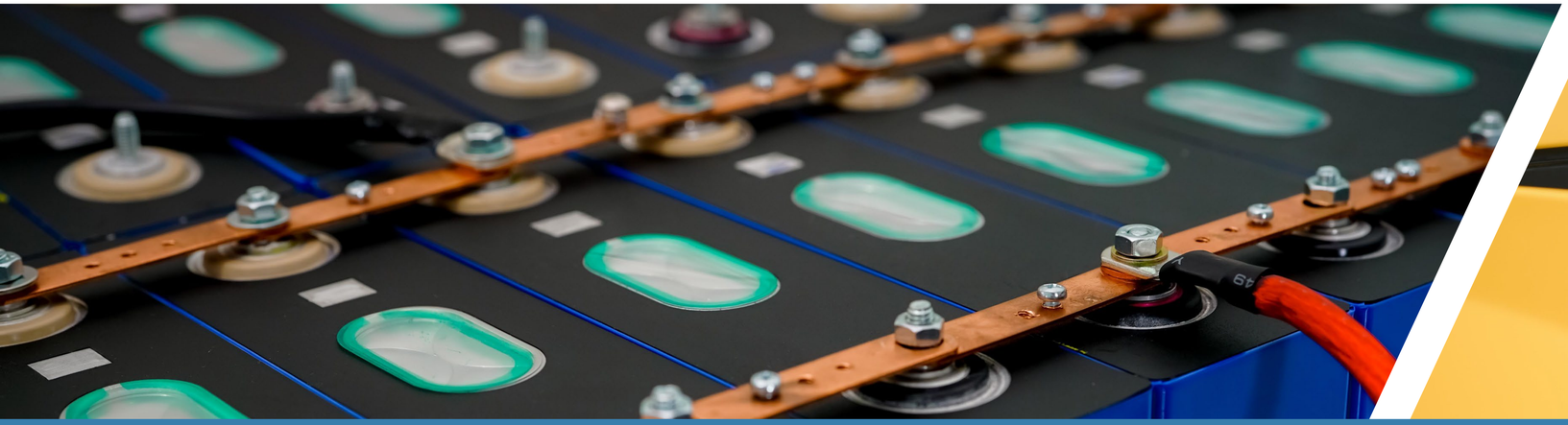
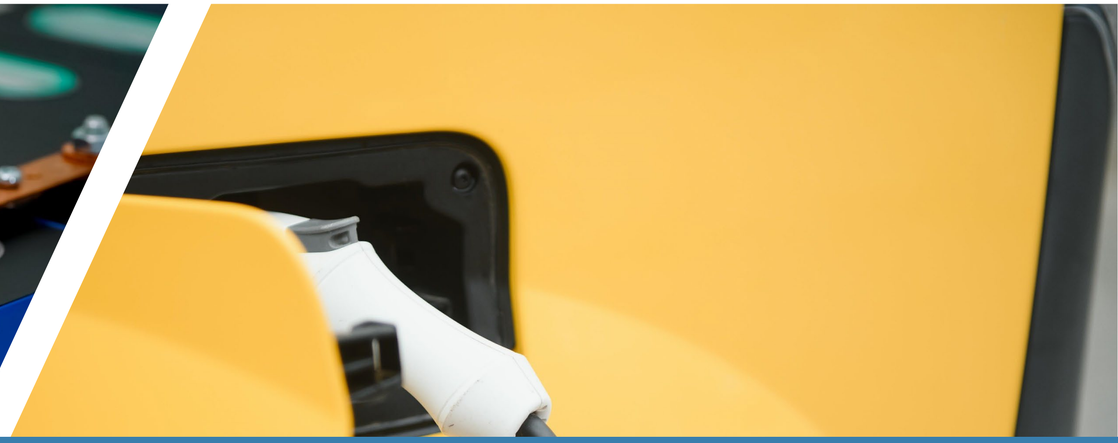
EPIC STRATEGIC OBJECTIVES WORKSHOP PROCESS

Virtual Technical Working Group Meetings – May 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

May 2024

CALIFORNIA PUBLIC UTILITIES COMMISSION

I. Welcome, Introduction, Agenda and Draft Strategic Objectives Presentation
II. Stakeholder Q&A (clarifying questions)
III. Technical Working Group Presentations
IV. Stakeholder Q&A
V. Break (~ 2:45)
VI. Technical Working Group Comments
VII. Wrap-up and next steps

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

CALIFORNIA PUBLIC UTILITIES COMMISSION

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.

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

CALIFORNIA PUBLIC UTILITIES COMMISSION

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
Achieving 100% Net-Zero Carbon Emissions... #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	July 2024	Hybrid Workshop

TODAY'S GOAL

Gain stakeholder comment and proposed edits to the Draft Strategic Objectives for the Climate Adaptation Strategic Goal that focus on:

- Achieving a target;
- By a specific date;
- With example strategies;
- Including key considerations;
- Outlining the path to market for innovation; and
- Identifying ways to measure success.

Technical Working Group Workplan

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Kick-Off

Review CPUC Strategic Goals

Identify priority Gaps from Fall 2023 Workshops

Impact Analysis Framework

Identify methods for measuring success and impact

In-Person Technical Working Groups

Collaborative effort to develop draft strategic objectives based on prioritized gaps

Virtual Technical Working Groups

Stakeholder feedback and comment on draft Strategic Objectives

Post-Workshop Comments

Stakeholder written comments on draft Strategic Objectives due June 21

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.

5.1 Accelerate Climate Adaptation in DVC Housing

CALIFORNIA PUBLIC UTILITIES COMMISSION

Strategic Objective: Accelerate and increase scale of climate adaptation in DVC housing.

WILL TAKE INTO CONSIDERATION:	WILL ACHIEVE A PATH TO MARKET THROUGH:	SUCCESS WILL BE MEASURED THROUGH:
• Social burden and health metrics; • Need for comprehensive program packages; • Need to act at natural equipment turnover points; • Undue burden of wildfire impacts on DVCs; and • Other systemic social impacts on DVCs.		• Standard electric system reliability metrics with an overlay of CalEnviroScreen and other geospatial demographic data sources; • Heat pump and other equipment and shell measure market penetration and absolute number of installations; • Codes and standards compliance rates; • Demonstration and deployment projects for high efficiency HVAC systems in DVCs by housing type; • Distributors' equipment stock measurements; and • Level of improvement in a community's resilience infrastructure after an event.

5.2 Increase Community Engagement and Empowerment

CALIFORNIA PUBLIC UTILITIES COMMISSION

Strategic Objective: Increase the quality of community engagement and co-creation, collaboration, and empowerment opportunities in the process of adapting to climate change.

WILL TAKE INTO CONSIDERATION:	WILL ACHIEVE A PATH TO MARKET THROUGH:	SUCCESS WILL BE MEASURED THROUGH:
• The lack of trust of energy actors among community members.		• EPRI's community engagement metrics; and • Consumer sentiment information and data.

5.3 Improve Power Restoration Time for Vulnerable Populations

CALIFORNIA PUBLIC UTILITIES COMMISSION

Strategic Objective: Innovative approaches to quick deployment and quick, mobile responses to outages.

WILL TAKE INTO CONSIDERATION:	WILL ACHIEVE A PATH TO MARKET THROUGH:	SUCCESS WILL BE MEASURED THROUGH:
• Distributor's stocking decisions determine equipment availability.	• Codes and Standards	• Standard electric system reliability metrics with an overlay of CalEnviroScreen and other geospatial demographic data sources, • Fuel source of available quick grid restoration equipment, • Number, size, and location of microgrids, • Number of bidirectional V-G or V-Home systems, • Mobile battery bank availability and penetration, and • Distribution-level storage in DVCs.

5.4 Grid Hardening for Long-Term Climate Impacts

CALIFORNIA PUBLIC UTILITIES COMMISSION

Strategic Objective: The program will achieve implementation of an optimized capital deployment framework for hardening the grid to long-term climate impacts to achieve increased affordability, reduce outage risk, and reduce social burden, where optimized means cost-effective prioritization of investments using objective, measured, verifiable data on grid equipment condition, capability, and alternatives by 2029-2033.

WILL TAKE INTO CONSIDERATION:

- Prioritizing investments that help mitigate multiple hazard impacts;
- Difference in needs around long-term anticipated climate change and acute climate events;
- The increase in cooling and heating extremes add to electricity system grid strain;
- Timing of the next general rate case (GRC) as a goal for larger pilots and deployments of technologies that utilities will demonstrate in EPIC 5;
- CEC's EPIC 5 (2026-2030) investments should be prioritized with accelerated timelines and will inform the utility EPIC 5 projects; and
- Data must be publicly available and easy to understand.

WILL ACHIEVE A PATH TO MARKET THROUGH:

- Demonstration projects, bigger pilots, and deployments

SUCCESS WILL BE MEASURED THROUGH:

- Reduction in the number of pieces of infrastructure identified as vulnerable;
- Real-time visibility into 100% of grid assets;
- Reduce O&M costs by X%;
- Long-term projected saving;
- Reduction in repetitive loss;
- Establishing baseline under modeled conditions;
- Trends in PSPS event number and duration;
- Reduction in restoration time;
- CEMI and CELID;
- Quantity and duration changes in outages by region; and
- Demonstrated reduction in social burden (RENCAT).

5.5 Improved Predictions and Forecasting for Increased Weather and Climate Variability

CALIFORNIA PUBLIC UTILITIES COMMISSION

Strategic Objective: By 2028-2030 develop sufficient tools and data and develop a model of California energy system with a shared view of California electric infrastructure (including distribution, transmission and CAISO infrastructure) that will improve modeling and forecasting to minimize load shed events and provide novel solutions to reduce restoration time after the extreme weather events.

WILL TAKE INTO CONSIDERATION:

- Affordability (not increasing ratepayer energy burden);
- Data privacy;
- AI and machine learning capabilities;
- Value of California projects that are outside of California that have California ratepayer benefits (for example in the broader WECC region);
- Customer behavior, needs and response to weather events;
- Workforce development needs; and
- Community needs and meeting reliability metrics that address them.

WILL ACHIEVE A PATH TO MARKET THROUGH:

- Reduced time from model to real life implementation;
- Improvements in resilience and reliability metrics including in the DVCs;
- Number of regulations adopting or mandating developed tools, data and standards.

SUCCESS WILL BE MEASURED THROUGH:

- Co-developing tools, data and solutions with those who will integrate them;
- Integration into CPUC proceedings;
- Integration into utility planning, forecasting and operations;
- Integration into RTO/ISO planning, forecasting and operations;
- Integration into industry practices;
- Reduced number of interruptions related to climate and extreme weather events;
- Number of after incident assessments;
- Demonstrations (particularly to support entrepreneurs); and
- Data democratization (making data open and available).

Poll Questions – Strategic Objectives

CALIFORNIA PUBLIC UTILITIES COMMISSION

5.1 Accelerate Climate Adaptation in DVC Housing

Accelerate and increase scale of climate adaptation in DVC housing.

5.2 Increase Community Engagement and Empowerment

Increase the quality of community engagement and co-creation, collaboration, and empowerment opportunities in the process of adapting to climate change.

5.3 Improve Power Restoration Time for Vulnerable Populations

Innovative approaches to quick deployment and quick, mobile responses to outages.

5.4 Grid Hardening for Long-Term Climate Impacts

The program will achieve implementation of an optimized capital deployment framework for hardening the grid to long-term climate impacts to achieve increased affordability, reduce outage risk, and reduce social burden, where optimized means cost-effective prioritization of investments using objective, measured, verifiable data on grid equipment condition, capability, and alternatives by 2029-2033.

5.5 Improved Predictions and Forecasting for Increased Weather and Climate Variability

By 2028-2030 develop sufficient tools and data and develop a model of California energy system with a shared view of California electric infrastructure (including distribution, transmission and CAISO infrastructure) that will improve modeling and forecasting to minimize load shed events and provide novel solutions to reduce restoration time after the extreme weather events.

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.

Comments and Input

- Proposed edits and clarifications
- Critical missing elements
- Key considerations
- Methods for achieving a path to market
- Ways to measure success

Presentations

1. Lindsey Fransen CEC

2. Kevin Johnson PG&E
   Jimmy O’Hare PG&E

Initial Feedback on EPIC 5 Climate Adaptation Draft Strategic Objectives

Lindsey Fransen, Supervisor of the Tech to Market Unit
Energy Research and Development Division

May 29, 2024

EPIC Background

Mission: EPIC invests in **innovation** to ensure equitable access to safe, affordable, reliable, and environmentally sustainable energy for electricity ratepayers.

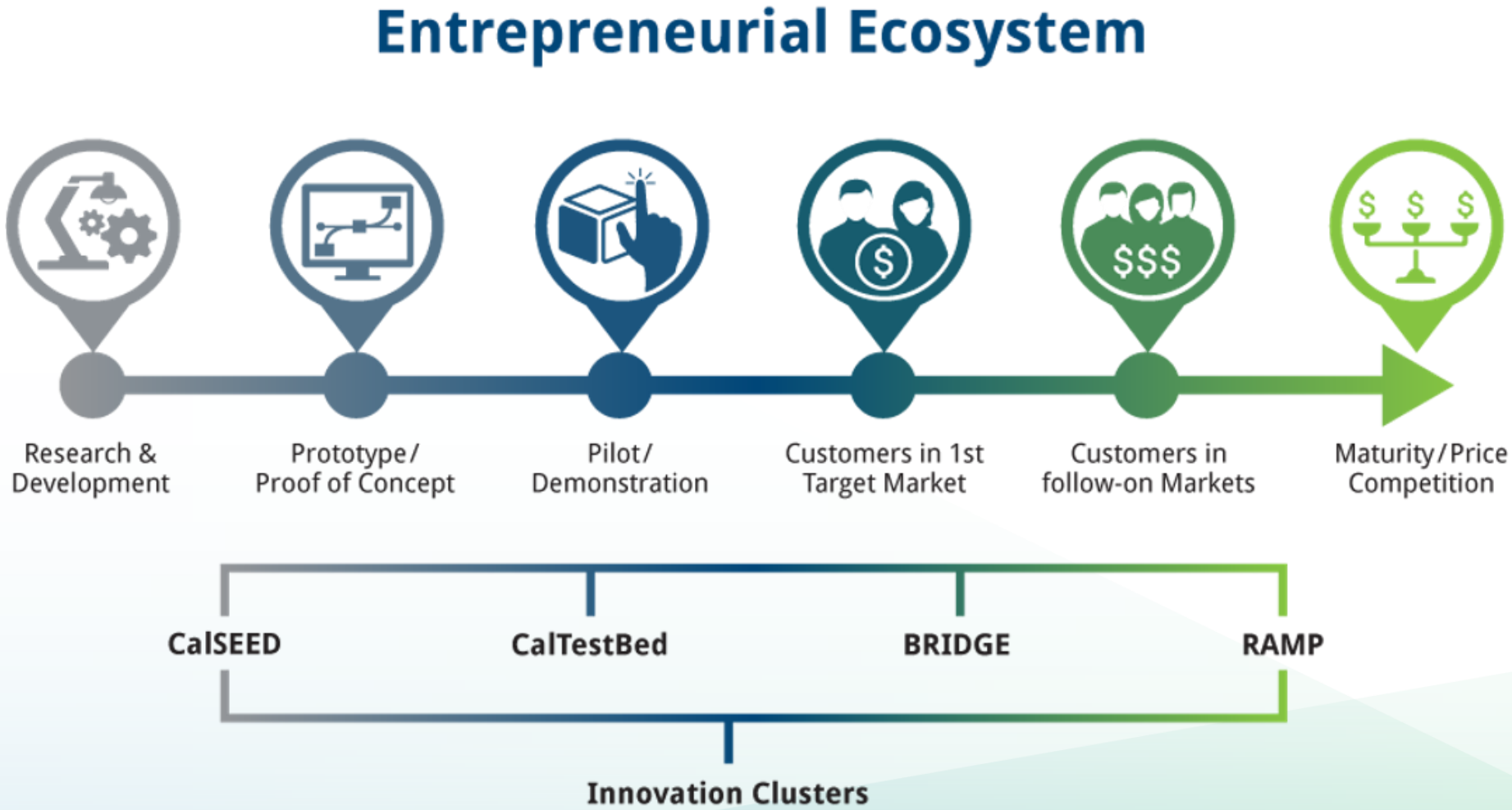
- **Applied research** to bring ideas from concept to the lab to the field
- **Demonstrations**, particularly in DVCs, to illustrate the value proposition of technologies and develop best practices for deployment
- **Market facilitation** to overcome non-technology barriers such as permitting, financing, customer education, workforce development, and others
- Providing **data and analysis to inform policies, proceedings, and programs**, such as
    - CPUC proceedings
    - CEC planning processes
    - Deployment programs and incentive programs
    - UL codes and standards and other industry-led initiatives

Initial Feedback Summary

Strategic objectives should:

1. Reflect and support EPIC's role as an RD&D program focused on advancing the technology and adoption readiness of clean energy and climate adaptation technologies.
2. Empower a flexible focus on RD&D innovation.
3. Include additional critical technology areas.
4. Integrate benefits to and collaboration with DVCs as a consistent guiding principle.
5. Build upon existing CEC EPIC program mechanisms to achieve a path to market.

Achieving Path to Market



Proposed Alternative Approach

Consider adopting a single strategic objective that focuses on innovation:

The EPIC program will **advance the adoption readiness of climate adaptation technologies and strategies** that:

- Reduce the frequency and duration of outages, particularly for DVCs
- Improve safety and comfort of DVCs during climate-driven events
- Reduce wildfire risk
- Produce and facilitate the use of open data and analytics to improve forecasting, risk assessment, operations, and planning
- Increase community engagement and empowerment

Proposed Objective 1

The program will accelerate and increase the adoption readiness of climate adaptation technologies and strategies in DVC communities.

Related draft objectives:

5.1: Accelerate and increase scale of climate adaptation in DVC housing

5.2: Increase the quality of community engagement and co-creation, collaboration, and empowerment opportunities in the process of adapting to climate change

5.3: Innovative approaches to quick deployment and quick, mobile responses to outages

Proposed Objective 2

The program will advance research and development of strategies and technologies that enhance the resilience of grid infrastructure to acute and gradual climate-driven impacts.

Related draft objectives:

5.3: Innovative approaches to quick deployment and quick, mobile responses to outages

5.4: The program will achieve implementation of an optimized capital deployment framework for hardening the grid to long-term climate impacts to achieve increased affordability, reduce outage risk, and reduce social burden, where optimized means cost-effective prioritization of investments using objective, measured, verifiable data on grid equipment condition, capability, and alternatives by 2029-2033.

Proposed Objective 3

By 2030, the program will develop and sustain open climate data, analytics, and technologies that improve electricity supply and demand forecasts; predict risk of extreme climatically driven weather events to utility infrastructure; improve coordination between weather observations / forecasting and grid operations; and inform planning, risk management, and investment decision-making.

Related draft objective:

5.5: By 2028-2030 develop sufficient tools and data and develop a model of California energy system with a shared view of California electric infrastructure (including distribution, transmission and CAISO infrastructure) that will improve modeling and forecasting to minimize load shed events and provide novel solutions to reduce restoration time after extreme weather events.

Proposed Objective 4

The program will advance technologies and strategies that reduce the risk of catastrophic wildfire along utility corridors, including, but not limited to, vegetation management and forest-thinning activities and associated technologies that utilize vegetation for production of valuable products that benefit ratepayers, including bioenergy and biofuels.

Measuring Success of the EPIC Program

CPUC should measure the success of the EPIC program based on its ability to innovate using metrics such as:

- Technology-based
  - Adoption Readiness Level (ARL)
  - Technology Readiness Level (TRL)
  - Commercial Readiness Level (CRL)
  - Manufacturing Readiness Level (MRL)
- Non-technology-based
  - Coordination with related policies, proceedings, and programs
  - Private sector offtake

Measuring Success of Projects and Technology Portfolios

Program administrators should measure the success of projects and technology portfolios based on their ability to achieve market outcomes and address the gaps identified in the strategic goals process

Metric Categories	Example Metrics
DVC Benefits	pollution burden | energy burden | # of outages | length of outages | quality of life | public health | reliability |
Grid Benefits	utilization rate of circuits | revenue from grid services | deferred grid upgrades | hosting capacity | power quality |
Interconnection & permitting	interconnection speed | permitting speed |
Resilience	# of outages | length of outages |

Thank You

Lindsey Fransen

Lindsey.Fransen@energy.ca.gov

Draft EPIC Strategic Objectives
Climate Adaptation

May 29, 2024

Together, Building
a Better California

5.2 Increase Community Engagement and Empowerment

CPUC Draft Strategic Objective:
Increase the quality of community engagement and co-creation, collaboration, and empowerment opportunities in the process of adapting to climate change.

PG&E Feedback

- Recommend that this "engagement and empowerment" objective is included in the Equity cross cutting principle, but not a standalone objective
- Recommend to re-frame in an RD&D Opportunity, such as:
  - **This program will enable collaborative solutions to climate adaptation by identifying, developing, and advancing technologies to support consensus building and partnerships between multiple private and public stakeholders.**

5.3 Improve Power Restoration Time for Vulnerable Populations

CPUC Draft Strategic Objective:
Innovative approaches to quick deployment and quick, mobile responses to outages

PG&E Feedback

- Recommend to reframe as two separate areas: tools for 1) prevention of climate hazard-related outages and 2) rapid restoration.
- Recommend to include performance metrics related to climate hazards/events

5.4 Grid Hardening for Long-Term Climate Impacts

CPUC Draft Strategic Objective:
The program will achieve implementation of an optimized capital deployment framework for hardening the grid to long-term climate impacts to achieve increased affordability, reduce outage risk, and reduce social burden, where optimized means cost effective prioritization of investments using objective, measured, verifiable data on grid equipment condition, capability, and alternatives by 2029-2033.

PG&E Feedback

- Recommendation that "operational cost effectiveness" be incorporated as a cost-cutting principle rather than a standalone goal, since it is related to nearly all of the strategic objectives.
- Recommendation to revise the objective as:
  - **This program will identify, develop, and advance technologies to increase grid resilience to long-term climate impacts, while considering both short-term and long-term affordability.**

Climate Adaptation: Additional Gaps

PG&E Feedback: Recommendation to include the following Objectives:

- 5.6 Advance solutions to support **cost-efficient forestry and vegetation management**, to improve affordability

- 5.7 Advancing **solutions to eliminate ignitions** with improved grid protection schemes and improved monitoring capabilities, to reduce the increasing risk of climate hazards in California

Electric Program Investment Charge (EPIC)

EPIC Roles and Path to Market

Strategic Objectives Technical Working Groups Round 2
May 13-15, 2024
May 29, 2024

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

California Public Utilities Commission

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

EPIC Role in Applied R&D

Source: D.12-05-037, at 32, 36, and 99.

- Investment in applied science and technology that provides public benefits but for which there is **no current clear business case for deployment of private capital**.
- Activities supporting pre-commercial technologies and approaches that are designed to solve specific problems in the electricity sector.
- Included in this area are:

  (i) Any clean energy technologies,

  (ii) demand-side technologies,

  (iii) non-technology elements such as strategies and methods to enhance adoption of clean energy technologies,

  (iv) addressing the environmental and public health impacts of electricity-related activities,

  (v) clean transportation as long as there is a linkage to the electricity sector and ratepayer benefits, and

  (vi) building codes and appliance standards.

- Does not include basic research that is seeking to expand scientific knowledge for its own sake.

EPIC Role in Technology Demonstration and Deployment

Source: D.12-05-037, at 32, 39, 40, and 100.

- The installation and operation of pre-commercial technologies or strategies at a scale sufficiently large and in conditions sufficiently reflective of anticipated actual operating environments to enable appraisal of the operational and performance characteristics and the financial risks.
- Assists technology development through the "valley of death" and toward commercialization.
- Deployment means installations that are directly interconnected or located on the electricity grid of the IOUs.
- Deployment may also include strategies and other activities that are not specifically about the deployment of a technology itself **but are designed to test successful ways of encouraging customer adoption of clean energy technologies**, such as electric vehicles, energy efficiency, or renewable generation.

EPIC Role in Market Facilitation

Source: D.12-05-037, at 32, 61, and 100.

- **Activities to address nonprice barriers to adoption of clean technologies** that are consistent with the goals of EPIC and provide benefits to electric ratepayers by ensuring that other activities are successful including:
  - (i) Addressing regulatory barriers and lack of information,
  - (ii) regulatory assistance and streamlining,
  - (iii) market research,
  - (iv) tracking program results,
  - (v) education and outreach, and
  - (vi) workforce development to support clean energy technology and strategy deployment.
- These activities help ensure that products or strategies make it all the way through the technology development cycle and are delivering benefits to consumers.