2025 EE Potential and Goals Study: Scenarios Workshop

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California Public Utilities Commission

Conference Call Etiquette

- We are actively monitoring the chat window; feel free to submit questions/comments via chat at any time.
- If you have a question and would like to raise your hand, please hold your question for the end of each section.
- **Use the "raise hand" feature to request to be unmuted.**
- The webinar is being recorded.

Stakeholder Engagement Opportunities

- Study-related comments are informal.
  - Comments on today's presentation are due **October 4** via e-mail to:
    - Ali.choukeir@cpuc.ca.gov
    - William.graswich@cpuc.ca.gov
    - Npodkowsky@guidehouse.com
  - Upcoming stakeholder engagement opportunities:
    - January 2025: Draft results
- To stay informed, look for notifications to the service lists, as well as updates to our webpage: 2025 Potential and Goals Study (ca.gov)

Primary Uses for the EE Potential and Goals Study

- Develops estimates of total system benefit, energy savings, and peak demand reduction potential in the service territories of California's major investor-owned utilities (IOUs)
- Forecast from 2026-2037, reporting net impacts. Results have multiple uses:
  - Informs the CPUC goal setting process
  - Informs Program Administrators' EE program portfolio planning, budget setting, and procurement efforts
  - Supports planning efforts of the CPUC, CEC, CAISO
  - Informs strategic contributions to Demand Forecast, IRP, SB350 targets
  - Identifies new energy efficiency and fuel substitution savings opportunities
- **The PG Study itself does not set goals; Guidehouse does not make recommendations to CPUC regarding goal setting.**

2025 Potential and Goals Study Scenarios

September 16, 2024

Agenda

01
Review of PG Study structure

02
Scenarios Scope

03
Approach to developing Scenarios

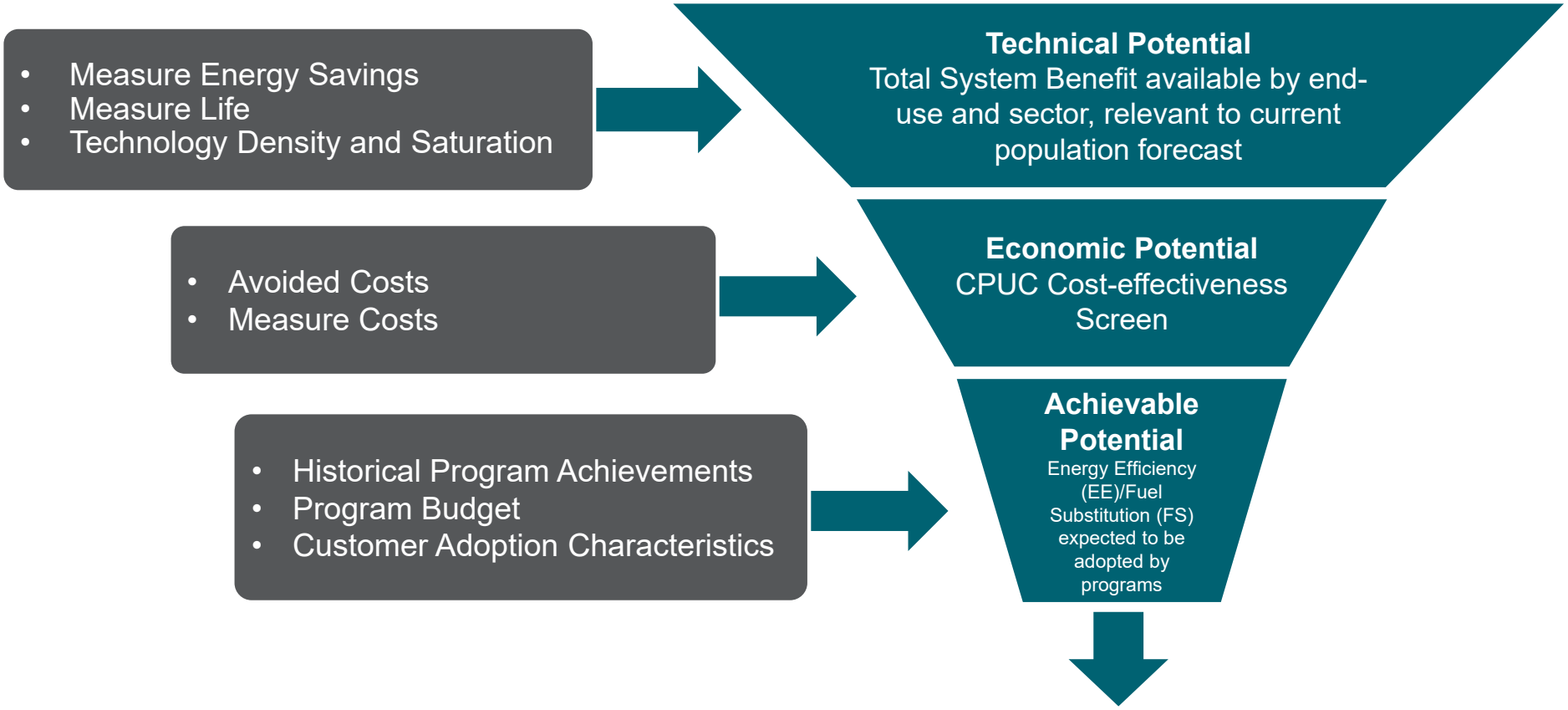
04
Scenario Levers – Variables, description, and ranges

05
Discussion of key topics

06
Proposed Scenarios

07
Questions for Stakeholders

What is a Potential Study?



Group E Scenarios Scope

The 2025 PG Study will develop up to **4 total scenarios** that inform the CPUC's goal setting process. We refer to these as the **PG Scenarios**:

- One "reference" scenario that stems directly from the calibration process
- Additional alternate scenarios (determined in conjunction with CPUC staff considering stakeholder input)

Additional scenario analysis will be conducted as part of the Additional Achievable Energy Efficiency (AAEE) and Additional Achievable Fuel Substitution (AAFS) analysis *after the 2025 PG Study is finalized*.

AAEE/AAFS Scenarios:

- Feed into the California Energy Commission's Integrated Energy Policy Report (IEPR)
- Are built around the adopted IOU goals and informed by PG Study Scenarios
- Consider additional variables and policy context
- Do not impact IOU goals

Scenario Approach & Levers

What is a Scenario?

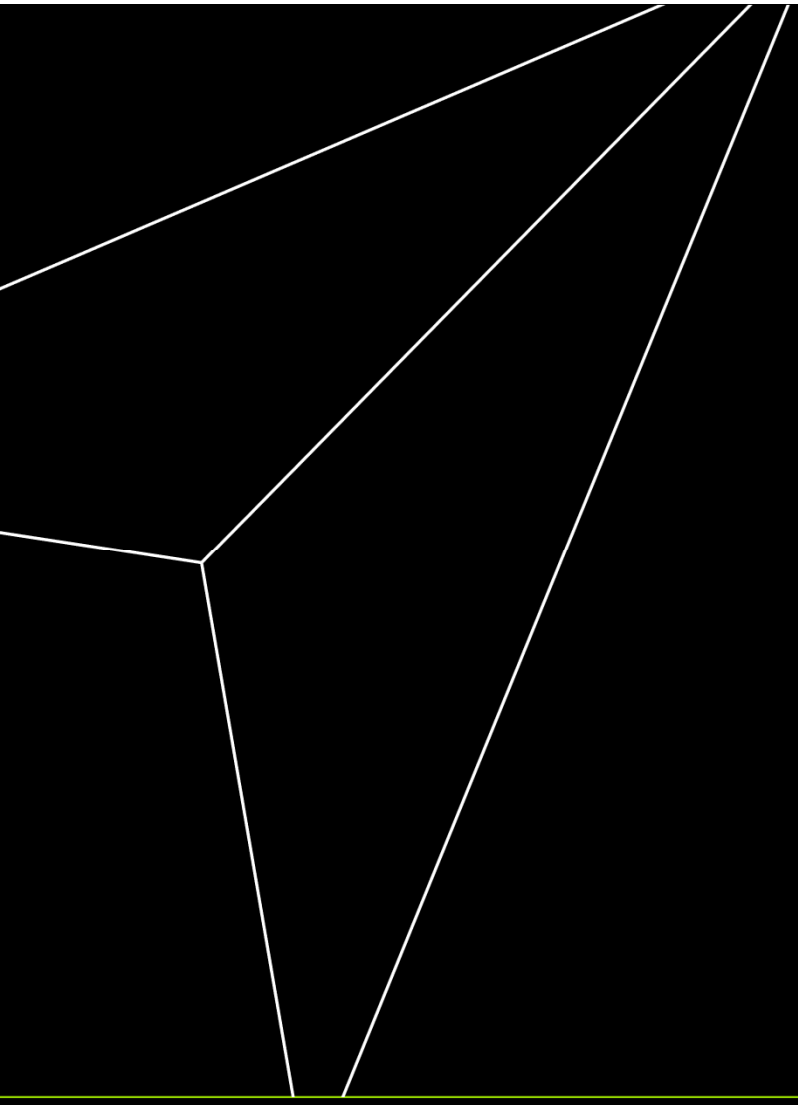
- Key variables in the PG Study Model can fall within a range of possibilities, grouped into two categories:
  - **Internally Influenced** - CPUC and IOUs collectively have control over these **policy** and **program** decisions
  - **Externally Influenced** - CPUC and IOUs do not have control over these factors

***Example* Internally Influenced**	***Example* Externally Influenced**
Cost-Effectiveness (C-E) test	Federal Tax Credit
C-E Threshold	Building stock forecast
Incentive levels	Retail energy price forecast
Marketing & outreach	Measure-level input uncertainties (unit energy savings, unit costs, densities)
Behavior, retro-commissioning & operational (BROs) customer enrollment over time	Non-IOU financing programs
IOU financing programs	Enacting of future Codes and Standards

- Scenarios allow us to explore different futures based on a combination of assumed policy interventions, program design decisions, and exogenous factors

Recommended Levers for Consideration

Lever	2023 Study Lever Description	2025 Range Descriptions	
		Lower	Upper
Cost-Effectiveness Test	Different C-E screening tests and/or thresholds yield different economic potential and cause the market model to incentivize different sets of measures. 2023 Study utilized **TRC** value of **0.85** for all Scenarios	TRC	TRC
C-E Measure Screening Threshold		Reference: 0.85 for all measures	High: 1.0
Incentive Levels (EE and FS)	Measure incremental cost capped at **Reference Values** – 50% (EE), 75%(FS) **Aggressive Values**– 75% (EE), 90%(FS)	Reference: Capped at median value of incremental cost as determined from CEDARS (by sector, technology, end use)	High: Capped at the median of the top quartile of incremental cost as determined from CEDARS (by sector, technology end use)
Fuel Substitution Adoption	**Reference** values based on calibration process. **Aggressive** values applied adoption parameter values for FS Technologies	Reference: Default calibrated values	Aggressive: Increased parametric adoption lever values to model broader increases in willingness to adopt, market dynamism
Program Engagement	Various outreach levels impacts customer awareness and the rate of technology adoption	Reference: Default calibrated value	Aggressive: Increased Awareness calibration parameter value
IRA Tax Credits	**Reference Case:** Best conservative estimated values for defined approach **Aggressive case** increased % of Commercial buildings meeting qualifying efficiency and % reduction in energy consumption	Reference: Best conservative estimate of Residential and Commercial Sector influences	High Adoption: Increasing forecasted participation for IRA tax credit provisions



Key Topics

Inflation Reduction Act

Modeling impact of IRA Tax Credits

IRA tax credits will have two primary effects in the model:

1. Increases TRC Benefits – Increasing Cost Effectiveness
2. Improves Customer Payback Period – Increases willingness to adopt

Residential

For applicable measures, IRA specifies a $/measure unit credit. The PG analysis will scale to account for applicability for the population of dwellings within building stock.

Scaling factors account for requirements that measures are installed in owner-occupied single-family homes, and that the homeowner has sufficient tax burden to receive the value of the tax credit. We will cross-reference/verify these assumptions against IRA data for residential energy credits by income size.

Compare PG Study forecast with actual IRA tax credit adoption data and adjust IRA adoption assumptions accordingly.

Commercial

IRA offers a $/sq ft tax credit for commercial buildings that meet a minimum % reduction in baseline energy usage, and applies to HVAC, Lighting, and Water Heating measures

Guidehouse will derive a $/measure unit value to be applied within the PG analysis.

Scenarios can vary the proportion of commercial building stock that can achieve the baseline energy reduction requirement.

Available IRA adoption data does not include commercial sector data - approach for the 2025 study cycle will be similar to 2023.

Inflation Reduction Act Tax Credit Data

Initial Participation Analysis – Stakeholder Feedback Requested

Number of returns with IRA Energy Efficient Home Improvement tax credit claims and total amount of tax credits paid out in California:

Measure	$/Return
Insulation or air sealing material or system	$ 701.08
Exterior doors, most expensive door	$ 420.52
Exterior doors, all other doors	$ 445.10
Exterior windows and skylights	$ 1,437.85
Central air conditioners	$ 1,301.59
Natural gas, propane, or oil water heaters	$ 437.54
Natural gas, propane, or oil furnace or hot water boilers	$ 971.62
Improvements or replacement of panelboards, subpanel boards, branch circuits, or feeders	$ 627.29
Home energy audits	$ 236.68
Electric or natural gas heat pumps	$ 1,763.46
Electric or natural gas heat pump water heaters	$ 631.62
Biomass stoves and biomass boilers	$ 821.13

Source - https://www.irs.gov/statistics/soi-tax-stats-clean-energy-tax-credit-statistics

Methodology:

- Using national-level data, calculated the breakdown of number of tax returns with IRA tax credit claims and total amount of tax credits claimed, by measure for the Energy Efficient Home Improvement credit.

Considerations:

- Not all measures are applicable to the PG Study (highlighted measure are included).
- Additional analysis is in progress comparing these values with PG Study forecasts and CA density & saturation data.
- This analysis will be leveraged to refine residential sector IRA adoption assumptions and specify reference/aggressive Scenarios.

Incentives

Lever Considerations

Incentive Caps

- Prior PG Studies employed 50%/75% of incremental cost as a conservative scenario and 75%/90% as an aggressive scenario for (EE/FS)
- For 2025 Study we propose applying *caps informed by CEDARS claims data segmented by Sector, Technology, and End Use*

Reference - Median value of reported incentives,

Aggressive – Median value of the top quartile of reported incentives

Representative Incentive Caps by Scenario (*values are preliminary*)

Sector	Technology	*End Use*	Reference	Aggressive
Residential	Fuel Substitution	*Water Heating*	75%	94%
Residential	Energy Efficiency	*HVAC*	55%	70%
Commercial	Fuel Substitution	*HVAC*	61%	86%
Commercial	Energy Efficiency	*HVAC*	51%	59%

Source – 2023 CEDARS Claims

CARB Zero Emissions Appliance Standards (ZEAS)

Considerations

- Proposed CARB ZEAS will require new sales of space and water heating equipment to be zero-emission. CARB Concept B proposes staggered compliance dates based on equipment type and feasibility.
- For PG Study, this means switching from a gas to electric code baseline (for replace-on-burnout and new construction cases). PG model will switch to electric baselines starting in the specified Effective Year for each Equipment Type.

Draft Effective Year	Equipment Type(s)
2027*	Boilers & water heaters (<75 kBtuh)
2029	Furnaces (≤2 MMBtuh), Boilers & water heaters (≤400 kBtuh), Instantaneous water heaters (≤200 kBtuh)
2031	Boilers & water heaters (≤2 MMBtuh), Instantaneous water heaters (≤2 MMBtuh), Pool heaters (≤2 MMBtuh)
2033	High temperature (>180°F) boilers & water heaters (≤2 MMBtuh)

Source: CARB Draft Zero-GHG Regulatory Proposal: Refined Concept B, May 29, 2024 Workshop (link)

*Earliest proposed Effective Year of 2027 falls within the goal-setting period for 2025 PG Study cycle. PG team proposes **ramping in this baseline change over a 3-year period (2027-2029)** given the *proposed* status of the standard, a fast-approaching compliance year, and some stakeholder concerns with feasibility.

- Questions for Stakeholders:
  - Should we model the proposed 2027 standard differently? If so, how?

Parametric Adoption Modeling

Reference and Aggressive Fuel Substitution Scenarios

- Parametric PG Model approach informed by 2021 Market Adoption Study
- 2023 PG Study introduced Aggressive FS Scenario - leveraged EE as a proxy for Market response to more mature measures and programs

- **Reference** - Default calibrated value based on reported Claims
- **Aggressive** - Forecasts potential influence of:
  - Increased marketing budget/effectiveness
  - Greater market responsiveness to programs
  - External and non-program influences

Parametric Modeling - Calibration Levers

Lever	Drivers and Impact on Model Results
Awareness	• Increasing initial awareness shortens the time required for a measure to reach 100% consumer awareness and accelerates adoption. • Increasing marketing strength increases the adoption rate of technologies in the nascent stage (i.e., having low initial consumer awareness). • Increasing word of mouth strength increases the adoption rate of technologies in the mid to later stages of adoption (i.e., having medium to high consumer awareness).
Willingness	• Increasing incentive levels impacts adoption, budget, and savings. • Overriding a technology's cost-effectiveness allows it to be considered for adoption (otherwise, non-cost-effective measures are not considered in achievable potential). • Adjusting the weighted utility adjusts the attractiveness of a technology relative to the others.
Stock Turnover	• Adjusting turnover rates allows the model to better reflect real-world market dynamics. The model assumes technologies turn over based on effective useful life (EUL). However, the real velocity of the market and turnover dynamics are not this perfect or exact.
Adoption	• Adjusting adoption of FS measures for better alignment of changing program paradigm and other market impacts.

Proposed Scenarios

Proposed Scenario Options

Scenario Levers	Reference	Aggressive FS	High IRA Adoption	High TRC
Cost-Effectiveness Test	TRC	TRC	TRC	TRC
C-E Measure Screening Threshold	0.85	0.85	0.85	1.0
Incentive Levels	**Reference Values** – Median of CEDARS claims reported	**Aggressive Values** Top quartile of CEDARS claims reported	**Reference Values** – Median of CEDARS claims reported	**Reference Values** – Median of CEDARS claims reported
Fuel Substitution Adoption	Reference	Aggressive	Reference	Reference
Program Engagement	Reference	Aggressive	Reference	Reference
IRA Tax Credits	Reference	Reference	High Adoption	Reference

Proposed Scenarios

Narrative descriptions

Scenario	Description
Reference	Market Achievable potential with inputs reflecting the best available information, calibrating the model using unadjusted IOU program results. Reference IRA and defined sector/technology-specific ZEA assumptions applied
Aggressive Fuel Sub	Reference Scenario modified to model the impact on achievable Fuel Substitution potential of increasing program budgets and increasing the influence of IOU FS programs on adoption. • Measure incentive value caps will be increased to the “high” value • Increasing Willingness, and/or Stock Turnover parametric calibration inputs to represent greater market response to adoption influences • “Awareness” parametric calibration inputs will be levered up to represent higher Marketing, Education, and Outreach (MEO) and/or increased MEO effectiveness
High IRA Adoption	Reference Scenario modified to model increasing or high scenario trend assumptions regarding statewide participation in IRA tax credit offering.
High TRC	Reference Scenario but with measure-level cost effectiveness screening set to 1. This is anticipated to generate a more conservative outcome with lower achievable Total System Benefit.

Stakeholder Input

- Based on this summary, do the CPUC staff proposed scenarios capture a reasonable range that can inform goal setting?
  - C-E thresholds?
  - Incentive levels?
- What key variables should be the focus of scenario design?
- Are there any structural factors that play into current PA goal attainment levels that should inform the study?
- CPUC staff aim to choose 4 scenarios – do you have suggestions for specific scenarios to consider?

Stakeholder Input

- Do you agree with our proposed approach for modeling CARB's proposed zero-emission standard for space and water heaters?
  - Should we model the proposed 2027 component differently? If so, how?
- Our analysis of FS potential will again incorporate the TECH incentives, reducing effective measure cost. Do you agree with this approach? Should other approaches or non-IOU incentives be considered?
- Is our inclusion of IRA tax credits statistics for the Residential Sector reasonable, including as a basis for our proposed high-IRA Scenario?

Reminders and Next Steps

Stakeholder engagement is critical and CPUC and the Potential and Goals Study team values written input and feedback.

- Study-related comments are informal.
- Study-related comments on Scenarios are due **October 4, 2024** via e-mail to: ali.choukeir@cpuc.ca.gov, william.graswich@cpuc.ca.gov, and npodkowsky@guidehouse.com

Stay Informed

CPUC's 2025 Energy Efficiency Potential & Goals Webpage:

https://www.cpuc.ca.gov/industries-and-topics/electrical-energy/demand-side-management/energy-efficiency/energy-efficiency-potential-and-goals-studies/2025-potential-and-goals-study

We'll post the slide deck, stakeholder input questions, and webinar recording posted to the website in the next few days.

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Thank You

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