

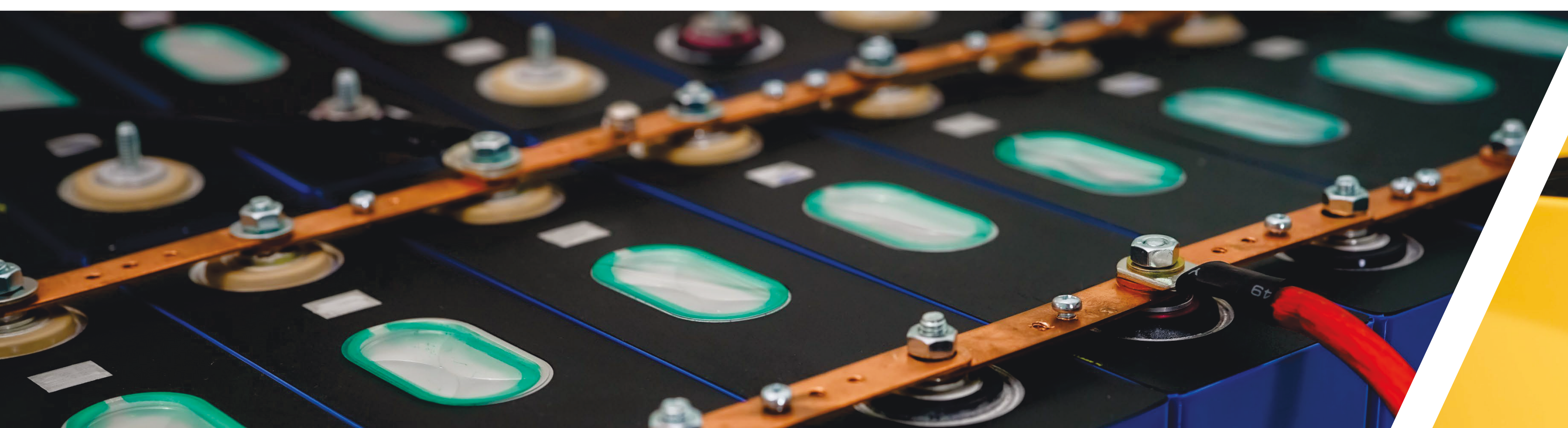


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EPIC STRATEGIC OBJECTIVES WORKSHOP PROCESS

Kick-Off Workshop: March 19, 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 Kick-Off Workshop

March 19, 2024



CALIFORNIA PUBLIC UTILITIES COMMISSION

- I. Welcome and Agenda Overview
- II. Opening Remarks: Commissioner Karen Douglas, CPUC
- III. Strategic Objectives: Background, Process, Definition, and
Mapping Gaps to Objectives
- IV. Break
- V. Stakeholder Discussion
- VI. Wrap Up Discussion and Next Steps
- VII. Closing Remarks

EPIC STRATEGIC OBJECTIVES PROCESS FACILITATION



CALIFORNIA PUBLIC UTILITIES COMMISSION

“The PICG Coordinator, under the direction of [CPUC] Staff, will facilitate the stakeholder process through a series of workshops and prepare a report that summarizes stakeholder input to inform the Commission’s future guidance for measurable program level strategic goals and Administrator level strategic objectives that align with achieving the State’s climate goals.”

D.23-04-042

The Policy + Innovation Coordination Group (PICG) was created by D.18-01-008 and D.18-10-052 and modified by D.23-04-042 to facilitate strategic planning guidance for EPIC portfolios by advising the Commission on a broad range of stakeholder input.

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.

EPIC STRATEGIC OBJECTIVES PROCESS SCHEDULE



CALIFORNIA PUBLIC UTILITIES COMMISSION

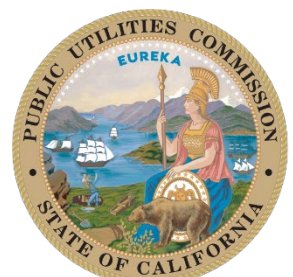
Working Group Meeting	When	Where
Impact Analysis Framework and Metrics Kickoff	April 2, 2024	Virtual workshop
Transportation Electrification #1	April 10, 2024	In-Person: CPUC Offices San Francisco
Building Decarbonization #1	April 11, 2024	In-Person: CPUC Offices San Francisco
Getting to 100% Net-Zero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

Electric Program Investment Charge (EPIC)

Defining EPIC Strategic Objectives

Strategic Objectives Kickoff Workshop
March 19, 2024

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



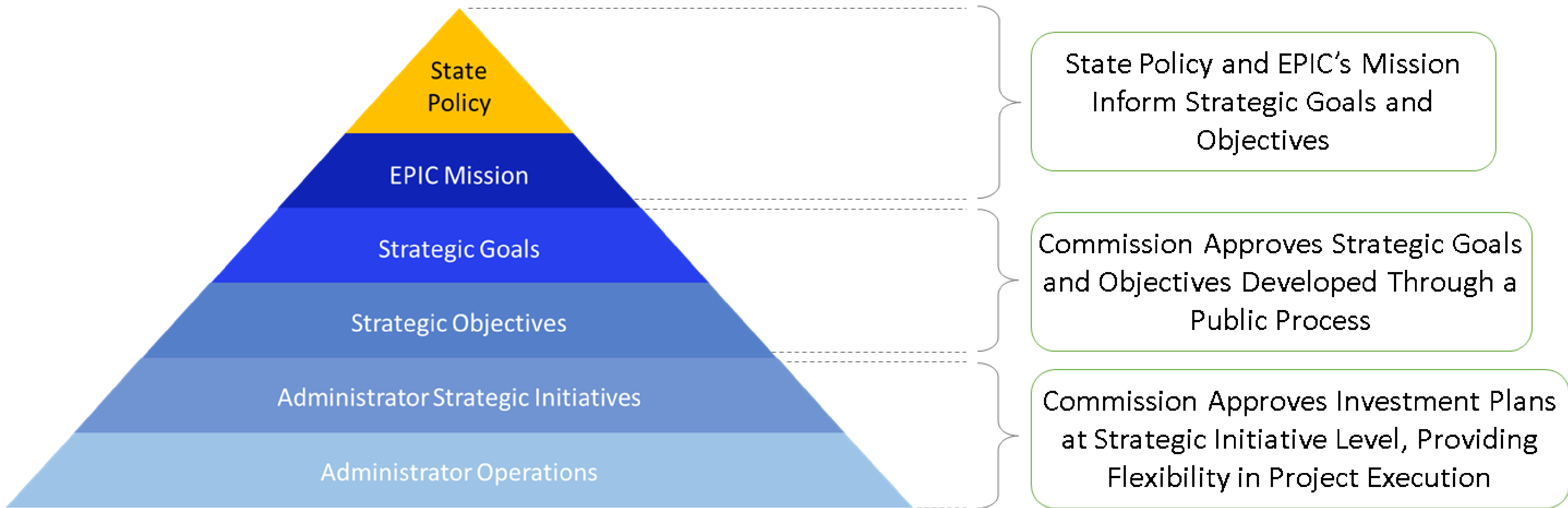
**California Public
Utilities Commission**

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Basis for Establishing EPIC Strategic Objectives

Decision (D.)23-04-042 directs a stakeholder process to inform CPUC guidance for measurable program-level EPIC strategic objectives aligned with EPIC’s strategic goals for achieving the State’s climate, energy, and equity goals.

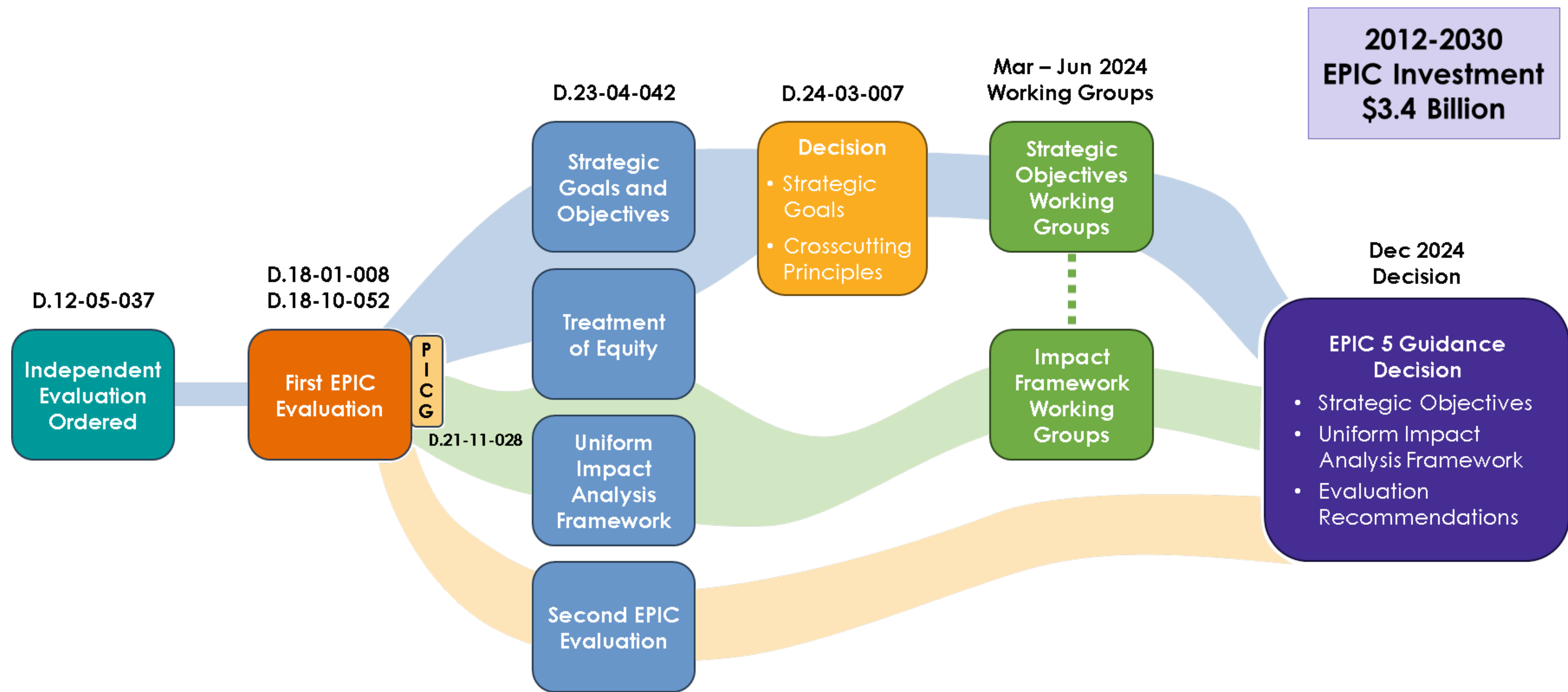
Strategic Objectives focus EPIC investments and provide a basis for measuring progress



Commission Decisions Require Measurable Outcomes

Decision	Commission Action
D.18-10-052	Found the EPIC Program needed clearer direction on priorities that would generate an optimal mix of research projects that maximize ratepayer benefits, lead to energy innovation, and support California's key policy goals.
D.21-11-028	Adopted EPIC's mission statement and updated the definition of EPIC's mandatory guiding principle of ratepayer benefit as (1) improving safety, (2) increasing reliability, (3) increasing affordability, (4) improving environmental sustainability, and (5) improving equity, all as related to California's electric system.
D.23-04-042	Ordered public workshops to facilitate strategic goals and objectives development.
D.23-04-042	Approved Principles for a Uniform Impact Analysis Framework to allow for improved EPIC program evaluation and oversight, as well as greater transparency for ratepayers.
D.24-03-007	Approved five EPIC Strategic Goals: <ul style="list-style-type: none"> •Transportation Electrification; •Distributed Energy Resource Integration; •Building Decarbonization; •Achieving 100 Percent Net-Zero Carbon Emissions and the Coordinated Role of Gas; and •Climate Adaptation.
D.24-03-007	Approved cross-cutting principles to provide guidelines for assessing proposed Strategic Objectives for EPIC 5 to ensure important cross-cutting issues identified in the Strategic Goals workshops are considered during the Strategic Objectives process.

Current Proceeding Activities Inform EPIC 5 Guidance



Progress Measurement Time Frames

Outputs

- Results of EPIC initiatives and projects, the specific innovations accomplished, and insights gained.

Outcomes

- Observed results from actions taken, such as increased utility utilization and/or market deployment, i.e., outcomes are how outputs of EPIC investments have been put into practice on a wider scale.

Impacts

- Effects attributable to EPIC outputs and outcomes in meeting state goals. Impacts are reliant on other influences that are broader, deeper, and slower than those EPIC has direct influence over.

Short Term EPIC Initiative Execution

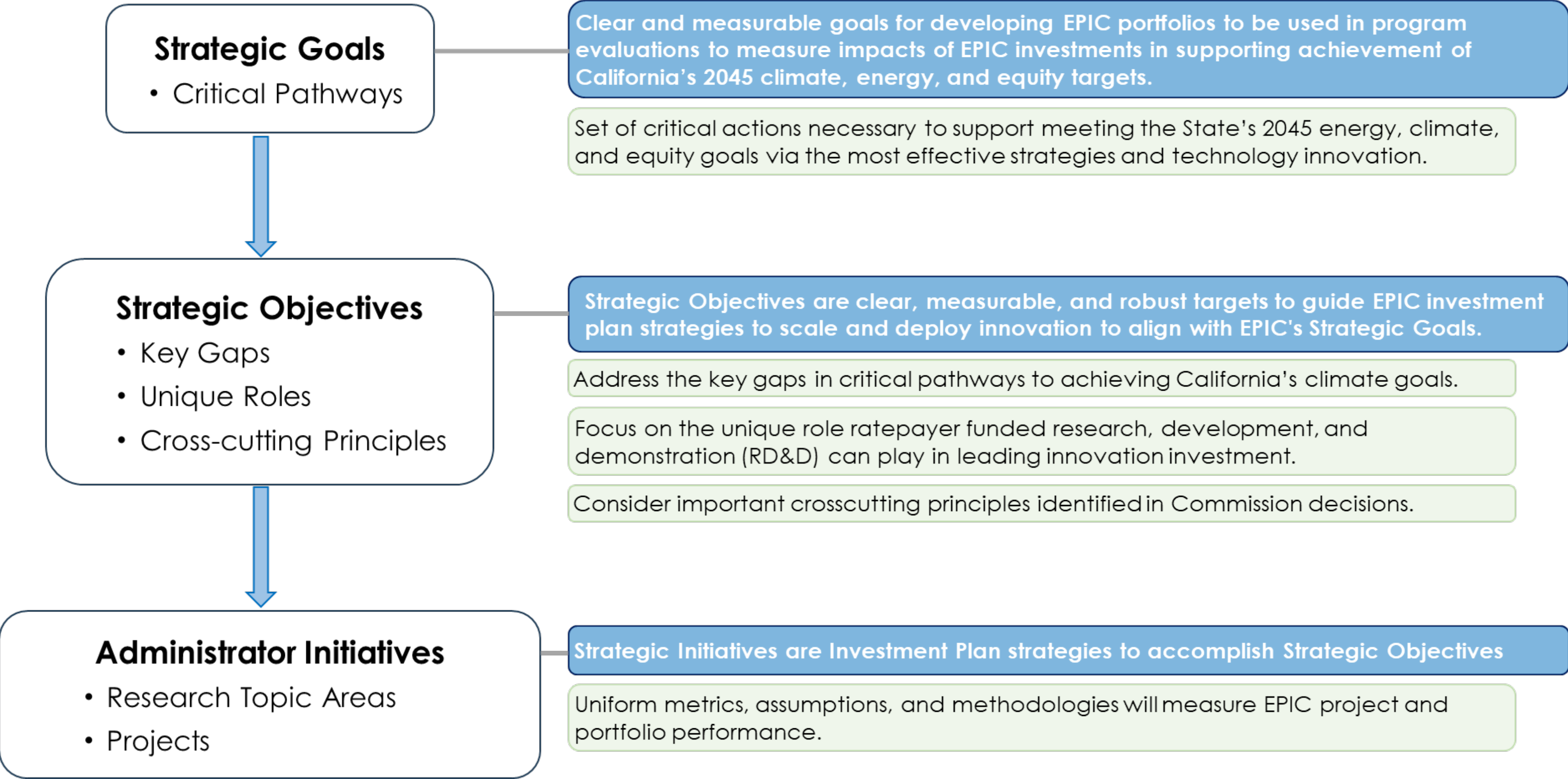
- Market Adoption Plan
- Project and Portfolio Performance

Mid-Term Deployment and Market Uptake

Long-Term Systemic Impacts

Strategic Goals and Objectives Guide EPIC Initiatives

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.



Opportunities for Coordination 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

Proposed Mapping of Gaps to Strategic Objectives (Preview)



TRANSPORTATION ELECTRIFICATION

- Capital Costs For Charging Equipment
- Intersection Between Capital Costs And Rates
- Managing Concentrations Of Charging Loads
- Managing Bulk System Or Zonal Loads Of Charging

BUILDING DECARBONIZATION

- Speeding And Enabling Residential Retrofits
- Coordinating At A Community Scale
- Understanding And Prioritizing Energy Burden
- Flexible Load
- Commercial And Industrial Building Retrofits

* Additional Gaps may be identified

ZERO CARBON AND COORDINATION WITH GAS

- Identifying Climate And Local Pollutant Impacts Of New Generation And Storage Technology
- Addressing Intermittency And Increasing Flexibility To Achieve A Carbon-free Power Sector
- Technology Innovation For Hard-to-decarbonize Sectors
- Coordination With Gas Decommissioning

DER INTEGRATION

- 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

CLIMATE ADAPTATION

- Protecting Vulnerable Populations
- Responding To Weather And Climate Variability

TRANSPORTATION ELECTRIFICATION

Identified Gaps from D.24-03-007, clustered by theme.

CAPITAL COSTS FOR CHARGING EQUIPMENT

High costs of electric vehicle charging infrastructure for light-, medium-, and heavy-duty electric vehicles

High costs of infrastructure for electrifying public transit to benefit DVC and nonattainment communities by mitigating pollution

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

INTERSECTION BETWEEN CAPITAL COSTS AND RATES

Lack of availability of affordable public charging infrastructure

Lack of opportunities for disadvantaged, low-income, ESJ, and tribal communities to directly benefit from electric vehicle adoption

GAPS

TRANSPORTATION ELECTRIFICATION (cont.)

Identified Gaps from D.24-03-007, clustered by theme.

MANAGING CONCENTRATIONS OF CHARGING LOADS

Lack of advanced planning for grid needs

High costs related to charger interconnection and grid upgrades for areas with high concentrations of electric vehicle charging infrastructure

Incomplete understanding consumer decision-making behavior related to challenges of electric vehicles adoption

MANAGING BULK SYSTEM OR ZONAL LOADS OF CHARGING

Misalignment between electric vehicle loads and intermittent renewable energy production

Lack of robust and uniform data sharing and cybersecurity protocols for transportation electrification

GAPS

BUILDING DECARBONIZATION

Identified Gaps from D.24-03-007, clustered by theme.

SPEEDING AND ENABLING RESIDENTIAL RETROFITS

Inability to easily share data across systems needed to plan for, develop, interconnect; and optimize building retrofits

High upfront costs of electrification retrofits

Lack of whole home retrofit approaches for low-income retrofits

Inability of renters to make large-scale, permanent upgrades in tenant-occupied buildings, and risks of increased rent burdens and loss of affordable housing

Lack of standardized retrofit packages and difficulty for consumers in coordinating among different decarbonization incentives and financing opportunities to understand how to fit them together to complement each other to reduce decarbonization cost

Long lead and installation times for electrification retrofits, in comparison to emergency equipment replacement timeline needs

Lack of standardization and complex and demanding building codes, permitting, and interconnection processes

BUILDING DECARBONIZATION (cont.)

Identified Gaps from D.24-03-007, clustered by theme.

COORDINATING AT A COMMUNITY SCALE

Increasing share of gas infrastructure costs accruing to those not able to afford electric retrofits

Lack of advanced planning, including city planning, for grid needs

Lack of understanding on the potential to transition entire neighborhoods from gas to geothermal heating and cooling, particularly in warm climates

UNDERSTANDING AND PRIORITIZING ENERGY BURDEN

Lack of energy burden, air quality, and safety metrics for building decarbonization efforts

High energy burden levels for low-income customers as compared to national and State averages, and increasing electric rates

GAPS

BUILDING DECARBONIZATION (cont.)

Identified Gaps from D.24-03-007, clustered by theme.

FLEXIBLE LOAD

Lack of understanding of customer behavior in technology adoption and demand flexibility

Need for advanced modeling and forecasting to better account for demand flexibility potential

High cost of grid upgrades associated with new, unmanaged electric load

Lack of flexible load capacity from building electric use

COMMERCIAL AND INDUSTRIAL BUILDING RETROFITS

Lack of low-cost automation and sensing solutions for commercial buildings

Commercial and industrial buildings often have higher energy demand and unique end uses that make electrification and decarbonization more difficult

GAPS

ACHIEVING 100% NET-ZERO CARBON EMISSIONS AND THE COORDINATED ROLE OF GAS

Identified Gaps from D.24-03-007, clustered by theme.

IDENTIFYING CLIMATE AND LOCAL POLLUTANT IMPACTS OF NEW GENERATION AND STORAGE TECHNOLOGY

Lack of information on high production and life-cycle costs of “green” electrolytic hydrogen

Lack of opportunities for disadvantaged, low-income, and ESJ communities and tribes to be readily included in the discussions and decision-making process on emerging generation and storage technology adoption, including discussion of potential impacts on public health

Lack of independent studies on appropriate, cost-effective roles and lifecycle costs and impacts of emerging technologies, including floating OSW, enhanced geothermal, biomass conversion, and clean renewable hydrogen in achieving carbon neutrality

GAPS

ACHIEVING 100% NET-ZERO CARBON EMISSIONS AND THE COORDINATED ROLE OF GAS (cont.)

Identified Gaps from D.24-03-007, clustered by theme.

ADDRESSING INTERMITTENCY AND INCREASING FLEXIBILITY TO ACHIEVE A CARBON-FREE POWER SECTOR

Lack of coordination between grid operators in the western region in order to integrate new large-scale renewable resources, including offshore wind

TECHNOLOGY INNOVATION FOR HARD-TO- DECARBONIZE SECTORS

Lack of clear pathways to economically decarbonize 100% of hard-to-decarbonize activities through electrification with no increase in air, water, and land pollutants by 2045

GAPS

ACHIEVING 100% NET-ZERO CARBON EMISSIONS AND THE COORDINATED ROLE OF GAS (cont.)

Identified Gaps from D.24-03-007, clustered by theme.

COORDINATION WITH GAS DECOMMISSIONING

Lack of a coordinated, statewide program to substitute non-pipeline alternatives for gas system repair and replacement projects where technically feasible

Lack of understanding on the potential to transition entire neighborhoods from gas to geothermal heating and cooling, particularly in warm climates

Lack of coordination and collaboration among EPIC and other gas and electric RD&D program investments on the common goal of decarbonization and right-sizing energy infrastructure and ratepayer affordability

GAPS

DER INTEGRATION

Identified Gaps from D.24-03-007, clustered by theme.

INCREASING ACCESS TO DER BENEFITS FOR DVCS

Lack of opportunities for disadvantaged, low-income, ESJ, and tribal communities to engage early and directly benefit from deployment of flexible resources

Need for better understanding of consumer adoption behavior regarding flexible DERs

STRENGTHENING THE ROLE OF DERS FOR GRID RESILIENCY

An outsized burden that long-duration outages have on disadvantaged, low-income, ESJ, and tribal communities

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

GAPS

DER INTEGRATION (cont.)

Identified Gaps from D.24-03-007, clustered by theme.

LEVERAGING DER TO REDUCE GRID COSTS AND IMPROVE RELIABILITY

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 comprehensive weather operational data to predict system conditions

Insufficient valuation, incomplete businesses models, and lack of appropriate market mechanisms for transmission and distribution grid services provided by flexible resources

STREAMLINING INTERCONNECTION AND COMMUNICATION

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

Complex and demanding interconnection processes that increase the costs and slow timelines for DER deployment

Lack of robust and uniform data sharing and cybersecurity protocols for DERs

CLIMATE ADAPTATION

Identified Gaps from D.24-03-007, clustered by theme.

PROTECTING VULNERABLE POPULATIONS

Lack of ESJ and tribal communities' access to resiliency infrastructure and resources

An outsized burden that long-duration outages have on disadvantaged, low-income, ESJ, and tribal communities

RESPONDING TO WEATHER AND CLIMATE VARIABILITY

Need to upgrade grid equipment life expectancy under climate adaptation scenarios, including stronger winds and increased heat and humidity that prevents equipment from cooling down at night

GAPS

Proposing Additional Gaps

“The Commission ... clarifies that the identified gaps are not the only gaps that proposed projects may address. Additional gaps may be added to the record through the next round of workshops meant to develop strategic objectives. We encourage all parties to participate actively in these workshops.” – D.24-03-007

We encourage participants to submit additional gaps for inclusion into the in-person workshop discussions. Please submit any additional gaps by **March 29, 2024** to picg@theaccelerategroup.com, with the following information:

- One-sentence description of the gap, the relevant critical pathway, the unique role of EPIC in addressing the gap, and the desired outcome.
- A brief justification for inclusion of the gap in the Strategic Objectives process, including the above elements.
- Any revision or addition of a gap category, and associated gaps relevant to that gap category, along with a brief justification for inclusion.