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Energy Division Staff Proposal Identifying Strategic Objectives and Criteria to Guide the Electric Program Investment Charge (EPIC) Program

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Energy Division Staff Proposal Identifying Strategic Objectives and Criteria for the Electric Program Investment Charge (EPIC) Program

California Public Utilities Commission Staff Proposal

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Executive Summary

The California Public Utilities Commission (Commission or CPUC) established the Electric Program Investment Charge (EPIC) program to invest in ratepayer-funded research, development, and demonstration (RD&D) to benefit California ratepayers who fund the program.[1] As part of its mission, the Commission aims to ensure that the EPIC program engages and prioritizes California's Disadvantaged Vulnerable Communities (DVCs), including tribes.[2] This Proposal, developed by the CPUC's Energy Division Staff (Staff), is informed by the scope of the Commission's EPIC Rulemaking (R.)19-10-005 and a year-long public stakeholder process. The record of the EPIC proceeding, including this Staff Proposal, will inform CPUC guidance for measurable EPIC Strategic Objectives. Staff's proposal was developed in consideration of the Commission's established EPIC Strategic Goals which are aligned with the State's climate goals.[3] The Strategic Objectives are defined as clear, measurable, and robust targets that will guide effective EPIC investment plan strategies to scale and deploy innovation that will benefit the ratepayers who fund the program.[4]

Section 1: Background

In Section 1, Staff explain how its Proposal for Strategic Objectives and improvements to EPIC planning align with the Commission's stated goals for EPIC to maximize ratepayer benefits and impacts in achieving California's clean energy and climate goals.[5] This section further describes Staff's process to develop its recommendations based on a robust, year-long public stakeholder process.

Section 2: EPIC Equity RD&D Framework and Affordability Guidance

In Section 2, Staff articulate an RD&D Equity Framework gleaned from equity stakeholder contribution through the CPUC's public workshop process. Staff used this Framework to inform its recommendations for equity metrics as well as outlines principles that should guide the development of EPIC investment portfolios. Staff further recommend actions the CPUC should consider for EPIC related to cost mitigation strategies for energy investments that can promote affordability for all ratepayers.

Section 3: Proposed EPIC Strategic Objectives

In Section 3, Staff propose thirteen Strategic Objectives the Commission should adopt to guide the development of future EPIC investments. The proposed Strategic Objectives are based on the July 2024 EPIC Strategic Objectives Workshop Report (Final Report)[6] which reflects a

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[1] Decision (D.)11-12-035 at 31, Conclusion of Law (COL) 1, and COL 3.

[2] D.21-11-028 at Ordering Paragraph (OP) 2, at 43, and at Appendix A.

[3] D.23-04-042 at OP 3; D.18-10-052; D.21-11-028; and D.24-03-007.

[4] Strategic Objectives Kick-Off Workshop. March 19, 2024. Staff presentation at 11.

[5] D.23-04-042 at Findings of Fact (FOF) 9, FOF 13, and COL 3.

[6] EPIC Strategic Objectives Workshop Report. EPIC Policy + Innovation Coordination Group (PICG). The Accelerate Group. July 2024. https://epicpartnership.org/resources/Strat_Obj_Revision_7_9.pdf

synthesis of stakeholders' recommended solutions for innovation gaps, which were identified in the Commission's decision adopting EPIC Strategic Goals.[7] Staff propose minor modifications to nine of the thirteen Final Report Strategic Objectives for clarity and to ensure they align with Commission policies and proceedings.[8] The proposed Strategic Objectives are summarized in Table ES.1.

Table ES.1: Proposed EPIC Strategic Objectives

1. Reducing Medium and Heavy-Duty Vehicle Charging Infrastructure Costs
2. Overcoming Barriers to Electric Vehicle (EV) Benefits in DVCs
3. Smart Systemwide Planning Tools for New Load
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
8. Increase Predictability of Weather, Intermittent Resources, 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
12. Reducing Feeder/Circuit Peaks
13. Cost-Effective Grid Hardening for Long-Term Climate Impacts

Section 4: Establishing Processes to Implement and Measure Strategic Goals and Objectives

In Section 4, Staff propose initiatives for implementing and measuring the outcomes and impacts of the Strategic Goals and Objectives to ensure Administrator investment plans benefit ratepayers. In order to understand progress on the Commission's Goals and Strategic Objectives, the Commission should establish a commensurate evaluation process tied to its targets. Staff recommend that the Commission utilize requirements based on the principles of Staff's Uniform Impact Analysis Framework.[9] The Commission should also develop a process to establish baselines to ensure EPIC administrators collect the appropriate project data to determine near-term and long-term impacts of ratepayers' significant investment. To support and promote effective investments, Staff further recommend that the Commission adopt a market transformation approach to ensure that EPIC investments are conceived to impact scaling and commercialization particularly for reliability and affordability. Once developed, each

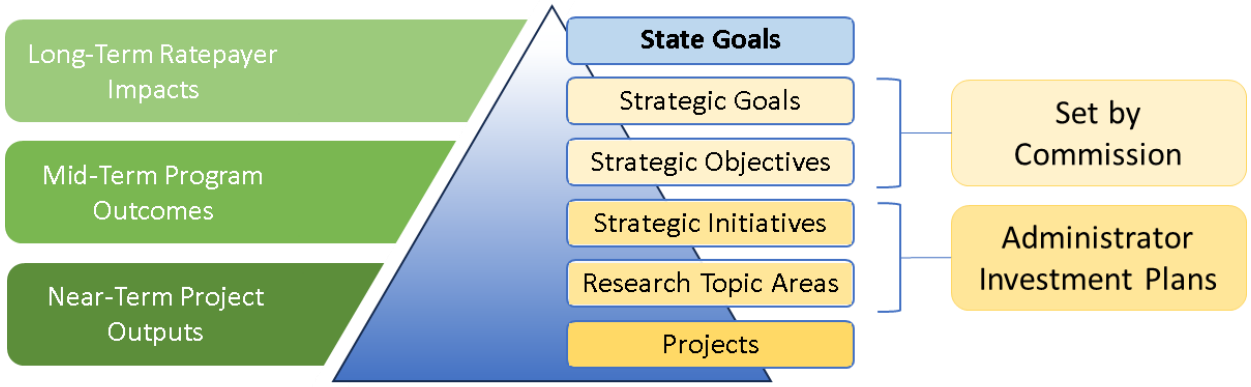
[7] D.24-03-007 at OP 1.

[8] All Strategic Goals and Strategic Objectives workshop reports, workshop video recordings, and workshop presentations are available online on the EPIC Policy + Innovation Coordination Group website at https://epicpartnership.org

[9] D.23-04-042 at OP 1 and at Appendix A. Foundational Principles for Development of a Uniform Impact Analysis Framework to Comply with Decision (D.)21-11-028.

administrator should use these mechanisms to justify their Investment Plans and demonstrate progress and impacts for near-, mid-, and long-term time frames, corresponding with EPIC program outputs, outcomes, and impacts, as shown in Figure ES.1.[10]

Figure ES.1 Illustration of EPIC Strategic Planning Hierarchy



In alignment with State Goals, EPIC Strategic Goals extend through 2045. EPIC strategic elements progress from least granular and longest term at the top to most granular and nearest term at the bottom. The Commission sets Strategic Goals and Objectives and approves Administrator Investment Plan Strategic Initiatives and Research Topic Areas. Administrators execute Investment Plan through individual projects.

To assess whether EPIC investments are achieving these goals, Staff recommend the Commission undertake a third independent EPIC Program evaluation to understand program impacts and benefits which can serve to make continued program improvements as well as inform Commission consideration of funding EPIC beyond 2030 when the program sunsets.

Section 1. Background

Introduction

Staff have developed this Proposal to inform the Commission's consideration of requirements for the EPIC program going forward. Staff's recommendations are intended to be consistent with established Commission direction that EPIC program benefits accrue to the California ratepayers who fund the program, particularly for equitable access to safe, affordable, reliable, and environmentally sustainable energy.[11] Ratepayers fund the EPIC program at approximately $185 million dollars each year, for a total of $2.5 billion authorized to-date.

[10] EPIC Uniform Impact Analysis Framework Kick-off Workshop. April 2, 2024. Fredric Beck. Defining A Uniform Impact Analysis Framework at 4. https://epicpartnership.org/resources/ImpactAnalysisKickoff_Beck.pdf

[11] D.11-12-035 at 31, COL 1, and COL 3.

Since its inception, the Commission has directed EPIC administrators to implement the program to aid the IOU electricity sector in meeting its compliance requirements at the lowest possible cost.[12,13,14]

The significant investment of California ratepayers demonstrates the power of EPIC nationally to make significant impacts and progress for scaling and commercializing climate and clean energy innovation (see Figure 1.1). Demonstrating outcomes of these investments is essential to ensuring EPIC Administrator investment plans benefit ratepayers.

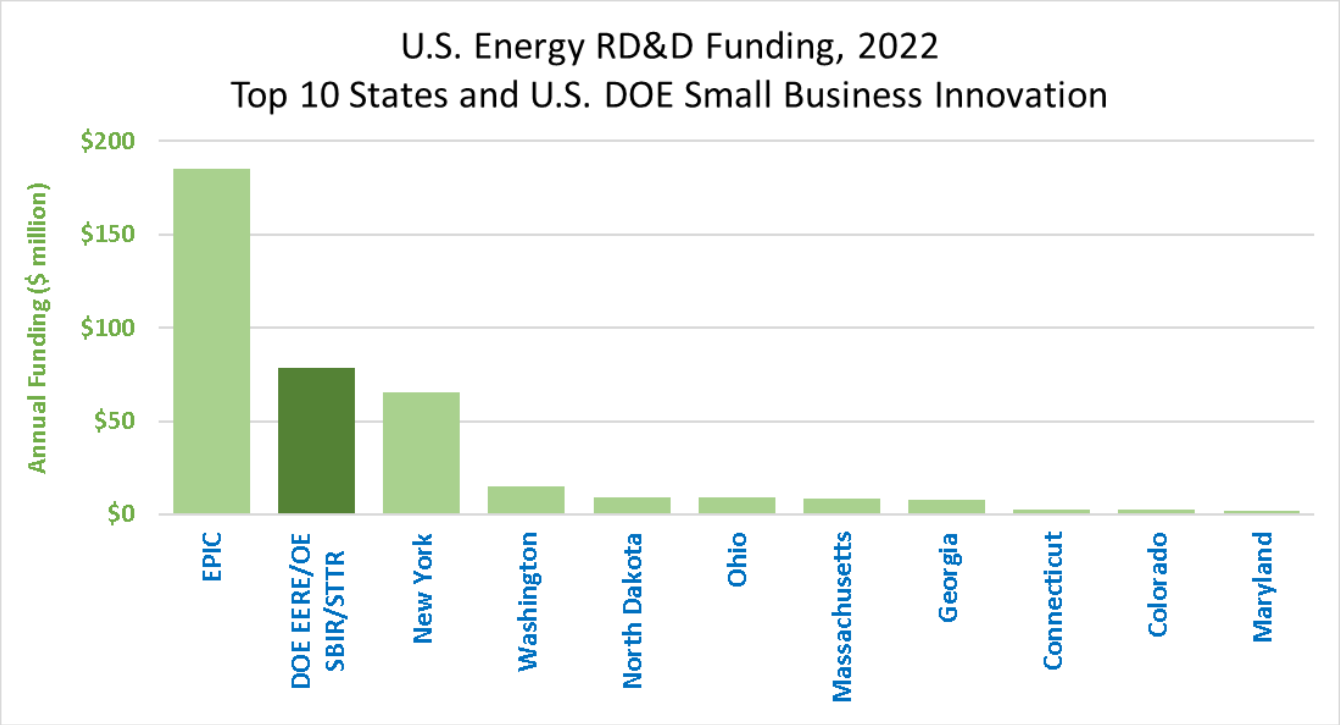


Figure 1.1. U.S. State Funded Energy R&D, Top Ten States, 2022.

With U.S. DOE Office of Energy Efficiency and Renewable Energy and U.S. DOE Office of Electricity Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) combined funding, averaged over FY 2022-FY 2023, shown for comparison.[15]

[12] D.12-05-037 at 20 and at OP 2. AB 32 (Pavley and Nunez, 2006) Global Warming Solutions Act of 2006. AB 1279 (Muratsuchi, 2022), The California Climate Crisis Act.

[13] Pub. Util. Code § 8366.

[14] Pub. Util. Code § 8360 requires cost-effectiveness in digital information and control technology, cyber security, distributed resources and generation, demand response, demand-side resources, energy-efficient resources, smart technologies, smart appliances and consumer devices, advanced electricity storage and peak-shaving technologies including plug-in electric and hybrid electric vehicles, and thermal-storage air-conditioning.

[15] The U.S. Department of Energy (DOE) Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) programs for the Offices of Energy Efficiency and Renewable Energy (EERE) and Electricity (OE) averaged $79 million for FY 2022-2023. These programs fund small business innovation, similar to EPIC's entrepreneurial ecosystem initiatives. Overall, DOE's 2022 combined enacted EERE and OE federal budget was over $3.5 billion; U.S. DOE. FY 2024 Congressional Justification. Energy Efficiency and Renewable Energy, at 6; U.S. DOE. FY 2024 Congressional Justification. Electricity/Proposed Appropriation Language at 8.

Staff's Methodology to Develop its Proposal

Staff implemented a stakeholder process to inform the Commission's stated intent to develop measurable Strategic Goals and Strategic Objectives for the EPIC program.[16] Staff implemented a series of five workshops in 2023 that resulted in the Commission's five EPIC Strategic Goals:[17]

- Transportation Electrification
- Distributed Energy Resource Integration
- Building Decarbonization
- Achieving 100 Percent Net-Zero Carbon and the Coordinated Role of Gas
- Climate Adaptation

In 2024, Staff then implemented five Technical Working Groups based on the Commission's five established EPIC goals and corresponding research gaps to identify relevant measurable Strategic Objectives to address these gaps.[18]

The CPUC defines Strategic Objectives as clear, measurable, and robust targets to guide EPIC investment plan strategies to scale and deploy innovation to align with EPIC's Strategic Goals.[19] The Strategic Objectives are intended as more granular near-term sub-targets of the long-term Strategic Goals and to:

- Address the key identified gaps for critical pathways to demonstrated progress in achieving California's climate, energy, and equity goals.
- Focus on the unique role ratepayer funded RD&D should play in leading innovation investment.
- Incorporate important crosscutting principles, including equity, identified in the decision approving the Strategic Goals.[20]

The EPIC Policy + Innovation Coordination Group (PICG) produced publicly available draft reports for each Technical Working Group identifying potential Strategic Objectives and summarizing areas of consensus or non-consensus.[21] The PICG issued the final EPIC Strategic Objectives Workshop Report (Final Report) synthesizing stakeholders' input on July

[16] D.23-04-042 at 9, and at 12-16. D.24-03-007 at FOF 4.

[17] D.24-03-007 at OP 1.

[18] See Appendix A for definitions of the strategic pillars used to identify and refine EPIC Strategic Goals and Objectives.

[19] D.23-04-042 at COL 3. Strategic Objectives Kick-Off Workshop. March 19, 2024. Staff presentation at 11. https://epicpartnership.org/resources/Strat_Obj_KickOff_3_14.pdf

[20] D.24-03-007 at 28-29.

[21] Appendix C to this report includes the final report and all draft EPIC Strategic Objective reports. All reports are available online on the EPIC PICG website at https://epicpartnership.org

9, 2024.[22] Staff utilized the Final Report as the basis of its Strategic Objective metrics recommendations in Section 4. Staff assessed the draft objectives for consistency with:

- Compliance with Commission decisions.
- Congruence with the EPIC proceeding record including consideration of stakeholder input throughout the workshop process.[23]
- Related Commission proceedings, including consultation with CPUC subject matter expert staff input.

Staff's analysis resulted in Table 1.1 (next page) correlating how the Strategic Objectives support meeting long-term EPIC Strategic Goals.

Staff further considered the next steps necessary for the Commission to evaluate whether its established measurable Strategic Goals and Strategic Objectives were impactful. To inform its recommendations in this regard, Staff utilized established Commission policy for 1) criteria for an Impact Analysis framework;[24] and 2) the Commission's Energy Efficiency Market Transformation Initiative[25] as guidance for EPIC's products or strategies to successfully complete the technology development cycle and deliver benefits to consumers. These concepts are described in detail in Section 4.

[22] EPIC Strategic Objectives Workshop Report. EPIC Policy + Innovation Coordination Group. The Accelerate Group. July 2024. https://epicpartnership.org/resources/Strat_Obj_Revision_7_9.pdf

[23] The record of Order Instituting Rulemaking (R.)19-10-005, including all documentation from the EPIC Strategic Goals and Strategic Objectives workshop processes.

[24] D.23-04-042 at OP 1 and at Appendix A. Foundational Principles for Development of a Uniform Impact Analysis Framework to Comply with Decision (D.)21-11-028.

[25] D.19-12-021 at 44, and at OP 6-12. Regarding Frameworks For Energy Efficiency Regional Energy Network And Market Transformation.
https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M321/K507/321507615.PDF

Table 1.1 EPIC Strategic Objective Relationship to EPIC Strategic Goals					
	EPIC Strategic Goal				
EPIC Strategic Objective	Transportation Electrification	Building Decarbon-ization	Achieving 100% Net-Zero Carbon	Climate Adaptation	DER Integration
1. Reducing Medium- and Heavy-Duty Vehicle Charging Infrastructure Costs	✓				
2. Overcoming Barriers to EV Benefits in DVCs	✓				
3. Smart Systemwide Planning Tools for New Load	✓	✓	✓		
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			✓		✓
8. Increase Predictability of Weather, Intermittent Resources, 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	✓	✓			✓
12. Reducing Feeder/Circuit Peaks	✓	✓	✓		✓
13. Cost-Effective Grid Hardening for Long-Term Climate Impacts	✓	✓		✓	

Section 2. EPIC Equity RD&D Framework and Affordability Guidance

The Commission requires that EPIC innovations support, benefit, and engage Disadvantaged Vulnerable Communities (DVCs).[26] The Commission directs EPIC Administrators to align their EPIC investment plans with the CPUC's Environmental and Social Justice (ESJ) Action Plan.[27] The Commission further endorsed ED Staff Principles for Equity in RD&D Strategies to inform the Strategic Objectives workshop process.[28] The Commission requires EPIC program benefits to be maximized, cost-effective, and affordable to ratepayers.[29] California statute requires Administrators to consider State policy to maintain safe, reliable, efficient, and secure electrical service, including deployment of cost-effective and innovative smart grid technology, in each investment plan.[30]

In alignment with this direction, Staff recommends that the Commission require refined guidance for EPIC initiatives and projects to explain how proposed research investments will demonstrate equity, cost mitigation, and promote affordability for all ratepayers. Consistent with the CPUC's ESJ Action Plan, and stakeholder input received, in this section Staff highlight such refined principles.

Principles to Guide Equity for EPIC Planning and Evaluation

Staff propose that the *Principles for Equity in RD&D* adopted by the Commission in D.24-03-007[31] also be applied in developing EPIC investment plans, including Strategic Objectives equity metrics , project execution, and program evaluation. This approach is consistent with the Commission's ESJ Action Plan and its stated intent for EPIC to "increasingly support, benefit, and engage disadvantaged vulnerable California communities."[32] These principles are articulated in the Table 2.1 below, Equity in RD&D Framework.

[26] D.21-11-028 at OP 2, and at Appendix A at A1

[27] D.23-04-042 at OP 2. Environmental & Social Justice Action Plan at 2. Version 2.0. CPUC. April 7, 2022.

[28] D.24-03-007 at 28-29.

[29] D.12-05-037 at OP 2, and at 20. D.21-11-028, at OP 2, and at Appendix A.

[30] Pub. Util. Codes §§ 8360 and 8366.

[31] D.24-03-007 at 28-29.

[32] D.21-11-028 at OP 2, at 43, and at Appendix A.

Table 2.1. Equity in RD&D Framework[33]	
EPIC Equity Principle	**EPIC Equity Principle Definition**
Prioritization	Prioritize investments and measure impacts on the most vulnerable communities, including reducing the energy burden and reducing air pollution in DVCs and non-attainment areas.(b)
Engagement	Develop deeper and ongoing engagement with DVCs: (c) 1) build trust, 2) better understand relevant needs, 3) educate communities on innovative technologies and processes,(d) 4) design projects with community input from the start of the process in advance of and to inform portfolio development, (e) 5) inform priority community stakeholders how their feedback was or was not incorporated into EPIC plans and why, 6) engage DVCs in project evaluation,(f) and 7) develop sustainable, continuous community partnerships.(g)
Metrics	Develop clear and measurable metrics for assessing the impact of RD&D investment in DVCs. Potential metrics recommended by workshop participants include energy burden, health and safety, program access and education, and financial and economic measures. Metrics should take into consideration that equity needs are regionally diverse, and one size may not fit all when measuring impacts.(h)
Access	Make information on innovative technologies, incentives, and financial mechanisms easily accessible and understandable to DVCs. The Commission should provide guidance to Administrators in developing a consistent approach to simplify and streamline application processes, such as a "one-stop shop" to aid in applying to all available incentive programs. The Commission should establish policies to address the challenges of split incentives that renters face in decarbonization efforts, including consistent coordination across other CPUC programs and proceedings.(i)
Outreach	Work to enable better integration and coordination with local communities throughout the entire RD&D process. EPIC Administrators, initiatives, and projects should meet DVCs at times and locations that work for them and consider the digital divide when hosting virtual outreach opportunities. Administrators should both acknowledge differences in communities and encourage opportunities for coordination and collaboration among them. Administrators should share among themselves information on community outreach. Administrators should at a minimum apply the Disadvantaged Communities Advisory Group (DACAG) Framework and seek input from the DACAG regarding project formulation and execution in DVCs.(j)

To ensure consistency with Commission policies and proceedings, Staff further consulted relevant ED subject matter experts particularly related to equity considerations in proceedings relevant to the proposed Strategic Objectives.

Evaluating Equity Impacts of EPIC Investments in DVCs

This Framework – along with the Equity Metrics embedded in each of the proposed Strategic Objectives below – should guide the development of EPIC investment plans and support the

[33] D.24-03-007 at 28-29.

Strategic Initiatives, and the level at which the Commission approves funding allocations. Similarly, these Equity principles and metrics should be used to evaluate EPIC project proposals, collect equity data, and evaluate impacts in DVCs of initiatives and projects in achieving EPIC's Strategic Objectives. To ensure public transparency and to support Commission oversight of this effort, Administrators should report on equity investments and direct DVC impacts and keep this reporting up to date on a quarterly basis. Reporting data should include, but not be limited to:

- Quantify investment and realized impacts by physical project location.
- Forecast impacts by physical DVC project location.
- Provide rationale and methods for all data collected related to metrics.
- Identify baselines from which change in metric is to be compared.
- Provide narrative providing context for the data and impacts.

Actions the Commission Should Take to Require Affordability Criteria for EPIC Planning and Measurement

Require EPIC Investment Plans to Address Affordability

Administrators should be required to demonstrate that their proposed Strategic Initiatives and Research projects have the potential to mitigate the cost of achieving the State's energy and climate goals. In doing so, Administrators should explain in their investment plans how innovation research can impact cost mitigation of energy investments to achieve the State's climate goals. Administrator investment plans should be required to describe and justify how proposed research will address costs and how research outcomes will be measured over time to assess impacts of research objectives. .

Return EPIC Funds to Ratepayers Expeditiously

The Commission requires EPIC Administrators return program interest to ratepayers at the end of each multi-year EPIC investment cycle.[34] The Commission also requires EPIC Administrators return unencumbered funds and uncommitted funds to ratepayers at the end of the EPIC program if legally permitted to do so.[35] The Commission requires that funds committed or encumbered for projects in one investment cycle will not reduce future investment cycle funds,[36] though unspent funds remaining at the end of an investment cycle will offset future program funding requirements.[37]

[34] D.13-11-025 at OP 42; D.15-04-020 at OP 12, COL 13, and at 17; and D.18-01-008 at OP 9.

[35] D.13-11-025 at OP 43.

[36] D.13-11-025 at OP 42.

[37] D.13-11-025 at OP 38. Ratepayer collections for a subsequent investment cycle are reduced by the amount of carryover from the previous investment cycle, as well as by interest earned during the previous cycle. This is done on an investment cycle (5-year) basis, not annually.

To support cost-containment, affordability, and timely investment of EPIC funds, Staff propose modifying these requirements to (1) require return of EPIC program interest to ratepayers annually, and (2) require that any unspent or unencumbered funds be returned to ratepayers at the end of each program cycle rather than rolled over to the next investment cycle.

Ensure Program Budget Transparency

EPIC program administration itself should be prudent, efficient, necessary, and avoid duplication. Administrators should describe in their annual reports actions they are taking to reduce administrative – including staffing - or project costs and report cost savings. Commensurately, in their Annual Reports, administrators should explain how reduced staffing impacts their ability to implement the program and what program impacts were incurred as a result.

Section 3. Proposed EPIC Strategic Objectives

Staff propose the following Strategic Objectives to guide development of future EPIC investment plans. Staff's proposal is closely aligned with the Final Report synthesizing the 13 Strategic Objectives.[38] The proposed Strategic Objectives were vetted to ensure alignment with relevant Commission proceedings working with CPUC staff subject matter experts. Proposed modifications to the Strategic Objectives are described below in comparison to the original Strategic Objectives described in the Final Report.

Each Strategic Objective identifies key RD&D gaps describing barriers to achieving the State's climate goals as well as commensurate metrics to determine progress in addressing these gaps. The example progress metrics in the tables below are illustrative and derive from the Technical Working Group process and are intended to guide administrators in developing relevant metrics. The use of the impact analysis framework to complement the metrics is discussed in Section 4.

To ensure that Strategic Objective targets are meaningful, the Commission should establish baselines and implement a uniform process for measuring impacts that sets clear expectations prior to program implementation. Staff recommend the Commission launch a subsequent phase of this proceeding to establish a measurement methodology via a public stakeholder process. Each Strategic Objective includes equity progress metrics, with seven of the 13 Strategic Objectives incorporating explicit equity-related targets or goals.[39] These metrics and processes are essential to inform program evaluation.

[38] EPIC Strategic Objectives Workshop Report. EPIC Policy + Innovation Coordination Group. The Accelerate Group. July 2024. https://epicpartnership.org/resources/Strat_Obj_Revision_7_9.pdf

[39] Progress metrics shown for each Strategic Objective are from the Final Report unless otherwise specified.

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

Table 2.1. Comparison of Final Report Proposed Strategic Objective to ED Staff Proposed Strategic Objective	
Final Report Description with Modifications	**ED Staff Proposed Strategic Objective**
The EPIC program will accelerate innovation, demonstration, and innovative approaches to deployment that support the reduction of the IOU cost of medium- and heavy-duty charging infrastructure installations, and associated cost of IOU grid upgrades~~, and/or the total cost of ownership~~ by a target of 50% by 2035.	The EPIC program will accelerate innovation, demonstration, and innovative approaches to deployment that support the reduction of the IOU cost of medium- and heavy-duty charging infrastructure installations, and associated cost of IOU grid upgrades by a target of 50% by 2035.

Background

In 2018, the Commission's Vehicle Electrification proceeding determined that as California continues implementing its transportation electrification policies, the number of electric vehicles (EVs) and required charging infrastructure is expected to grow significantly from 2023 to 2032.[40] Additionally, the proceeding determined the required level of behind-the-meter and utility-side of-the meter spending on accelerating transportation electrification has the potential to impact rate affordability. The anticipated expenses are driven in part by California's goal that all medium- and heavy-duty vehicles (MHDV) be zero-emission by 2045 for all operations where feasible.[41] A Lawrence Berkeley National Laboratory (LBNL) analysis estimated that without charging infrastructure cost reduction, electrifying the California trucking industry would require a $10.8 billion upfront investment.[42]

Table 2.2. Summary of Strategic Objective Characteristics: Reducing Medium and Heavy-Duty Vehicle Charging Infrastructure Costs	
Related Strategic Goals	Transportation Electrification
Related Proceedings	**R.23-12-008.** Transportation Electrification Policy and Infrastructure.

[40] R.18-12-006 at 7 and at 10. Development of Rates and Infrastructure for Vehicle Electrification. Final Decision Closing Rulemaking. December 20, 2023.

[41] Executive Department. State of California. Governor's Executive Order N-79-20.

[42] California semi-truck electrification: Preliminary assessment of infrastructure needs and cost-benefit analysis. Lawrence Berkeley National Laboratory. September 2019.

Staff Modification	Modified to specify IOU cost savings because other savings, such as grid operator savings, would not promote ratepayer affordability. Modified to remove the target of decreasing total cost of electric vehicle ownership because CPUC does not have authority to regulate vehicle purchase price.
Gap Addressed	Current high cost of infrastructure to support California's medium and heavy-duty vehicle (MHDV) electrification goals impacts ratepayer affordability.
Metrics	• Reduction in charging infrastructure installation times, by community.[43] • Utility bill savings for ratepayers in avoided infrastructure investments. • Number and EV adoption rate for medium and heavy-duty vehicles, by community. • Air pollution reduction, by airshed (%, mass) • Greenhouse Gas (GHG) reduction (%, mass) • Air pollution reduction in DVCs (%, mass)

Staff Findings and Justification

This Strategic Objective aligns with and supports the CPUC's Transportation Electrification proceeding as described below. The Objective's 2035 target is consistent with a 2024 National Renewable Energy Laboratory (NREL) study finding that with continued improvements in vehicle and fuel technologies, zero-emission medium- and heavy-duty vehicle can reach total-cost-of-driving parity with conventional medium- and heavy-duty diesel vehicles by 2035 without incentives.[44] Administrators should consider the likely location of MHDV charging infrastructure for on-road fueling along major freight corridors because MHDV presents a different use case than for light duty vehicles.[45,46] Staff propose this Strategic Objective with the above modifications as reasonable for the following reasons:

1. Aligns with the CPUC's Transportation Electrification proceeding scope for Proactive Planning to Accelerate Transportation Electrification, which initially will focus on zero emissions freight infrastructure planning because of the: (i) significant load growth

[43] R.24-01-018. Establish Energization Timelines. https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M524/K427/524427971.PDF

[44] Assessing Total Cost of Driving Competitiveness of Zero-Emission Trucks. iScience Vol. 27, Issue 4, 109385, April 19, 2024. Accessible online at https://www.cell.com/action/showPdf?pii=S2589-0042%2824%2900606-0. Also Decarbonizing Medium- & Heavy-Duty On-Road Vehicles: Zero-Emission Vehicles Cost Analysis. National Renewable Energy Laboratory. March 2022. Accessible online at https://www.nrel.gov/docs/fy22osti/82081.pdf

[45] California semi-truck electrification: Preliminary assessment of infrastructure needs and cost-benefit analysis. Lawrence Berkeley National Laboratory. September 2019. https://eta-publications.lbl.gov/sites/default/files/california_semi_truck_electrification_executive_summary_0.pdf

[46] The costs and challenges of installing corridor DC Fast Chargers in California. Institute of Transportation Studies, University of California, Davis. Case Studies on Transport Policy 11 (2023) 100969.

anticipated with medium-duty and heavy-duty charging; and (ii) its likely impact on electric infrastructure.[47]

2. Aligns with several elements of the CPUC's Transportation Electrification proceeding, including (i) zero emissions freight infrastructure planning, (ii) continuous assessment of transportation electrification infrastructure planning needs, (iii) charging infrastructure support, and (iv) considering impacts on ratepayers.[48]
3. Supports Executive Order N-79-20 goal that all medium- and heavy-duty vehicles be zero-emission by 2045 for all operations where feasible.[49]

Strategic Objective 2: Overcoming Barriers to EV Benefits in DVCs

Table 2.3. Comparison of Final Report Proposed Strategic Objective to ED Staff Proposed Strategic Objective
Final Report Description: No Modifications
The EPIC program will accelerate innovation, demonstration, and innovative approaches to deployment to overcome obstacles to equitable transportation electrification benefits (including alleviation of pollution, bridging transportation access, and addressing energy burden) in Disadvantaged and Vulnerable Communities, low-income communities, and non-attainment air districts.

Background

In 2022, the Commission's proceeding on Transportation Electrification ordered a $1 billion 5-year third-party administered statewide transportation electrification infrastructure rebate program to help ensure California meets its ambitious climate and electric vehicle (EV) goals.[50] The program offers rebates for customer-side EV infrastructure investments, with higher rebates for projects in underserved, disadvantaged, and tribal communities to ensure charging infrastructure extends to these hard-to-reach communities.[51] A 2022 UC Davis study finds the most important transportation electrification metrics for DVCs are benefits for local community members; improvements in local air pollution; transparent and collaborative community engagement; consideration of end-of-life impacts, and enhanced access to additional sustainable technologies.[52]

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[47] R.23-12-008, Transportation Electrification Policy and Infrastructure. Assigned Commissioner's Scoping Memo and Ruling, April 12, 2024. https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M529/K525/529525879.PDF

[48] R.23-12-008 at 3 and at 8, Transportation Electrification Policy and Infrastructure. Assigned Commissioner's Scoping Memo and Ruling, April 12, 2024. https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M529/K525/529525879.PDF

[49] Executive Order N-79-20 at OP 1. https://www.gov.ca.gov/wp-content/uploads/2020/09/9.23.20-EO-N-79-20-Climate.pdf

[50] D.22-11-040 at OP 4. Transportation Electrification Policy and Investment.

[51] D.22-11-040 at 137, at FOF 73, and at COL 60. Transportation Electrification Policy and Investment.

[52] Improving Our Understanding of Transport Electrification Benefits for Disadvantaged Communities. UC Davis: National Center for Sustainable Transportation. January 2022. https://escholarship.org/uc/item/9tc331hz

Table 2.4. Strategic Objective 2: Overcoming Barriers to EV Benefits in DVCs	
Related Strategic Goals	Transportation Electrification
Related Proceedings	**R.23-12-008**: Transportation Electrification Policy and Infrastructure. **R.18-12-006**: Development of Rates and Infrastructure for Vehicle Electrification.
Staff Modification	No Staff modification.
Gap Addressed	Lack of priority community access to transportation electrification benefits.
Metrics	• Improvement in air quality metrics as related to transportation sector emissions (NOx, PM2.5, PM10). • Reduction in household energy burden for targeted DVCs: Amount that energy burden decreased (percent reduction in share of income paid for energy bills) for participating households.[53] • Annual rate of new EV charging infrastructure installation in DVCs, in comparison to the overall system. • Number, MW, and MWh of customers in DVCs participating in transportation electrification use cases. • Program and technology accessibility: Percent change in program awareness and share of priority community participation over time.

Staff Findings and Justification

Staff propose this Strategic Objective without modification as reasonable for the following reasons:

1. Aligns with the CPUC's Transportation Electrification proceeding, the scope of which broadly includes all issues related to transportation electrification, including equity and affordability. [54]
2. Aligns with the CPUC's Development of Rates and Infrastructure for Vehicle Electrification (DRIVE) proceeding, and its Transportation Electrification Framework,

[53] Energy burden is defined as the percentage of gross household income spent on energy costs. Pacific Northwest National Laboratory (2021). Metrics for an Equitable and Just Energy System.https://www.pnnl.gov/sites/default/files/media/file/Metrics%20for%20Energy%20Equity.pdf

[54] R.23-12-008. Order Instituting Rulemaking at 14. Transportation Electrification Policy and Infrastructure. https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M521/K872/521872957.PDF

including acceleration of transportation electrification deployment in DVCs and other historically underserved markets.[55]

3. Aligns with CPUC's Distributed Energy Resources (DER) Action Plan, Track 4, which includes transportation electrification and equitable participation and distribution of benefits of DER customer programs.[56]
4. Consistent with California's Senate Bill (SB) 350 (de León, 2015) requirement that the CPUC ensures increased access to transportation electrification-related opportunities for low- and moderate-income communities and DVCs as transportation electrification becomes more widespread.[57]
5. Supports Executive Order N-79-20 requiring the CPUC to accelerate deployment of affordable fueling and charging options for zero-emission vehicles and micromobility options, in ways that serve all communities and in particular DVCs.[58]
6. Supports the CPUC's Environmental and Social Justice Action Plan's goal to improve local air quality and public health in DVCs.[59]

Strategic Objective 3: Smart Systemwide Planning Tools for New Load

Table 2.5. Comparison of Final Report Proposed Strategic Objective to ED Staff Proposed Strategic Objective

Final Report Description with Modifications	ED Staff Proposed Strategic Objective
The EPIC program will support the development, integration, and updating of transparent, open-access grid planning tools that a) substantially increase the forecasting and predictability of intermittent resources, electric vehicles, building electrification, flexible load, and distributed energy resources, b) enable widespread adoption of demand flexibility, c) coordinate with utility capital planning processes, and ~~e~~d) integrate into utility operations for the enablement of	The EPIC program will support the development, integration, and updating of transparent, open-access grid planning tools that a) substantially increase the forecasting and predictability of intermittent resources, electric vehicles, building electrification, flexible load, and distributed energy resources, b) enable widespread adoption of demand flexibility, c) coordinate with utility capital planning processes, and d) integrate into utility operations for the enablement of

[55] D.22-11-040 at 130. Transportation Electrification Policy and Investment. https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M499/K005/499005805.PDF

[56] The CPUC adopted the Distributed Energy Resources Action Plan 2.0 on April 21, 2022. For more information see: https://www.cpuc.ca.gov/deractionplan

[57] SB 350 (De Leon, 2015) Clean Energy and Pollution Reduction Act of 2015. As encoded in Pub. Res. Code §§ 25327(a)(4), 25327(d), and 740.12 (a)(1)(C). https://leginfo.legislature.ca.gov/faces/billPdf.xhtml?bill_id=201520160SB350&version=20150SB35093CHP

[58] Executive Order N-79-20 at OP 4 and OP 6(b). https://www.gov.ca.gov/wp-content/uploads/2020/09/9.23.20-EO-N-79-20-Climate.pdf

[59] CPUC Environmental & Social Justice Action Plan, Goal 2. Version 2.0. April 7, 2022.

grid services and dynamic operation with the goal of reducing ratepayer costs over time and ensuring Disadvantaged and Vulnerable Communities are not left behind in benefits from the transition to zero-emission technologies.	grid services and dynamic operation with the goal of reducing ratepayer costs over time and ensuring Disadvantaged and Vulnerable Communities are not left behind in benefits from the transition to zero-emission technologies.

Background

In 2022, the Commission's DER Action Plan required refinement of tools to provide reliable, accurate, and useful data to developers and consumers seeking to integrate distributed energy resources, including generation and load, to make the most of investments already made by ratepayers.[60] In 2021, the Commission's High DER proceeding required consideration of cost-effective and widespread transportation electrification to enable swift integration of flexible load[61] and distributed generation as well as optimized grid infrastructure investments to meet the State's 100 percent clean energy goals.[62]

Table 2.6. Strategic Objective 3: Smart Systemwide Planning Tools for New Load	
Related Strategic Goals	Transportation Electrification, Building Decarbonization, and Achieving 100% Net-Zero Carbon and the Coordinated Role of Gas, Climate Adaptation
Related Proceedings	**R.24-01-018.** Establish Energization Timelines. **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.19-01-011.** Building Decarbonization. **R.18-12-006.** Rates and Infrastructure for Vehicle Electrification. **R.18-07-006.** Framework and Processes for Assessing the Affordability of Utility Service. **R.18-04-019.** Strategies and Guidance for Climate Change Adaptation.

[60] CPUC Distributed Energy Resources Action Plan 2.0, at 12. Adopted April 21, 2022. https://ia.cpuc.ca.gov/agendadocs/3506_results.pdf

[61] Load flexibility encompasses a range of distributed energy resources, including demand reduction, electric vehicles, battery storage, and others.

[62] R.21-06-017. Order Instituting Rulemaking to Modernize The Electric Grid For A High Distributed Energy Resources Future. Scoping Decision at 13-14. July 2021.

Staff Modification	Clarification that grid planning tools should be transparent and open access to be responsive to CPUC concerns about lack of transparency in IOU integrated planning and project prioritization methods and enable widespread adoption of demand flexibility.[63]
Gap Addressed	High capital cost of grid modernization to meet new load and underscoring that DVCs are insufficiently considered in grid planning.
Metrics	• Avoided costs of project demonstrations compared to a baseline. • Commensurate peak load reduction. • Reductions in forecasting errors and mismatch with actual load. • Locational changes in service interruption indexes including SAIDI, SAIFI, and CAIDI.[64] • Reduced risk of loss of load, reduced load shed events. • Affordability Ratio (AR) defined by the CPUC as an essential utility services bill divided by the sum of household income minus nondiscretionary expenses.[65]

Staff Findings and Justification

Because this Strategic Objective overlaps with many Commission proceedings, EPIC Administrators should avoid duplication with similar work at the CPUC, IOUs, and other entities, and demonstrate that investments are coordinated and complementary. Staff propose this Strategic Objective with above modifications as reasonable for the following reasons:

1. Aligns with several components of CPUC's High DER proceeding including: (i) requirements for utilities to use scenario planning to improve forecasting in their Distribution Planning and Execution Process; (ii) requirements for utilities to develop project prioritization methods and methods for integrated planning; (iii) requirements to address CPUC concerns about lack of transparency in IOU integrated planning and project prioritization methods; and (iv) requirements for utilities to include metrics evaluating equity in utility distribution plan reporting.[66]
2. Aligns with several components of CPUC's Climate Change Adaptation proceeding, including (i) requiring the IOUs to integrate the best available climate science, in coordination with the California Climate Assessment, into their long-term planning via

[63] D.24-10-030 at OP 24. Improvements to Distribution Planning and Project Execution Process, Distribution Resource Planning Data Portals, and Integration Capacity Analysis Maps.

[64] System Average Interruption Duration Index (SAIDI), System Average Interruption Frequency Index (SAIFI), and Customer Average Interruption Duration Index (CAIDI).

[65] D.20-07-032 at 16-18. Adopting Metrics and Methodologies for Assessing the Relative Affordability of Utility Service. The Affordability Ratio be calculated for representative customer at various points of the income distribution, but generally for the 20th percentile.

[66] D.24-10-030 at OP 6, at OP 25, and at 82-83. Improvements to Distribution Planning and Project Execution Process, Distribution Resource Planning Data Portals, and Integration Capacity Analysis Maps.

their Climate Adaptation Vulnerability Assessments (CAVAs),[67] (ii) recommending that IOUs integrate this best available climate science into other long-term planning proceedings,[68] and (iii) requiring that IOUs follow specific guidelines when proposing investments based on their CAVAs, including incrementality, prioritization, cost-effectiveness, and justification of investment.[69]

3. Consistent with the Governor's Clean Energy Transition Plan, which states that to meet the rapid grid expansion needed to realize California's climate and clean energy goals by 2045, upgrades to the electric distribution system are needed to accommodate local needs for electrified end-uses and distributed energy resources.[70] This Plan finds that because these upgrades are paid for by customer electric bills, a higher degree of planning than in the past is required to be equitable, timely, and cost-effective.
4. Supports the CPUC's DER Action Plan Grid Infrastructure Track, which is focused on CPUC actions to guide utility infrastructure planning and operations to make the most of existing and future infrastructure and maximize the value to ratepayers of DERs interconnected to the electric grid.[71] Supports cost-effectively meeting California's goal of 100% clean electricity by 2045 through modernization of tools used in the distribution planning process.

Strategic Objective 4: Reducing Cost of Whole Home Electrification

Table 2.7. Comparison of Final Report Proposed Strategic Objective to ED Staff Proposed Strategic Objective

Final Report Description with Modifications	ED Staff Proposed Strategic Objective
The EPIC program will accelerate innovation, demonstration, and reliable and ~~innovative~~ scalable approaches to deployment that help reduce the all-in cost of whole-home electrification and enable demand flexibility / automated response to process signals or dynamic rates for single-family and multi-family buildings and manufactured housing by	The EPIC program will accelerate innovation, demonstration, and reliable and scalable approaches to deployment that help reduce the all-in cost of whole-home electrification and enable demand flexibility / automated response to process signals or dynamic rates for single-family and multi-family buildings and manufactured housing by 50%, while decreasing residents' energy costs, by 2035.

[67] D.24-08-005 at OP 1-3. Phase 2 Decision Updating Climate Change Adaptation Modeling Requirements and Refining the Climate Adaptation and Vulnerability Assessments.

[68] D.24-08-005 at OP 4. Phase 2 Decision Updating Climate Change Adaptation Modeling Requirements and Refining the Climate Adaptation and Vulnerability Assessments.

[69] D.24-08-005 at OP 13. Phase 2 Decision Updating Climate Change Adaptation Modeling Requirements and Refining the Climate Adaptation and Vulnerability Assessments.

[70] Building the Electricity Grid of the Future: California's Clean Energy Transition Plan. Governor Gavin Newsom. May 2023. https://www.gov.ca.gov/wp-content/uploads/2023/05/CAEnergyTransitionPlan.pdf

[71] CPUC Distributed Energy Resources Action Plan 2.0 at 12. Adopted April 21, 2022. https://ia.cpuc.ca.gov/agendadocs/3506_results.pdf

50%, while decreasing residents' energy costs, by 2035.	

Background

In 2019, the Commission's Building Decarbonization proceeding scoped in the development of a coherent and comprehensive set of Commission rules, policies, and procedures accelerating and maximizing cost-effective reduction of GHG emissions from buildings to benefit ratepayers.[72] This is consistent with the Governor's call for the California Air Resources Board to incorporate building decarbonization into its 2022 Scoping Plan for Achieving Carbon Neutrality.[73] The Commission's efforts on Building Decarbonization are further supported by the California Energy Commission's findings that electrification of homes and businesses is an essential component of California's plan to achieve net zero greenhouse gas emissions.[74] Electricity use by California residential buildings accounts for over a third (36%) of all California electricity use and nearly two-fifths (39%) of California gas use.[75] A complementary DOE effort launched in 2023, the Affordable Home Energy Shot, aims to reduce the cost of energy-efficient retrofits in affordable homes in all 50 states through innovation by at least 50% and decrease residents' energy costs by at least 20% within a decade.[76] This DOE initiative is intended to be a long-term R&D effort focused on whole home building upgrades, efficient electrification, and smart controls for affordable multifamily, manufactured, and single-family homes. The federal initiative seeks to ensure that households in the greatest need will benefit from decarbonization solutions, particularly low-income households, and communities of color.

Table 2.8. Strategic Objective 4: Reducing Cost of Whole Home Electrification	
Related Strategic Goals	Building Decarbonization
Related Proceedings	**R.22-07-005.** Advance Demand Flexibility Through Electric Rates **R.20-01-007.** Long-Term Gas System Planning **R.19-01-011.** Building Decarbonization

[72] R.19-01-011. Order Instituting Rulemaking on Building Decarbonization at 7, 10, and 18, February 8, 2019.

[73] Governor Newsom Calls for Bold Actions to Move Faster Toward Climate Goals. Office of the Governor. State of California. July 22, 2022. Available online at https://www.gov.ca.gov/2022/07/22/governor-newsom-calls-for-bold-actions-to-move-faster-toward-climate-goals/

[74] Benefit-Cost Analysis of Targeted Electrification and Gas Decommissioning in California. California Energy Commission: PIR-20-009. December 2023.

[75] California Energy Commission. California Energy Consumption Database. 2022 data. Downloaded Sept. 19, 2024 from http://www.ecdms.energy.ca.gov/elecbyutil.aspx and http://www.ecdms.energy.ca.gov/gasbyutil.aspx

[76] U.S. Department of Energy. Affordable Home Energy Shot. 2023. https://www.energy.gov/eere/affordable-home-energy-shot

Staff Modification	Manufactured housing added to scope as it is a distinct use case with potentially different innovation solutions. Reliability, scalability, demand flexibility and automated response added to scope to incorporate the cross-cutting component of demand flexibility.
Gap Addressed	High cost of residential building electrification.
Metrics	• Change in modeled and actual all-in costs of whole-home electrification, with attribution by use, and disaggregated by community/region. • Total energy (MWh, MCF, MMBtu) and energy use intensity (energy used per square foot of conditioned space) reduction. • Tenant comfort measurements. • Affordability ratio (AR), defined by the CPUC as an essential utility services bill divided by the sum of household income minus nondiscretionary expenses.[77] • Customer cost savings ($) in aggregate and by low-income household served. • Energy utility bill cost savings in priority populations after program implementation. • Percent change in electrification in DVCs.

Staff Findings and Justification

EPIC administrators should coordinate to leverage knowledge and resources available through the federal Affordable Home Energy Shot and similar national programs but ensure there is no duplication of the federal programs. Staff propose this Strategic Objective with the above modifications as reasonable for the following reasons:

1. Aligns with several components of the CPUC's Building Decarbonization proceeding including: (i) maximizing cost-effective reduction of GHG emissions from buildings, (ii) development of current and future Title 24 building standards and Title 20 appliance standards at least cost, and (iii) supporting the future development of more stringent building codes.[78]
2. Aligns with several components of the CPUC's Long-Term Gas System Planning proceeding including: (i) informing how much gas infrastructure is needed to ensure reliable gas service from 2019-2030, 2030-2040, and beyond 2045; (ii) managing the natural gas transition, including through social research to understand human behavior and motivation, indicated by the long-range portfolio modeling in the CPUC's Integrated

[77] D.20-07-032 at 16-18. Adopting Metrics and Methodologies for Assessing the Relative Affordability of Utility Service. The AR be calculated for representative customer at various points of the income distribution, but generally for the 20th percentile.

[78] R.19-01-011. Order Instituting Rulemaking on Building Decarbonization, February 8, 2019.

Resource Plan program; and (iii) inform needs for facilitation of coordination between electric utilities and natural gas utilities.[79]

3. Supports the CPUC's Demand Flexibility proceeding through smart control innovation that could be of particular benefit to customers who are also enrolled in dynamic rate demand flexibility programs aimed at making electric bills more affordable and equitable.[80]
4. Supports the CPUC's goal to maximize cost-effective reduction of GHG emissions from buildings in support of the State's goals of reducing economy wide GHG emissions 40% below 1990 levels by 2030 and achieving carbon neutrality by 2045 or sooner.[81]

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

Table 2.9. Comparison of Final Report Proposed Strategic Objective to ED Staff Proposed Strategic Objective
Final Report Description: No Modifications
The EPIC program will accelerate innovative approaches, strategies, and business models to achieve lifecycle cost-parity for difficult-to-decarbonize commercial and industrial buildings and processes, with a specific focus on strategies that lead to the reduction of NOx, PM, and other surface-level pollutants impacting Disadvantaged and Vulnerable Communities.

Background

In 2020, the Commission established the scope of its Electric Integrated Resource Planning proceeding to consider the relationship of the electricity sector to industry, including for reliability, cost, criteria air pollutant emissions, and impacts on ESJ communities as part of meeting economy-wide GHG reduction goals.[82] In 2024, the Commission's Long-Term Gas System Planning proceeding determined it would consider how building electrification and other decarbonization and gas-related programs and proceedings can advance decarbonization and mitigate risks of adverse outcomes in the nearer term while long-term planning is underway.[83]

Industries requiring high heat and process emissions of carbon dioxide, and economic factors including low profit margins, capital intensity, long asset life, and trade exposure are the most

[79] R.20-01-007. Order Instituting Rulemaking to Establish Policies, Processes, and Rules to Ensure Safe and Reliable Gas Systems in California and perform Long-Term Gas System Planning, January 27, 2020.

[80] R.22-07-005. Order Instituting Rulemaking to Advance Demand Flexibility Through Electric Rates. Assigned Commissioner's Phase 1 Scoping Memo and Ruling. 11/2/2022. https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M498/K072/498072273.PDF

[81] R.19-01-011. Order Instituting Rulemaking Regarding Building Decarbonization at 3 and at 7. 2/8/2019. https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M264/K629/264629773.PDF

[82] R.20-05-003. Order Instituting Rulemaking, Electric Integrated Resource Planning and Related Procurement Processes at 7. 5/14/2020.

[83] R.24-09-012. Order Instituting Rulemaking, Long-Term Gas System Planning at 3. 10/4/2024.

difficult to decarbonize.[84] Difficult-to-decarbonize California industries include cement plants, glass manufacturers, paper manufacturers, chemical manufacturing, mining operations, stone, clay, metal processors, and food processors, as well as critical facilities such as hospitals that rely on fossil-fueled emergency backup power, and research laboratories requiring high temperature process heat.

Table 2.10. Strategic Objective 5: Innovative Approaches for Difficult-to-Decarbonize Sectors	
Related Strategic Goals	Building Decarbonization, Achieving 100 percent Net-Zero Carbon and the Coordinated Role of Gas
Related Proceedings	**R.24-09-012.** Long-Term Gas System Planning **R.20-05-003.** Electric Integrated Resource Planning and Related Procurement Processes **R.19-01-011.** Building Decarbonization
Staff Modification	No Staff modification.
Gap Addressed	High cost and lack of electrification solutions for difficult-to-decarbonize commercial and industrial sector applications.
Metrics	• Cost metric improvements, analyzed by process decarbonization category. • Reduced GHG emissions and improved air quality in DVCs. • Relative standing of community (census tract) based on population characteristics and pollution burden (Cal Enviro Screen to be used, where it identifies communities least able to afford increases in charges for affordable services).

Staff Findings and Justification

Staff propose this Strategic Objective without modification as reasonable for the following reasons:

1. Aligns with several components of the CPUC's Electric Integrated Resource Planning and Related Procurement Processes proceeding, including (i) relationship of the electricity sector to other sectors, including but not limited to industry, transportation, and buildings; (ii) impacts on environmental and social justice communities, and related

[84] The challenge of decarbonizing heavy industry. Brookings. June 2021. https://www.brookings.edu/articles/the-challenge-of-decarbonizing-heavy-industry/

issues; (iii) reliability, cost, GHG emissions, and criteria air pollutant analyses; and (iv) ensuring reasonable costs and minimizing bill impacts.[85]

2. Aligns with the preliminary scope of the CPUC's Long-Term Gas System Planning proceeding, including (i) how research, implementation, and coordination efforts should be leveraged and encouraged and (ii) how building electrification and other decarbonization and gas-related programs and proceedings should be leveraged to meet the proceedings key objectives of developing and implementing long-term gas transition planning approaches, methodologies and objectives and identifying and acting on opportunities for interim actions that can help reduce system and ratepayer costs and facilitate decarbonization in the nearer term.[86]
3. Consistent with the CPUC's proceeding on Building Decarbonization, the scope of which includes all policy framework issues that will help accomplish building decarbonization and is designed to be inclusive of any alternatives that could lead to the reduction of GHG emissions associated with energy use in buildings.[87]
4. Supports CPUC's Environmental and Social Justice Action Plan goal of increasing investment in clean energy resources to benefit ESJ communities, especially to improve local air quality and public health.[88]
5. Focuses on cases where direct or indirect electrification innovation may cost-effectively abate GHG emissions from difficult-to-decarbonize sectors in support of achieving California's goal of state-wide net zero GHG emissions by 2045.[89]

[85] R.20-05-003. Order Instituting Rulemaking, Electric Integrated Resource Planning and Related Procurement Processes at 7. 5/14/2020. https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M337/K641/337641522.PDF

[86] R.24-09-012. Order Instituting Rulemaking, Long-Term Gas System Planning at 2, 13, and 14. 10/4/2024. https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M542/K029/542029029.PDF

[87] R.19-01-011. Order Instituting Rulemaking Regarding Building Decarbonization. 2/8/2019. https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M264/K629/264629773.PDF

[88] CPUC Environmental & Social Justice Action Plan, Goal 2. Version 2.0. April 7, 2022.

[89] AB 1279, Muratsuchi. The California Climate Crisis Act. 2022.

Strategic Objective 6: Community-Scale Decarbonization

Table 2.11. Comparison of Final Report Proposed Strategic Objective to ED Staff Proposed Strategic Objective
Final Report Description: No Modifications
The EPIC Program will demonstrate technology, deployment strategies, planning approaches and businesses models for achieving 100% neighborhood- or community-scale electrification at cost-parity or on a cost-beneficial basis on a coordinated timeline with long-term gas planning activities at the CPUC, with a prioritization on addressing needs and obstacles of Disadvantaged and Vulnerable Communities.

Background

In 2020, the Commission's Building Decarbonization proceeding directed funding for two building decarbonization pilot programs to raise awareness of building decarbonization technologies and applications, test program and policy designs, and gain practical implementation experience and knowledge necessary to develop a larger scale approach in the future.[90]

Table 2.12. Strategic Objective 6: Community-Scale Decarbonization	
Related Strategic Goals	Transportation Electrification, Building Decarbonization, Achieving 100 percent Net-Zero Carbon and the Coordinated Role of Gas, Distributed Energy Resource Integration, Climate Adaptation
Related Proceedings	**R.24-09-012.** Long-Term Gas System Planning **R.23-12-008.** Transportation Electrification Policy and Infrastructure **R.21-06-017.** Modernize the Electric Grid for a High DER Future **R.19-01-011.** Building Decarbonization **R.18-04-019.** Strategies and Guidance for Climate Change Adaptation **GRC.** Electric and gas General Rate Case (GRC) proceedings
Staff Modification	No Staff modification.
Gap Addressed	High cost of community-scale decarbonization and uncertainty of timing and nature of transition from natural gas.

[90] D.20-03-027 at 7-8, at OP 9 and at OP 19. Establishing Building Decarbonization Pilot Programs.

Metrics	• Number of and total customers within 100% electrified/decarbonized communities. • Change in electricity, gas, fuel demand within 100% electrified/decarbonized communities. • Change ($/household) in total energy costs for participants in neighborhood- or community-scale electrification. • Change (%) in customer satisfaction for energy services. • Ratepayer cost savings in avoided upgrades to existing gas/electric infrastructure per household in the targeted electrified community and per household impact on all other ratepayers. • GHG reductions and air quality improvements in the electrified communities, particularly in priority populations. • % of participants at various income levels, % of EPIC project funding invested in and benefitting DVCs.[91] • Health and safety issues abated (number of homes with % frequency issues abated).[92] • Energy (MWh, MCF, MMBtu) and cost savings ($) for customers in aggregate or by low-income household served: Energy cost savings in priority populations after program implementation.[93] • Change (%) in energy burden. • Scalability of project approach, including % of utility customers meeting project eligibility criteria.

Staff Findings and Justification

Administrators should coordinate with CPUC staff and IOUs to ensure that any proposed EPIC investment plan strategic initiatives complement current CPUC approved investments and policies that advance progress in this area. Otherwise, this Strategic Objective could be duplicative of a Commission decision establishing building decarbonization pilot programs,[94] and specifically recent studies on benefit-cost analysis of targeted electrification and gas decommissioning in California.[95] With this caveat, Staff propose this Strategic Objective without modification as reasonable for the following reasons:

[91] Pacific Northwest National Laboratory (2024). Advancing Energy Equity and Justice in Planning https://epicpartnership.org/resources/ImpactAnalysisKickoff_Kazimierczuk.pdf

[92] Pacific Northwest National Laboratory (2021). Metrics for an Equitable and Just Energy System https://www.pnnl.gov/sites/default/files/media/file/Metrics%20for%20Energy%20Equity.pdf

[93] Pacific Northwest National Laboratory (2021). Metrics for an Equitable and Just Energy System https://www.pnnl.gov/sites/default/files/media/file/Metrics%20for%20Energy%20Equity.pdf

[94] D.20-03-027. Establishing Building Decarbonization Pilot Programs.

[95] An E3 study identifies 11 sites for targeted decarbonization in Northern California, and a RAND study identifies five sites for targeted decarbonization in Southern California. Both studies are funded by the CEC under PIER project PIR-20-008.

1. Supports cost-effectiveness of meeting California's GHG and heat pump targets.[96] Geographically concentrating decarbonization and avoiding gas pipeline replacement could produce substantial cost savings, as discussed in the *2024 Joint Agency Staff Paper: Progress Towards a Gas Transition*.[97]
2. Aligns with the CPUC's Long-Term Gas Planning proceeding, which will consider many aspects of long-term gas planning including how research, implementation and coordination efforts should be encouraged, as well as considering short- and medium-term actions to reduce gas infrastructure costs and facilitate decarbonization.[98]
3. Complements the CPUC's Building Decarbonization proceeding by developing innovations that may be deployed through CPUC building decarbonization pilot projects, and by developing innovations targeting both new community construction and existing community retrofit.[99]
4. Consistent with a 2023 CEC-funded study finding that community-scale decarbonization through electrification and gas decommissioning will significantly challenge the funding and cost recovery mechanisms for California's gas distribution system and that targeted electrification and gas decommissioning offers a cost-effective approach to support building electrification in specific locations where the costs of new gas infrastructure can be avoided.[100]

[96] Letter from Governor Newsom to CARB including a request to incorporate a goal of deployment of 6 million heat pumps statewide by 2030 into the final CARB Scoping Plan. July 22, 2022. https://www.gov.ca.gov/wp-content/uploads/2022/07/07.22.2022-Governors-Letter-to-CARB.pdf

[97] R.20-01-007. Assigned Commissioner's Ruling Scheduling Phase 3 Prehearing Conference and Providing Joint Agency Staff Gas Transition White Paper and Draft Phase 3 Scope and Schedule for Party Comment. Attachment A. 2024 Joint Agency Staff Paper: Progress Towards a Gas Transition at 32-33. February 22, 2024. https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M539/K741/539741115.PDF

[98] R.24-09-012. Order Instituting Rulemaking to Establish Policies, Processes, and Rules to Ensure Safe and Reliable Gas Systems in California and Long-Term Gas Planning at 2-3, and 13-14. September 2024. https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M539/K683/539683149.PDF

[99] Of the two building decarbonization pilot programs authorized by D.20-02-027, only the TECH initiative to advance early-stage low-emissions space and water heating equipment applies to both new and existing communities. The BUILD initiative applies only to new all-electric residential construction. See D.20-02-027 at 7 for further details.

[100] Benefit-Cost Analysis of Targeted Electrification and Gas Decommissioning in California. Evaluation of 11 Candidate Sites in the San Francisco Bay Area at 9 and at 12. California Energy Commission: PIR-20-009. Energy & Environmental Economics (E3). December 2023.

Strategic Objective 7: Impacts Research for New Generation and Storage

Table 2.13. Comparison of Final Report Proposed Strategic Objective to ED Staff Proposed Strategic Objective	
Final Report Description with Modifications	**ED Staff Proposed Strategic Objective**
The EPIC Program will ~~support the development of transparent and publicly understandable~~ conduct new lifecycle and techno-economic analysis, as needed, to identify the ~~of~~ emerging ~~generation, storage, and related~~ zero-carbon technologies with the lowest~~,~~ ~~focusing on assessing~~ economic, land, air, water, net energy, health, and safety impacts on California communities, including DVCs. ~~directly or indirectly affected, through comprehensive and replicable processes involving multiple stakeholders and opportunities for community engagement and evaluation of research focus and outputs~~.	The EPIC program will conduct new lifecycle and techno-economic analysis, as needed, to identify the emerging zero-carbon technologies with the lowest adverse and highest beneficial economic, land, air, water, net energy, health, and safety impacts on California communities, including DVCs.

Background

In 2021, the Commission's Energy Efficiency proceeding adopted lifecycle-based metric as the single goals metric for measuring energy efficiency program savings.[101] The metric reflects the lifecycle energy, capacity, and greenhouse gas benefits of a measure in dollar terms, in contrast to the separate energy and peak demand (i.e., kilowatt-hour, kilowatt, and therm) goals the CPUC had traditionally adopted. The Commission determined that use of a single lifecycle metric, expressed annually, will connect the goals for the program Administrators directly to the avoided cost value of energy efficiency savings, which should encourage achievement of savings that deliver high value.[102] The Commission utilizes lifecycle technology analysis as an important tool in measuring energy technology impacts. For instance, the CPUC's Energy Efficiency Program methodology for combining lifecycle analysis with cost analysis helps to better align its program with reducing GHG emissions and support customer equity and long-term energy grid stability.[103]

[101] D.21-09-037 at 3. Energy Efficiency Goals for 2022-2032.

[102] D.21-05-031 at 9. Assessment of Energy Efficiency.

[103] D.21-05-031 at 13-17. See also CPUC Better Aligns Energy Efficiency Programs To Reduce GHG Emissions, Support Equity, and Increase Grid Stability. May 20, 2021 https://www.cpuc.ca.gov/news-and-updates/all-news/cpuc-better-aligns-energy-efficiency-programs-to-reduce-ghg-emissions-and-increase-grid-stability

Table 2.14. Strategic Objective 7: Impacts Research for New Generation and Storage	
Related Strategic Goals	Achieving 100 percent Net-Zero Carbon and the Coordinated Role of Gas, Distributed Energy Resource Integration.
Related Proceedings	**R.24-09-012.** Long-Term Gas System Planning **R.24-01-017**. California Renewables Portfolio Standard Program **R.21-06-017.** Modernize the Electric Grid for a High DER Future **R.20-05-003.** Electric Integrated Resource Planning and Related Procurement Processes **R.18-04-019.** Strategies and Guidance for Climate Change Adaptation **R.13-02-008.** Biomethane Standards and Requirements, Pipeline Open Access Rules, and Related Enforcement Provisions
Staff Modification	(1) Clarifies on “new” lifecycle analysis research. (2) Adds techno-economic analysis which is needed to assess economic impacts. (3) Clarifies that focus is on zero-carbon technologies. (4) Clarifies purposes is to identify emerging technologies with lowest impact. (5) Clarifies that focus is on California communities. (6) Removes specificity that multiple stakeholders, including DVCs, will provide input on study processes and results as this in an overarching expectation for all Strategic Objectives. (7) Clarifies that research should demonstrate achieving state goals by mitigating energy costs.
Gap Addressed	California-specific analysis on the risk of unintended lifecycle impacts from emerging clean energy technology and processes, including the ability to achieve the State’s goals cost-effectively in consideration of affordability, is lacking.
Metrics	• Increased understanding of risks and knowledge gaps of new generation and storage technologies, measured in impacted or targeted communities. • Short, written plain language summaries shall be used to convey all major impact research planning and results to stakeholders in a simple and easily understood manner. • Number of community consultations held with community leaders.

	• Responsiveness of planning processes to participation and fairness of decisions, as measured by perceived output legitimacy for DVCs.[104,105] • Number and frequency of education and awareness sessions on curated topics

Staff Findings and Justification

Lifecyle analysis has an essential role in revealing unintended consequences of energy technology deployment by using a "cradle-to-grave" approach in analyzing a technology's upstream, operational, and downstream energy use and environmental impacts.[106] Technoeconomic analysis has an essential role in evaluating energy technology lifecycle economic impacts and cost-effectiveness.[107] Combining lifecycle environmental analysis with techno-economic cost analysis to monetize energy and environmental impacts provides a powerful tool for ensuring EPIC Strategic Goals will be met cost-effectively and with lowest environmental impact. Given the existing body of knowledge on energy lifecycle assessment, administrators should assess existing electricity technology lifecycle analysis studies to avoid duplication and ensure that additional research is complementary and necessary to identify and address knowledge gaps that support this Strategic Objective. Criteria for technology analysis selection should be developed to determine a priority ranking of technologies to be examined. Such an approach can help ensure EPIC funds are invested in innovation that will improve cost-effectiveness and reduce environmental impacts to ratepayers over the long lifetimes of electricity technology. Staff propose this Strategic Objective with modifications as reasonable for the following reasons:

1. Aligns with the Commission's precedent that lifecycle analysis has value for forecasting and tracking emissions reductions related to cost savings.[108]
2. Supports obtaining information necessary to consider all costs when meeting California's ambitious target of achieving state-wide net zero GHG emissions by 2045 with anthropogenic GHG emissions 85% below 1990 levels in 2045 in a cost-effective manner.[109]
3. Supports the CPUC's Long-Term Gas proceeding, which addresses gas transition planning to facilitate decarbonization activities over time in a way that supports equity, safety and affordability, and mitigates reliability challenges, commodity price spikes and

[104] Pacific Northwest National Laboratory (2024). Advancing Energy Equity and Justice in Planning. https://epicpartnership.org/resources/ImpactAnalysisKickoff_Kazimierczuk.pdf

[105] Perceived legitimacy of agricultural transitions and implications for governance. *Land Use Policy* Volume 116, May 2022, 106067. https://www.sciencedirect.com/science/article/pii/S0264837722000941

[106] See, for example, Life Cycle Assessment Harmonization, National Renewable Energy Laboratory at https://www.nrel.gov/analysis/life-cycle-assessment.html, and Life Cycle Analysis, Argonne National Laboratory at https://www.anl.gov/esia/life-cycle-analysis

[107] Technoeconomic & Life-Cycle Analysis. Lawrence Berkeley National Laboratory. https://energyanalysis.lbl.gov/technoeconomic-life-cycle-modeling

[108] D.21-05-031 at 2. Assessment of Energy Efficiency Potential and Goals and Modification of Portfolio Approval and Oversight Process.

[109] AB 1279, Muratsuchi. The California Climate Crisis Act. 2022.

other potential adverse outcomes.[110] Long-term planning work will require consideration of data and analytical needs and provide an additional tool for the Commission to assess the trajectory of developments in the gas sector over time with reference to metrics and milestones set out in scenario analyses.[111]

4. Supports the CPUC's High DER Future proceeding, which aims to capture and maximize the value that DERs provide to the distribution grid.[112] DER costs and benefits over their lifespan are crucial to incorporating DERs into distribution alongside traditional wires solutions on a least-cost /best-fit basis.[113]
5. Supports the CPUC's Electric Integrated Resource Planning (IRP) proceeding, which models electric system resource planning and includes an Inputs and Assumptions update process in each cycle for candidate resources and emerging technologies.[114] Specifically, supports IRP's (1) objective to identify a diverse and balanced portfolio of resources that provides optimal integration of renewable energy in a least-cost manner while maintaining reliability, (2) permitting status and resource feasibility assessment for busbar mapping criteria analysis, (3) promoting cost effectiveness of candidate resources and emerging technologies identified in the Inputs and Assumption process through research and pilot projects, and (4) cost effectiveness of IRP procurement for emerging technologies including offshore wind, geothermal, and long duration energy storage (12-hour and multi-day).[115]
6. Supports the CPUC's Renewables Portfolio Standard (RPS) proceeding's (1) ongoing monitoring, reviewing, and revising, as needed, of all RPS procurement methods, and (2) ongoing review and revising, if needed, of analytical tools to improve the RPS program and streamline its administration.[116] Includes some RPS procurement programs requiring specific generation technologies to be procured by the IOUs, such as the Bioenergy Market Adjusting Tariff (BioMAT) and Bioenergy Renewable Auction Mechanism (BioRAM) bioenergy programs.

[110] R.24-09-012. Order Instituting Rulemaking to Establish Policies, Processes, and Rules to Ensure Safe and Reliable Gas Systems in California and Long-Term Gas System Planning at 2. September 26, 2024. https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M542/K029/542029029.PDF

[111] R.24-09-012. Order Instituting Rulemaking to Establish Policies, Processes, and Rules to Ensure Safe and Reliable Gas Systems in California and Long-Term Gas System Planning at 2. September 26, 2024.

[112] R.21-06-017. Modernize the Electric Grid for a High DER Future. ACO Scoping Memo and Ruling at 5-6. November 15, 2021.

[113] Input from CPUC High DER Future proceeding subject matter experts, Nov. 15, 2024.

[114] Integrated Resource Plan and Long-Term Procurement Plan (IRP-LTPP), 2024-26 IRP Cycle Events and Materials. For more information see https://www.cpuc.ca.gov/irp

[115] D.24-08-064. Determining Need for Centralized Procurement of Long Lead-time Resources Procurement.

[116] R.24-01-017. Assigned Commissioner's Scoping Memo and Ruling on California Renewables Portfolio Standard Program at 2-5. May 9, 2024.

Strategic Objective 8: Increase Predictability of Weather, Intermittent Resources, and Load

Table 2.15. Comparison of Final Report Proposed Strategic Objective to ED Staff Proposed Strategic Objective	
Final Report Description with Modifications	**ED Staff Proposed Strategic Objective**
By 2030, the EPIC Program will ~~help achieve measurable reductions in climate-related risk to utility infrastructure through the development of open climate data, analytics, and technologies that~~ conduct data analysis and develop and/or improve modeling tools and technologies to measurably improve: a) predictions to electric system operational climate risk; ~~a~~b) ~~electricity~~ intermittent electric resource supply and electricity demand forecasts under climate uncertainty, ~~b) improve the ability to predict risks of extreme, climate-driven weather events to utility infrastructure,~~ c) open-access data on grid equipment condition and capability; and ~~c~~d) coordination between weather observation, forecasting, and grid operations~~, and d) inform and coordinate with utility systems planning, operations, and investment decisions~~.	By 2030, the EPIC program will conduct data analysis and develop and/or improve modeling tools and technologies to measurably improve: a) predictions to electric system operational climate risk; b) intermittent electric resource supply forecasts and electricity demand forecasts under climate uncertainty; c) open-access data on grid equipment condition and capability; and d) coordination between weather observation, forecasting, and grid operations.

Background

In 2022, the Commission's Demand Flexibility proceeding recognized the critical role of demand response in ensuring system reliability, especially during severe weather events as may be exacerbated by climate change, as California's electric system continues to integrate greater amounts of renewable generation and energy storage.[117] In 2020, the Commission's Electric Integrated Resource Planning (IRP) proceeding recognized California's electricity market is changing rapidly in many respects, including major shifts in the resource mix, weather, climate uncertainty, and increasing acceleration of electrification of building and transportation energy use.[118] Electricity supply includes generation from intermittent and renewable resources such as wind, solar, and hydropower which may be impacted by both short-term weather events and long-term climate change.

[117] R.22-07-005 at 1. Order Instituting Rulemaking to Advance Demand Flexibility Through Electric Rates. 7/22/2022.
https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M496/K285/496285639.PDF

[118] D.21-06-035 at FOF 4. Requiring Procurement To Address Mid-Term Reliability (2023-2026).

Table 2.16. Strategic Objective 8: Increase Predictability of Weather, Intermittent Resources, and Load	
Related Strategic Goals	Transportation Electrification, Building Decarbonization, Distributed Energy Resource Integration Achieving 100 percent Net-Zero Carbon and the Coordinated Role of Gas, Climate Adaptation
Related Proceedings	**R.22-07-005.** Advance Demand Flexibility Through Electric Rates. **R.20-05-003.** Electric Integrated Resource Planning and Related Procurement Processes.
Staff Modification	Clarifies focus is on tool development to address grid operational climate risk. Clarifies climate impacts on both generation and load are in scope. Clarifies monitoring grid condition and capability are in scope.
Gap Addressed	Need for improved data analysis and modeling tools to better predict electric system operations and planning under increasing climate uncertainty.
Metrics	• Development of advanced modeling tools to understand future load shapes of electrification, including transportation and home heating, in combination with current weather variability and extreme weather events. • Development of locational near-term climate modeling that can better predict 12-hour, 24-hour, or 72-hour renewable generation and load profiles. • Quantify correlation between CPUC Energy Modeling Team predictions and EPIC work, particularly for (a) behind the meter (BTM) PV generation, (b) variability of weather year managed and consumption peaks, and (c) consistency of predicted demand to historical trends in demand. • Development of locational long-term climate modeling that can better predict the likelihood of extreme weather events that may impact infrastructure. • Reductions in forecasting errors and mismatch with actual load. • Reduced risk of loss of load, reduced number and duration of load shed events • Continued and enhanced open access to data • Reduction in system resilience variability among service areas, particularly in DVCs. • Locational changes in service interruption indexes including SAIDI, SAIFI, and CAIDI.[119]

[119] System Average Interruption Duration Index (SAIDI), System Average Interruption Frequency Index (SAIFI), and Customer Average Interruption Duration Index (CAIDI).

Staff Findings and Justification

Improved technologies—including sensors—can improve data quality and modeling, increasing confidence in projection of extreme events, and justify and optimize investments for reliability. The development of locational near-term climate modeling that can better predict 12-hour, 24-hour, or 72-hour renewable generation and load profiles is responsive to the need to characterize grid conditions under climate uncertainty. The development of locational long-term climate modeling can better predict the likelihood of extreme weather events in a given area, which can inform infrastructure planning. Staff propose this Strategic Objective with above modifications as reasonable for the following reasons:

1. Aligns with the Cal-Adapt program, funded by EPIC, in improving climate modeling for near term weather forecasting to inform utility operations. Improved data analysis and modeling tools are necessary to better predict resilience needs for electric system operations and planning under increasing climate uncertainty.[120]
2. Consistent with the CPUC's proceeding on Demand Flexibility, specifically the design principle that demand flexibility tariffs should provide a dynamic price signal that should, to the extent feasible, accurately incorporate the marginal costs of energy, generation capacity, distribution capacity, and transmission capacity based on grid conditions.[121]
3. Improved demand flexibility informed by improved modeling and forecasting of this Strategic Objective can enhance the reliability of California's electric system, make electric bills more affordable and equitable, and reduce the curtailment of renewable energy and GHG emissions associated with meeting the state's future system load.[122]

[120] R.18-04-019. Order Instituting Rulemaking to Consider Strategies and Guidance for Climate Adaptation at 2. https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M213/K511/213511543.PDF

[121] D.23-04-040 at 3. Adopting Electric Rate Design Principles and Demand Flexibility Design Principles.

[122] R.22-07-005. Order Instituting Rulemaking, Advance Demand Flexibility Through Electric Rates. Assigned Commissioner's Phase 1 Scoping Memo and Ruling at 1. 11/2/2022.

Strategic Objective 9: Leveraging DERs for Grid and Community Resiliency

Table 2.17. Comparison of Final Report Proposed Strategic Objective to ED Staff Proposed Strategic Objective	
Final Report Description with Modifications	**ED Staff Proposed Strategic Objective**
The EPIC Program will support technology development, innovative deployment models, and real-world testing and evaluation for the demonstration of the use of clean distributed energy resources to reduce the impact of outage events, through strategies that ~~make outages invisible to~~ allow critical and/or essential loads and services to remain powered through such events and that reduce power restoration time for vulnerable populations, with a specific focus on solving challenges related to critical loads and services identified by Disadvantaged and Vulnerable Communities as critical community resilience needs.	The EPIC Program will support technology development, innovative deployment models, and real-world testing and evaluation for the demonstration of the use of clean distributed energy resources to reduce the impact of outage events, through strategies that allow critical and/or essential loads and services to remain powered through such events and that reduce power restoration time for vulnerable populations, with a specific focus on solving challenges related to critical loads and services identified by Disadvantaged and Vulnerable Communities as critical community resilience needs.

Background

In 2021, the Commission's High DER proceeding anticipated a high-penetration DER future in order to meet California's transportation electrification and climate goals.[123] The proceeding finds DER growth will continue to increase, especially due to policies and programs driving transportation electrification and associated DERs such as EVs and EV supply equipment.[124] The proceeding seeks to determine how to optimize the integration of millions of DERs within the distribution grid while ensuring affordable rates and mitigating any unintended negative impacts.[125]

The 2023 EPIC Strategic Goals process identified lack of robust and uniform data sharing and cybersecurity protocols for DER integration and transportation electrification.[126] The Commission endorsed cybersecurity as a crosscutting strategy to be considered in Strategic Objectives development.[127] The Commission's Microgrid proceeding seeks to protect the

[123] R.21-06-017. Order Instituting Rulemaking to Modernize the Electric Grid for a High DER Future at 9. https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M390/K664/390664433.PDF

[124] R.21-06-017. Order Instituting Rulemaking to Modernize the Electric Grid for a High DER Future, at 8.

[125] R.21-06-017. Order Instituting Rulemaking to Modernize the Electric Grid for a High DER Future at 9-10.

[126] EPIC Strategic Objectives Kick-Off Workshop. Workshop Presentation at 15 and at 23. March 19, 2024. https://epicpartnership.org/resources/Strat_Obj_KickOff_3_14.pdf

[127] D.24-03-007 at 28-29

health, safety, and lives of California residents during catastrophic events, including cyber-attacks.

Table 2.18. Strategic Objective 9: Leveraging DERs for Grid and Community Resiliency	
Related Strategic Goals	DER Integration, Transportation Electrification, Building Decarbonization, Climate Adaptation
Related Proceedings	**R.24-09-012.** Long-Term Gas System Planning. **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 DER Future. **R.19-09-009.** Microgrids Pursuant to Senate Bill 1339. **R.19-01-011.** Building Decarbonization. **R.18-04-019.** Strategies and Guidance for Climate Change Adaptation. **GRC.** Electric and gas General Rate Case (GRC) proceedings.
Staff Modification	Clarifies that critical and/or essential services are included in DVC resilience needs. Clarifies the intent that critical and/or essential loads and services to remain powered through outage events.
Gap Addressed	Critical and/or essential loads and services in DVCs is not well-identified. Microgrid switching for grid power outage and grid power restoration may not be seamless for critical and/or essential loads.
Metrics	• CPUC Resiliency Score Card metrics.[128] • Strategies that successfully demonstrate ability to remain powered, recover quickly from, or otherwise mitigate outage events, the MW load served by such strategies, and duration load was served. • Number of outages mitigated for individual projects. • Percent of load and DERs identified as critical load maintained during outage events. • Capacity (MW) of emitting backup generation replaced with zero-emission DERs. • Cost of solution implementation (for project and at scale), before and after-tax credits and incentives.

[128] The Resiliency Score Card is a component of CPUC's developing methodology of equitable resiliency evaluation and planning. The Score Card is a suggested tool that provides a basic benchmark of achievement but recognizes that more can be done. Information Session: Introduction to the CPUC Equitable Resiliency Study at 8. September 10, 2024. Available online under "Resiliency and Microgrids Events and Materials" at https://www.cpuc.ca.gov/resiliencyandmicrogrids

	• Number of circuits proactively addressed. • Operational and cost effectiveness of front of the meter (FTM) and behind the meter (BTM) solutions. • Sandia Resilient Node Cluster Analysis Tool (ReNCAT) social burden metrics.[129] • Duration (hours) of outages mitigated; the percent of load and DERs identified as critical load that maintains during outage events; MW of emitting backup generation replaced with zero-emission DERs; and the value of associated outages through the Interruption Cost Estimate (ICE) Calculator 2.0.[130] • Number of DVC residents who had access to power during an outage, number of minutes of power supplied by alternative methods during an unplanned outage (wildfire, calamity, etc.).[131]

Staff Findings and Justification

Strategies that allow critical and/or essential loads and services to remain powered through events such as extreme weather outages and summer peak load disruptions and reduce power restoration time for vulnerable populations can address the outsized burden that long-duration outages have on disadvantaged, low-income, ESJ, and tribal communities. While cybersecurity for DERs did not rise to the forefront in the EPIC Technical Working Groups, it appears to be a nascent area for EPIC innovation and should be focus of particular research development and coordination - including at the federal level. Given the potential for severe impacts from cyber-attacks on utility infrastructure and communications, RD&D for cybersecurity addresses a gap in reliability and safety. Staff propose this Strategic Objective with modifications as reasonable for the following reasons:

1. Supports the Commission's High-DER proceeding future consideration of (1) rate impacts and (2) alignment with the Commission's ESJ Action Plan.[132] The proceeding's scope specifically considers how the proceeding could advance or challenge achievement of the nine ESJ Action Plan goals.
2. Consistent with the Commission's Microgrid proceeding, including (i) supporting and reducing barriers to microgrid deployment while prioritizing system, public, and worker safety, and avoiding shifting costs between ratepayers, (ii) reducing greenhouse gas emissions; (iii) adapting to the impacts of a changing climate; and (iv) protecting the

[129] Sandia National Laboratory. Resilient Node Cluster Analysis Tool (ReNCAT). Available online at https://energy.sandia.gov/resilient-node-cluster-analysis-tool/

[130] U.S. DOE. Interruption Cost Estimate (ICE) Calculator. Available online at https://icecalculator.com/home

[131] Kenneth Holbrook (2024). Equity for Tribes (2023). https://epicpartnership.org/resources/Strat_Goals_Equity_Workshop-Holbrook.pdf

[132] R.21-06-017. Order Instituting Rulemaking on Modernize the Electric Grid for a High DER Future at 11 and at 16. https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M390/K664/390664433.PDF

health, safety, and lives of California residents during catastrophic events, such as wildfires, floods, earthquakes, extreme weather, or cyber-attacks.[133]

3. Supports achieving goals laid out in the CPUC's ESJ Action Plan by prioritizing resilience needs in DVCs and ensuring that critical resilience priorities as defined by both the utility and communities are met.[134] This includes ESJ Action Plan Goal 4 to increase climate resiliency in ESJ communities, and its associated Action Item 4.1.3 to develop a framework for integrating resiliency planning and evaluation into current grid planning policy and development of tools to guide utilities in resilience planning.
4. Supports optimizing DER integration for community resilience to avoid the negative impacts of distribution grid power disruptions.[135]

Strategic Objective 10: Expediting and Streamlining Interconnection and Energization Processes

Table 2.19. Comparison of Final Report Proposed Strategic Objective to ED Staff Proposed Strategic Objective

Final Report Description with Modifications	ED Staff Proposed Strategic Objective
The EPIC Program will support acceleration ~~accelerate~~ of the development, testing, and integration of innovative technology, communication protocols, and modeling approaches to streamlining interconnection and energization ~~permitting~~ processes for DER and electric vehicle charging infrastructure, with a goal to demonstrate the capability to ~~perform same-day~~ significantly reduce interconnection and ~~permitting~~ energization approval timelines under multiple high DER penetration and electrification scenarios, ~~and~~ with a priority for addressing challenges in Disadvantaged and Vulnerable Communities.	The EPIC Program will support acceleration of the development, testing, and integration of innovative technology, communication protocols, and modeling approaches to streamlining interconnection and energization processes for DER and electric vehicle charging infrastructure, with a goal to demonstrate the capability to significantly reduce interconnection and energization approval timelines under multiple high DER penetration and electrification scenarios, with a priority for addressing challenges in Disadvantaged and Vulnerable Communities.

[133] R.19-09-0092. Order Instituting Rulemaking on Microgrids Pursuant to Senate Bill 1339 at 2. https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M314/K274/314274617.PDF

[134] CPUC Environmental & Social Justice Action Plan at 43. Version 2.0. April 7, 2022.

[135] R.21-06-017. Order Instituting Rulemaking, Modernize the Electric Grid for a High DER Future at 18.

Background

In September 2024, the Commission's Energization Timeline proceeding established average and maximum energization targets and timelines for the IOUs.[136] In the same decision, the Commission adopted new reporting requirements to inform the Commission's consideration of accelerating energization targets and a mechanism for customers to report delays in the large electric IOUs' completion of their energization requests to the Commission.

In September 2020, the Commission adopted proposals to improve certainty regarding timelines for distribution upgrade planning, cost estimation, and construction for the interconnection process.[137] In the 2020 decision, the IOUs were required to track nineteen timelines in the interconnection process and provide quarterly reports.[138] The decision also established standard timelines for the installation of Net Generation Output Meters,[139] required the utilities to provide quarterly updates on substation upgrades to applicants whose projects are dependent on a substation upgrade, and established standard timelines for design and construction of interconnection-related distribution upgrades.[140]

In September 2019, the Commission established the Microgrids proceeding to consider what, if any, actions needed to be taken to help the commercialization of microgrids, both in front of the meter and behind the meter. One of the focuses of this proceeding was to consider improvements to streamline the IOU interconnection process and lower interconnection costs for microgrid applications (including direct current microgrids) and related resiliency strategies. All efforts in the proceeding also needed to prioritize system, public, and worker safety, and avoid shifting costs to non-participating ratepayers.[141] An early result of this proceeding resulted in the Commission requiring the IOUs to streamline and expedite applications and approvals for specific behind-the-meter resiliency projects.[142]

The U.S. Department of Energy (DOE) has found connecting more DERs will improve grid reliability and lower energy costs in communities across America and that interconnection delays are a barrier to the increased need to deploy DERs.[143] As the number of requests to

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[136] D.24-09-020 at 2-3. Establishing Target Energization Time Periods And Procedure For Customers To Report Energization Delays.

[137] D.20-09-035 at 82-98. Streamlining Interconnection: Adopting Recommendations From Working Groups Two, Three, and Subgroup.

[138] These included, for example, time from submission of Interconnection Request to time it's deemed complete, time from Interconnection Request is deemed complete to completion of initial review, and total time from submission of Interconnection Request to Permission to Operate. (*See* D.20-09-035 at 84-86.)

[139] A 20-business day timeline for the design of net generation output meters and a 20-business day timeline for construction. D.20-09-035 at 86-87 and 95.

[140] These are as follows: (i) 60 business days for design and 60 business days for construction; or (ii) design and construction timelines as agreed with the customer. D.20-09-035 at 86 and 93.

[141] R.19-09-009. Order Instituting Rulemaking at 2 and at 7. Microgrids Pursuant to Senate Bill 1339 and Resiliency Strategies. https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M314/K274/314274617.PDF

[142] D.20-06-017 at OP 4 and at 22-26. R.19-09-009. Microgrids Pursuant to Senate Bill 1339 and Resiliency Strategies.

[143] DOE Releases Draft Roadmap with Solutions to Improve Interconnection of Rooftop Solar, EV Chargers and Other Distributed Clean Energy Resources. September 6, 2024. https://www.energy.gov/eere/articles/doe-releases-draft-roadmap-solutions-improve-interconnection-rooftop-solar-ev

interconnect DERs to the electric grid continues to rapidly increase, increased queue times can delay the deployment of new clean energy resources and jeopardize state and local government goals supporting renewable generation and EV charging infrastructure.[144]

Table 2.20. Strategic Objective 10: Expediting and Streamlining Interconnection and Permitting	
Related Strategic Goal	DER Integration, Transportation Electrification
Related Proceedings	**R.24-01-018.** Establish Energization Timelines. **R.23-12-008.** Transportation Electrification Policy and Infrastructure. **R.21-06-017.** Modernize the Electric Grid for a High DER Future. **R.19-09-009.** Microgrids Pursuant to Senate Bill 1339 and Resiliency Strategies. **R.17-07-007.** Streamlining Interconnection of Distributed Energy Resources and Improvements to Rule 21.
Staff Modification	Clarifies it is not EPIC's role to directly accelerate interconnection and energization timeline decrease, but it can support with research, strategic plans, and pilot concepts. Clarifies the objective applies to both interconnection and energization. Distinguishes between local permitting and CPUC-jurisdictional utility processes such as applications for Permission to Operate. Modifies the desired timelines to better reflect achievable objectives.
Gap Addressed	Long lead times for DER and VGI technology grid integration on constrained circuits slows electrification and increase energy costs.
Metrics	• % decrease in time to receive electric service for energization customers and utilities. • % decrease in interconnection time from application to Permission to Operate (PTO) for customers and utilities. • % of DERs and EVs interconnected with expedited timelines. • Decrease in interconnection and energization costs over time due to reduced timelines.

[144] DOE Releases Draft Roadmap with Solutions to Improve Interconnection of Rooftop Solar, EV Chargers and Other Distributed Clean Energy Resources. September 6, 2024.

	• Affordability ratio (AR), defined by the CPUC as an essential utility services bill divided by the sum of household income minus nondiscretionary expenses.[145] • Assess if the same, or modifications to the tools can be used by local jurisdictions to expedite the permitting process.

Staff Findings and Justification

Staff propose this Strategic Objective with above modifications as reasonable for the following reasons:

1. Aligns with several components of the CPUC's Streamlining Interconnection proceeding (and successor proceedings) including streamlining (efficiency, transparency, and clarity) for the process of interconnection to utility distribution lines by providing data necessary for future data-driven considerations of process improvements.[146]
2. Consistent with the CPUC's Microgrids proceeding, specifically to streamline the Rule 21 interconnection process and lower interconnection costs for microgrid applications.[147] This includes but is not limited to direct current microgrids.[148]
3. Aligns with the CPUC's Resource Adequacy proceeding to continue its efforts to ensure the availability of reliable and cost-effective electricity supply in California through implementation and administration of its Resource Adequacy program.[149] Enhancements to the interconnection process will help bring new resources to market more quickly to meet near and mid-term reliability needs and will help mitigate scarcity pricing concerns.
4. Complementary to the California Independent System Operator's (CAISO's) ongoing initiative to enhance its generator interconnection process, specifically to prioritize studies and accelerate interconnection to the CAISO grid for projects most likely to be developed.[150] CPUC staff is engaged with these CAISO efforts, which are intended to tighten linkages among resource and transmission planning activities, interconnection processes, and resource procurement. CPUC staff is actively seeking innovative practices to better prioritize interconnection of preferred resources in both the CAISO's process and the utilities' distribution facilities.

[145] D.20-07-032 at 16-18. Adopting Metrics and Methodologies for Assessing the Relative Affordability of Utility Service. The Affordability Ratio be calculated for representative customer at various points of the income distribution, but generally for the 20th percentile. https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M344/K049/344049206.PDF

[146] R.17-07-007. Streamlining Interconnection of Distributed Energy Resources and Improvements to Rule 21. D.20-09-035 at 2 and at 93.

[147] D.20-06-017 at COL 14, at COL 28, and at OP 10. Short-Term Actions To Accelerate Microgrid Deployment And Related Resiliency Solutions.

[148] R.19-09-009. Order Instituting Rulemaking, Regarding Microgrids Pursuant to Senate Bill 1339 and Resiliency Strategies. ACO Scoping Memo and Ruling for Track 1 at 5.

[149] R.23-10-011. Order Instituting Rulemaking at 11. Oversee the Resource Adequacy Program.

[150] CAISO 2023 Interconnection Process Enhancements Initiative. For more information see https://stakeholdercenter.caiso.com/StakeholderInitiatives/Interconnection-process-enhancements-2023

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

Table 2.21. Comparison of Final Report Proposed Strategic Objective to ED Staff Proposed Strategic Objective	
Final Report Description with Modifications	**ED Staff Proposed Strategic Objective**
~~In coordination with relevant CPUC proceedings,~~ ~~t~~ The EPIC Program will conduct analysis, ~~coordination, and~~ real-world demonstrations, and data collection to ~~that can~~ support the development and ongoing update of an evidence-based framework for the location-, time-, and performance-based values of grid services that are a) usable by grid operators to reduce costs to ratepayers and expand opportunities for distributed zero-emission technologies, and b) accessible by any DER, electric vehicle, or flexible load~~, and c) include appropriate baselines~~.	The EPIC Program will conduct analysis, real-world demonstrations, and data collection to support the development and ongoing update of an evidence-based framework for the location-, time-, and performance-based values of grid services that are a) usable by grid operators to reduce costs to ratepayers and expand opportunities for distributed zero-emission technologies, and b) accessible by any DER, electric vehicle, or flexible load.

Background

In its 2022 Integrated Distributed Energy Resources (IDER) proceeding, the Commission determined it must pursue additional refinement in several issue areas, including development of methods to properly value greenhouse gas emissions avoided cost.[151] In 2021, the Commission's Distribution Resources Plans (DRP) proceeding determined it must pursue additional refinement in locational benefit evaluation, cost-effective DER deployment mechanisms, and cost-effective DER integration into distribution planning consistent with the goal of yielding net benefits to ratepayers.[152] In its 2021 High DER proceeding, the Commission determined 12 new and outstanding issues remain to be resolved to ensure the grid can efficiently and cost-effectively support the growth of DERs.[153] Among these, and directly linked to this Strategic Objective, is the Commission's determination that DER value streams including energy and ancillary services, greenhouse gas costs/credits, and resiliency

[151] D.22-05-002 at OP 5. Adopting Changes to Avoided Cost Calculator in the Integrated Distributed Energy Resources proceeding.

[152] D.21-09-005 at 18-21. Approving, as Modified, and Closing Applications in the Distribution Resources Plans proceeding.

[153] R.21-06-017. Order Instituting Rulemaking, Modernize the Electric Grid for a High DER Future at 13 and at Appendix C. 7/22/2021. https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M390/K664/390664433.PDF

remain untapped.[154] Finally, DERs, whether load reducing or load increasing, play a role in energization discussions as they impact grid management and reliability.[155]

Table 2.22. Strategic Objective 11: Providing Data Input into a Value of DER Framework	
Related Strategic Goals	DER Integration, Building Decarbonization, Transportation Electrification
Related Proceedings	**R.24-01-018.** Establish Energization Timelines. **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 DER Future. **R.19-01-011.** Building Decarbonization. **GRC.** Electric and Gas General Rate Case (GRC) proceedings.
Staff Modification	Removes the coordination with relevant CPUC proceedings because it is an overarching required component to all of the proposed Strategic Objectives. Clarifies analysis, demonstration, and data will be combined to create a framework for characterizing the value of DER grid services as the endpoint. Removes establishing baselines as this is an overarching recommendation to all proposed Strategic Objectives.
Gap Addressed	Uptake of innovation to improve grid flexibility is slowed by lack of understanding of the value of grid services provided by distributed generation and flexible load such as electric vehicles, battery storage, and VGI technology integration.
Metrics	• The establishment of standard procedures to evaluate distributed and flexible load grid services, baselines, and benefits. • Open access to data to be evaluated by the framework. • Number of calls for grid services. • Units of grid service provided (kW, kWh, kVAR, etc.). • Change in number of registered grid service providing assets. • Change in number of customers enrolled in load flexibility, integrated load flexibility, and dynamic rate programs statewide. • Extent of cost-effective peak load reduction ($/kW).

[154] R.21-06-017. Order Instituting Rulemaking, Modernize the Electric Grid for a High DER Future at Appendix C, Item (G). List of New and Outstanding Issues. 7/22/2021
https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M392/K348/392348813.pdf

[155] D.24-09-020 at 18. Establishing Target Energization Time Periods And Procedure For Customers To Report Energization Delays.

	• Capacity (MW) and value ($) of deferred or avoided grid upgrades due to load flexibility. • Share (%) of DVCs enrolled in relevant programs pertaining to DER, Transportation Electrification, Building Decarbonization, and/or dynamic rates.[156] • Documented impacts from community consultations held with community leaders. • Change in number of contractors offering more than two DER programs.

Staff Findings and Justification

Staff propose this Strategic Objective with above modifications as reasonable for the following reasons:

1. Supports the CPUC's Distributed Energy Resource Action Plan in maximizing the ratepayer and societal value of millions of DERs on the grid, while ensuring affordable and equitable rates.[157]
2. Aligns with several components of the CPUC's High DER proceeding, including (i) improving IOU distribution planning processes to better capture DER value and optimize DER siting, (ii) improving integration capacity analysis data to enhance accuracy and usefulness for DER planning, siting, and interconnection, (iii) identifying and addressing gaps and barriers to unlocking economic opportunities for DERs to provide grid services, reduce ratepayer costs, increase equity, and meet State policy objectives, and (iv) leveraging DER smart inverter capabilities to provide value to grid operators and ratepayers.[158]
3. Consistent with the CPUC's proceeding on Demand Flexibility, specifically the design principle that demand flexibility tariffs should provide a dynamic price signal that should, to the extent feasible, accurately incorporate the marginal costs of energy, generation capacity, distribution capacity, and transmission capacity based on grid conditions.[159]
4. Consistent with the State's goal to cost-effectively meet California's target of achieving a renewable and zero-carbon power sector by 2045.[160]

[156] Pacific Northwest National Laboratory (2021). Metrics for an Equitable and Just Energy System.https://www.pnnl.gov/sites/default/files/media/file/Metrics%20for%20Energy%20Equity.pdf

[157] CPUC Distributed Energy Resource (DER) Action Plan 2.0 at 4. April 21, 2022 https://www.cpuc.ca.gov/about-cpuc/divisions/energy-division/der-action-plan

[158] R.21-06-017. Assigned Commissioner's Amended Scoping Memo and Ruling at 5-7. 8/11/2023.

[159] D.23-04-040 at 3. Adopting Electric Rate Design Principles and Demand Flexibility Design Principles.

[160] AB 1279, Muratsuchi. The California Climate Crisis Act. 2022.

Strategic Objective 12: Reducing Feeder / Circuit Peaks

Table 2.23. Comparison of Final Report Proposed Strategic Objective to ED Staff Proposed Strategic Objective
Final Report Description: No Modifications
To support ratepayer affordability, the EPIC Program will accelerate innovation, demonstration, and deployment of innovative and replicable methods to increase the utilization rate of a circuit and reduce circuit and feeder peak loads, in order to avoid or defer costly grid upgrades, through the coordination of DERs, EVs, flexible load, and grid intelligence, with a focus on circuits serving Disadvantaged and Vulnerable Communities where increased adoption of zero-emission technologies can increase equitable benefits.

Background

In October 2024, the Commission's High DER proceeding established policies to enable swift evolution of IOU grid capabilities and operations to integrate solar, storage, electric vehicle equipment, and other DERs to meet the State's 100 percent clean energy goals.[161] These policies are aligned with implementation of the Commission-adopted Limited Generation Profile option to alleviate capacity distribution-level constraints and requirements for the IOUs to modify Integration Capacity Analysis methodologies to make use of Limited Generation Profile application information.[162]

A 2021 UC Berkeley study found that grid limits pose constraints for future DER deployment across utility territories and may exacerbate existing inequities related to DER adoption.[163] With all grid constraints enforced, the study found over half of households served by PG&E and SCE lack grid access to adopt sufficient photovoltaic capacity to offset their annual electricity consumption, on average. The study also found grid capacity for DERs decreases for priority populations as measured by the CalEnviroScreen indicators.

[161] D.24-10-030 at OP 1-42. Improvements To Distribution Planning And Project Execution Process, Distribution Resource Planning Data Portals, And Integration Capacity Analysis Maps.

[162] D.24-10-030 at OP 32-33. Improvements to Distribution Planning and Project Execution Process, Distribution Resource Planning Data Portals, and Integration Capacity Analysis Maps.

[163] Inequitable access to distributed energy resources due to grid infrastructure limits in California. Nature Energy volume 6, at 892–903 (2021). https://www.nature.com/articles/s41560-021-00887-6

Table 2.24. Strategic Objective 12: Reducing Feeder/Circuit Peaks	
Related Strategic Goals	Building Decarbonization, Transportation Electrification, DER Integration, Achieving 100 percent Net-Zero Carbon and the Coordinated Role of Gas
Related Proceedings	**R.24-01-018.** Establish Energization Timelines. **R.23-12-008.** Transportation Electrification Policy and Infrastructure. **R.23-10-011.** Resource Adequacy Program **R.22-07-005.** Advance Demand Flexibility Through Electric Rates. **R.21-06-017.** Modernize the Electric Grid for a High DER Future. **R.20-05-003.** Electric Integrated Resource Planning and Related Procurement Processes. **R.19-01-011.** Building Decarbonization.
Staff Modification	No Staff modification.
Gap Addressed	High cost of upgrading capacity-constrained feeder lines and circuits.
Metrics	• Avoided grid capacity upgrade costs, on a per project basis, and extrapolated if deployed at scale. • Transformer upgrade deferrals vs expectations. • Changes in load factor for demonstration projects. • Increases in flexible load capacity as a percent of peak power, both grid-wide and locally. • Reduction in number and line-miles of DER capacity-limited feeders/circuits. • Adoption of a planning model to compare leveraging DERs to a grid upgrade. • Program Acceptance Rate: % of DVCs enrolled in relevant programs pertaining to DER, Transportation Electrification, and Building Decarbonization.[164] • Community Acceptance Rating: Community Satisfaction Score indicating acceptance and support for investment.[165]

[164] Pacific Northwest National Laboratory (2021). Metrics for an Equitable and Just Energy System. https://www.pnnl.gov/sites/default/files/media/file/Metrics%20for%20Energy%20Equity.pdf

[165] Pacific Northwest National Laboratory (2021). Metrics for an Equitable and Just Energy System. https://www.pnnl.gov/sites/default/files/media/file/Metrics%20for%20Energy%20Equity.pdf

Staff Findings and Justification

Staff propose this Strategic Objective without modification as reasonable for the following reasons:

1. Aligns with several components of the CPUC's High DER proceeding, including (i) improving integration capacity analysis data to enhance accuracy and usefulness for DER planning, siting, and interconnection, (ii) leveraging DER smart inverter capabilities to provide value to grid operators and ratepayers, and (iii) identifying updates are needed to the CPUC's Grid Modernization Framework to better prepare the electric grid for a high DER future.[166,167]
2. Supports the CPUC's Transportation Electrification Policy and Infrastructure proceeding in addressing how the IOUs will effectively and affordably support the pace and scale of transportation electrification growth required to achieve California's zero-emission vehicle goals, including improved early identification of future transportation electrification load to support existing electric grid planning processes, and development of priority regions for transportation electrification load.[168]
3. Consistent with the state's goal to cost-effectively achieve California's target of achieving 100% clean electricity retail sales from eligible renewable energy resources and zero-carbon resources by 2045.[169]

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

Table 2.25. Comparison of Final Report Proposed Strategic Objective to ED Staff Proposed Strategic Objective

Final Report Description with Modifications	ED Staff Proposed Strategic Objective
By ~~2029~~ 2033, the EPIC program will develop and demonstrate tools, technologies, and frameworks that improve long-term planning and achieve more cost-effective capital investments for grid hardening for long-term climate impacts, with a focus on increasing affordability, reducing outage risk, and reducing social burdens of outages.	By 2033, the EPIC program will develop and demonstrate tools, technologies, and frameworks that improve long-term planning and achieve more cost-effective capital investments for grid hardening for long-term climate impacts, with a focus on increasing affordability, reducing outage risk, and reducing social burdens of outages.

[166] R.21-06-017. Assigned Commissioner's Amended Scoping Memo and Ruling at 5-8. 8/11/2023.

[167] The CPUC's Grid Modernization Framework is defined by D.18-03-023 at 2 in the Proceeding on Development of Distribution Resources Plans Pursuant to Pub. Util. Code § 769.

[168] R.23-12-008. Order Instituting Rulemaking on Transportation Electrification Policy and Infrastructure at 7-9. 12/20/2023.

[169] SB 1020, Laird. Clean Energy, Jobs, and Affordability Act of 2022.

Background

In 2020, the Commission's Climate Adaptation proceeding required each large investor-owned utility (IOU) to file a Climate Adaptation Vulnerability Assessment (CAVA) every four years.[170] The purpose of the CAVA is to serve as a report to inform long-term planning for 1) identifying vulnerabilities and risks to IOU assets, operations, and services caused by climate change impacts and 2) describe adaptation solutions. As part of this consideration, the Commission also requires the IOUs to simultaneously submit Risk Assessment and Mitigation Phase (RAMP) reports. Both reports consider best practice climate modeling[171] and historical observed data to inform the IOUs' GRCs by justifying related proposed infrastructure investments. The two risk assessment approaches are related, but not identical. For instance, CAVAs consider a multi-decade long-term planning timeframe.[172]

The Commission has previously approved funds for EPIC to develop tools that support Climate Adaptation efforts such as Cal-Adapt. Cal-Adapt is a platform which analyzes global climate data and downscales for California assessment at the statewide and regional levels to inform targeted climate adaptation planning. Cal-Adapt's data and tools are utilized by the California Climate Change Assessments and IOUs' CAVAs.[173]

Table 2.26. Strategic Objective 13: Cost-Effective Grid Hardening for Long-Term Climate Impacts	
Related Strategic Goals	Transportation Electrification, Building Decarbonization, Climate Adaptation
Related Proceedings	**R.18-04-019.** Strategies and Guidance for Climate Change Adaptation. **GRC.** Electric General Rate Case (GRC) proceedings.
Staff Modification	Clarifies the timeframe for Objective. Clarifies EPIC will gather data on technology (hardware and equipment) demonstrations.
Gap Addressed	Lack of capital investment planning tools and frameworks for grid hardening to address cost, service, and societal risks from long-term climate change impacts.

[170] D.20-08-046 at OP 9. Energy Utility Climate Change Vulnerability Assessments And Climate Adaptation In Disadvantaged Communities (Phase 1, Topics 4 and 5).

[171] D.24-08-005. Updating Climate Change Adaptation Modeling Requirements and Refining the Climate Adaptation and Vulnerability Assessments. https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M537/K988/537988980.PDF

[172] D.24-08-005, Attachment A at 2. Climate Adaptation and Vulnerability Assessments (CAVA) Investment Proposal Guidelines.

[173] EPIC projects supporting Cal-Adapt are project numbers EPC-15-008, EPC-15-036, EPC-17-033, EPC-20-007, EPC-21-037, EPC-21-038, and EPC-23-024. Cal-Adapt data and tools are available online at https://cal-adapt.org

Metrics	• Number of new transformer technology, conductors, or other equipment tested or deployed to determine real-world performance and cost-effectiveness. • Increased access to open climate data and analytics. • Locational changes in service interruption indexes including SAIDI, SAIFI, CAIDI and CEMI.[174] • Change in amount (number, capacity, and $-value) of electric system infrastructure identified as vulnerable. • Change in capital costs from baseline for climate-adaptation-related projects/circuits and extrapolated at scale. • Change in O&M costs for climate-adaptation-related projects and extrapolated at scale. • Changes in repetitive loss metrics (including capacity and $-value) for electric infrastructure and services. • Usage of baselines developed under modeled conditions. • Change in restoration time metrics, including Customers Experiencing Long Interruption Duration (CELID). • Change in Social Burden as measured by Sandia National Laboratory Resilient Node Cluster Analysis Tool (ReNCAT) metrics. • Duration (hours) of outages mitigated; the percent of load and DERs identified as critical load that maintains during outage events; MW of emitting backup generation replaced with zero-emission DERs; and the value of associated outages through the Interruption Cost Estimate (ICE) Calculator 2.0.

Staff Findings and Justification

The development of increasingly sophisticated data, tools, and methodologies will aid the IOUs in being able to better predict potential climate impacts to proactively develop solutions for maintain resilient infrastructure, operations, and services. This data is necessary for the IOUs to justify proposed investments in ratemaking proceedings that are prudent and demonstrate cost-efficient incremental solutions that will mitigate costs for ratepayers in the long run while ensuring their energy systems are reliable in the face of climate change.[175] In implementing this Strategic Objective, Administrators should take care to coordinate with the IOUs as well as the proceeding's efforts to develop Equity Impact Metrics to avoid duplication. [176] Staff propose this Strategic Objective with the above modification as reasonable for the following reasons:

[174] System Average Interruption Duration Index (SAIDI), System Average Interruption Frequency Index (SAIFI), Customer Average Interruption Duration Index (CAIDI), and Customers Experiencing Multiple Interruptions (CEMI).

[175] D.24-08-005 at 19-20. Updating Climate Change Adaptation Modeling Requirements and Refining the Climate Adaptation and Vulnerability Assessments.

[176] This includes current IOU collaboration with the CPUC and Sandia National Laboratory on the RenCAT tool, and IOU collaboration on open-source climate data through Cal-Adapt, and EPIC-funded project.

1. Aligns with several components of the CPUC's Climate Adaptation proceeding, including: 1) considering how to address climate change adaptation for the IOUs to ensure safety and reliability of utility operations; 2) usage of most up-to-date climate science data sources, tools, and other resources to inform climate assessments, adaptation proposals, and community adaptive capacity; and 3) continued development of data, tools, and methodologies to improve assessments of and resiliency planning for potential climate impacts to IOU infrastructure, operations, and services.[177]
2. Supports the CPUC's ESJ Action Plan: 1) Goal 4 to increase climate resiliency and adaptive capacity in ESJ communities; 2) Action Item 4.1.1 to initiate climate adaptation planning with emphasis on disadvantaged and vulnerable communities.[178] Supports the current Climate Adaptation proceeding, particularly Task 2 of the Phase 2 Scope, which considers additional guidance for measuring community adaptive capacity in CAVA analyses.[179]

Section 4. Processes to Implement and Measure Strategic Goals and Objectives

To support and ensure achievement of the Commission's requirements for implementing EPIC Strategic Goals and Strategic Objectives, Staff propose requirements and processes to measure progress and impacts of EPIC investments. These processes are necessary to form the basis for future program evaluations as well as the Commission's consideration of EPIC funding beyond 2030.[180] Staff recommend that the Commission utilize and authorize funds from its EPIC administrative budget as reasonable and necessary to implement these improved EPIC oversight activities for program accountability of hundreds of millions of ratepayer dollars.

Initiatives for Measurable Progress

The Commission states it is foundationally important for Administrators to have clear metrics and consistently report on EPIC's investment progress.[181] It further requires that EPIC Strategic Goals and Strategic Objectives produce results that are measurable, affordable, and cost-effective.[182] In alignment with these policies, Staff propose a public workshop process to inform establishing the following mechanisms for evaluating and tracking the impacts of all EPIC initiatives and projects and to fill gaps in the record.[183]

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[177] R.18-04-019. Order Instituting Rulemaking to Consider Strategies and Guidance for Climate Change Adaptation at 17-18. https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M213/K511/213511543.PDF

[178] CPUC ESJ Action Plan 2.0 at 42-43. https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/news-and-outreach/documents/news-office/key-issues/esj/esj-action-plan-v2jw.pdf

[179] R.18-04-019. Phase 2 Scoping Memo and Ruling, Question 1.6 at 14. https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M510/K465/510465632.PDF

[180] The Commission has a budget to oversee the EPIC program, capped at 0.5% of the total EPIC budget. D.12-05-037 at OP 5.

[181] D.18-10-052 at 100.

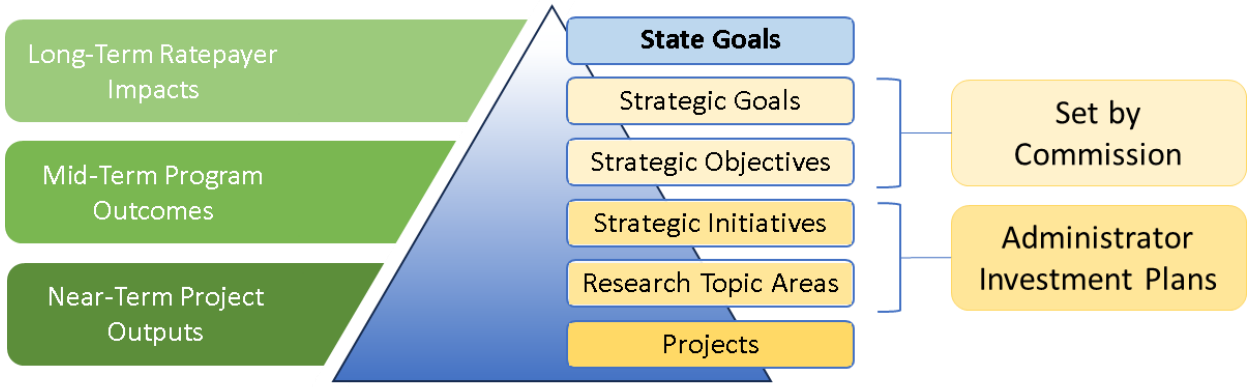
[182] D.12-05-037 at OP 2 and at 20; D.21-11-028 at OP 2 and at Appendix A; D.23-04-042 at 12-16; Pub. Util. Codes §§ 8360 and 8366.

[183] D.21-11-028 at OP 12.

- **Baselines:** Establish baselines necessary to measure change in progress, including Market Transformation.
- **Metrics Criteria:** Identify criteria and processes by which Administrators should be required to justify appropriate metrics and data.
- **Impact Assessment Framework:** Refine framework guidelines for impact assessment of all measured elements.
- **Market Transformation**: Develop an EPIC Market Transformation Initiative (EMTI) to ensure EPIC is delivering measurable benefits to ratepayers that can demonstrate outcomes such as scalability and commercialization.

Each administrator should use these mechanisms to justify their Investment Plans and demonstrate progress and impacts for near-, mid-, and long-term time frames, corresponding with EPIC program outputs, outcomes, and impacts, as shown below in Figure 4.1.[184]

Figure 4.1 Illustration of EPIC Strategic Planning Hierarchy



In alignment with State Goals, EPIC Strategic Goals extend through 2045. EPIC strategic elements progress from least granular and longest term at the top to most granular and nearest term at the bottom. The Commission sets Strategic Goals and Objectives and approves Administrator Investment Plan Strategic Initiatives and Research Topic Areas. Administrators execute Investment Plan through individual projects.

Table 4.1 maps the elements to be evaluated to each timeframe and illustrates that different baselines, data, and processes may be needed for each timeframe. For near-term timeframes, individual project outputs are the measured element used to gauge the performance of Research Topic Areas, which should be apparent progress demonstrated in the EPIC database. For mid-term timeframes, success of Strategic Initiatives in meeting Strategic Objectives is gauged through Market Transformation Initiative outcomes. Long-term impacts are demonstrated through the Market Transformation Initiative by performance of Strategic Objectives in meeting Strategic Goals, with metrics measuring the ultimate ratepayer impacts of EPIC investments.

[184] EPIC Uniform Impact Analysis Framework Kick-off Workshop. April 2, 2024. Fredric Beck. Defining A Uniform Impact Analysis Framework at 4. https://epicpartnership.org/resources/ImpactAnalysisKickoff_Beck.pdf

Table 4.1. EPIC Impact Timeframes vs. Progress Measurement				
Time Frame	**Measured Element**	**Progress Rollup**	**Baseline and Metrics**	**Measured Element Description**
Near-term Outputs	Project	Research Topic Area	Technology and Operational	Project performance as demonstrated in the EPIC database and annual reports, with analysis of Research Topic Area effectiveness in supporting Strategic Initiatives.
Mid-term Outcomes	Strategic Initiative	Strategic Objective	Market and Deployment	Strategic Initiative effectiveness in realizing Strategic Objectives as demonstrated through outcomes of the Market Transformation Initiative.
Long-Term Impacts	Strategic Objective	Strategic Goal	Ratepayer and Societal	Strategic Objective impacts on meeting strategic goals as demonstrated by attributable IOU-level ratepayer impact, GHG and airshed emission reduction, and other attributable progress toward meeting State Goals.

Elements Required for Measurable Progress

The foundations for the above proposed measurable progress mechanisms are found within existing Commission requirements.[185] The workshop process will focus on elaborating upon these and identifying the necessary details and requirements for Commission consideration in developing guidance that accelerates innovation and ensures consistent, measured progress for the last phase of EPIC.

Baseline Establishment

The Commission requires that an EPIC impact analysis framework identify existing baselines to demonstrate a point of comparison.[186] Baselines are necessary to provide insight into how EPIC investments directly impact scalability and applicability beyond use cases demonstrated at laboratory or demonstration scale by EPIC projects. Baselining processes incorporate elements fundamental to informing project planning and execution, allow effective coordination and integration of top-down and bottom-up planning, monitoring and reporting, and demonstrating ratepayer benefits on all aspects of project performance.[187]

Metric Establishment and Data Collection Needs

Progress metric and performance criteria to achieve Strategic Objectives must be established prior to project implementation to enable clarity in project scoping and data collection. To

[185] D.12-05-037 at OP 2 and at 20. D.18-10-052 at 100 and at 100. D.21-11-028 at OP 2 and at Appendix A. D.23-04-042 at COL 4, at FOF 4, at FOF 10, at 12-16, and at Appendix A.

[186] D.21-11-028 at OP 12 and at 23.

[187] Department of Energy. Performance Baseline Guide. DOE G 413.3-5B. Feb 3, 2016.

maximize their effectiveness, performance metrics should (1) be employed for planning, goal setting, benchmarking, and linking strategy to individual goals, (2) include portfolio-level metrics, (3) include well-defined tracking mechanisms, and (4) utilize feedback mechanisms to improve portfolio performance.[188] While EPIC is not required to use a cost-effectiveness approach like some CPUC programs, EPIC contributes to cost mitigation to make IOU energy infrastructure investments less expensive than they might otherwise have been without EPIC innovation.

Impact Assessment

The Commission requires Administrators to develop a single, uniform benefits analysis framework and set of metrics enabling the evaluation and tracking of the benefits of all EPIC projects.[189] The Commission further endorsed a set of foundational principles for development of this framework, reflecting administrator input.[190] The EPIC Strategic Objectives Technical Working Group process considered this framework in the development of the proposed Strategic Objectives, demonstrating the complex considerations that should be considered for each Strategic Objective.[191] Accordingly, Staff recommend that the Commission develop Impact Analysis criteria through a stakeholder workshop guided by the existing Impact Analysis Framework principles.[192] Administrators should then demonstrate in their Investment Plans how their EPIC portfolios will demonstrate impacts as needed for near-, mid-, and long-timescales.

Utilize a Market Transformation Framework to Promote Scaling Up and Measure Impacts

A market transformation approach for EPIC is needed to demonstrate that ratepayer funding has demonstrated a necessary role through the full technology development cycle to result in scaling and commercializing innovations that benefit ratepayers.[193] Staff propose an EPIC Market Transformation Initiative (EMTI) to operationalize this requirement and ensure EPIC benefits are maximized, cost-effective, and affordable to ratepayers.[194]

The Commission established a Market Transformation process as necessary to advance groundbreaking energy efficiency transformation initiatives that will bring sustainable, cost-

[188] R&D performance measurement and benchmarking. Project Management Institute Global Congress 2003. https://www.pmi.org/learning/library/benchmarking-process-performance-research-development-7745

[189] D.21-11-028 at OP 12. D.23-04-042 at COL 4

[190] D.23-04-042 at OP 1 and at Appendix A. Foundational Principles for Development of a Uniform Impact Analysis Framework to Comply with Decision (D.) 21-11-028

[191] Defining A Uniform Impact Analysis Framework. CPUC Staff Presentation. Fredric Beck. April 2, 2024. EPIC Uniform Impact Analysis Framework Kickoff Workshop. D.23-04-042 at OP 1 requires EPIC Administrators to meet with ED Staff to discuss the specific methodologies and metrics that will be used to measure impacts that would be considered by the Commission in Phase 2-D of this proceeding. However, Phase 2-D of the proceeding has not yet been launched, and the proceeding closes March 30, 2025.

[192] D.23-04-042 at OP 1 and at Appendix A.

[193] D.12-05-037 at OP 4, at 32, and at 61.

[194] D.12-05-037 at OP 2 and at 20. D.21-11-028 at OP 2 and at Appendix A. Pub. Util. Codes §§ 8360 and 8366.

effective market changes to California.[195] The process aims to eliminate market barriers to adoption of innovative technologies in support of California's clean energy and climate goals Market transformation initiatives strive to be self-sustaining and can yield measurable benefits that remain long after active market interventions have ended. These initiatives should also seek to support California's goals in greenhouse gas reduction, workforce development, equity, and utilize marketing, education and outreach strategies.

The EMTI will be modeled after the Commission's Energy Efficiency Market Transformation Initiative.[196] In particular, Staff propose adapting the Energy Efficiency High-Level Principles and Market Transformation Guidelines and Strategies of this initiative to the EPIC program. For EPIC, this means alignment of EPIC's Market Facilitation program investment areas with the guidelines and strategies recommended in this Proposal to ensure innovations move through stages of technical development to the market and/or electric grid in a manner that justifies the usage of rate-payer funding.[197]

Referring to Figure 4.2 below, emerging technologies funded through EPIC Applied R&D should include long-term development and marketing plans and connect with potential users early-on to ensure market relevance. Demonstrations funded through EPIC Technology Development and Deployment should include clear marketing plans and metrics for scale-up, commercialization, and deployment. Activities to address nonprice market and deployment barriers funded through EPIC Market Facilitation should be designed to help emerging technologies and innovation move fully into profitability and widespread deployment.

The EMTI should be based on a stage-gate project management process such as used by the U.S. DOE, IOUs, and many industries to provide Administrators the flexibility to on-ramp and off-ramp activities based on their performance as well as changes in priority due to evolving conditions.[198] The stage-gate process is a phased project management approach that produces fact-based funding decisions based on a set of defined evaluation criteria with specified go/no-go criteria and metrics.[199] The expectation is that projects with serious technical or other issues will be identified and resolved early-on, enabling greater investment in the projects with the greatest probability for success in later stages. Appendix B lists the Energy Efficiency proceeding High-Level Principles and Market Transformation Guidelines and Strategies for consideration of what might be adapted to EPIC.

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[195] CPUC Program Launches To Innovate Energy Efficiency Through Market Transformation. January 31, 2023. https://www.cpuc.ca.gov/news-and-updates/all-news/cpuc-program-launches-to-innovate-energy-efficiency-through-market-transformation-2023

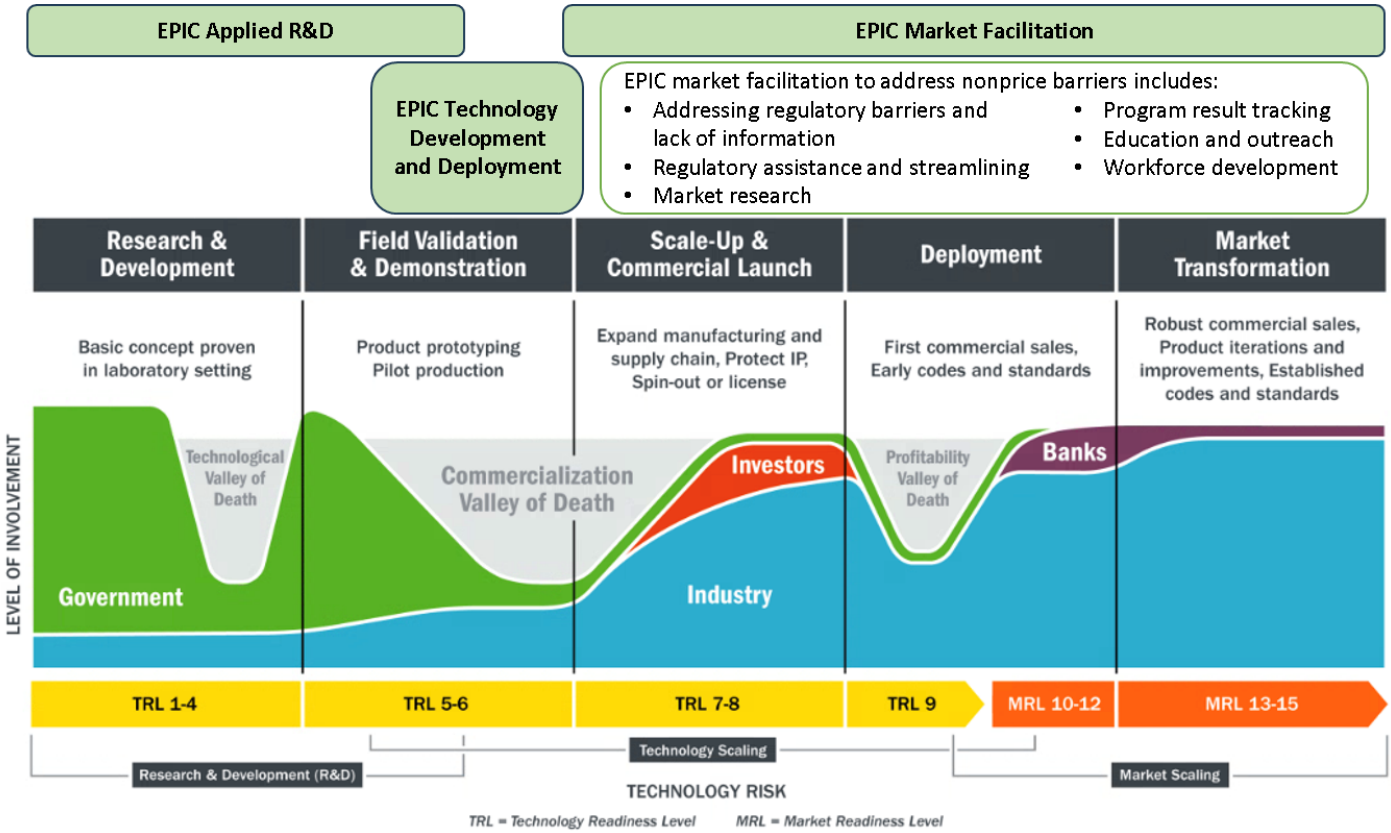
[196] D.19-12-021, Attachment A at 101-104. Frameworks for Energy Efficiency Regional Energy Networks and Market Transformation. https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M321/K507/321507615.PDF

[197] EPIC market facilitation activities are defined by D.12-05-037 at 32, 61, and 100.

[198] D.19-12-021 at 104. U.S. Department of Energy (DOE) Industrial Technologies Program. Stage-Gate Innovation Management Guidelines. Feb. 2007. https://www.energy.gov/eere/analysis/articles/stage-gate-review-guide-industrial-technologies-program

[199] Stage-Gate Innovation Management Guidelines. Industrial Technologies Program. US DOE. February 2007. https://www.energy.gov/eere/analysis/articles/stage-gate-review-guide-industrial-technologies-program

Figure 4.2 EPIC's Role in the Technology and Innovation to Market Process



Technology-to-Market Process: *Technology readiness is commonly measured on a nine-point scale referred to as Technology Readiness Level (TRL). TRLs are used to consistently identify technology development stages across technology types. Market Readiness Levels (MRLs) refer to the readiness of a market to accept and adopt a new technology.* Graphic adapted from U.S. Department of Energy.[200]

Section 5. Developing a Metrics and Evaluation Process

Staff propose that the Commission establish a subsequent phase of the EPIC proceeding to develop a Metrics and Evaluation process as described above. Staff recommends that Energy Division conduct a public stakeholder workshop process with input from EPIC Administrators and a broad group of relevant stakeholders. To implement this process, the Commission should consider authorization for ED to utilize the CPUC's EPIC administration budget as part of its program oversight. This builds on EPIC's Market Facilitation mandate by making improvements to demonstrate progress and long-term impacts from EPIC investments.

Evaluation Milestones to Ensure Alignment with CPUC Strategic Goals and Objectives

Staff propose two balanced feedback-loop mechanisms to ensure continuing alignment with EPIC program Strategic Goals and Objectives: 1) Public Symposia on proposed Investment Plans for each Strategic Goal; and 2) Program Evaluation. Additionally, Staff recommend that

[200] DOE Building Technologies Program. Technology-to-Market. https://www.energy.gov/eere/buildings/technology-market

Administrators begin to incorporate this alignment immediately with any EPIC funds that have not yet been contracted for previously approved EPIC cycles.

Early Implementation of Strategic Alignment

Because Administrators have up to six years to implement funding and previous strategies, this lag could result in misalignment with State and Commission policies that have evolved. Accordingly, Administrators should begin to implement improvements identified through the mechanisms below for relevant EPIC funds previously approved. Staff recommend that in alignment with this Staff Proposal any: 1) pre-request for proposal (pre-RFP) projects and initiatives be required to align with the Strategic Objectives and 2) pre-contract research should identify measurable goals. This will allow ratepayers to immediately benefit from this approach, for administrators to gain lessons-learned to inform full implementation for EPIC 5, and to have early data for a subsequent program evaluation.

Public Investment Plan Symposia

At least three months in advance of submitting their Investment Plans to the CPUC, Administrators should be required to present their Plans in a series of in-depth public forums organized by each Strategic Goal. To ensure a balanced approach, the Symposia should be overseen by Energy Division and facilitated by the PICG. Symposia participants should include invited Commissioners from both Commissions, agency subject matter experts (SMEs), industry and community stakeholders, and a peer panel of invited non-financially interested experts. These Symposia are an opportunity for administrators to demonstrate how their proposed Investment Plans align with the Commission's guidelines for planning and measurement. There would be five Symposia allowing for discrete discussion and feedback for each Strategic Goal:

- Transportation Electrification
- Building Decarbonization
- DER Integration
- Getting to Zero Carbon with the Coordinated Role of Gas
- Climate Adaptation

In each Symposia, Administrators must demonstrate how their proposed Strategic Initiatives and Research Topic Areas will achieve the Commission's established Strategic Goals and Objectives, as well as how they will collect data to demonstrate achievement by defining associated metrics. Focusing a Symposia by each Strategic Goal allows sufficient time to consider discrete strategies coordinated across administrators while targeting stakeholders (including around CPUC proceedings) that have interest in these particular areas of innovation. Administrators should be required to explain in their Investment Plans how they utilized feedback from these Symposia, and Staff will consider this Symposia feedback in its review of EPIC Investment Plan applications. Staff recommends that similar to the Strategic Goals and Objectives development process, the PICG should facilitate this process resulting in a summary report of the Symposia.

Program Evaluation

To comply with Commission requirements that EPIC demonstrate prudency and impacts of ratepayer investments, and to inform Commission consideration of potential EPIC funding past 2030, Staff propose a third independent EPIC Program evaluation. Staff anticipate that a more robust program evaluation to understand impacts of EPIC investments since 2012 should commence scope development early in the EPIC 5 investment cycle to assess progress, value, and inform course corrections. This proposal for subsequent program evaluation is consistent with the Commission's requirements for a formal evaluation at the midpoint of every EPIC program cycle.[201] To date, there has been insufficient EPIC program data available for CPUC evaluations to inform program outcomes and impacts. This information is essential to the Commission's consideration of whether ratepayers should continue to fund EPIC beyond 2030. Staff recommends that the Commission authorize Energy Division to utilize of the EPIC oversight funds for this purpose.

Conclusion

Below Staff provide a summary of its recommendation in the above Proposal.

Next Proceeding

Strategic Objectives

- Adopt the above proposed 13 Strategic Objectives based on the proceeding's Technical Working Group stakeholder process report, as modified by Staff.

Equity

- Require Administrators and Commission to apply Staff's recommended Equity in RD&D Framework in investment plan formulation, execution, and evaluation.

Affordability

- Provide Ratepayer relief by requiring the annual return of interest and unused funds.
- Require EPIC Investment plans to demonstrate prudent use of ratepayer fund by avoiding research duplication and promoting research cost-efficiencies.
- Require EPIC investment plans to describe how Strategic Initiatives and Research topics will mitigate the cost of energy system investments in implementing the State's goals and promote affordability.

Planning Alignment with Criteria

- Authorize Energy Division to use EPIC oversight funds to implement a series of Symposia for each EPIC Strategic Goal for Administrators to propose how their investment plans will align with Commission guidance, to be facilitated by the PICG.

[201] D.23-04-042 at OP 6 and at 31.

- Require program administrators to proactively coordinate with CPUC staff and proceedings, as well as across administrators, in advance of developing their investment plans.
- Require administrators to apply criteria of Strategic Goals, Strategic Objectives, Measurement, and Evaluation as soon as possible, including for any previously approved unencumbered, uncontracted, or otherwise uncommitted EPIC funding.

Establishing Metrics and Evaluation

- Establish a subsequent EPIC proceeding phase and scope to develop baselines, metrics, impact analysis frameworks. Authorize Energy Division to manage the process using oversight funds to facilitate.
- Require the development of a new market transformation initiative for the EPIC program, as informed by the CPUC's Energy Efficiency Market Transformation Initiative, using a public stakeholder process as part of the new EPIC phase.
- Authorize ED to commence planning for a subsequent mid-cycle program evaluation using EPIC oversight funds.

Appendix A. EPIC Strategic Pillars

EPIC's Strategic Planning Framework incorporates four strategic pillars as guideposts to identify and refine EPIC Strategic Goals and Strategic Objectives.[202]

Table A.1. EPIC Strategic Pillars

EPIC Strategic Pillar	Definition
Critical Pathways	The set of critical actions necessary to support meeting the State's 2045 energy, climate, and equity goals via the most effective strategies and technology innovation.
Key Gaps	Core challenges for achieving the State's goals and how RD&D should be prioritized to address opportunities and barriers more quickly along critical pathways.
Unique Roles	Identification of the best-positioned stakeholders (ratepayers, state, federal, academic, private sector) to lead innovation investment addressing identified gaps, including through coordination and collaboration.
Desired Outcomes	Clear, measurable, and reasonable targets for developing EPIC portfolios and used in program evaluations to measure EPIC's progress in supporting achievement of California's 2045 goals.

[202] R.19-10-005. Staff Proposal and Request for Input on Strategic Goals for Electric Program Investment Charge (EPIC) Program at 2-3. November 20, 2023. As adopted by D.24-03-007.

Appendix B. Example Energy Efficiency Market Transformation Principles and Guidelines to be Adapted for EPIC

Staff propose a stage-gate process as the operational model for the EPIC Market Transformation Initiative (EMTI) under EPIC's Market Facilitation program investment area, as informed Commission direction for a Market Transformation Initiative (MTI) in the CPUC's energy efficiency (EE) proceeding. The following tables outline CPUC-approved EE MTI high-level principles and market transformation guidelines and strategies for consideration. Staff recommend that this EE process serve to inform an EPIC Market Transformation process.

Table B.1. Energy Efficiency Market Transformation Initiative Principles

Applicability	EE MTI High-Level Principles[203]
All Initiatives Must Meet	1. Drive incremental savings that achieve the state's energy efficiency (EE), equity, and GHG reduction goals.
	2. Be managed cost-effectively as a portfolio under the MT framework and just and reasonable for ratepayers to fund.
	3. Use a stage-gate process for development and deployment.
All Initiatives Must Meet as Applicable[204]	4. Complement and coordinate with Rolling Portfolio programs.
	5. Support and not stifle innovation.
	6. Leverage existing processes and forums where appropriate.
	7. Integrate strategies to maximize equity.
	8. Be informed, measured, and evaluated by data and information.
	9. Include metrics to assess progress toward MTI and State and Commission policy goals.
	10. Be vetted in an inclusive, open, and transparent manner.
	11. Ensure that the energy efficiency workforce is adequately trained, skilled, and available.
	12. Synchronize with the evolving long-term structural changes to California's energy production and consumption.

[203] D.19-12-021 at 101-102. Frameworks for Energy Efficiency Regional Energy Networks and Market Transformation
https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M321/K507/321507615.PDF

[204] D.19-12-021 at 102. The Commission acknowledges that some principles may not be applicable to each and every initiative.

Table B.2. Energy Efficiency Market Transformation Initiative Guidelines	
EE Market Transformation Guidelines and Strategies[205]	**Alignment with EE MTI High-Level Principles**
1. MTIs should not be limited to technologies and should consider additional approaches that strive to meet the State's goals (e.g., behavior, equity, workforce, code compliance strategies, etc.).	Principles 1 and 3
2. MTIs should support and complement additional State and Commission goals to achieve substantial GHG emissions reductions, such as through demand response, integrated demand-side management (IDSM), and strategies that ensure grid stability.	Principles 1 and 3
3. MTI Plan development should not be overly expensive or prevent timely action and important learnings.	Principle 4
4. MTIs should consider how to transform the EE marketplace to maximize energy savings, health, affordability, and job access for disadvantaged communities.	Principle 7
5. MTIs should have timely feedback and evaluations to enable pivoting strategies if needed in support of continuous improvement.	Principle 8
6. MTIs should be vetted in a transparent way and include stakeholder, community, and potential participant feedback processes as applicable.	Principle 10
7. MTIs must make commitments that adequately cover the time expected to realize market transformation to effectively address market barriers and facilitate functional industry partnerships.	Principle 1
8. MTIs should consider how to transform the EE marketplace to ensure both the availability and utilization of a well-trained and suitability-skilled EE workforce.	Principle 11
9. MTIs should be designed to address or at least complement the likely long-term structural changes to California's energy industry including relying on carbon-free resources coupled with efficient electrification.	Principle 12

[205] D.19-12-021 at 102-103. Frameworks for Energy Efficiency Regional Energy Networks and Market Transformation

Appendix C. Attachments

1. **EPIC Strategic Goals and Strategic Objectives Process Kickoff Presentations**
   (i) Strategic Goals Kickoff Workshop Presentation. Defining EPIC Strategic Goals. August 16, 2023.[206]
   (ii) Strategic Objectives Kickoff Workshop Presentation. Defining EPIC Strategic Objectives. March 19, 2024.[207]
2. **EPIC Strategic Objectives Technical Working Group Reports[208]**
   (i) Draft EPIC Strategic Objectives: Transportation Electrification. April 10, 2024.
   (ii) Draft EPIC Strategic Objectives: Building Decarbonization. April 11, 2024.
   (iii) Draft EPIC Strategic Objectives: Achieving 100% Net-Zero Carbon Emissions and the Coordinated Role of Gas. April 12, 2024.
   (iv) Draft EPIC Strategic Objectives: Distributed Energy Resource Integration. April 30, 2024.
   (v) Draft EPIC Strategic Objectives: Climate Adaptation. May 1, 2024.
   (vi) EPIC Strategic Objectives Workshop Report. July 9, 2024.

End Appendix-A

[206] Strategic Goals Kickoff Workshop. Defining EPIC Strategic Goals. Fredric Beck. CPUC. August 16, 2023. Available online at https://epicpartnership.org/resources/Strat_Goal_Kickoff_Fred_Beck_CPUC.pdf

[207] Strategic Objectives Kickoff Workshop. Defining EPIC Strategic Objectives. Fredric Beck. CPUC. March 19, 2024. Available online at https://epicpartnership.org/resources/Strat_Obj_KickOff_3_14.pdf

[208] All EPIC Strategic Objectives Technical Working Group reports, presentations, and videos are available online at https://epicpartnership.org/strategicobjectives.html