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CALIFORNIA PUBLIC UTILITIES COMMISSION

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ELECTRIC PROGRAM INVESTMENT CHARGE

DRAFT EPIC Strategic Objectives

April 2024

TRANSPORTATION ELECTRIFICATION

Initial Draft Strategic Objectives for the Electricity Program Investment Charge ("EPIC") Program for the 2026-2030 Investment Period. These Draft Strategic Objectives were developed by stakeholders participating in the California Public Utility Commission's ("CPUC") in-personal technical working group on April 10, 2024, in response to the process and Strategic Goals established by the CPUC in D.24-03-007.

How these Draft Strategic Objectives were developed

The Draft Strategic Objectives were developed through a multi-part process:

1. **Fall 2023: Strategic Goals Process.** The CPUC launched a Strategic Goals process for the EPIC program in August 2023, and facilitated stakeholder workshops to identify the priority state climate, equity, and energy goals that EPIC could work to support, exploring critical pathways to achieving those goals, identifying the obstacles, challenges, and gaps along those pathways, and discussing the key roles of entities responsible for overcoming those gaps. The output from that process was the development of a Staff proposal on Strategic Goals for the EPIC program, filed in November 2023.

2. **March 2024: Strategic Goals Adopted.** In March 2024, the CPUC adopted five strategic goals for the EPIC program in D.24-03-007 (Transportation Electrification, Building Decarbonization, Achieving 100% Net-Zero Carbon Emission and the Coordinated Role of Gas, Distributed Energy Resource Integration, and Climate Adaptation), and directed the establishment of a workshop process to establish Strategic Objectives for the EPIC program.

   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 that:

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

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

   c. Consider important crosscutting principles identified in the decision, including equity, emerging strategies, and safety (including cybersecurity)

3. **March 2024: Strategic Objectives Process Launched.** The Strategic Objectives Workshop process kicked off on March 19, 2024 with a public workshop, and was followed by an April 2, 2024 workshop on developing an Impact Analysis Framework for the EPIC program.

4. **April 2024: Technical Working Group meetings begin.** Technical working groups for each strategic goal launch in April 2024, focused on initial development of Draft Strategic Objectives for the EPIC program.

5. **May - June 2024: Finalize Strategic Objectives for inclusion in CPUC Staff Proposal.** The included Draft Strategic Objectives below will be discussed as part of follow-up virtual technical working group meetings in May 2024, as well as in-person and virtual Workshops in June 2024. The ultimate product of this work is the development of a CPUC Staff Proposal on the Strategic Objectives to be included in a CPUC litigated proceeding.

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Transportation Electrification

Strategic Goal: 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.

Identified Gaps:

Increasing Equitable Access to Transportation Electrification Benefits	**Reducing Capital Costs for Charging Equipment**	**Managing Bulk System or Zonal Loads of Charging**	**Managing Concentrations of Charging Loads on the Distribution System**
Lack of availability of affordable public or shared charging infrastructure	High costs of electric vehicle charging infrastructure for light-, medium-, and heavy-duty electric vehicles	Misalignment between electric vehicle loads and intermittent renewable energy production	Lack of advanced planning for grid needs
Lack of opportunities for disadvantaged, low-income, ESJ, and tribal communities to directly benefit from electric vehicle adoption	High costs of infrastructure for electrifying public transit to benefit DVC and nonattainment communities by mitigating pollution	Lack of robust and uniform data sharing, testing, certification, and cybersecurity protocols for transportation electrification	High costs related to charger interconnection and grid upgrades for areas with high concentrations of electric vehicle charging infrastructure and/or low grid capacity
	Lack of uniform standards and protocols for interconnection, system design, and communication among grid-connected devices, including smart meters, smart inverters, and internet-of-things (IoT) technology	Lack of capability to leverage optimized charging, bidirectional charging, and V2X for grid services.	Incomplete understanding of consumer decision-making behavior related to challenges of electric vehicles adoption
			Long timelines for grid upgrades to accommodate EV charging infrastructure, particularly for fleets

1.1 Reducing Installation Costs and Time

Strategic Objective: This program will result in an X% reduction in electric vehicle charging costs and an X% reduction in electric vehicle charging installation time by 2035.

The Strategic Objective will take into consideration:

- Older housing stock; and
- Energization timelines.

The Strategic Objective will achieve a path to market through:

- Demonstrating the value for Disadvantaged Vulnerable Communities (DVC) and in charging at multifamily housing.

Success for the Strategic Objective will be measured through:

- Cost per mile parity across charging methods;
- Number of electric panel or grid upgrades eliminated or deferred;
- Average revenue received by EV owners;
- Reduction in curtailed renewable energy due to managed charging; and
- Incremental cost of managed / V2X charging.

Targeted Questions for Stakeholders:

- **Is the Strategic Objective appropriately stated? If not, what do you propose?**
- **What measurable targets and timelines would you recommend?**
- **To what extent is the cost and timeline of installing charging a barrier to transportation electrification?**
- **To what extent would increased availability of micro-mobility (electric scooters, bikes, etc.), electrified transit, or shared vehicles address communities' access to electrified transportation? As compared to additional single passenger vehicle charging?**
- **Are there considerations that are not mentioned here that any strategy should keep in mind?**
- **What is the most effective way to bring new strategies to market after the EPIC program activities are complete?**

1.2 Reducing Cost of Charging Infrastructure for Medium and Heavy-Duty Vehicles

Strategic Objective: The program support the achievement of a target of X% of all medium- and heavy-duty charging installation being bidirectional capable by 2035, to reduce the costs of medium- and heavy-duty EV fleet operations and maintenance.

The Strategic Objective will take into consideration:

- Ratepayer costs should not increase more than X (for example, tied to the rate of inflation);
- Cybersecurity;
- Available data sources;
- Resiliency and associated costs;
- Coordinating with renewable energy production times ($ value of shifted clean energy);
- Early adopters' costs may be higher;
- Readily deployable infrastructure;
- Supply chain dependability and availability.

The Strategic Objective will achieve a path to market through:

- Developing successful replicable and scalable model approaches and cost-effective pathways;
- Developing VPP/V2B/V2G specific rates tariffs to compensate customers (prosumers);
- Reducing upgrade costs.

Success for this Strategic Objective will be measured through:

- Number of MWh load shifted;
- EPIC project cost per ton GHG reduction;
- GHG and air pollution reduction in the targeted DVC communities and elsewhere (to identify any air quality impacts elsewhere);
- $/bill savings for ratepayers in avoided infrastructure investments;
- EV adoption rate, particularly for medium and heavy-duty vehicles;
- Number of medium and heavy-duty vehicle fleets electrified..

Targeted Questions for Stakeholders:

- **Is the Strategic Objective appropriately stated? If not, what do you propose?**
- **What measurable targets and timelines would you recommend?**
- **For those who own, manage, and operate Medium and heavy-duty fleets, are there any gaps?**

- **For EV charging/DER installers and aggregators, are there strategies to incorporate new technologies or products to help achieve the strategic objective? What barriers do you see to the development of new technologies or products to address this objective?**
- **What is the path to market and likely timeline for availability of technologies or products?**

1.3 Ubiquitous EV-capable parking in Disadvantaged Vulnerable Communities (DVCs)

Strategic Objective: The program will support innovation in deployment strategies to achieve 75% of existing housing in DVC communities having EV charging-capable parking by 2035.

The Strategic Objective will take into consideration:

- Older housing stock;
- Need for information on use-cases in disadvantaged, low-income, and Tribal communities;
- Energization timelines; and
- Need to manage load.

The Strategic Objective will achieve a path to market through:

- Demonstrating the value of DVC community markets and in charging at multifamily housing.

Success for the Strategic Objective will be measured through:

- Number of multifamily housing in DVC communities that serve as resilience hubs;
- Percent penetration of charging infrastructure in DVC communities;
- Percent increase in EV adoption in DVC communities;
- Uptake of energy management systems; and
- Uptake of EV chargers with load management capability.

Targeted Questions for Stakeholders:

- **To what extent is the lack of charging the primary barrier to transportation electrification?**
- **To what extent would increased availability of micro-mobility (electric scooters, bikes, etc.), electrified transit, or shared vehicles address communities' access to electrified transportation? As compared to additional single passenger vehicle charging?**
- **What other barriers to transportation electrification exist in DVC communities?**
- **Are there considerations that are not mentioned here that any strategy should keep in mind?**
- **Do you have thoughts on how to bring strategies to market after the EPIC program activities are complete?**
- **Are there other objectives not mentioned here that are related to increasing equitable access to transportation electrification benefits and are important for your community?**

1.4 Ensuring Communities Receive VGI Benefits

Strategic Objective: This program will increase the value from managed or dynamic charging for DVC communities' charging use cases by X%.

This Strategic Objective will take into consideration:

- Increased need for community resilience;
- Energization timelines;

This Strategic Objective will achieve a path to market through:

- Demonstrating value of EV charging and VGI to DVC communities.

Success for this Strategic Objective will be measured through:

- Payback period of EVs through managed charging value;
- Time EVs are used as backup power in response to grid outages;
- Number of customers in DVC communities participating in virtual power plant applications;
- Return on investment;
- Number of micro-mobility technologies penetrating DVC communities;
- Time burden of charging in multifamily housing; and
- Increased resilience (loss of energy reduced) in DVC communities.

Targeted Questions for Stakeholders:

- **To what extent is the lack of revenue received for VGI activities a barrier to transportation electrification in your community?**
- **Are there considerations that are not mentioned here that any strategy should keep in mind?**
- **Do you have thoughts on how to bring these strategies to market after the EPIC program activities are complete?**
- **Are there other objectives not mentioned here that are related to increasing equitable access to transportation electrification benefits and are important for your community?**

1.5 VGI as a Grid Enabling Asset

Strategic Objective: The program will accomplish enabling widespread VGI build out to operate and decarbonize the grid at the lowest societal cost by 2035.

This Strategic Objective will take into consideration:

- Cybersecurity needs of the end-to-end communication systems;
- The need for robust market oversight;
- Relevant CPUC proceedings including those related to transportation electrification, load management, rate design, etc;
- Continued safety and reliability of the grid;
- Other non-transportation related flexible loads (ex. buildings, DER)
- Affordability of rates and grid upgrades;
- Equity specific use cases for VGI;
- Competing clean generation use-cases and co-location with DERs; and
- Unmanaged charging and misalignment of charging with renewable generation will set California back in achieving it's clean energy goals

This Strategic Objective will achieve a path to market through:

- Understanding and appropriately valuing shifted load;
- Determining the required amount of renewable generation and its optimal locations to leverage VGI effectively in meeting California's clean energy targets; and
- Creating cybersecurity requirements to enable all VGI capabilities.

Success for this Strategic Objective will be measured through:

- Number of vehicles served
- Societal cost test
- Cost/Benefit analysis for the electric system
- Criteria emissions and GHG attribution
- Cost of service
- Number of cybersecurity incidents

Targeted Questions for Stakeholders:

- **What specific, quantifiable metrics should be used to define 'widespread build-out' and 'lowest societal cost'? How can we best phrase the objective to ensure it includes measurable targets such as specific percentages, cost reductions, or operational benchmarks?**
- **Are there considerations that are not mentioned here?**
- **What additional ways can the strategic objective be measured?**
- **Do you have thoughts on how to bring strategies to market after the EPIC program activities are complete?**

1.6 Innovative Solutions to Reduce Grid Upgrades

Strategic Objective: Reduce the number of grid upgrades need to support the state's transportation electrification goals by 50% through the implementation of a diversified portfolio of electric grid innovation projects by 2045.

The Strategic Objective will take into consideration:

- Grid performance.
- Consumer behaviors.
- Community needs.
- Equity and justice outcomes.

The Strategic Objectives will achieve a path to market through:

- Deployment of pilots and demonstration projects as replicable and scalable models.
- Support market facilitation with seamless strategies that remove market barriers to achieve economies of scale.

Success for the Strategic Objective will be measured through:

- Total number of grid upgrades.
- Total number of project installations needing grid upgrades.
- Overall cost of grid upgrades in terms of rate base investment and other funds.
- Measurable CPUC cross-cutting ratepayer benefits.
- Disadvantaged vulnerable communities (DVC) measurable benefits.

Targeted Questions for Stakeholders:

- **Is the 50% reduction in electric grid upgrades an aggressive and achievable target and if not, please propose an alternative with the strategic rationale?**
- **What other grid performance innovative projects should EPIC consider for pilot and demonstration projects to reduce grid upgrades needed to meet the projected transportation electrification load growth need?**
- **Are the performance metrics appropriate and any gaps in measurements of success?**

1.7 Smart Systemwide Grid Planning Tools

Strategic Objective: Deploy grid capital planning tools to enable continuous, localized, and prioritization of grid upgrades as efficient and critical pathways by 2035.

The Strategic Objective will take into consideration:

- Variations of transportation modes (i.e. light-medium-heavy duty)
- Consumer behaviors.
- Community needs.
- Equity and justice outcomes.

The Strategic Objective will achieve a path to market through:

- Deployment of pilots and demonstration projects as replicable and scalable models.
- Support market facilitation with seamless strategies that remove market barriers to achieve economies of scale.

Success for the Strategic Objective will be measured through:

- CPUC cross-cutting EPIC measures
- Return on capital associated with grid load management solutions
- Less capital investment deployed towards grid upgrades
- New, innovative, or enhanced grid performance features

Targeted Questions for Stakeholders:

- **What grid planning tools will be needed to inform systemwide grid upgrades?**
- **What criteria should be taken into consideration in deploying grid planning tools?**
- **How shall the Strategic Objective be measured for success?**

1.8 Accelerate Grid Interconnection Timelines

Strategic Objective: Accelerate grid interconnection timelines by 50% to enable EV infrastructure installation by 2030.

The Strategic Objective will take into consideration:

- Variations of transportation modes (i.e. light-medium-heavy duty)
- CPUC energization proceeding.
- Consumer behaviors.
- Community needs.

Success for the Strategic Objective will be measured through:

- Frequency of interconnection installations.
- Interconnection installation timelines.
- Cost savings.

Targeted Questions for Stakeholders:

- **Does the Strategic Objective set an aggressive and achievable grid interconnection timeline reduction target? If not, please propose alternatives.**
- **What factors should be taken into account to reduce grid interconnection timelines?**
- **How shall the Strategic Objective be measured for success?**

EPIC DRAFT STRATEGIC OBJECTIVES

APPENDIX

As part of the development of Draft Strategic Objectives in the technical working group meetings, participants provided examples of strategies that may help achieve the Strategic Objective. At this time, it is premature to finalize specific strategies to reach the Strategic Objectives, as that will be determined as part of Administrator Investment Plans. However, capturing the discussed strategies can provide helpful context to participants to understand the focus of the discussion.

The following represents a non-exhaustive list of possible strategies identified by stakeholders for each Strategic Objective. Stakeholders need not provide comments, edits, or suggestions on the identified strategies.

TRANSPORTATION ELECTRIFICATION

Strategic Objectives	Stakeholder-supplied Example Strategies
1.1 Reducing Installation Costs and Time	• Enhanced and targeted level 1 charging; • Maximizing use of existing infrastructure; • Coordinating with other electrification investments; and • Using networked systems and VGI to make level 1 charging work for everyone.

1.2 Reducing Cost of Charging Infrastructure for Medium and Heavy-Duty Vehicles	• Developing programs that could help medium- and heavy-duty EV fleet operators and drivers to monetize on EV fleet battery use as a grid resource, through, for example:
	  ○ Demonstrating ROR s, operations and use case scenarios of the medium- and heavy-duty EV fleet/vehicle engagement in VPPs/V2Gs and V2Xs;
	  ○ Pilots and demonstrations (for example, for battery-swapping, EV fleet operations and charging models, cost-effective managed charging and load management approaches);
	  ○ Identifying feasible electric rates structures for medium- and heavy-duty EV fleet owners and operators;
	  ○ Use case studies and demonstrations (for example for off-road vehicle application, V2G capabilities in rural areas); and
	  ○ Feasibility pilots and use case studies and demonstrations (for example, testing feasibility for bidirectional EV vehicles with different mix of vehicle types and different customer types).
	• Where bidirectionality is not feasible, develop mapping tools for hardware (controllers, meter adapters, DTM, etc.) and software (e.g. ALM) solutions that match the unique fleet operators' and drivers' needs to reduce costs in EV charging infrastructure installation and operations, and reduce the infrastructure physical (space) footprint.

1.3 Ubiquitous EV-capable parking in Disadvantaged Vulnerable Communities (DVCs)	• Innovation in residential equipment, including metering; • Maximizing use of existing infrastructure; and • Micro-mobility and mass transit.
1.4 Ensuring Communities Receive VGI Benefits	• Technological advancements to facilitate VGI; • All future charging stations are VGI capable; and • Increasing opportunities for load management.

1.5 GI as a Grid Enabling Asset	• Managed charging and other EV use cases for the grid; • Price signals and participation of aggregated EV's in the wholesale market; • VGI as a load management tool to minimize system upgrades and costs; and • Understand customer behavior around charging and VGI use cases.
1.6 Innovative Solutions to Reduce Grid Upgrades	• Aggregated distributed energy resources (DERs) • Smart charge management (SMI) solutions • Dynamic grid management capabilities
1.7 Smart Systemwide Grid Planning Tools	
1.8 Accelerate Grid Interconnection Timelines	

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