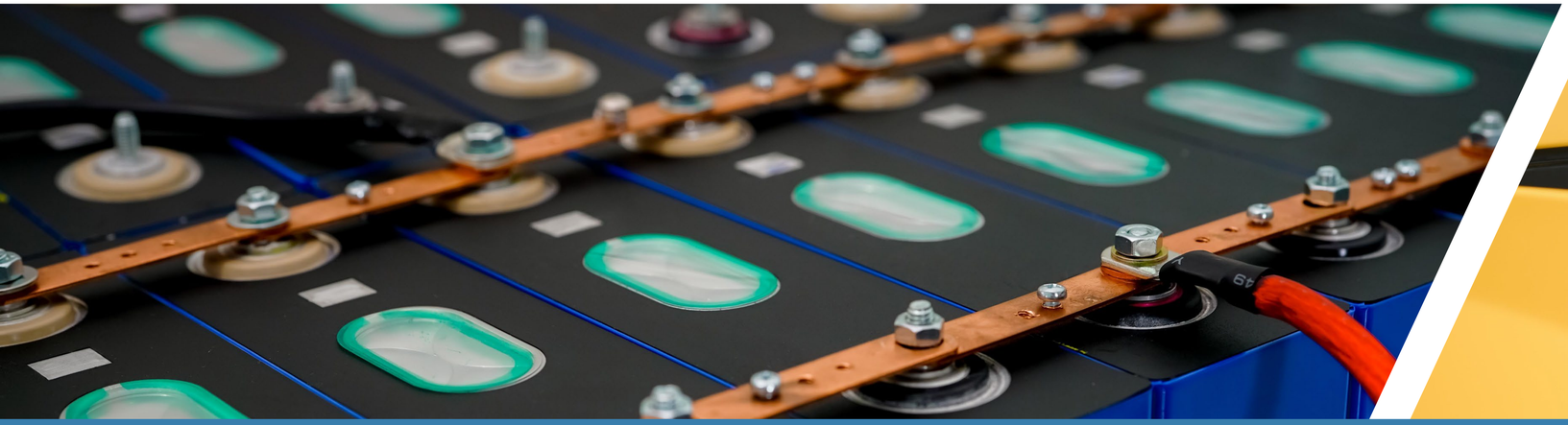
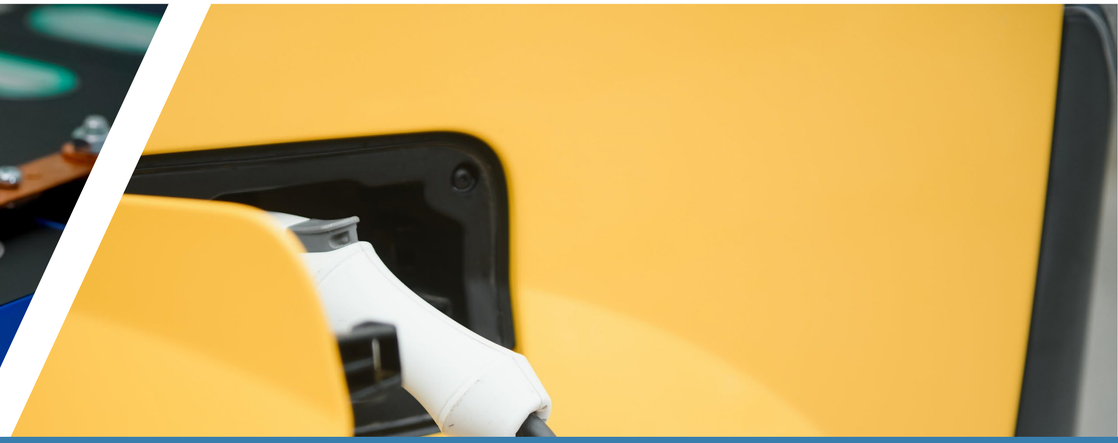
# EPIC STRATEGIC OBJECTIVES WORKSHOP PROCESS

## Virtual Technical Working Group Meetings – May 2024





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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 (~ 11:15)
VI. Technical Working Group Comments
VII. Wrap-up and next steps

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

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| | |
|---|---|
| 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. |

# 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.

# EPIC STRATEGIC OBJECTIVES PROCESS SCHEDULE

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

# TODAY'S GOAL

Gain stakeholder comment and proposed edits to the Draft Strategic Objectives for the Building Decarbonization 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.

# 2.1 Whole-Home Electrification Cost Reductions



**Strategic Objective:** The program will support the achievement of a whole-home electrification cost target reduction of X% reduction by 2035.

**WILL TAKE INTO CONSIDERATION:**

- Space constraints, noise concerns, and the installation process;
- Contractor skills and technological biases;
- Uncertain savings;
- Health and safety issues in homes;
- Operating costs;
- Project phasing;
- Customer values; and
- Distrust in the marketplace.

**WILL ACHIEVE A PATH TO MARKET THROUGH:**

- HVAC and water heater contractors double electric sales via manufacturers incentives;
- Updating electrical codes;
- Leveraging trusted messengers; and
- Satisfying all customer values, including comfort, costs, and health.

**SUCCESS WILL BE MEASURED THROUGH:**

- DVC adoption increases by 30% by 2035;
- Equity metrics for multi-family and DVC adoption;
- EPIC project cost per ton GHG reduction and estimated GHG reductions if scaled
- Customers have additional technology choices from which to choose.

# 2.2 Avoiding Grid Upgrades due to Decarbonization

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**Strategic Objective:** This program will support the achievement of a target of X% of whole-building decarbonization upgrades that require no associated grid upgrades.

| WILL TAKE INTO CONSIDERATION: | WILL ACHIEVE A PATH TO MARKET THROUGH: | SUCCESS WILL BE MEASURED THROUGH: |
|---|---|---|
| • Existing transformer capacity;<br>• PV hosting capacity.<br>• Contractor skills and technological biases; and<br>• Knowledge levels of contractors designing the upgrades. | • Updating electrical codes; and<br>• Reducing upgrade costs. | • Avoided costs<br>• Metrics that differentiate by building type<br>• Transformer upgrade deferrals vs expectations<br>• Changes over time in number of homes per transformer<br>• Peak load reductions on transformers<br>• No grid upgrades required for ⅓ of CA by 2039 |

# 2.3 Flexible Load

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**Strategic Objective:** Reduce the number of grid upgrades need to support the state's building decarbonization goals by 50% by 2035 through the deployment of flexible building load technologies, with a focus on ensuring equitable deployment of strategies.

## WILL TAKE INTO CONSIDERATION:

- Prioritizing low-hanging-fruit opportunities and strategies first, aligning with the state's 2030 load flexibility goal;
- Disparities in retrofit levels, particularly in multifamily buildings and among LI/Tribal/DVC communities;
- Other non-building related flexible loads (ex. TE, DER);
- Rapidly changing load shapes;
- Different customer segments have different needs, with a focus on DVC's, and low-income multi tenant customers;
- Varying access to internet and fiber especially in rural communities;
- Affordability of rates and grid upgrades;
- Align with relevant CPUC proceedings on building decarbonization, load management, rate design, etc.; and
- Cybersecurity of communications, controls, and technologies

## WILL ACHIEVE A PATH TO MARKET THROUGH:

- Accurately value real-time load flexibility and shifted loads; and
- Expanding monetization or revenue streams beyond current programs or incentives

## SUCCESS WILL BE MEASURED THROUGH:

- # of customer's enrollment in a load flexibility program
- Cost effective peak load reduction ($/kW)
- $ deferred grid upgrades due to load flexibility

# 2.4 Address Split Incentives in Commercial Multi-Family Buildings

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**Strategic Objective:** The program will address split incentives for commercial multi-family buildings through novel tenant and landlord strategies that develop a roadmap to deploy a portfolio of energy efficiency, electrification, and decarbonization technologies with innovative financing options by 2032.

## WILL TAKE INTO CONSIDERATION:

- Landlord responsibility to invest in building retrofits to achieve net zero targets
- Measures to avoid landlord pushing costs to tenants (i.e. higher rent, fees)
- Understand consumer behaviors and DVC needs

## WILL ACHIEVE A PATH TO MARKET THROUGH:

- Tenant-centric solutions that are replicable and scalable
- Landlord-focused financing options to accelerate adoption
- Tenant no-cost programs for DVCs and affordable financing options for non-DVCs
- Building owner bill financing strategies to address split incentives

## SUCCESS WILL BE MEASURED THROUGH:

- Prioritize disadvantaged vulnerable communities (DVCs)
- Prioritize climate zones
- Reduce GHG emissions at building sites and surrounding communities
- Evaluate and monitor cost shifts from landlord to tenant, including housing costs
- Embedded measurable and verifiable KPIs
- Participation rate
- Access and equity metrics
- Comfort measures for tenants

# 2.5 Accelerate Net Zero Technologies for Commercial and Industrial Buildings

CALIFORNIA PUBLIC UTILITIES COMMISSION

**Strategic Objective:** The program will accelerate the adoption of energy efficiency, electrification and decarbonization technologies for commercial and industrial buildings resulting in X% reduction in GHG emissions by 2040.

| WILL TAKE INTO CONSIDERATION: | WILL ACHIEVE A PATH TO MARKET THROUGH: | SUCCESS WILL BE MEASURED THROUGH: |
|---|---|---|
| • Industrial and commercial end-users<br>• Prioritization of commercial and industrial building sub-sectors<br>• Prioritization of grid constrained zones and high concentrations for GHG emissions<br>• Apply a full design approach to minimize energy consumption in achieving net zero<br>• Energy efficiency standards<br>• Utility and building owner co-investment strategies for DERs and other technologies<br>• Distinct pathways for utility and buildings sectors<br>• Distributed ownership business models<br>• Integrate with EPIC hard-to-abate sector programs<br>• Consumer behavior and change management practices | • Establish eligible investments to be funded as pilots and demonstration projects<br>• Validation of net zero technologies and financing solutions to spur commercialization<br>• Layering in novel and viable incentive programs<br>• Deploy utility incentive programs without comprising equity and affordability<br>• Framework for commercialization pathways for utilities and building sector | • Reduce GHG emission and improve air quality for workers and communities<br>• Prioritize disadvantaged vulnerable communities (DVCs)<br>• Grid peak demand and load management alleviation measures<br>• Technology performance<br>• Embedded measurement and verification of KPIs tied to CPUC cross-cutting goals<br>• Safety, Quality of Life, Productivity<br>• Minimize commercial operational disruptions |

# 2.6 Community Scale Electrification/Decarbonization



**Strategic Objective:** The program will achieve a target of X% (or X number) of 100% decarbonized/electrified communities (including new and existing buildings) by 2045 (with earlier targets aligned with the utility 4-year rate case cycles).

CONTINUED…

# 2.6 Community Scale Electrification/Decarbonization

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## WILL TAKE INTO CONSIDERATION:

- DVC prioritization for community-scale electrification, particularly in the worst air quality zones;
- Engaging communities in planning and identifying desired solutions;
- Ensuring DVC benefitting from the projects;
- Health and safety issues in homes and DVC prioritization for home improvements;
- Operating costs and life-time savings from avoided upgrades (for example for areas wit decommissioned gas infrastructure);
- Coordinating with existing home upgrades, energy efficiency and other complimentary programs to reduce overall costs;
- Coordinating and prioritizing community-scale projects for fire zones and coordinating with fire and emergency management efforts;
- Customer values and community need;
- Cybersecurity and safety concerns and standards.

## WILL ACHIEVE A PATH TO MARKET THROUGH:

- Developing successful replicable and scalable model approaches to community-scale electrification/decarbonization projects, including successful building retrofits/designs, VPP/V2G/V2B integration and load management/energy exports profiles, models for VPP and DER aggregators;
- Developing tools for aggregating customers into community-scale projects;
- Developing tools to map opportunity areas for community-scale projects;
- Developing VPP/V2B/V2G specific rates tariffs to compensate customers (prosumers);
- Updating electrical codes; and
- Reducing upgrade costs.

## SUCCESS WILL BE MEASURED THROUGH:

- Number and X% of 100% electrified/decarbonized communities;
- Number of 100% buildings (or households) electrified/decarbonized;
- Number and X% of buildings with bidirectional EV wiring;
- Savings $/household in electric upgrades in the community-scale projects as compared to single house electrification/decarbonization projects;
- Savings in avoided upgrades to existing gas/electric infrastructure (per household in the targeted electrified community and per household impact on all other ratepayers);
- Overall bill savings to all ratepayers and $/household in the targeted communities;
- Energy and demand reductions in the electrified neighborhoods in a community-scale vs single home/building projects;
- GHG reductions and air quality improvements in the electrified communities;
- EPIC project cost per ton GHG reduction and estimated GHG reductions in community-scale projects vs single home/building projects.

# Poll Questions – Strategic Objectives

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### 2.1 Whole-Home Electrification Cost Reductions

The program will support the achievement of a whole-home electrification cost target reduction of X% reduction by 2035.

### 2.2 Avoiding Grid Upgrades due to Decarbonization

This program will support the achievement of a target of X% of whole-building decarbonization upgrades that require no associated grid upgrades.

### 2.3 Flexible Load

Reduce the number of grid upgrades need to support the state's building decarbonization goals by 50% by 2035 through the deployment of flexible building load technologies, with a focus on ensuring equitable deployment of strategies.

### 2.4 Address Split Incentives in Commercial Multi-Family Buildings

The program will address split incentives for commercial multi-family buildings through novel tenant and landlord strategies that develop a roadmap to deploy a portfolio of energy efficiency, electrification, and decarbonization technologies with innovative financing options by 2032.

### 2.5 Accelerate Net Zero Technologies for Commercial and Industrial Buildings

The program will accelerate the adoption of energy efficiency, electrification and decarbonization technologies for commercial and industrial buildings resulting in X% reduction in GHG emissions by 2040.

### 2.6 Community Scale Electrification/Decarbonization

The program will achieve a target of X% (or X number) of 100% decarbonized/electrified communities (including new and existing buildings) by 2045 (with earlier targets aligned with the utility 4-year rate case cycles).

# 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. Yu Hou | CEC |
| 2. Jordan Smith | SCE |
| 3. Jon Kochik | SDG&E |

# Initial Feedback on EPIC 5 Building Decarbonization Electrification Draft Strategic Objectives

Yu Hou, Supervisor of the Building Decarbonization Unit
Energy Research and Development Division

May 14, 2024

# Initial Feedback Summary

- Combine related objectives to improve clarity and consistency
- Avoid setting arbitrary targets and strive for consistent and measurable metrics
- Consider key related policies and proceedings
- Include missing technology areas not covered in the draft objectives
- Leverage and build upon existing CEC EPIC Program mechanisms to achieve a path to market

# Feedback on Draft Objectives 2.1, 2.4, and 2.6

- **2.1 - Whole-Home Electrification Cost Reductions**
- **2.4 - Address Split Incentives in Commercial Multi-family Buildings**
- **2.6 - Community Scale Electrification Decarbonization**

Feedback:

- Combine Objectives 2.1, 2.4, and 2.6
- Proposed Strategic Objective: The program will support technology and strategy research to provide whole-home electrification options for the residential sector including both single-family and multi-family buildings.

The objective will take into consideration:

- Using community-scale electrification strategies to achieve 100% decarbonized communities
- Addressing split incentives in commercial multi-family buildings

# Feedback on Draft Objective 2.2

**This program will support the achievement of a target of X% of whole-building decarbonization upgrades that require no associated grid upgrades.**

Feedback:

- Proposed revision: The program will support technology and strategy research to reduce the need for associated grid upgrades due to building decarbonization.
- The objective should consider potential EV charging load from the building sector.

# Feedback on Draft Objective 2.3

**Reduce the number of grid upgrades needed to support the state's building decarbonization goals by 50% by 2035 through the deployment of flexible building load technologies, with a focus on ensuring equitable deployment of strategies.**

Feedback:

- This metric refers to reducing grid upgrades by a specific amount, while the metric we discussed at the workshop was to "limit *relative* grid capacity increase" by some amount. The latter reflects that some amount of grid capacity increase will likely be required for increasing load or changes to where grid congestion occurs, etc.
- "Number of grid upgrades" is an imprecise metric when referring to grid capacity changes.
- Proposed: "Limit grid capacity increase by X% relative to load growth due to electrification."

# Feedback on Draft Objective 2.5

**The program will accelerate the adoption of energy efficiency, electrification and decarbonization technologies for commercial and industrial buildings resulting in X% reduction in GHG emissions by 2040.**

Feedback:

- The objective should clarify that the decarbonization of industrial buildings does not include industrial processes.

# Critical Missing Elements

- Limited support exists to connect the complicated web of federal, state, local, and utility funding and financing programs and efficiently package and sequence building electrification and decarbonization retrofits. EPIC 5 could play an important role in filling this gap.

# Thank You

Yu Hou

Yu.Hou@energy.ca.gov

# Building Decarbonization

# Building Decarbonization

## 2.4 Address Split Incentives in Commercial Multi-Family Buildings

- Tenant and landlord strategy is outside the scope of EPIC, as is financing.
- This strategic objective should be refocused on EPIC RD&D innovation

# Feedback on EPIC 5 Strategic Objective: Building Decarbonization

May 2024

# 2.1 Whole Home Electrification Cost Reductions

## Strategic Objective statement (edit):

- The program will support the achievement of an X% reduction in the cost of whole-home electrification (projects?) by 2035.
  - How determine the X% number? Top down vs. bottoms up vs. ? Also – would this be “on average”?
  - For target year, recommend basing it on Commission approval plus # of years (e.g., 10)

## Methods for achieving path to market

- Can EPIC influence “manufacturer incentives”?
- Contractors are an integral path to market, and will need more support to incorporate program information, tech advancements, and a more whole-home energy perspective
- Include the need for tools that measure and predict energy changes resulting from electrification, to inform customer decisions

## Ways to measure success

- For DVC community adoption increases – what’s the best way to establish baseline?
  - Also assume this will measure all residential customer adoption as a separate but related metric
- How isolate cost reductions attributable to EPIC versus other market/economic factors?
- How measure “additional customer technology choices”?
- Potential addition: a measurement of contractor advancements

# 2.2 Avoiding Grid Upgrades due to Decarbonization

## Overall:

- Some overlap with Objective 2.3 (Flexible Load). Is the key difference that 2.2 is solely focused on residential retrofits, whereas 2.3 is broader sets of customers / equipment ?
- Also, should the objective reference “service upgrades” vs. “grid upgrades” (or similar)
  - If yes, the 2.2 Objective statement should call that out specifically
  - Achieve a target of X% of residential whole-building electrification upgrades that require no associated *service* (?) upgrades
  - For target year, recommend basing it on Commission approval plus # of years (e.g., 10)

## Key considerations

- Consider including EV charging
- Consider calling out panel technology innovations more directly here, and other load balancing technology innovations
- Should this include storage in addition to PV
- IOU requirements for planning, service upgrades and interconnection

## Methods for achieving path to market

- It seems that technology advancements are the biggest path to market (e.g., panel, meter collar, etc.)

## Ways to measure success

- Consider shifting from “transformer upgrades” and “grid upgrades” to service upgrades

# 2.3 Flexible Load

**Overall:**

- Some overlap with Objective 2.2 (“no associated grid upgrades). Is the key difference that 2.2 is solely focused on residential retrofits, whereas 2.3 is broader sets of customers / equipment ?
- Also, should the objective reference “service upgrades” vs. “grid upgrades” (or similar)
- For target year, recommend basing it on Commission approval plus # of years (e.g., 10)

**Methods for achieving path to market**

- If technology innovations are likely to enable this Objective, consider including that here, including communications technology

**Ways to measure success**

- Clarify difference between “load flexibility program” vs. demand response program
- Consider shifting from “grid upgrades” to service upgrades

# 2.4 Address Split Incentives in Commercial Mult-Family Bldgs

## Overall:

- For target year, recommend basing it on Commission approval plus # of years (e.g., 10)

## Key considerations

- IOUs and other program administrators have do not have jurisdiction over property owner decisions about rent amounts
- Need to consider tenant motivations to electrify as non-owners of the residence

## Methods for achieving path to market

- The enablers for this objective seem to be easily installed and inexpensive appliances, MF building “microgrid” advancements, and economic models to share the costs and benefits.
  - This objective may be too broad – consider focusing on a more specific enabler
- Those listed are focused only on financial / economic approaches – are those able to be impacted by EPIC
- Likely requires tools that measure and predict energy changes resulting from electrification, to inform customer decisions (like Objective 2.1)
- Likely requires policy and codes to require property owner action

## Ways to measure success

- Need more specific measurement items
- Percent of buildings that have upgraded all units

# 2.5 Accelerate Net Zero Technologies for C&I Buildings

## Overall:

- For target year, recommend basing it on Commission approval plus # of years (e.g., 10)

## Key considerations

- Address concerns around productivity and trust on new technologies for commercial and industrial customers.
- Sustainability and long-term performance of new technologies (i.e., fuel sub equipment) should be monitored and tracked for this program
- Consider focusing on hydrogen innovations
- Many industrial customer energy needs are likely difficult to decarbonize

## Methods for achieving path to market

- Fourth bullet – should say “compromising” instead of comprising
- Can EPIC develop “financing solutions” or “incentive programs”

## Ways to measure success

- Consider approaching as “leading” and “lagging” indicators
- Lagging: # / % of decarbonized buildings, by size, type, sector, community type (e.g., DVC), and the corresponding GHG reduction, air quality, customer satisfaction
- Leading: Increased number of patents for net zero technologies

# 2.6 Community Scale Electrification/Decarbonization

## Overall:

- For target year, recommend basing it on Commission approval plus # of years (e.g., 10)

## Key considerations

- Consider including reference to the challenge of requiring all customers in a given community to upgrade appliances

## Methods for achieving path to market

- Consider including reference to advancements of community solar and microgrids

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THANK YOU!