable energy management systems (EMS) delivering repeatable, standards-based demand flexibility across large commercial campuses—without locking facilities into proprietary EMS platforms.	2025	2025
DR25.06	EPRI FLEX DR 2.0 SPA	Active	2025	SCE is participating in EPRI's Flexible Demand Response (Phase 2) Collaborative to develop, validate, and demonstrate flexible demand response (Flex DR) as a dependable hybrid resource—explicitly encompassing both "Power Down" (load reduction for grid needs) and "Power Up" (beneficial load increase during surplus renewable generation).	2025	2025
DR25.07	Smart Panel Field Study	Active	2025	The Smart Panel Field Study ("Study") is designed to test and evaluate the capabilities of advanced circuit-level load management technology in residential settings, focusing on homes participating in SCE's Low Income Building Electrification (BE) pilot and the Energy Coalition's Bassett-Avocado Advanced Energy Community (BAAEC) initiative. The Study is part of an overall strategy to evaluate opportunities for residential "grid edge" technologies to enable and support the impending increase in electric transportation and other electric loads, in tandem with the local electric distribution system and future models of demand flexibility and dynamic pricing.	2025	2025
DR25.12	EPRI Flex Refrigeration SPA	Active	2025	The project integrates industrial refrigeration controls, thermal energy storage, floor-slab heating controls, and managed charging for electric forklifts at a large, refrigerated warehouse to deliver demand flexibility and emissions reductions.	2025	2025

Appendix 5

Disadvantaged Communities Advisory Group Engagement

Appendix 5 - Disadvantaged Communities Advisory Group Engagement

In compliance with the requirements listed in D.23-04-042[1] SCE, together with PG&E and SDG&E, presented its Community Engagement Plan to the Disadvantaged Communities Advisory Group (DACAG) on April 17, 2026.

SCE incorporated the DACAG's feedback into its Community Engagement Plan, which SCE submitted on June 26, 2026.[2] Below is a table from the Community Engagement Plan that shows the DACAG's feedback on all IOU Community Engagement Plans.

Table 1: DACAG Feedback from April 17, 2026 Meeting[3]

Feedback	How is SCE incorporating this feedback?	Implemented in CEP?
Engage with the Tribal community across multiple groups	SCE will work with Tribal Liaisons to identify appropriate venues to present EPIC to Tribal Audience.	Yes
Report on how engagement has been integrated into the EPIC 5 Investment Plans	SCE will report on how comments and feedback from engagement activities have been incorporated into the EPIC 5 Investment Plan.	Yes
Set expectations up front about the kind of feedback Administrators looking for and not looking for in engagement activities.	ESJ workshops provide prompts and guidance on the types of questions IOUs seek from participants.	Yes
Question: Does EPIC cover all of California?	EPIC is funded by and conducted for the benefit of the ratepayers of the three large California-based IOUs (PG&E, SCE, SDG&E).	Yes

1 D.23-04-042, p. 22 writes "Administrators should seek to consult with the Disadvantaged Communities Advisory Group (DACAG) in developing its community engagement plans to advise the Commission on its review of Tier 2 Advice Letters proposing how they will comply with D.18-10-052 in engaging ESJ communities and incorporating resulting feedback into developing their strategic initiatives."

2 This table is from SCE Advice Letter 5838-E, "Electric Program Investment Charge 5 Community Engagement Plan," submitted June 26, 2026.

3 For more information about the April 17, 2026 DACAG meeting, including a recording of the meeting, visit https://www.energy.ca.gov/event/2026-04/disadvantaged-communities-advisory-group-meeting.

Feedback	How is SCE incorporating this feedback?	Implemented in CEP?
Question: When a customer's meter is on reservation, are you engaging with the individual customer, or are you engaging with the tribe?	SCE has broad-based engagement with the customer and the Tribal Nation. SCE's Planners work at the individual customer level, and SCE sends bills directly to customers. SCE's Tribal Relations Team engages with Tribal Nations.	Yes
Educating tribal customer[s] about how EPIC affects their bill would be helpful.	SCE will work with Tribal Liaisons to identify appropriate messaging and venues to present EPIC to Tribal audiences.	Yes
Provide engagement with the community throughout the project, from beginning to end of the project	SCE shares information about its EPIC projects before launch through public pre-launch workshops. SCE will also discuss projects with the EPIC Advisory Panel. During the project's life, SCE provides quarterly updates on all projects on the EPIC database at epicpartnership.org.	Yes
For projects going into a disadvantaged community, Administrators should seek partnership with community groups or tribal groups.	SCE has partnered with community groups on its EPIC projects. SCE also discusses projects with the EPIC Advisory Panel to explore potential partnerships.	Yes

Appendix 6

Tribal Engagement

Appendix 6 – Tribal Engagement

SCE performed extensive discussions with internal and external stakeholders in preparation of the EPIC 5 Investment Plan. This interactive process was an integral part of designing SCE's EPIC 5 Investment Plan.

As part of that process, SCE spoke with its internal Tribal Liaisons team to discuss how to engage Tribal Nations as well as potential areas of interest during preparation of SCE's Community Engagement Plan.[1] A consistent piece of feedback was the need to deliver on promises SCE makes to Tribal Nations, whether in EPIC or otherwise, to not damage the Tribal Nations' trust in SCE. SCE's Tribal Liaison team also said that the needs of Tribal Nations are diverse and very individual to each Tribal Nation; affordability is a primary area of concern, but other needs vary widely. As discussed in the EPIC 5 Community Engagement Plan, SCE will work closely with the Tribal Liaison throughout EPIC 5 to identify opportunities where EPIC 5 technology demonstrations and Tribal Nations' need align.[2]

SCE, PG&E, and SDG&E co-hosted the California Tribal Leaders Energy and Safety Summit from May 18-20, 2026. Two hundred sixty-eight (268) participants registered for the Summit, which covered a broad range of energy-related topics. The EPIC teams from the IOUs prepared content to share with participants of the Summit.

On July 2, 2026, SCE hosted a workshop with its EPIC Advisory Panel (see Appendix 1). One of the panelists is the President of the American Indian Chamber of Commerce of California. SCE valued her and the other panelists' feedback and incorporated that feedback as described in Table 2 of Appendix 1.

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[1] SCE Advice Letter 5838-E, "Electric Program Investment Charge 5 Community Engagement Plan," submitted June 26, 2026.

[2] *Ibid.*

Appendix 7

Regulatory and Legislative Background

Appendix 7: Regulatory and Legislative Background

This appendix provides regulatory and legislative background for SCE's EPIC 5 Investment Plan. It is intended to supplement the application by summarizing the major statutory, regulatory, and procedural developments that established EPIC, shaped prior SCE investment plans, and informed the Commission's EPIC 5 planning framework.

1. Introduction

EPIC is California's ratepayer-funded public-purpose innovation program for clean energy research, development, demonstration, and deployment. EPIC provides a mechanism for demonstrating and validating emerging technologies under real-world utility operating conditions and helps bridge the gap between research activity and broader deployment. The program has evolved through a series of Commission decisions, investment plan approvals, annual reporting requirements, stakeholder engagement directives, and related policy proceedings that inform SCE's EPIC 5 Investment Plan.

Table 1 outlines key EPIC regulatory milestones. It then summarizes the statutory and regulatory framework for EPIC, describes the evolution of program requirements from EPIC 1 through EPIC 5, and explains how SCE's EPIC portfolio aligns with relevant Commission proceedings and the EPIC 5 Strategic Goals.

Table 1: Key EPIC Regulatory Milestones

Date	Proceeding or Decision	Key Regulatory Action	EPIC Relevance
May 2012	D.12-05-037	Established the EPIC Program to fund applied research and development, technology demonstration and deployment, and market facilitation programs to provide ratepayer benefits; provided that the program would continue through 2020 with an annual budget adjusted for inflation.[1]	Established the foundational EPIC framework, including the program purpose, eligible activity types, budget structure, IOU/CEC administration roles, inflation treatment, and annual reporting obligation.

[1] D.12-05-037, OPs 1, 5, 7, and 16.

Date	Proceeding or Decision	Key Regulatory Action	EPIC Relevance
November 19, 2013	A.12-11-004 / D.13-11-025	Approved SCE's 2012-2014 EPIC Investment Plan.[2]	Authorized SCE's first EPIC investment cycle and associated project portfolio.
May 1, 2014 / April 9, 2015	A.14-05-005 / D.15-04-020	SCE submitted its 2015-2017 EPIC Investment Plan Application on May 1, 2014, and the Commission approved the application on April 9, 2015.[3]	Authorized SCE's second EPIC investment cycle and continued SCE's TD&D project implementation.
May 1, 2017 / October 25, 2018	A.17-05-005 / D.18-10-052	SCE submitted its 2018-2020 EPIC Application on May 1, 2017, and the Commission approved the application on October 25, 2018.[4]	Authorized SCE's third EPIC investment cycle and continued SCE's grid modernization, customer, and foundational technology demonstrations.
2019	R.19-10-005	The Commission initiated a two-phase rulemaking to determine the future of EPIC.	Began the policy process that shaped the continuation and structure of EPIC beyond 2020.
2020	D.20-08-042	In Phase 1 of R.19-10-005, the Commission determined that EPIC would continue for ten years through 2030, and that each investment period would span five years, covering 2021-2025 and 2026-2030.	Established the longer-term continuation of EPIC and shifted the program to five-year investment periods.
2021	D.21-11-028	In Phase 2 of R.19-10-005, the Commission determined that the IOUs should continue their roles as EPIC administrators, along with the CEC.	Confirmed SCE's continuing role as an EPIC administrator for future investment cycles and set the EPIC 4 framework.

[2] A.12-11-004; D.13-11-025, OP 8.
[3] A.14-05-005; D.15-04-020, OP 1.
[4] A.17-05-005; D.18-10-052, OP 2.

Date	Proceeding or Decision	Key Regulatory Action	EPIC Relevance
October 1, 2022 / November 30, 2023	A.22-10-001 / D.23-11-086	SCE, together with PG&E and SDG&E, filed its EPIC 4 Investment Plan covering 2021-2025, and the Commission approved the application on November 30, 2023.[5]	Authorized SCE's EPIC 4 portfolio and provided the basis for SCE's active 2021-2025 project execution.
April 2023	D.23-04-042	Directed EPIC Program Administrators to file annual reports on April 30 of each year through a Tier 2 advice letter following the outline in Appendix C.[6]	Established the current Tier 2 advice letter filing format for annual EPIC reports.
March 2024 / EPIC 5 Planning	D.24-03-007	Identified five EPIC 5 Strategic Goals: Transportation Electrification, Distributed Energy Resource Integration, Building Decarbonization, Achieving 100 Percent Net Zero Carbon and the Coordinated Role of Gas, and Climate Adaptation.[7]	Provides the strategic goal framework for aligning future EPIC 5 investment planning.
2026	D.26-02-037	Reaffirmed the IOUs' role as EPIC 5 Administrators, along with the CEC, and directed administrators to prepare EPIC 5 investment plans.[8]	Supports SCE's continued role in the 2026-2030 EPIC 5 investment cycle and informs the requirements addressed in SCE's EPIC 5 Investment Plan.

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5 A.22-10-001; D.23-11-086, OP 1.

6 D.23-04-042, OP 8 and Tier 2 Advice Letter 5810-E, Purpose and Background.

7 D.24-03-007, OP 1 and Appendix A. Also see SCE Advice Letter 5810-E, Submission of Electric Program Investment Charge (EPIC) Annual Report, EPIC Administrator Annual Report for 2025 Activities, EPIC Program Components.

8 D.26-02-037, OP 2.

2. Legislative Direction and State Policy

Several legislative enactments and statewide policy priorities have informed the development of EPIC and the technology areas addressed through SCE's EPIC portfolio.

- Assembly Bill 32 and subsequent Scoping Plan work have informed California's greenhouse gas reduction and carbon neutrality pathway, which overlaps with EPIC investments related to net-zero carbon operations, building decarbonization, DER integration, and climate adaptation.[9]
- Senate Bill 350 established statewide energy efficiency, clean energy, and transportation electrification objectives that increased the importance of grid modernization, flexible load management, and electrification-enabling technologies.[10]
- Assembly Bill 523 reinforced the importance of equity, transparency, and participation by disadvantaged and under-resourced communities in public-interest energy research and innovation programs by directing EPIC investments toward disadvantaged and low-income communities and requiring consideration of localized health impacts.[11]
- Senate Bill 100 established California's 100 percent clean energy policy goal, increasing the need for technologies that support renewable integration, energy storage, grid flexibility, and reliability on a clean electric system.[12]
- Executive Order N-79-20 established statewide zero-emission vehicle goals, which helped inform EPIC activities related to transportation electrification, charging infrastructure, vehicle-grid integration, and distribution planning.[13]

3. EPIC Program Renewal and EPIC 5 Framework

In 2019, the Commission initiated Rulemaking R.19-10-005 to evaluate the future of the EPIC. In Phase 1, the Commission issued Decision D.20-08-042 and determined that EPIC would continue through 2030, with two five-year investment periods covering 2021-2025 and 2026-2030. In Phase 2, the Commission issued D.21-11-028 and determined that the investor-owned utilities (IOUs) would continue to serve as EPIC administrators alongside the CEC. In D.21-11-028, the Commission established the EPIC 4 framework and directed administrators to file investment plans at the Strategic Initiative level, allowing projects to be developed following

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[9] AB 32, September 27, 2006, available at https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=200520060AB32, and California Air Resources Board (CARB), 2022 Scoping Plan for Achieving Carbon Neutrality (Nov. 2022).

[10] SB 350, Approved October 7, 2015, available at https://legiscan.com/CA/text/SB350/id/1140562.

[11] AB 523, Approved October 7, 2017, available at https://legiscan.com/CA/text/AB523/id/1652942.

[12] SB 100, Approved September 10, 2018, available at https://legiscan.com/CA/text/SB100/id/1819458.

[13] Governor Newsom's Zero-Emission by 2035 Executive Order (N-79-20), issued January 19, 2021, available at https://www.gov.ca.gov/wp-content/uploads/2020/09/9.23.20-EO-N-79-20-Climate.pdf.

investment plan approval while maintaining transparency regarding intended outcomes, funding priorities, and investment focus areas.

Following approval of the EPIC 4 Investment Plans, the Commission and Energy Division initiated planning activities for the next EPIC investment cycle. In D.24-03-007, the Commission identified five EPIC 5 Strategic Goals: Transportation Electrification, Distributed Energy Resource Integration, Building Decarbonization, Achieving 100 Percent Net Zero Carbon and the Coordinated Role of Gas, and Climate Adaptation. The Commission directed EPIC administrators to use these Strategic Goals to guide future investment planning. D.24-03-007 therefore established the primary policy framework for EPIC 5 planning and informed the development of research topic areas proposed in this Investment Plan.

In D.26-02-037, the Commission established the framework for the EPIC 5 investment cycle, reaffirmed the roles of the investor-owned utilities and the California Energy Commission as EPIC administrators, and directed administrators to prepare investment plans for the 2026-2030 funding period. Consistent with prior EPIC decisions, the EPIC 5 framework continues the Strategic Initiative planning approach adopted in EPIC 4, under which administrators identify strategies and intended outcomes at a portfolio level rather than seeking approval of individual projects at the outset of the investment cycle. This structure provides administrators flexibility to adapt project selections over time in response to emerging technologies, stakeholder feedback, and lessons learned while maintaining transparency regarding investment priorities, anticipated benefits, and program objectives.

D.26-02-037 also advances EPIC program planning and evaluation by emphasizing common strategic goals, measurable outcomes, stakeholder engagement, and equity considerations across the investment lifecycle. Consistent with these directives, SCE's EPIC 5 Investment Plan was developed through coordination with the other EPIC administrators and Energy Division staff and incorporates research topic areas aligned with the EPIC 5 Strategic Goals, stakeholder-informed priorities, equity objectives, and anticipated ratepayer benefits.

4. Annual Reporting

SCE’s annual EPIC reporting obligation originates from Ordering Paragraph 16 of D.12-05-037, which required SCE and the other EPIC administrators to file annual reports concerning the status of their respective EPIC programs. D.23-04-042 later directed that annual reports be submitted by Tier 2 advice letter.[14] SCE’s Tier 2 Advice Letter 5810-E, dated April 30, 2026, explains that SCE submitted the 2025 EPIC Annual Report pursuant to those requirements.[15]

The annual reports provide transparency into project status, budget activity, stakeholder engagement, knowledge transfer, lessons learned, benefits, and coordination with other

[14] D.12-05-037, OP 16 and D.23-04-042, OP 8.

[15] SCE Advice Letter 5810-E, Submission of Electric Program Investment Charge (EPIC) Annual Report, EPIC Administrator Annual Report for 2025 Activities.

administrators. They also provide a record of how SCE's active EPIC portfolio aligns with the broader CPUC policy proceedings that support the EPIC 5 Strategic Goals.

5. Alignment with Relevant CPUC Proceedings

SCE's 2025 EPIC Annual Report explains that the EPIC 5 Strategic Goals are supported by CPUC proceedings and that SCE aims to align its projects with those proceedings. Table 2 summarizes the relevant proceedings and active SCE EPIC projects identified in the Annual Report. This table demonstrates that SCE's portfolio is not isolated from broader Commission policy development; rather, it is designed to test and advance technologies relevant to transportation electrification, DER integration, building decarbonization, net-zero carbon planning, and climate adaptation.[16]

Table 2: Alignment of Active SCE EPIC Projects with Relevant CPUC Proceedings[17]

EPIC 5 Strategic Goal	Relevant CPUC Proceedings Identified in SCE's 2025 Annual Report	Active SCE EPIC Projects Identified in SCE's 2025 Annual Report
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.	EPIC 3: Distributed Plug-In Electric Vehicle Charging Resources; Next Generation Distribution Automation III; Service and Distribution Center of the Future; Smart City Demonstration; Vehicle-to-Grid Integration Using On-Board Inverter. EPIC 4: Communication Assisted Protection Technologies for Inverter-based Networks (CAPTIN); Stability Improvement with DERs (SIDER); Swift Electrification of Transit (SET); Thermally Optimized Advanced Duct Strategy (TOADS).

16 SCE Advice Letter 5810-E, Submission of Electric Program Investment Charge (EPIC) Annual Report, EPIC Administrator Annual Report for 2025 Activities, Table 3: Alignment of SCE's Active EPIC Projects with CPUC Proceedings.

17 SCE Advice Letter 5810-E, Submission of Electric Program Investment Charge (EPIC) Annual Report, EPIC Administrator Annual Report for 2025 Activities, Table 3: Alignment of SCE's Active EPIC Projects with CPUC Proceedings.

EPIC 5 Strategic Goal	Relevant CPUC Proceedings Identified in SCE's 2025 Annual Report	Active SCE EPIC Projects Identified in SCE's 2025 Annual Report
Distributed Energy Resource Integration	R.26-04-009, Order Instituting Rulemaking on California Advanced Electric Rate Design; R.24-01-017, California Renewables Portfolio Standard Program; R.22-11-013, Distributed Energy Resource Program Cost-Effectiveness Issues, Data Access and Use, and Equipment Performance Standards; 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.20-05-003, Continue Electric Integrated Resource Planning and Related Procurement Processes; R.19-09-009, Microgrids Pursuant to Senate Bill 1339 and Resiliency Strategies; R.18-07-003, California Renewables Portfolio Standard Program; R.17-07-007, Streamlining Interconnection of Distributed Energy Resources and Improvements to Rule 21.	EPIC 3: Advanced Technology for Field Safety (ATFS); Beyond Lithium-ion Energy Storage Demo; Control and Protection for Microgrids and Virtual Power Plants; Distributed Plug-In Electric Vehicle Charging Resources; Next Generation Distribution Automation III; Smart City Demonstration; Storage-Based Distribution DC Link; Vehicle-to-Grid Integration Using On-Board Inverter. EPIC 4: CAPTIN; Flexible Alternating Current System (FACS); ML-Augmented Digital Simulation (MAD-S); Quantum Networking; SET; SIDER; TOADS.

EPIC 5 Strategic Goal	Relevant CPUC Proceedings Identified in SCE's 2025 Annual Report	Active SCE EPIC Projects Identified in SCE's 2025 Annual Report
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.19-01-011, Building Decarbonization.	EPIC 2: System Intelligence and Situational Awareness Capabilities. EPIC 3: Next Generation Distribution Automation III; SA-3 Phase III Field Demonstrations; Service and Distribution Centers of the Future; Smart City Demonstration; Vehicle-to-Grid Integration Using On-Board Inverter; Wildfire Prevention & Resiliency Technology Demonstration. EPIC 4: FACS; Industrial Demand Flexibility Enabling Distribution Grid Autonomous Resilience (IDF-EDGAR); Local Optimization & Grid Edge Management Systems (LO-GEMS); MAD-S; Quantum Networking; SIDER.
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.	EPIC 2: System Intelligence and Situational Awareness Capabilities. EPIC 3: Advanced Technology for Field Safety (ATFS); Beyond Lithium-ion Energy Storage Demo; Next Generation Distribution Automation III; SA-3 Phase III Field Demonstrations; Storage-Based Distribution DC Link. EPIC 4: FACS; IDF-EDGAR; LO-GEMS; MAD-S.
Climate Adaptation	R.18-04-019, Strategies and Guidance for Climate Change Adaptation.	EPIC 3: Advanced Comprehensive Hazards Tool; Advanced Technology for Field Safety (ATFS); Smart City Demonstration; Wildfire Prevention & Resiliency Technology Demonstration. EPIC 4: A2G Operational Efficiencies; ML-Augmented Digital Simulation (MAD-S).

6. Inflation Adjustment and Affordability Considerations

The Commission's approach to EPIC funding and inflation adjustments has evolved over successive investment cycles. Throughout the program's history, the Commission has periodically evaluated whether and how EPIC funding levels should be adjusted to account for inflation while balancing ratepayer affordability and program objectives. The EPIC 5 funding framework continues this evolution by allowing EPIC administrators to propose inflation-adjusted budgets subject to Commission review.

The Commission first established an inflation adjustment mechanism in Decision D.12-05-037. Ordering Paragraph 7 directed that EPIC collection amounts be adjusted based on changes in the Consumer Price Index, specifically the Consumer Price Index for Urban Wage Earners and Clerical Workers (CPI-W).[18] The Commission subsequently applied this methodology in the EPIC 2 cycle, where inflation adjustments increased authorized program collection levels and budgets. In EPIC 2, the Commission applied the same methodology, to calculate an average annual inflation rate of 1.605%, which, when compounded, provided a 4.89% total increase in EPIC program collection and budget amounts.[19]

For the EPIC 3 cycle, the Commission modified the inflation adjustment framework in D.18-01-008. The Commission revised D.12-05-037 to allow use of "any reasonable method" to adjust EPIC funding for inflation and adopted the California CPI-W methodology in place of a national CPI calculation.[20] The decision also shifted from a backward-looking approach based on historical averages to the use of forward-looking inflation projections.[21] The Commission subsequently approved an inflation adjustment of 8.862% for the EPIC 3 investment period using this revised methodology.

As part of the EPIC program renewal proceeding, the Commission addressed inflation treatment for future EPIC funding cycles. In D.20-08-042, the Commission authorized the CEC to propose an inflation adjustment in its 2026-2030 investment plan but did not authorize an inflation adjustment for the 2021-2025 EPIC 4 funding cycle.[22] Similarly, in D.21-11-028, the Commission provided EPIC administrators with the ability to propose budget adjustments using the California CPI-W methodology for the 2026-2030 investment period but did not approve

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[18] The total collection amount shall be adjusted on January 1, 2015 and January 1, 2018 commensurate with the average change in the Consumer Price Index, specifically the Consumer Price Index for Urban Wage Earners and Clerical Workers for the third quarter, for the previous three years.

[19] D.15-02-020, Appendix B.

[20] D.18-01-008, OP 5, "Ordering Paragraph (OP) 7 of Decision 12-05-037 is modified to allow the Commission to use any reasonable method to adjust the triennial EPIC collection amount for inflation."

[21] *Ibid.*

[22] D.20-08-042, OP 3, "The California Energy Commission shall have an annual Electric Program Investment Charge budget of $147.26 million, with the ability to propose to adjust its budget for its 2026-2030 investment plan by the rate of inflation, as calculated using the California Department of Finance's California CPI-W method."

inflation-adjusted budgets for EPIC 4.[23] As a result, no EPIC administrator, including the CEC, PG&E, SDG&E, or SCE, received an inflation adjustment during the EPIC 4 cycle.

Most recently, D.26-02-037 continued this framework by permitting EPIC administrators to propose inflation adjustments for EPIC 5 using the California CPI-W methodology.[24] However, after considering customer affordability concerns, stakeholder feedback, and the importance of prudent stewardship of ratepayer funds, SCE elected not to request an inflation adjustment in its EPIC 5 Investment Plan. See Section 3 "Funding Overview" for more information on SCE's funding for EPIC 5.

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[23] D.21-11-028, 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."

[24] D.26-02-037, OP 2, "…Administrators may propose increases to account for inflation in their EPIC 5 investment plan applications."

Appendix 8

Acronyms and Abbreviations

Appendix 8 – Acronyms and Abbreviations

Acronym	Definition
AC	Alternating Current
ADMS	Advanced Distribution Management System
AGV	Autonomous Ground Vehicle
AI	Artificial Intelligence
AL	Advice Letter
AMI	Advanced Metering Infrastructure
API	Application Programming Interface
AUV	Autonomous Underwater Vehicle
BTM	Behind-the-Meter
CAIDI	Customer Average Interruption Duration Index
CAISO	California Independent System Operator
CAVA	Climate Adaptation Vulnerability Assessment
CBO	Community-Based Organization
CEC	California Energy Commission
CEP	Community Engagement Plan
CPUC	California Public Utilities Commission
CT	Current Transformer
CO_2 / CO_2e	Carbon Dioxide / Carbon Dioxide Equivalent
DAC	Disadvantaged Community
DC	Direct Current
DCaaS	DC as a Service
DER	Distributed Energy Resource
DERMS	Distributed Energy Resource Management System
DFMS	Distributed Flexibility Management System
DVC	Disadvantaged Vulnerable Community
EASE	Energy Storage and Advanced Energy Management
ED	Energy Division
EGEUF	Enhanced Grid Efficiency, Utilization & Flexibility
EPIC	Electric Program Investment Charge
ESJ	Environmental and Social Justice
ETR	Estimated Time of Restoration
EV	Electric Vehicle
EVSE	Electric Vehicle Supply Equipment
FAN	Field Area Network

FIT	Field Intelligent Technologies
GFO	Grant Funding Opportunity
GHG	Greenhouse Gas
GIS	Geographic Information System
GO	General Order
GRC	General Rate Case
GRIP	Grid Resilience and Intelligence Platform
GW	Gigawatt
HVAC	Heating, Ventilation, and Air Conditioning
HTS	High-Temperature Superconductors
IEC	International Electrotechnical Commission
IBR	Inverter-Based Resource
IEEE	Institute of Electrical and Electronics Engineers
IGP	Integrated Grid Project
IGPO	Intelligent Grid Planning & Orchestration
IOU	Investor-Owned Utility
ISO	Independent System Operator
kW	Kilowatt
kWh	Kilowatt-hour
LIC	Low-Income Community
LiDAR	Light Detection and Ranging
LO-GEMS	Local Optimization & Grid Edge Management Systems
LTE	Long-Term Evolution
MAIFI	Momentary Average Interruption Frequency Index
MMT	Million Metric Tons
MPLS	Multiprotocol Label Switching
MW	Megawatt
MWh	Megawatt-hour
NERC	North American Electric Reliability Corporation
NFV	Network Functions Virtualization
OMS	Outage Management System
OP	Ordering Paragraph
OT	Operational Technology
PSPS	Public Safety Power Shutoff
PT	Potential Transformer
RAP	Research Administration Plan
RD&D	Research, Development & Demonstration

SAFE	Safe and Advanced Field Execution
SAIDI	System Average Interruption Duration Index
SAIFI	System Average Interruption Frequency Index
SCADA	Supervisory Control and Data Acquisition
SCE	Southern California Edison Company
SME	Subject Matter Expert
TD&D	Technology Demonstration and Deployment
TE	Transportation Electrification
TWh	Terawatt-hour
UAV	Unmanned Aerial Vehicle
UV	Ultraviolet
V2G	Vehicle-to-Grid
V2X	Vehicle-to-Everything
VAR	Volt-Ampere Reactive
VGI	Vehicle Grid Integration
VPP	Virtual Power Plant

Appendix 9

Glossary

Appendix 9: Glossary

Adaptive Grid Protection: A category of advanced protection technologies that can dynamically respond to changing grid conditions, including bidirectional power flows, distributed energy resources, and evolving fault characteristics.

Advanced Distribution Management System (ADMS): An integrated software platform used by utilities to monitor, analyze, and control distribution system operations.

Advanced Grid Upgrades: Technologies that increase grid capacity, flexibility, and performance through solutions such as energy storage, power electronics, and modular infrastructure.

Artificial Intelligence (AI): Computer systems designed to perform tasks that normally require human intelligence, such as pattern recognition, forecasting, optimization, and decision support.

Building Decarbonization: The process of reducing greenhouse gas emissions associated with buildings through electrification, energy efficiency, and clean energy technologies.

Climate Adaptation: Actions and investments intended to prepare for and respond to the impacts of climate change, including extreme heat, wildfire, flooding, and other climate-related risks.

Community Engagement Plan (CEP): A structured approach for informing and involving stakeholders and communities in EPIC investment planning, project development, and program implementation.

Community-Scale Decarbonization: The deployment of technologies and strategies that reduce emissions across neighborhoods, communities, or regions rather than at the individual customer level.

Decarbonization: The reduction or elimination of greenhouse gas emissions from energy production, transportation, buildings, and industrial activities.

Demand Flexibility: The ability of customers or devices to modify electricity consumption in response to grid conditions, price signals, or utility programs.

Digital Substation: A substation that leverages advanced sensors, communications, automation, and digital analytics to improve operational visibility, reliability, and efficiency.

Digital Twin: A virtual representation of a physical asset, system, or process that uses real-world data to model performance and support planning and operational decisions.

Distributed Energy Resource (DER): A small-scale energy resource connected to the distribution system or located behind a customer meter, including solar photovoltaics, battery storage, electric vehicles, demand response resources, and flexible loads.

Distributed Energy Resource Management System (DERMS): A platform used to monitor, coordinate, and optimize the operation of distributed energy resources.

Dynamic Grid Edge Visibility: Technologies and systems that provide real-time operational information about grid conditions, environmental hazards, and field activities at the edge of the distribution system.

Electrification: The transition from direct fossil fuel use to electricity as the primary energy source for transportation, buildings, and industrial processes.

Enhanced Grid Efficiency, Utilization & Flexibility (EGEUF): SCE's EPIC 5 Strategic Initiative focused on increasing the capability, utilization, and flexibility of existing grid infrastructure.

Environmental and Social Justice (ESJ) Communities: Communities that may experience disproportionate environmental, economic, health, or social burdens and that may benefit from targeted investments and engagement.

Field Intelligent Technologies (FIT): SCE's EPIC 5 Strategic Initiative focused on improving asset visibility, monitoring, sensing, and operational awareness through advanced field technologies.

Flexible Energy & Load on Demand: Technologies and operational approaches that enable electricity demand and distributed resources to respond dynamically to grid conditions.

Grid Edge: The portion of the electric system located near customers where utility infrastructure interfaces with distributed energy resources, buildings, vehicles, and other end-use technologies.

Grid-Enhancing Technologies: Technologies that improve utilization, flexibility, reliability, or capacity of existing electric infrastructure without requiring traditional infrastructure expansion.

Hosting Capacity: The amount of distributed energy resources that can be connected to a circuit or portion of the electric grid without adversely affecting safety, reliability, or power quality.

Intelligent Asset Sensors: Advanced sensing technologies that provide continuous or near-continuous information regarding the condition, performance, and health of grid assets.

Intelligent Grid Computing: Advanced computing architectures and technologies that support grid planning, analytics, forecasting, automation, and real-time operations.

Intelligent Grid Planning & Orchestration (IGPO): SCE's EPIC 5 Strategic Initiative focused on advanced planning, forecasting, data integration, connectivity, and operational coordination.

Interconnection: The process of connecting a new customer load, distributed energy resource, or generating facility to the electric system.

Inverter-Based Resource (IBR): An energy resource that connects to the electric grid through power electronic inverters rather than rotating machinery. Examples include solar photovoltaic systems and battery energy storage systems.

Non-Wires Alternative: A solution that addresses electric system needs through technologies such as energy storage, demand flexibility, or distributed energy resources rather than traditional infrastructure investments.

Peak Load: The highest level of electricity demand experienced by the electric system during a specified period.

Public Safety Power Shutoff (PSPS): A planned de-energization of electric facilities intended to reduce wildfire risk during periods of elevated fire danger.

Research Topic Area: A broad technology focus area within a Strategic Initiative that identifies technologies and innovation opportunities SCE may pursue through future EPIC projects.

Safe and Advanced Field Execution (SAFE): SCE's EPIC 5 Strategic Initiative focused on improving safety, reliability, restoration, and field execution capabilities through advanced technologies.

Smart Grid Sensors: Devices that provide real-time information regarding grid conditions, asset performance, power quality, and operational status.

Strategic Goal: A high-level objective established by the CPUC to guide EPIC investments and evaluate program outcomes.

Strategic Initiative: A broad technology investment area used to organize EPIC 5 activities and align projects with CPUC Strategic Goals and Objectives.

Technology Demonstration and Deployment (TD&D): Activities that validate emerging technologies under real-world operating conditions to determine their practicality, performance, safety, and value before broader deployment.

Transportation Electrification: The transition from gasoline and diesel vehicles to electric transportation technologies and supporting infrastructure.

Valley of Death: The gap between technology development and commercial adoption where promising technologies often fail to achieve widespread deployment because they lack sufficient validation, operational experience, or investment.

Vehicle-to-Grid (V2G): A capability that allows electric vehicles to export electricity from their batteries back to the electric grid.

Vehicle-to-Everything (V2X): A broad category of technologies enabling electric vehicles to exchange energy with buildings, homes, microgrids, and the electric system.

Virtual Power Plant (VPP): A coordinated portfolio of distributed energy resources that can operate collectively to provide grid services similar to a conventional power plant.

Appendix 10

Inflation Table

Appendix 10 – Inflation Adjustment

Appendix 7 lists the CPUC rulings that guide the CPUC's method of calculating an inflation adjustment to EPIC budgets, including the use of the California Consumer Price Index for Urban Wage Earners and Clerical Workers (CPI-W). The California State Department of Finance publishes both the historical CPI-W and its five-year CPI-W forecast; an excerpt of this is in Figure 1 below.[1]

Figure 2: Historical and Forecasted CPI-W (California State Department of Finance)

CONSUMER PRICE INDICES, UNITED STATES AND CALIFORNIA

Year	CPI-W (Urban Wage Earners & Clerical Workers) United States Index	CPI-W (Urban Wage Earners & Clerical Workers) United States % Change	CPI-W (Urban Wage Earners & Clerical Workers) California Index	CPI-W (Urban Wage Earners & Clerical Workers) California % Change
2000	168.892	3.5	168.077	3.6
2001	173.517	2.7	174.731	4.0
2002	175.875	1.4	179.016	2.5
2003	179.808	2.2	183.759	2.6
2004	184.483	2.6	188.930	2.8
2005	190.975	3.5	195.881	3.7
2006	197.142	3.2	203.267	3.8
2007	202.767	2.9	209.875	3.3
2008	211.053	4.1	217.648	3.7
2009	209.630	-0.7	216.292	-0.6
2010	213.967	2.1	219.713	1.6
2011	221.575	3.6	226.364	3.0
2012	226.229	2.1	231.610	2.3
2013	229.324	1.4	234.947	1.4
2014	232.771	1.5	238.960	1.7
2015	231.810	-0.4	241.617	1.1
2016	234.076	1.0	246.194	1.9
2017	239.051	2.1	253.267	2.9
2018	245.146	2.5	263.091	3.9
2019	249.222	1.7	270.842	2.9
2020	252.248	1.2	275.630	1.8
2021	265.510	5.3	288.710	4.7
2022	287.984	8.5	310.565	7.6
2023	298.990	3.8	321.228	3.4
2024	307.552	2.9	330.850	3.0
2025	315.492	2.6	341.537	3.2
2026 f/	326.468	3.5	355.253	4.0
2027 f/	333.688	2.2	366.236	3.1
2028 f/	341.357	2.3	377.951	3.2
2029 f/	349.372	2.3	390.119	3.2
2030 f/	357.544	2.3	402.590	3.2

1 https://dof.ca.gov/forecasting/economics/economic-indicators/inflation/.

The California State Department of Finance also shares the document “How to Use the Consumer Price Index (CPI),” which explains how to use the CPI-W.[2] The method that the California State Department of Finance uses to calculate loss of purchasing power from inflation (i.e. “How to Compare Historical Prices to Current Prices”) is consistent with the method CPUC used in Appendix B of D.15-02-020, and is the method SCE used in Section 3 to calculate the previous loss of purchase power during EPIC 4 and the forecasted loss of purchasing power during EPIC 5.

The CPI-W for the end of EPIC 3 (2020) was 275.630 and the CPI-W for the end of EPIC 4 (2025) was 341.537. Applying the method from “How to Use the Consumer Price Index (CPI)” to calculate the inflation rate from the end of the EPIC 3 cycle to the end of the EPIC 4 cycle yields:

Inflation rate = ((2025 CPI-W – 2020 CPI-W)/2020 CPI-W) x 100
Inflation rate = ((341.537 – 275.630) / 275.630) x 100
Inflation rate = 23.91%

The CPI-W for the end of EPIC 4 (2025) was 341.537 and the California State Department of Finance forecasted CPI-W for the end of EPIC 5 (2030) was 402.590. Applying the method from “How to Use the Consumer Price Index (CPI)” to calculate the inflation rate from the end of the EPIC 3 cycle to the end of the EPIC 4 cycle yields:

Inflation rate = ((2030(f) CPI-W – 2025 CPI-W)/2020 CPI-W) x 100
Inflation rate = ((402.590 – 341.537) / 341.537) x 100
Inflation rate = 17.88%

2 https://dof.ca.gov/media/docs/forecasting/economics/economic-indicators/inflation/How-To-Use-CPI-Data.pdf.