EPIC STRATEGIC OBJECTIVES WORKSHOP PROCESS

In-Person Technical Working Group Meetings – April 2024

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

CALIFORNIA PUBLIC UTILITIES COMMISSION

EPIC Strategic Objectives Technical Working Groups

CALIFORNIA PUBLIC UTILITIES COMMISSION

April 2024

I. Welcome, Introduction, and Gaps Presentation

II. Breakout Session 1, prioritize Gaps

III. Report Out and Group Discussion

IV. Lunch

V. Breakout Session 2, identify Strategic Objectives

VI. Report Out and Group Discussion

VII. Break

VIII. Breakout Session 3, refine Strategic Objectives and identify related Uniform Impact Analysis Framework

IX. Report Out and Group Discussion

STRATEGIC OBJECTIVES SUPPORT EPIC STRATEGIC GOALS (D.24-03-007)

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

EPIC STRATEGIC OBJECTIVES PROCESS SCHEDULE

Working Group Meeting	When	Where
Impact Analysis Framework and Metrics Kickoff	April 2, 2024	Virtual workshop
Transportation Electrification #1	April 10, 2024	In-Person: CPUC Offices San Francisco
Building Decarbonization #1	April 11, 2024	In-Person: CPUC Offices San Francisco
Getting to 100% Net-Zero Carbon... #1	April 12, 2024	In-Person: CPUC Offices San Francisco
Distributed Energy Resource Integration #1	April 30, 2024	In-Person: San Diego Foundation
Climate Adaptation #1	May 1, 2024	In-Person: San Diego Foundation
Transportation Electrification #2	**May 13, 2024**	Virtual Technical Working Group
Building Decarbonization #2	**May 14, 2024**	Virtual Technical Working Group
Achieving 100% Net-Zero Carbon Emissions... #2	**May 15, 2024**	Virtual Technical Working Group
Distributed Energy Resource Integration #2	**May 29, 2024**	Virtual Technical Working Group
Climate Adaptation #2	**May 29, 2024**	Virtual Technical Working Group
Wrap-Up Workshop	June 2024	Hybrid Workshop

TODAY'S GOAL

Develop Draft Strategic Objectives for the DER Integration Strategic Goal that focus on:

- Achieving a target;
- By a specific date;
- With example strategies;
- Including key considerations; and
- Outlining the path to market for sure innovation

Technical Working Group Workplan

BREAKOUT 1

Prioritize gaps

Discuss role of EPIC in overcoming gaps, and investment timeframe

REPORT OUT

BREAKOUT 2

Identify possible big impact outcomes, target dates, strategies, considerations, and paths to market to overcome GAPS

REPORT OUT

BREAKOUT 3

Refine draft Strategic Objectives and identify ways to measure if successful

REPORT OUT

VIRTUAL SESSIONS

Stakeholder feedback and comment on draft Strategic Objectives

Electric Program Investment Charge (EPIC)

EPIC Strategic Objectives and Uniform Impact Analysis Framework

Strategic Objectives Technical Working Groups
April 30 – May 1, 2024

California Public Utilities Commission (CPUC)
Energy Division, Climate and Equity Initiatives Section
Fredric Beck, Senior Analyst

California Public Utilities Commission

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Strategic Objectives - Criteria for Success

Implementing the Commission's guidance ensures EPIC administrators can clearly demonstrate that ratepayers' investment of billions of dollars in innovation is making a difference in achieving a cleaner, more equitable and affordable future and California's 2045 zero carbon climate goals.

- **Criteria 1: Incorporating Key Components in Formulating Measurable Targets**
- **Criteria 2: Demonstrating Ratepayer Benefit in Pursuit of State Policy Goals**
- **Criteria 3: Considering Cross-Cutting Principles from Strategic Goals**
- **Criteria 4: Incorporating EPIC's Foundational Principles for a Uniform Impact Analysis Framework**
- **Criteria 5: Aligning Proposed Strategic Objectives with CPUC Proceedings**

Criteria 1: Incorporating Key Components in Formulating Measurable Targets

Strategic Objectives are clear, measurable, and robust targets to guide EPIC investment plan strategies to scale and deploy innovation to align with EPIC's Strategic Goals.

Strategic Goals
- Critical Pathways

Clear and measurable goals for developing EPIC portfolios to be used in program evaluations to measure impacts of EPIC investments in supporting achievement of California's 2045 climate, energy, and equity targets.

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.

Strategic Objectives
- Key Gaps
- Unique Roles
- Cross-cutting Principles

Strategic Objectives are clear, measurable, and robust targets to guide EPIC investment plan strategies to scale and deploy innovation to align with EPIC's Strategic Goals.

Address the key gaps in critical pathways to achieving California's climate goals.

Focus on the unique role ratepayer funded research, development, and demonstration (RD&D) can play in leading innovation investment.

Consider important crosscutting principles identified in Commission decisions.

Administrator Initiatives
- Research Topic Areas
- Projects

Strategic Initiatives are Investment Plan strategies to accomplish Strategic Objectives

Uniform metrics, assumptions, and methodologies will measure EPIC project and portfolio performance.

*See Appendix A.1 for further information.

Criteria 2: Demonstrating Ratepayer Benefit in Pursuit of State Policy Goals

To bring greater focus to the EPIC Program and improve transparency, D.21-11-028 reiterates that EPIC Projects must show ratepayer benefit to prove they have met the guiding principle of EPIC. The 2021 decision adopts five ratepayer benefit definitions.

Ratepayer Benefit	Ratepayer Benefit Definition
Improve Safety	EPIC innovations should improve the safety of operation of California's electric system in the face of climate change, wildfire, and emerging challenges.
Increase Reliability	EPIC innovations should increase the reliability of California's electric system while continuing to decarbonize California's electric power supply.
Increase Affordability	EPIC innovations should fund electric sector technologies and approaches that lower California electric rates and ratepayer costs and help enable the equitable adoption of clean energy technologies.
Improve Environmental Sustainability	EPIC innovations should continue to reduce GHG emissions, criteria pollutant emissions, and the overall environmental impacts of California's electric system, including land and water use.
Improve Equity	EPIC innovations should increasingly support, benefit, and engage disadvantaged vulnerable California communities.

Criteria 3: Considering Strategic Goal Cross-Cutting Principles

In D.24-03-007, the Commission endorsed principles* providing guidelines for assessing proposed Strategic Objectives for EPIC 5 to ensure important cross-cutting issues identified in the Strategic Goals workshops are considered in the Strategic Objectives technical working groups.

- **Principles for Equity in RD&D Strategies**
  - **Prioritization:** Prioritize investments and measure impacts on the most vulnerable communities.
  - **Engagement:** Develop deeper and ongoing engagement with DVCs.
  - **Metrics:** Develop clear and measurable metrics for assessing the impact of RD&D investment in DVCs.
  - **Outreach:** Enable better integration and coordination with local communities throughout the entire RD&D process.
- **Principles for Emerging Strategies**
  - **Equity:** Develop EPIC RD&D strategies and equity guideposts to achieve the last 10% of the 100% carbon free grid.
  - **Innovation Gaps:** Undertake research where there are gaps in emerging strategies to inform opportunities for innovation.
  - **Cost:** Prioritize RD&D that can significantly reduce ratepayer costs.
- **Principles for Safety (including Cybersecurity) Strategies**
  - **Uncertainty:** Take situational uncertainty into account, including extreme weather and cyberthreats.
  - **Coordination:** Assess the unique role EPIC could play in advancing cybersecurity standards and protocols.

*See Nov. 20, 2023, Ruling in R.19-10-005 issuing the Staff Proposal and Request for Input on Strategic Goals for Electric Program Investment Charge (EPIC) Program for complete principles.

Criteria 4: Incorporating EPIC's Foundational Principles for a Uniform Impact Analysis Framework

D.23-04-042 adopted foundational principles for development of a uniform impact analysis framework to comply with D.21-11-028.* The principles include:

- Demonstrating Ratepayer Benefit
- Scalable and Replicable Innovation
- Quantifying Net Impacts
- Accurate Attribution
- Consistent and Transparent Methodology
- Building on Existing Metrics
- Consistent Data and Assumptions
- Direct, Indirect, and Induced Impact Reporting
- Iterative Process

*See Appendix A.2 for the complete set of foundational principles.

Criteria 5: Aligning Proposed Strategic Objectives with CPUC Proceedings

Strategic Goal	Proceeding	Description
1. Transportation Electrification	R.23-12-008	Transportation Electrification Policy and Infrastructure
	R.22-07-005	Advance Demand Flexibility Through Electric Rates
	R.18-12-006	Development of Rates and Infrastructure for Vehicle Electrification
2. Distributed Energy Resource Integration	R.24-01-017	California Renewables Portfolio Standard Program
	R.22-11-013	Distributed Energy Resource Program Cost-Effectiveness Issues, Data Access and Use, and Equipment Performance Standards
	R.22-07-005	Advance Demand Flexibility Through Electric Rates
	R.21-06-017	Modernize the Electric Grid for a High Distributed Energy Resources Future
	R.20-05-003	Continue Electric Integrated Resource Planning and Related Procurement Processes
	R.19-09-009	Microgrids Pursuant to Senate Bill 1339 and Resiliency Strategies
	R.18-07-003	California Renewables Portfolio Standard Program
	R.17-07-007	Streamlining Interconnection of Distributed Energy Resources and Improvements to Rule 21
3. Building Decarbonization	R.22-07-005	Advance Demand Flexibility Through Electric Rates
	R.19-01-011	Building Decarbonization
4. Net Zero Carbon	R.20-05-003	Continue Electric Integrated Resource Planning and Related Procurement Processes
	R.20-01-007	Long-Term Gas System Planning
5. Climate Adaptation	R.18-04-019	Strategies and Guidance for Climate Change Adaptation

APPENDICES

A.1 EPIC Strategic Goals and Objectives are Defined by Pathways, Gaps, Roles, and Outcomes

A.2 Foundational Principles for Development of a Uniform Impact Analysis Framework to Comply with Decision (D.) 21-11-028

Appendix A1. EPIC Strategic Goals and Objectives are Defined by Pathways, Gaps, Roles, and Outcomes

Critical Pathways	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	Key challenges for achieving zero carbon goals and how RD&D should be prioritized to address opportunities and barriers more quickly along critical pathways
Unique Roles	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 impacts of EPIC in supporting achievement of California's 2045 goals

EPIC Strategic Objectives Solve Key Challenges to Produce Desired Outcomes

Appendix A.2

Appendix A
Foundational Principles for Development of a Uniform Impact Analysis Framework to Comply with Decision (D.) 21-11-028

This document outlines the Commission's expectations of Electric Program Investment Charge (EPIC) administrators in developing and implementing a uniform impact analysis framework and metrics, enabling the evaluation and tracking of the impacts of all EPIC projects, in compliance with D.21-11-028, Ordering Paragraph 12. These foundational principles include:

Purpose

- The mandatory guiding principle of EPIC is to provide ratepayer benefits as related to California's electric system.[1]
- The EPIC impacts analysis framework should provide EPIC administrators with a uniform methodology to demonstrate with data the realized and potential impacts to ratepayers from EPIC research, development, and demonstration (RD&D) investment.

Overarching Principles

- In general, each EPIC project should offer a reasonable probability of providing benefits to ratepayers and expenditures on projects which have a low probability for success should be minimized,[2] and the EPIC portfolio as a whole should demonstrably benefit ratepayers.
- While in some cases, a targeted group of ratepayers may benefit from an individual project's output, EPIC investments should result in scalable and replicable innovations that prioritize solutions to address California's energy and climate goals.
- Accurate and precise EPIC project and program impacts reporting is paramount to inform policy, decision-making, and formulating EPIC strategic goals. Therefore, impacts resulting from the analytical framework must be defensible and not overstated.
- Clear and transparent methods are necessary to calculate past, current, and future EPIC impacts based on published data and reasonable assumptions, such that any party can take the data and assumptions and apply the methodology to recreate the results. Without such foundation, it will be difficult to calculate quantitative impacts of EPIC innovations that lack the market or deployment

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[1] D.12-05-037.

[2] Pub. Util. Code § 740.1(a) and (b).

R.19-10-005 ALJ/TJG/JNF [Excerpted from CPUC Decision 23-04-042]

history to have readily available sufficient data for impacts analysis or project future impacts of pre-commercial innovations.

Net Impacts

- Realized ratepayer benefits must be demonstrated by the incremental, value-added impact of EPIC innovation.
  - ➢ For example, if a ratepayer spends $20 to save $30, the ratepayer impact realized is the net $10 savings, not the gross $30 impact. Thus, the metric by which EPIC investments should be evaluated is *net*, not gross, impacts.
- Net impacts are required to calculate project or program benefit-cost ratios and rates of return on ratepayer investment.

Attribution

- To understand the impact of EPIC accurately and precisely, and therefore, inform continuance or improvements in EPIC strategic goals and strategic objectives, administrators should demonstrate to the CPUC what impacts have or are forecasted to occur that would not have otherwise occurred without EPIC investment (i.e., only these impacts should be attributed to EPIC.)
- The portion of the observed change that is only due to EPIC investment must be documented with data, and a set of reasonable and acceptable rules for determining the share of credit attributed to EPIC developed, including attribution for the value of cost-shared, matching, or leveraged funding.
- Comparable scenarios should be used to estimate when the market would have produced an innovation had EPIC funding not been available. Where innovation would have eventually occurred without EPIC, impacts should be based on the acceleration in the time to market readiness of the innovation, rather than the lifetime of the technology itself.
  - ➢ For example, if a deployed EPIC innovation provides impacts for 20 years between 2025 and 2045, and it is determined the innovation would have occurred and been deployed without EPIC in 2030, then the period of market acceleration due to EPIC is five years and EPIC impacts are calculated only for that 5-year period.

Methods

- Administrators should use or adapt existing accepted methodologies where possible for efficiencies of resources, time, cost, and effort.[3]

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[3] Including for example, but not limited to, the following works and other works by their respective authors: An Investigation of Innovative Energy Technologies Entering the Market between 2009-2015, Enabled by EERE-funded R&D. PNNL-31895. Pacific Northwest National Laboratories. August 2021; Metrics for an Equitable and Just Energy System. Pacific Northwest National Laboratories. June 2021; Evaluating Realized Impacts of DOE/EERE R&D Programs -

DISTRIBUTED ENERGY RESOURCE INTEGRATION

EPIC will invest in the cost-effective integration of high penetrations of distributed energy resources to support the state's goal to achieve a renewable and zero-carbon power sector by 2045, in part by building on the state's goal to deploy 7,000 megawatts of flexible load by 2030, by addressing identified gaps for this goal.

DISTRIBUTED ENERGY RESOURCE INTEGRATION

CALIFORNIA PUBLIC UTILITIES COMMISSION

Increasing Access to DER Benefits for DVCs	Strengthening the Role of DERs for Grid Resiliency	Leveraging DER to reduce grid costs and improve reliability	Streamlining Interconnection and Communication
Lack of opportunities for disadvantaged, low-income, ESJ, and tribal communities to engage early and directly benefit from deployment of flexible resources	An outsized burden that long-duration outages have on disadvantaged, low-income, ESJ, and tribal communities	Need for better understanding of the ability of aggregated DER and VPP deployment to reduce or forestall the cost associated with grid upgrades, and to support grid reliability	Lack of uniform standards and protocols for interconnection, system design, visibility, and communication among grid-connected devices, including smart meters, smart inverters, and internet-of-things (IoT) technology
Customers in DVCs face trust, information, valuation, and infrastructure barriers to adoption of DERs and participation in grid services	Need for reliable and resilient power for communities and critical facilities during periods of power outages due to wildfire, extreme weather, and other emergency situations	Insufficient valuation, incomplete businesses models, and lack of appropriate market mechanisms for transmission and distribution grid services provided by flexible resources	Complex and demanding interconnection and permitting processes increase the costs and slow timelines for DER deployment
		Lack of comprehensive weather operational data to predict system conditions	High costs, high latency, and low cybersecurity safeguards for communication to and between DERs to support grid services strategies.
		Lack of reliable, real-time, automated coordination of generation and load at the grid edge.	Lack of low latency distribution system intelligence, data feed for actual dynamic capacity constraints, and real-time enablement for automation services providers including distributed grid services.
		Potential operational conflicts between leveraging the same DERs for grid services, resiliency, reducing energy bills, and transportation	

KEY:

REVISED GAP

NEW GAP

TIPS AND ADVICE

- **Focus on addressing the gaps:** Is what you are proposing a/the key ingredient to overcoming the gap(s)?
- **Fall in love with the problem, not any particular solution.**
- **Don't try to do everything:** CPUC has established this process to narrow and focus EPIC investments.
- **Focus on the specific role of EPIC:** What can EPIC be doing specifically within its domain (electricity RD&D) that isn't being done already elsewhere (federal funds, other state funds, private market)?
- **Stay out of the trap of new programs:** EPIC itself does not have the power to create new laws, new regulations, stand up new incentives, or create market signals.

Appendix A.2 (cont.)

- The methodology used to calculate impacts should be grounded in theory (i.e., if funding startup is seen as beneficial, data documentation and impact demonstration of this strategy should be provided).
- Impacts evaluation may involve expert elicitation. Clearly and succinctly framing questions is required to guide experts in obtaining pertinent data.

Metrics

- D.13-11-025, Attachment 4 provides a list of impacts (*Metrics and Potential Areas of Measurement)* proposed by the EPIC administrators and approved by the CPUC, which can serve as the basis for discussion of metrics. The list includes 10 impact metric categories and 59 potential areas of measurement. The decision allows creation of new, project-specific impact metrics to consider for revisions.
- Because units of measure have not been defined for many of these metrics, additional definitions are required for uniform impact reporting. This impact metrics list may be modified and updated based on new information and must be used consistently across all administrators.

Assumptions

- To the extent possible, administrators should use the same core data set for basic assumptions, such as the emissions profile of peak power in each service area. If administrators do not use the same data set, they should provide rationale for why not.
- While market penetration assumptions may vary by innovation, the method by which these assumptions are arrived should be consistent.

Impact Reporting

- For clarity of impacts on different economic sectors, direct, indirect, and induced impacts should be disaggregated in reporting.

Iterative Process

- Guidelines may be revised and clarified as the EPIC Impacts Analysis Framework is developed to achieve the goals and principles outlined above.

(END OF APPENDIX A)

Standard Impact Evaluation Method. DOE/EE-1117. August 2014; A Framework for Evaluating R&D Impacts and Supply Chain Dynamics Early in a Product Life Cycle. DOE/EE-1096. June 2014; A Proposed Methodology to Determine the Leverage Impacts of Technology Deployment Programs. James L. Wolf. Prepared for US DOE/EERE. June 2008; Impact Evaluation Framework for Technology Deployment Programs. Sandia National Laboratories. Prepared for US DOE/EERE. July 2007; and Prospective Evaluation of Applied Energy Research and Development at DOE (Phase Two). National Research Council. The National Academies Press. 2007.