EPIC Strategic Goals

Kick-Off Workshop

Report

EPIC POLICY + INNOVATION
COORDINATION GROUP

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

This report was completed by The Accelerate Group, a consultant to the California Public Utilities Commission and the Project Coordinator for the EPIC Policy + Innovation Coordination Group. The information herein was collected and summarized by the Project Coordinator, with input from members of the EPIC Policy + Innovation Coordination Group and does not reflect an official position of the California Public Utilities Commission.

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I. EXECUTIVE SUMMARY

In its most recent EPIC decision,[1] the CPUC directed that program-wide goals are needed to evaluate the progress of innovation investments and the extent to which investment plan portfolios maximize ratepayer benefits and impacts in achieving California's clean energy and climate goals. As part of that decision, the CPUC directed the establishment of a public workshop process to inform how Strategic Goals and Objectives should be articulated and established by the Commission in its next guidance Decision for the EPIC 5 cycle (2026-2030). The workshop process will collect feedback on measurable program level strategic goals and Administrator level strategic objectives that align with achieving the State's climate goals.

On August 16, 2023, the California Public Utility Commission (CPUC) hosted the EPIC Strategic Goals Kick-Off Workshop, the first workshop in a Strategic Goals Workshop series designed to meet the objectives of this CPUC decision.

The overall goal of the Strategic Goals Workshop process is to collect stakeholder input on critical pathways, gaps, roles, and outcomes in achieving the State's climate goals that would be best fulfilled by EPIC's research, development, and demonstration (RD&D) funding, considering its unique role and opportunities. The Strategic Goals Kick-Off Workshop aimed to introduce the overall purpose of the Strategic Goals Workshop process and identify specific topic areas for subsequent workshop discussions.

More than 170 stakeholders participated in the stakeholder workshop, with speakers identifying critical pathways, and relevant gaps, in achieving the state's energy, climate, and equity policies that could be addressed by ratepayer-funded RD&D. As further detailed in this report, participants highlighted needs for further investments in RD&D around the topics of transportation electrification, customer engagement and affordability, climate resilience, outreach/cooperation with tribes and disadvantage communities, renewable energy integration, and the need to identify low-cost pathways for achieving state goals. The participants also provided suggestions on improvement of EPIC program process and highlighted the importance of coordination and cooperation across projects, entities and funding opportunities and ability to prioritize and conclude/recycle projects quickly.

[1] CPUC Decision (D.)23-04-042

II. BACKGROUND

What is EPIC?

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

The Electric Program Investment Charge (EPIC) is a California ratepayer funded program that drives efficient, coordinated investment in new and emerging clean energy solutions. Its mandatory guiding principle is to provide ratepayer benefits, with a mission of investment in innovation to ensure equitable access to safe, affordable, reliable, and environmentally sustainable energy for electricity ratepayers. EPIC invests in a wide range of critical innovation, including building decarbonization, cybersecurity, demand reduction, distributed energy resource integration, energy storage, entrepreneurial ecosystems, grid decarbonization, grid decentralization, grid modernization, grid optimization, grid resiliency and safety, high penetration renewable energy grid integration, industrial and agricultural innovation, smart grid technology, transportation electrification, and wildfire mitigation. From 2012 through 2030, EPIC will have invested nearly $3.4 billion in clean energy technology innovation.

What is the Policy + Innovation Coordination Group?

The California Public Utilities Commission (CPUC) oversees and monitors the implementation of EPIC research, development, and deployment program. For current EPIC funds from investment periods 1 (2012-2014), 2 (2015-2017), 3 (2018-2020), and 4 (2021-2025) there are four program administrators: the California Energy Commission (CEC), Pacific Gas and Electric (PG&E), Southern California Edison (SCE), and San Diego Gas & Electric (SDG&E). The CEC administers 80% of the funds and the utilities administer 20%.

In Decision 18-10-052, the CPUC established the Policy + Innovation Coordination Group (PICG)—comprised of a Project Coordinator, the four Administrators, and the CPUC—to better align EPIC investments and program execution with CPUC and California energy policy needs. In Decision 23-04-042, the CPUC directed the PICG to convene the Strategic Goals and Objectives process for the EPIC 5 funding cycle (2026-2030).

Workshop Process Goals

The Strategic Goals Workshop Process will focus on identifying four core elements:

Pathways:

Set of critical actions necessary to support meeting the State's 2045 zero carbon goals via the most effective strategies and technology innovation.

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.

Roles:

The best-positioned stakeholders (ratepayers, state, federal, private sector) to lead innovation investment in addressing identified gaps, including through coordination and collaboration.

Outcomes:

Clear, measurable, and reasonable targets to be used by administrators in developing EPIC portfolios and used in program evaluations to measure impacts of EPIC in supporting achievement of California's 2045 zero carbon goals.

III. WORKSHOP SUMMARY

Agenda

The workshop was hosted from 10 am – 5 pm and consisted of three panels, each followed by stakeholder discussions inviting questions and comments from the audience in the room and participants connected virtually. CPUC Commissioner Genevieve Shiroma provided opening and closing remarks. CPUC Staff and the PICG Project Coordinator provided an initial introduction to the Workshop process and the purpose of the event.

Opening Remarks: Commissioner Genevieve Shiroma welcomed the participants and outlined the goals and purpose of the workshop series: to discuss gaps, challenges, and opportunities to advance innovation though California's EPIC research, development, and demonstration pathways. The workshop input will help CPUC develop clear and measurable strategic goals and objectives for EPIC 5 that will provide a roadmap to monitor and track progress of EPIC investment and ensure that they align with equity, energy and climate goals

and produce ratepayer benefits. Commissioner Shiroma highlighted the critical role of research and the urgency in the face of the climate challenges that Californians are facing.

Introduction: The PICG Project Coordinator, Andrew Barbeau, and CPUCs Fred Beck introduced the purpose and scope of the Strategic Goals Workshop Process, outlined its proposed process in defining the EPIC strategic Goals and its role in the future Commission proceedings that will determine strategic goals for the EPIC 5 funding cycle. Andrew also introduced the foundation that was laid out in the previous work that PICG did in 2020-2021 to identify policy and innovation partnership areas, highlight critical challenges and timely opportunities for enhanced coordination and to connect RD&D to policy to inform regulatory decisions. CPUC's Fred Beck then introduced the basis for establishing EPIC Strategic Goals and the D23-04-042 directive, the four core elements that the workshop will focus on to help define the strategic goals: critical pathways, key innovation gaps, EPIC's role in addressing them, and desired outcomes of EPIC investments that will help measure their success and contribute to impacts on the achievement of state goals. The questions and comments from the participants also highlighted the following potential additional topics/critical pathways to consider: industrial sector decarbonization; geothermal energy and its linkage with the long-term storage; and customer engagement. Potential critical gaps/hurdles raised included the need to find areas to reduce costs of EV charging infrastructure installation and telematics for home charging in terms of shifting peak demand, as well as a need for improved tools for modelling simulations and better definition of resilience.

Panels: The three panels focused on the following areas:

I. Perspectives on Innovation Needs.

Presenters:

- Leuwam Tesfai, CPUC
- Duncan Callaway, University of California, Berkeley (UC Berkeley)
- Adria Tinnin, TURN
- Peter Miller, NRDC

The panelists provided the perspectives of the of the representatives of CPUC, UC Berkeley, TURN and NRDC, followed by a stakeholder discussion that highlighted the following key challenges/gaps: the need for reduced costs of grid upgrades; pipeline as the missing link for the hydrogen development; the need for more data from the meters, particularly regarding the EV charging; the need to look for opportunities to lower the costs of infrastructure upgrades and potential rates redesign; the concern that the distribution grid will not be able to support the electrification goals and the need to look for ways to improve adoption and marketing of climate technologies; interconnection ties incentives to bring electricity to California.

II. Perspectives from Other Energy RD&D Efforts.

Presenters:

- Gil Bindewald, US Department of Energy (US DOE)
- John Lochner, NYSERDA
- Lisa Epifani, X, The Moonshot Factory
- Brian Young, Washington Department of Commerce

The panelists for this session included perspectives from the US Department of Energy, NYSERDA, X, The Moonshot Factory, and Washington Department of Commerce, followed by a stakeholder discussion that highlighted important takeaways on methods to improve EPIC investment outcomes and impacts. Key topics discussed included: having stakeholders play a key role; making the process more accessible to tribes and local communities; recognizing that topics such as electrification often potentially expand to unexpected topics and areas; the need to prioritize investments to maximize impact; to kill/complete/compose unsuccessful projects fast to pivot to other priorities; to ensure alignment with realities and the regulatory environment; engage the local tribes in the discussions and meet them where they are to maximize participation, at the events like tribes water summit, considering that tribes are also looking for solutions and have access to funding; look for opportunities for regional coordination where there are common obstacles (for example on Hydrogen HUBs or National Offshore Wind Consortium); look for opportunities to work with businesses around testing new technologies, like vehicle-to-grid (V2G); look for ways to collaborate outside of cost share.

III. Perspectives from EPIC Administrators.

Presenters:

- Anthony Ng, California Energy Commission
- Dan Gilani, PG&E
- Tony Johnson, Southern California Edison
- Cynthia Carter, SDG&E

The panelists provided the perspectives of the of the representatives of the California Energy Commission, PG&E, SCE and SDG&E, followed by a stakeholder discussion that highlighted the following key roles of EPIC investment: supporting commercialization and meeting customer needs; looking into a coordinated role of utilities; finding ways to kill/complete/compost unsuccessful projects fast to be able to move on to other areas. Panelists also stressed the need for the research to be relevant in the face of rapidly changing technologies and leverage discussions happening elsewhere to stay

relevant and avoid duplication; sending market signals that bring in private investors looking to co-invest and leverage state investments.

Presentations

The link to each presentation is included in the Appendices to this report.

Attendees

More than 170 individuals participated in the full day workshop, virtually and in person, including CPUC Commissioner Genevieve Shiroma, representatives from the US Department of Energy, the four Administrators of the EPIC Program (California Energy Commission, and the three utilities), as well as RD&D leaders, research institutions, community leaders, technology solution providers, government entities, utilities, non-governmental organizations, and industry.

IV. KEY TAKEAWAYS

Key Gaps and Opportunities

During the workshop, the panelists and participants identified the following key gaps and unique roles/opportunities for EPIC investments:

#1: Customer engagement and affordability, and customer role and experiences with the clean energy transition.

Many stakeholders indicated the need to consider customer engagement and customer perspective/experience as an important factor/gap, or a pathway, to consider. Commissioner Shiroma indicated that it is part of consideration for developing strategies and looking into the cultural and behavioral incentives to ensure customer intake (for example in adopting EVs). Several panelists and participants highlighted that affordability is one of the major barriers that stops electrification, noting that, for example heat pumps are more expensive than gas and existing programs may not be sufficient to incentivize customers, particularly the middle-income customers that do not qualify for the CARE program. Some suggestions also included looking into low-income rates, or capping rate increases with inflation. The panelists and Commissioner Shiroma also highlighted a need to identify ways to help people afford behind the meter initiatives and have no upfront fees. She noted the on-bill financing

as one of the proceedings at the CPUC that she is working on. The utilities also indicated that customer engagement, rather than technology, is a major roadblock and suggested that changing customer psychology to increase adoption will need to be led by CPUC and not utilities. One of the desired outcomes of EPIC investment can potentially be gaining insights, through demonstrations, into understanding customer psychology, the early adopters, and how to help customers understand and adopt the new technologies.

#2: High costs of distribution system upgrades.

Many presenters noted the need to look for cost minimization and to improve efficiency and affordability of existing technology to be able to scale up the upgrades quickly. As an example, participants suggested tweaking existing technology to make it more efficient and affordable, instead of developing new technology. At the same time, other participants suggested also looking for "moonshot" type innovation opportunities that could have groundbreaking impacts and provide tremendous value, or dramatically reduce costs. Participants stressed the need to find ways to lower the costs of infrastructure upgrades, prioritize the ones that are unavoidable, look for RD&D opportunities in reducing utility operational costs, and look for utility coordination and optimization to avoid the upgrades that are avoidable. The customers will not be able to afford the price of how much and how quickly the upgrades are needed to fully electrify.

#3: High costs and slow pace of EV charging installations and limited access for low-income customers.

The participants and panelists indicated that to reach the climate goals the EV charging installation needs to scale up significantly, which might not be achievable without substantially lowering the costs and time of the installation. Participants highlighted the need to fix the market failures and ensure the location of charging infrastructure is where they are most needed, rather than where they are most profitable, so that the changing infrastructure reaches low-income communities. The home charging and telematics for integration, rather than expensive upgrades, multifamily charging and shifting peak demand remain key issues. Lack of coordination in terms of the EV charging technologies creates another frustration for the customers. Testing and demonstrations for the V2G charging and bidirectional operability was suggested as one of the areas for EPIC cooperation with the industry. The EV infrastructure needs to be considered from the perspective of its value to and impacts on the gid and not just as a load.

#4: Climate vulnerability and variability.

Presenters indicated response to weather and climate variability as one of the major gaps and the need to invest in resilience to protect people and economy. Participants recommended thinking of the natural systems, like forests and agriculture, as opportunities. Climate adaptation brings a new topic for tribal representation and cooperation/coordination with the tribes. The participants encouraged engaging tribes and meeting with them locally to ensure maximum participation, at the events attended by tribal members, like the Tribes Water Summit, keeping in mind that tribes are looking for solutions to the same problems and have access to funding.

#5: Limited capacity of distribution system to accommodate electrification and new load with the greater penetration of DER.

Many participants expressed concern over the ability of the distribution system to support the future electrification efforts and the need to expedite building up system capacity. Participants highlighted the need to find cost reductions opportunities, considering the amount of upgrades needed and find ways to reduce the conventional capacity upgrades and prioritize upgrades that are unavoidable.

#6: Forecasting and modelling for renewable heavy portfolios.

Some panelists indicated the need to improve forecasting of resource adequacy by adding different scenarios of higher renewables penetration and extreme weather events. They expressed a need to build a tool to incorporate climate predictions and different electrification scenarios, like different levels of heat pumps adoption. Other participants also indicated the need for tools to help with modeling simulations, and machine learning tools that will invite a path for developing technology to improve modelling.

#7: Understanding realistic realm and role of hydrogen for the California economy.

Several stakeholders inquired into the hydrogen solutions and what role they could play, whether there is research and infrastructure available to support it and highlighted a need to look into permitting and impact on local communities. Participants noted that availability of pipelines and potential leakage impacts need to be evaluated to determine whether hydrogen is a good solution for California. Some participants also expressed concern over using hydrogen to justify the gas infrastructure, because most hydrogen is not currently produced with renewable resources.

#8: Availability of long duration storage, transformers, and other critical equipment and resources, in the future when it's needed.

The panelists identified the long duration storage and availability of lower costs locally built transformers and other critical grid infrastructure as a potential future deadlock. Commissioner Shiroma asked whether there are opportunities for RD&D and find more efficient way to use ratepayer dollars in more innovative ways.

#9: Wildfire mitigation and prevention.

Some panelists indicated that a lot of improvements are still needed for wildfire mitigation and prevention, including improving inspection and analysis, looking into customer impacts in disadvantaged communities, optimizing existing vegetation practices and utilizing broader forest management. Find ways to reduce undergrounding costs and improve lifecycle efficiencies and cost-effective management at service drop.

#10: Transmission infrastructure and regional ties with the broader systems.

The participants also noted a need for better interconnection ties to bring electricity to California, that can be a potential roadblock, and a need to look for mechanisms that can incentivize intertie connections.

#11: Load management across all types of loads to ensure affordability.

Participants described the potential costs of new infrastructure needed to support new transportation and building electrification loads, and the role that load management and load shifting could play in the reduction of otherwise necessary grid investment, and to balance renewable energy resources integrated into the grid.

Process Recommendations

The participants also provided recommendations on approaches and considerations for improving EPIC funding prioritization and coordination:

#1: Maximize value through incremental improvements to existing technology.

Some panelist indicated the potential opportunity in maximizing value and reducing costs though improving existing technologies and looking into ways to improve their efficiency and expand their capabilities with incremental, low-cost changes, rather than only looking to developing new technologies.

#2: Maximize impacts by aligning RD&D investments with the policy tracks.

Panelists from both California and out of state research and development entities highlighted the need to align the RD&D outcomes with the policies to maximize impact and ensure relevance.

#3: Target EPIC investment to the unique areas best suited for government funding.

The panelists suggested that government investment can play a key role in supporting riskier investment that may be overseen by the industries but may have greater community benefits and find ways to connect more closely with the community needs to identify such opportunities. Other participants highlighted that EPIC could play a key role in commercialization and bringing projects to market. CEC also noted that EPIC investments play key role in sending market signals that bring in private investors looking to coinvest and leverage state investments.

#4: Coordinate funding between different entities and projects.

The panelist identified a need to coordinate funding opportunities between different entities to avoid unnecessary overlaps but leverage synergies that can help maximize impacts, in different parts of the project, technology development and different pieces of the whole. Participants highlighted the need to look for opportunities for regional, state, federal, and industry coordination and integration across the projects. One of the suggested areas was to work with businesses around testing new technologies, like V2G integration, operability testing for bi-directional charging, or integration testing. The panelist also suggested testing how systems work together when looking at the digital infrastructure across the board.

#5: Coordinate regionally and integrate federal funding opportunities.

The panelists and participants highlighted a need to look for opportunities for regional coordination where there are common obstacles, for example, on the Hydrogen HUBs or National Offshore Wind Consortium, and look for ways to collaborate beyond the cost share. Participants noted the need to look for the integration of the federal funding incentives under the Inflation Reduction Act (IRA) and Bipartisan Infrastructure Law (BIL) into the EPIC funding considerations. The participants highlighted the need to leverage discussions happening elsewhere to stay relevant and responsive to customer needs and to avoid duplication.

#6: Develop tailored and localized community outreach and engagement.

The panelists and participants highlighted a need to reach the tribes and local disadvantaged communities where they are to ensure their engagement and greater participation. This can ensure better coordination of the local efforts with the broader state projects and ensure EPIC investments are better aligned with the community and tribal needs.

#7: Identify numerical targets for the strategic goals, where possible.

NYSERDA provided examples of the key geothermal drilling costs reduction targets and highlighted the importance of setting clear targets to measure project success.

#8: Think about the big picture.

The panelists highlighted approach strategic planning by taking into consideration the overall objective and the big picture rather than a piecemeal individual actions approach.

#9: Define a benefits framework.

Panelists indicated the importance of defining what the benefits are and developing a benefits framework to measure investment success.

#10: Prioritize funding in the key areas.

The panelists highlighted the importance of identifying key areas to prioritize funding among the many opportunities that exist for RD&D. The panelists expressed the importance of prioritizing the investment for the most impactful projects to maximize value and align the projects with realities, customer needs and regulatory environment.

#11: Allow flexibility in project closures.

Many panelists highlighted the importance of finding ways to close projects quickly that were not on track to achieve the intended results or that were past their useful time (“kill”, “recycle” or “compost”) in order to save unnecessary costs and time and be able to move on to more pressing areas, but also be able to apply their gained learnings to other topics. Some panelists also highlighted the importance of being flexible and open to the potential expansion into new areas that electrification brings to the table, like water integration. Participants also highlighted the need to identify clear paths to production for different RD&D initiatives and pivoting quickly if tested technologies are not ready for it.

#12: Ensure continuous monitoring of progress.

The panelists highlighted the need for continuous monitoring and tracking progress of the initiatives against the broader state goals and roadmaps to ensure that the funding is on track with its strategic goals.

#13: Integrate EPIC success stories into regulatory decisions.

Commissioner Shiroma highlighted the power of success stories from the EPIC projects and the need to think of the ways to brings them into the regulatory decisions to ensure the successful projects are adopted and expanded upon in the regulatory processes and in the full-scale implementation efforts.

V. APPENDICES

Video Recordings:

Workshop video **PT. 1**
Workshop video **PT. 2**

Agenda: **(PDF)**

Presentations:

Andrew Barbeau, EPIC PICG Project Coordinator - Presentation Link
Fred Beck, California Public Utilities Commission - Presentation Link
Leuwam Tesfai, California Public Utilities Commission - Presentation Link
Duncan Callaway, UC Berkeley - Presentation Link
Adria Tinnin, TURN - Presentation Link
Peter Miller, NRDC - Presentation Link
Gil Bindewald, US Department of Energy - Presentation Link
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