# 2023 EE Potential and Goals Study: Draft Work Plan Workshop

CPUC Leads:

Study lead: Travis Holtby

Low-Income: Kapil Kulkarni

Contractor: Guidehouse

California Public Utilities Commission

# EE Potential and Goals Legal Basis

- Public Utilities Code 454.55-56
  - (a)(1) The commission, in consultation with the Energy Commission, shall identify all potentially achievable cost-effective electricity efficiency savings and establish efficiency targets for an electrical corporation to achieve
  - (a) The commission, in consultation with the Energy Commission, shall identify all potentially achievable cost-effective natural gas efficiency savings and establish efficiency targets for the gas corporation to achieve

# Primary Uses for the EE Potential and Goals Study

- Setting EE goals for IOUs

- Informing downstream forecasts and planning
  - IRP
  - CEC's IEPR
  - Program planning for IOU's and program administrators

# Schedule for this cycle

| Activity | Track / Comment Type | When |
|---|---|---|
| Study launch workplan workshop | Study / informal comment | Today / informal comments due Aug. 16th |
| Measure characterization | Study / informal comment | Early/Mid September 2022 (email) |
| Modeling/Scenario results | Study / informal comment | January 2023 |
| Draft Study release | Study / informal comment | Early March 2023 |
| Proposed Decision (PD) on goals adoption for 2024 and beyond | Policy / formal comment | Q2 / Q3 2023 |
| Decision on goals adoption for 2024 and beyond | Policy / formal comment | Q3 2023 |

Email informal comments to Travis and Neil:
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# Goals metric: 1st year saving to Total System Benefit

- In 2024 the IOU's EE goals metric will change to Total System Benefit (TSB)
  - TSB is an expression, in dollars, of the lifecycle energy, ancillary services, generation capacity, transmission and distribution capacity, and GHG benefits of energy efficiency activities, on an annual basis.

$$\textit{Total System Benefit} = \textit{NTG Ratio (Sum of All Benefits}^{xi} - \textit{Sum of All Increased Supply Costs}^{xii})$$

For more info: TSB Technical Guidance doc

# 2021 vs 2023 EE Potential and Goals Focus/Changes

- 2021
  - Fuel Substitution
  - EE/Demand Response co—benefits
  - COVID sensitivity
  - IRP scenario
- 2023
  - Fuel Substitution
  - Informs mid-cycle Low-Income goals (2021-2026 cycle)
  - Top-Down Context & Credibility

Guidehouse
Outwit *Complexity*

# 2023 Potential and Goals Study Work Plan

## Workshop

August 2, 2022

# Guidehouse Team

## And our Subcontractors

**Amul Sathe**
**Project Director**
**Guidehouse**

**Neil Podkowsky**
**Project Manager**
**Guidehouse**

**Rebecca Legett**
**Measure Lead**
**Guidehouse**

**Yamini Arab**
**Modeling Lead**
**Guidehouse**

TIERRA™

DNV

Mitchell Analytics

Opinion Dynamics

VERDANT

# Group E Overview and Introduction

# 2023 Group E Contract Elements

## Primary focus of today's workshop:

**EE Potential Forecast -** Core effort includes model development and producing scenario results.

*Market and Measure Characterization; Technical, Economic, Achievable Potential; Low Income; Fuel Substitution; Codes & Standards*

## Planned activities for 2023 Group E project beyond Core study:

**Post Processing -** Post process the EE potential forecast to meet needs beyond the goal setting process

*AAEE/SB350 Scenarios; Locational disaggregation; Hourly impact estimates; IRP integration*

**Primary Data Collection** – Additional research to support refinement of future planning and recommendations

*End-use market characterization, Baseline characterization, Market effects studies*

**Top Down Analysis** – Macro analysis to add context & credibility to the bottom up measure level-derived model output

# Potential and Goals Study Overview

- The 2023 Potential and Goals (PG) study builds upon refinements and improvements of past study cycles to inform the goals related policy questions CPUC staff are considering
- Preliminary, informal stakeholder feedback provided to CPUC during 2022 informed 2023 PGS Workplan
- **Multiple activities** make up the 2023 PG study:
  - Developing core forecasts to inform the IOU energy efficiency (EE) goal setting process managed by the CPUC
  - Coordinating with other forecasting related efforts at the CPUC such as integrated resource planning (IRP)
  - Providing forecasts in a format that can be useful for other state planning processes (e.g. the CEC's IEPR), program administrators, and program implementors

# What to expect for the 2023 Study?

- Compressed project timeline for core PG Study compared to 2021 cycle
- Emphasis on enhancements to Fuel Substitution and Low Income
- Commitment to stakeholder engagement
- Continuing past methodologies in other areas (Residential/Commercial, C&S, BROs)
- Application of Total System Benefit metric to provide “optimal” model outputs
- Right-sizing the model and analysis granularity as needed to balance scope and budget

# EE Potential Forecast Overview

# EE Potential Forecast Overview

- **This section covers:**
  - What a potential study is and the major steps to conducting a study
  - An introduction to scenarios
  - High level project schedule and stakeholder engagement plan

- **Critical things that are different than previous study:**
  - Shorter timeline but similar level of planned stakeholder engagement
  - Prioritization of Low Income, Fuel Substitution

- **During Q&A please consider:**
  - Thoughts/questions/concerns about the schedule
  - Are the priorities in line with your needs and expectations
  - Where else stakeholders can/should be involved in the process
  - Questions about other materials presented so far in this workshop

# What is a Potential Study?

- Measure Energy Savings
- Measure Life
- Technology Density and Saturation

**Technical Potential**
Total energy savings available by end-use and sector, relevant to current population forecast

- Avoided Costs
- Measure Costs

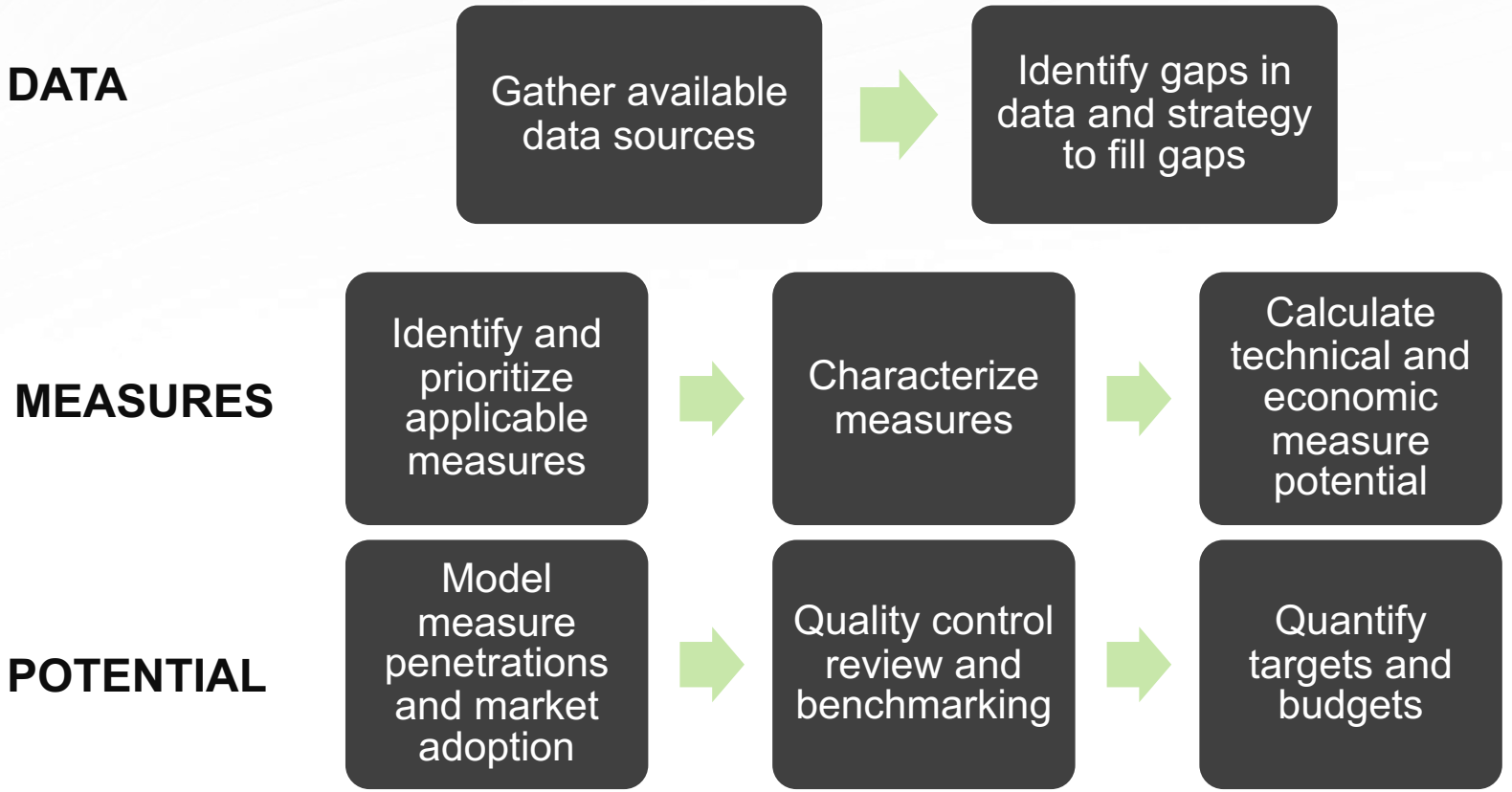
**Economic Potential**
CPUC Cost-effectiveness Screen

- Historical Program Achievements
- Program Budget
- Customer Adoption Characteristics

**Achievable Potential**
EE expected to be adopted by programs

**Establishes Goals & Scenarios for Forecast**

# Data and analysis structure



# Scenarios

- Up to four scenarios to inform the goal setting processes
- Scenarios address differences based on internally influenced variables – policy and program decisions under control of the CPUC and IOUs.
- Scenarios will adjust multiple variables and test combined effects

| Variables Analyzed in 2021 PGS | New Consideration for 2023 PGS |
|---|---|
| • Incentive levels<br>• Cost effectiveness thresholds<br>• Program engagement<br>• Financing programs | • Total System Benefit optimization |

# Preliminary Schedule for EE Potential Forecast

| Milestone/Deliverable | Start Date | Completion Date |
|---|---|---|
| Scope Development | 7/1/2022 | 8/15/2022 |
| Develop Model Infrastructure | 8/1/2022 | 8/15/2022 |
| Characterize Measures | 8/1/2022 | 9/15/2022 |
| Develop Technical Potential | 9/15/2022 | 10/15/2022 |
| Develop Economic Potential | 10/15/2022 | 11/15/2022 |
| Develop Baseline Achievable Potential | 11/15/2022 | 12/31/2022 |
| Achievable Potential Scenarios | 1/1/2023 | 1/31/2023 |
| Codes & Standards Potential | 11/1/2022 | 1/15/2023 |
| Low Income Potential | 9/1/2022 | 12/31/2022 |
| Preliminary Results Shared with Stakeholders | | Late Jan 2023 |
| Draft Report and Model Delivery | | 3/1/2023 |
| Final Report and Model Delivery | | 5/1/2023 |
| Decision on EE Goals | | Q3 2023 |

# Preliminary Planned Stakeholder Engagement Topics

| | |
|---|---|
| **Q3 2022** | Work Plan (today's meeting) |
| | Input on measure priorities and characterization (service list e-mail) |
| **Q4 2022** | Input on scenarios (webinar) |
| | Presentation of Low-Income approach and data needs (webinar) |
| **Q1 2023** | Input on locational post processing (webinar) |
| | Draft results (webinar) |

# Study Overview Questions

- Are there questions/concerns with the project timeline?
- Any specific stakeholder engagement topics we should consider that aren't planned?
- Are the Low Income and Fuel Substitution focus areas appropriately positioned? Are there other areas of focus that should be added?
- Questions about other materials presented so far in this workshop?

# Market and Measure Characterization

# Market and Measure Characterization

- **This section covers:**
  - Tasks 8b.1, 8b.2 and 13 in our workplan
  - Characterizing technologies that have the potential to save electricity and/or natural gas
  - Market and measure data needed for the study

- **Critical things that are different than previous study:**
  - Greater attention to fuel substitution measures, including incentives
  - Emphasis on Low Income measures
  - Removal of EE/DR co-benefits, Mining sector

***Measure list to be delivered by 8/12/22 to stakeholders in supplemental Memo & Appendix***

# Market Data & Global Inputs

- Market data consists of non-measure-specific inputs to the model.
- Key types of market data, and their sources, include the following:

| Market Data Input | Source |
|---|---|
| Customer retail rates forecast ($/kWh, $/therm) | CEC Integrated Energy Policy Report (IEPR) |
| Energy sales forecasts (GWh, MW, and therm) | California Energy Consumption Database (ECDMS) |
| Forecast of building and consumption growth | Request from California Energy Commission |
| Avoided energy and capacity costs | CPUC Cost-Effectiveness Tool (2022 ACC vintage) |
| Historic program savings and spending | CEDARS |
| Inflation rate | Federal Reserve Bank forecasts |
| Discount rate | Utility WACC (as used in the ACC) |

# Residential and Commercial Market Sectors

## Measure Characterization

**Changes to Include**

- Refine measure list to **capture the high impact measures** and simplify or eliminate low impact measures
  - Characterize multiple competing levels for high-impact measures (e.g. multiple SEER levels for residential air conditioners)
- Special attention to **fuel substitution measures**
- Consider **targeting measures** to fully capture high potential impact; e.g., by climate zone

# Industrial and Agricultural Market Sectors

## Measure Characterization

- Two categories of measures are characterized and modeled differently

| | |
|---|---|
| **Deemed measures** | • Prescriptive-type measures including those prescriptive measures that may be installed through a custom program<br>• Characterization approach: similar process as commercial measures using DEER/eTRM, CEDARS and secondary data sources<br>• Modeled with: Bottom-up diffusion model |
| **Custom Measures** | • Used to lump together measures and projects that are site-specific, require unique calculations for each project, and do not rely on fixed DEER or workpaper values. Also used to characterize future emerging technologies, and SEM programs<br>• Characterization approach: leverage historical program trends and consumption forecasts<br>• Modeled with: Top-down forecasting utilizing program-specific trend data, market and sector level penetration data, and population data to derive achievable potential |

# Market and Measure Characterization Data Questions

- What year of data should we use for historic program savings and spending?
- Do you have program and measure data to share that's not available via DEER/Workpapers or CEDARS? (Including pending workpapers not yet submitted or approved.)
- Are there any fuel substitution programs that can inform data inputs?
- Are there any specific industrial and agricultural segments or technologies of interest to study (e.g. technologies with cross-cutting potential)?

- **Upon delivery of proposed measure list, please consider:**
  - Which measures are highest priority?
  - Are there additional measures or technologies that should be included in the study?

# Five-minute stretch break…

# Modeling Methodology Overview

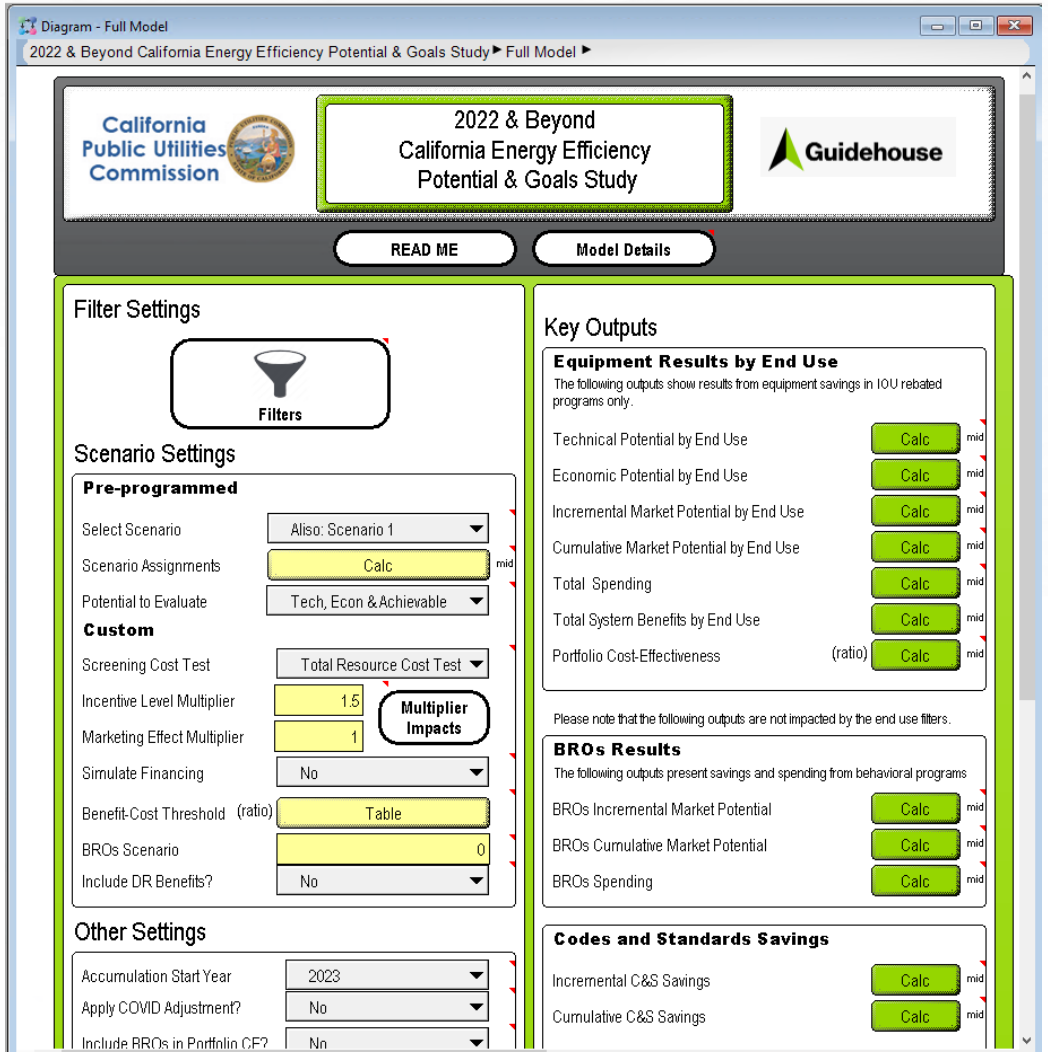
# Modeling Methodology Discussion

- **This section covers:**
  - Modeling platform overview
  - Key Technical, Economic and Achievable potential analysis elements
  - Specific approach details for Low Income, Fuel Substitution, BROs, Codes & Standards potential modeling

- **Key 2023 Study Updates:**
  - Modeling approach and analysis tool consistent with 2021 PG Study
  - Emphasis on Low Income and Fuel Substitution including new analysis elements

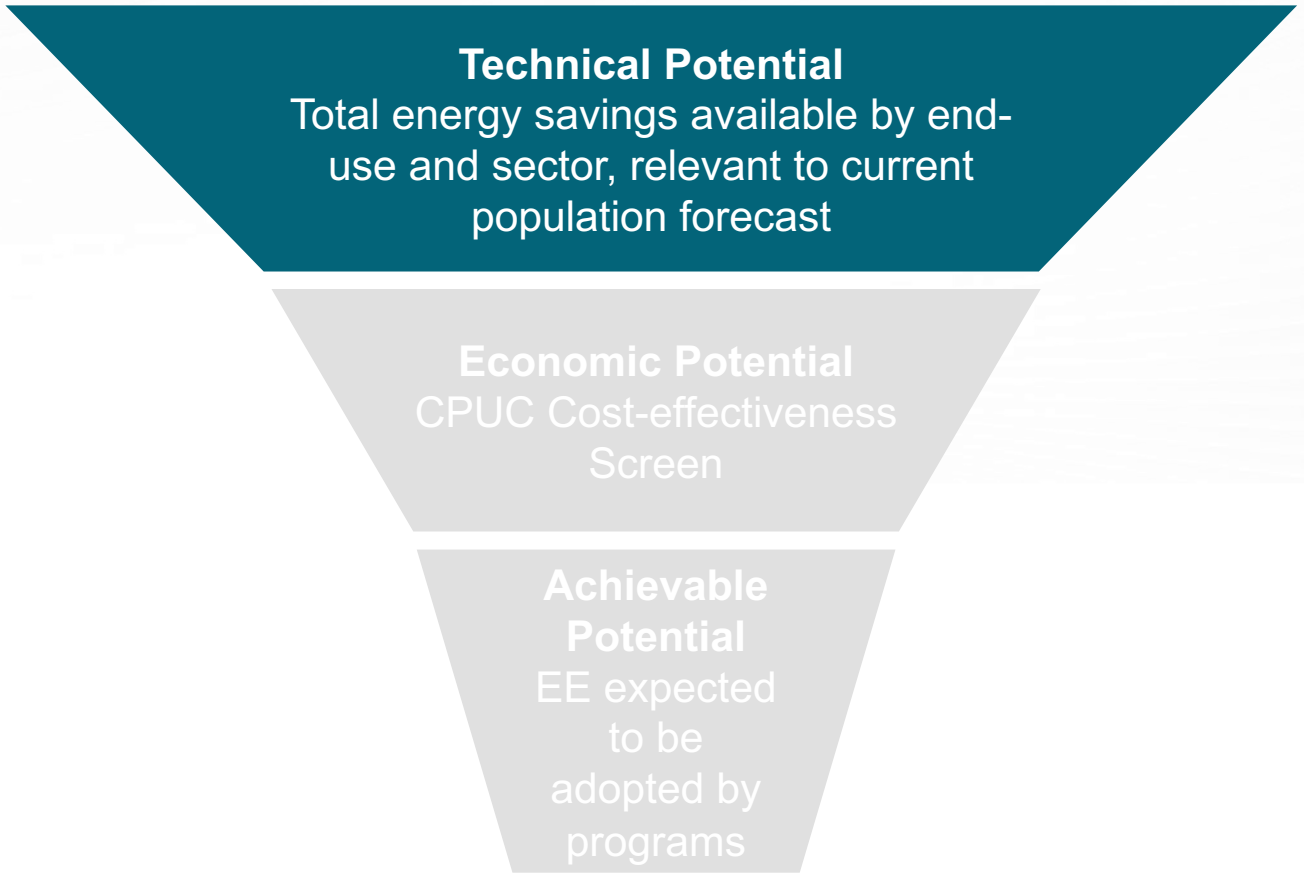
# Modeling Platform

- Continue to use the model last used in the 2021 PG study with necessary revisions. This is largely bottom-up model already capable of:
  - Estimating Technical, Economic and Market Potential
  - Providing results with measure-level granularity
  - Explicitly modeling fuel substitution
  - Assessing cost effectiveness of individual measures and report portfolio cost effectiveness
  - Distinguishing between rebate program savings, codes and standards savings, and low-income program savings
  - Outputting annual and cumulative savings, including the total system benefits (TSB) metric
- Results details outputs spreadsheets and results viewers will be made available to stakeholders as have been in the past.
- The typical stakeholder should not have to download and run the model.



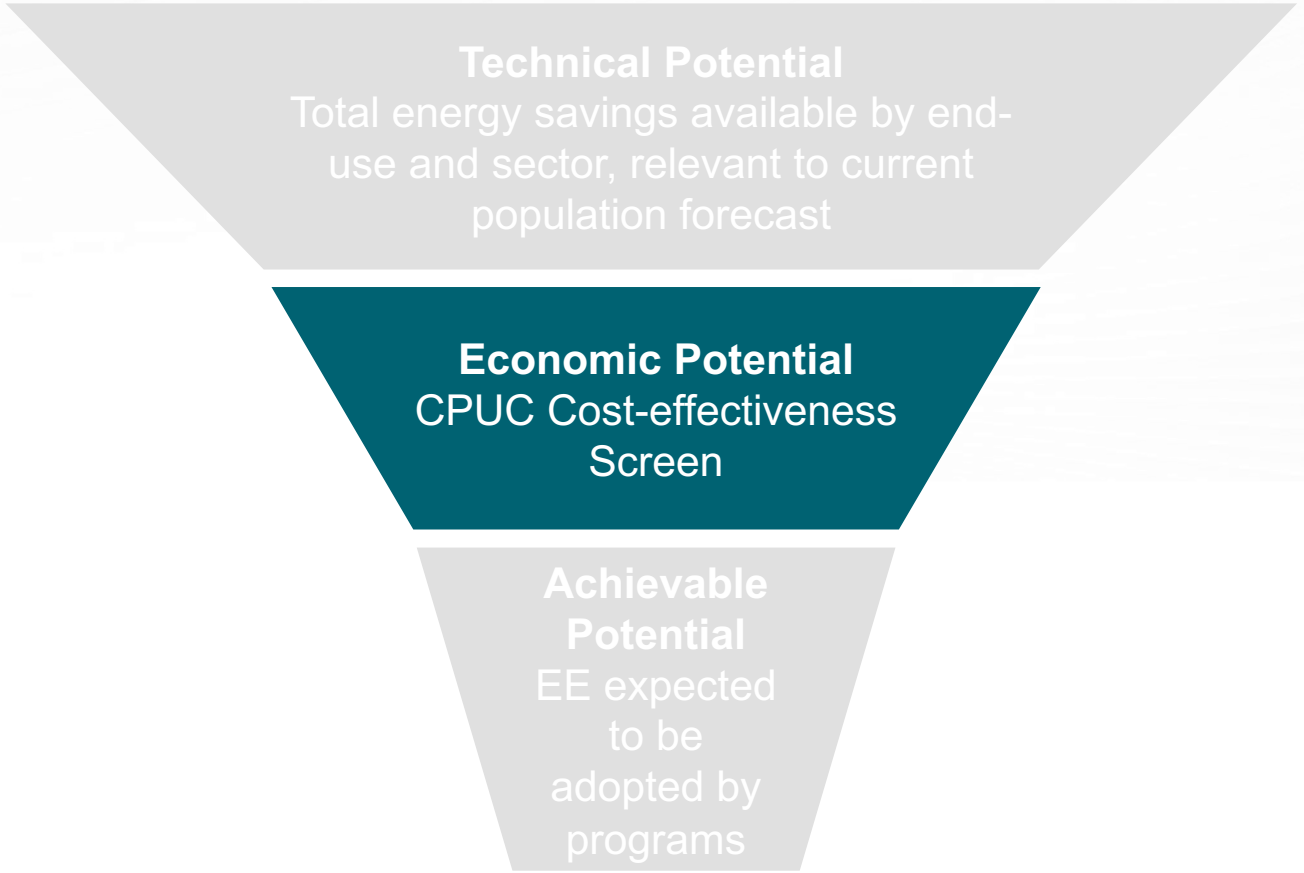
# Technical Potential for Rebate Programs

- Assumes **ALL** eligible customers adopt **ALL** of the highest level of efficiency available within a technology group, regardless of cost effectiveness.
- Estimated by:
  - Sizing the total population for each individual measure in specific sectors and territories using building stock and appliance saturation data
  - Estimating the number of annual installation decisions is based on replacement type, using either a measure's burnout rate, number of retrofittable measures, or new building stock.
  - Assuming all annual installations are the highest efficiency
  - Multiply number of installations by unit energy savings



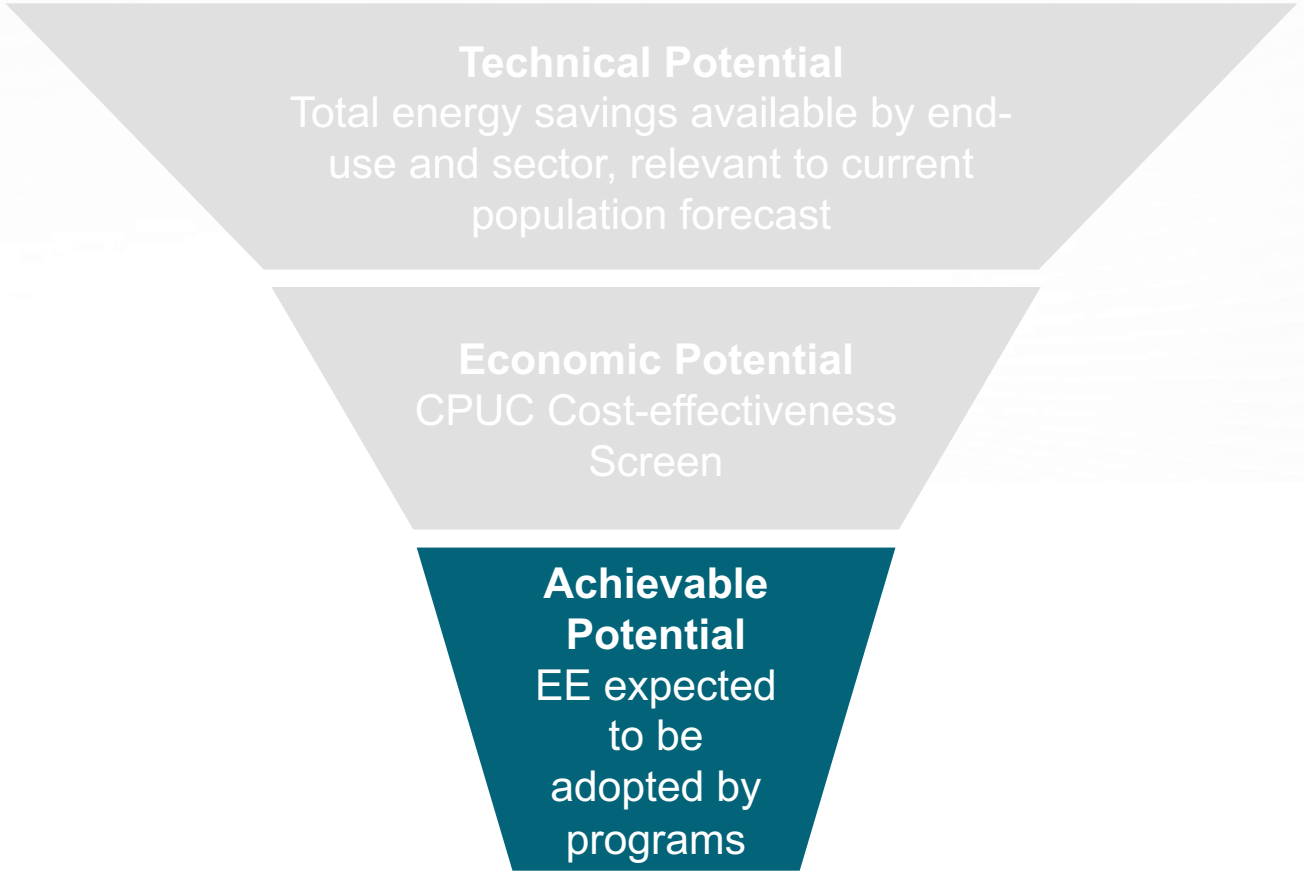
# Economic Potential for Rebate Programs

- Calculated as the total potential available when limited to only cost-effective measures. All components of economic potential are a subset of technical potential.
- Estimated by:
  - Applying a cost effectiveness test to each measure (the 2021 PG study used the TRC test only)
  - Set a threshold definition of “economic” across scenarios (2021 PG study considered a range of TRC from 0.85 to 1.25), below which a measure is deemed not cost effective
  - Remove all non cost-effective measures from the analysis and recalculate potential



# Achievable Potential for Rebate Programs

- The EE savings that could be expected in response to specific levels of program incentives and assumptions about existing CPUC policies, market influences, and barriers.
- Estimated by:
  - Calculating the market share, or penetration of measures based on customer awareness of the measure and customer willingness to adopt the measure. Willingness is determined in one of two ways:
    - Multi-attribute-based: Predicts consumer behavior by weighting multiple value factors that customers use to decide whether to adopt a more efficient measure..
    - Payback-based: Compares payback time associated with efficient measure against competing measures.
  - Calibrating forecast using historic program data



# Low Income

## Modeling Approach

- 2023 PGS methodology consistent at a high level with prior cycle, and will include:
  - Market Characterization
  - Measure Selection and Characterization
  - Assessment of Technical and Market Potential
  - Apply Low Income-specific Penetration and Adoption inputs

## New Considerations for 2023 PGS

- Consider applying measure pre-screen using IOU-specific ESA Cost Effectiveness Tool (ESACET) values
  - Incorporates modeled quantification of Non-Energy Benefits
  - Measures with Health, Comfort and Safety emphasis are included (will *not* be screened out)
- Adding Fuel Substitution measures
- Explore adding granularity to analysis around Low Income customer demographic categories, Mobile Home breakout

# Low Income

## Discussion

- Should Guidehouse incorporate Economic Potential scenarios into the Low Income P&G modelling methodology using the guidelines from the ESA Decision for Program Years 2021-26 (D.21-06-015)?
- What are the benefits and drawbacks of incorporating Economic Potential for the first time in a LI P&G study?
- Does additional demographic and housing stock granularity provide significant benefit?
- What are stakeholders' other priorities/concerns regarding the new considerations for low-income analysis?

# Fuel Substitution

## Modeling Approach

- Methodology consistent at a high level with EE potential
- FS Measure characterization and modeling will be concurrent with EE

## New Considerations for 2023 PGS

- Greater effort on ensuring robustness of the measure inputs, assumptions, analysis
- Considering incentive layering for end uses and associated measures that have both EE and FS impacts
- Incorporation of non-IOU Electrification program (i.e. BUILD/TECH) and Codes & Standards impacts on achievable potential
- Consideration of Zonal electrification efforts
- Non-measure specific Electrification costs:
  - Avoided gas infrastructure costs
  - Panel upgrades

# Fuel Substitution

## Discussion

- Does the approach proposed meet stakeholder needs?
- Is there non-measure cost or other data available that could be applied?
- How should the study treat non-IOU program impacts on EE FS?
- What are stakeholders' other priorities/concerns regarding the new considerations for fuel substitution analysis?

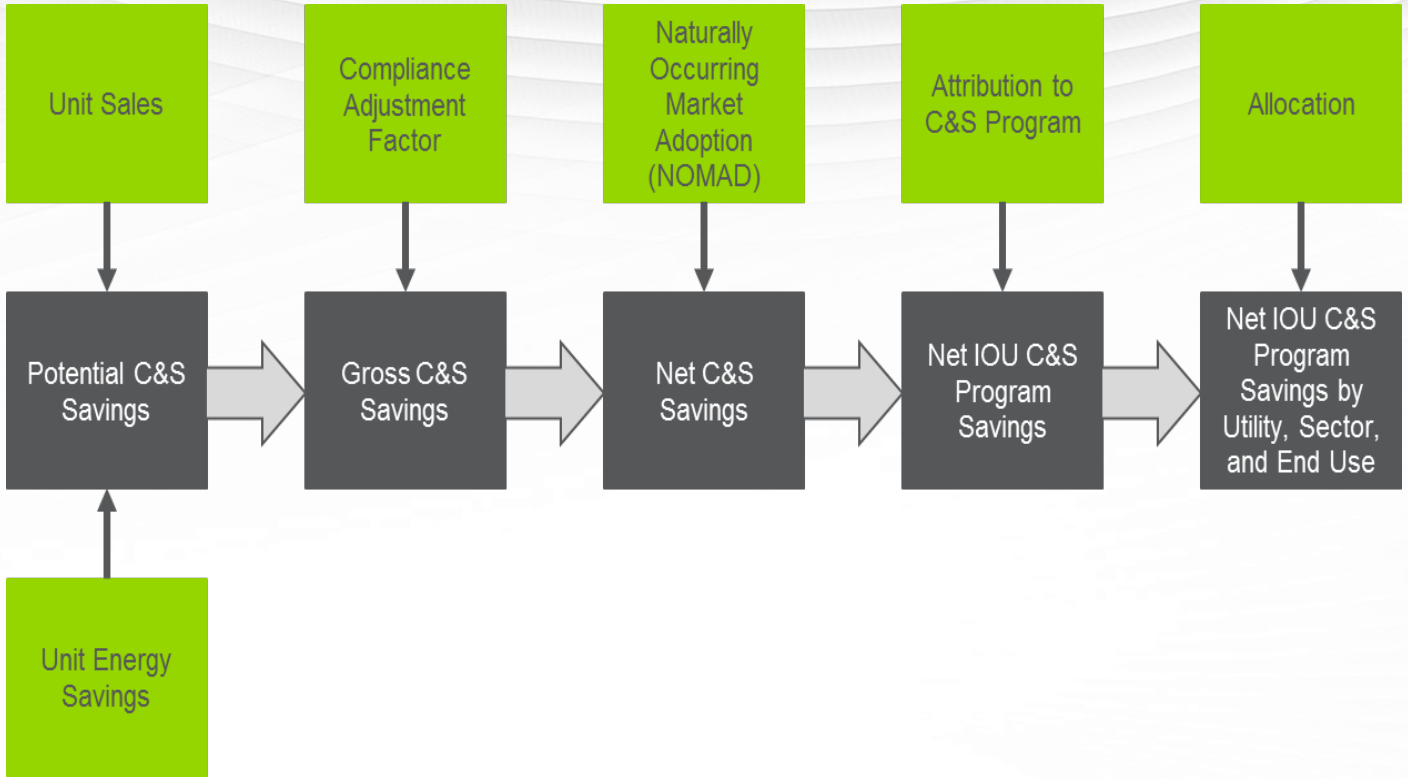
# BROs

## BROs

- Measure list consistent with 2021 PGS, but update data, as available.
- Primary focus:
  - Home Energy Reports
  - Strategic Energy Management
  - Retrocommissioning
- Additional measures include Residential and Commercial Competitions, Universal Audit Tool, BEIMS, Benchmarking
- Key assumptions are based on existing programs and planned program rollouts and targets

# Codes & Standards

- Calculations
  - Adjust code baseline for rebated measures
  - Calculate net C&S Savings – subtracts naturally occurring market adoption of code-compliant technologies
  - Calculate net IOU C&S Savings – portion attributed to advocacy work




- Where gaps exist (mostly for pending new C&S), research or estimate:
  - **Market size estimates:** Market sale projections, construction projections, and trends
  - **Compliance factors:** For building codes, use historical data at the building level by building type based on the proportion of projected energy savings achieved. For the appliance standards, review historical compliance rates for similar standards.
  - **NOMAD factors:** From prior evaluations with adjustments to shift the start year, as appropriate.

# Methodology Questions

- What time period of historic program data is reasonable for use in calibrating the rebate program model?
- Does changing the TRC threshold from 0.85 to 1.25 serve the objectives of the study now that TSB is the primary metric?
- Are there any new BROs programs we should consider? If so, what vetted data is available to inform the modeling?
- Did stakeholders find the 2021 PG study online results viewer valuable? Or would you prefer a spreadsheet-based viewer?

# Reminders and Next Steps

# Reminders and Next Steps

**Stakeholder engagement is critical and CPUC and the Potential and Goals Study team values the input and direction provided.**

- Study-related comments are informal.
- Study-related comments on Workplan are due **August 16, 2022** via e-mail to: travis.holtby@cpuc.ca.gov and npodkowsky@guidehouse.com

# Stay informed

CPUC's 2023 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/2023-potential-and-goals-study

# Q&A and Open Discussion

- What additional questions/comments do you have that haven’t already been covered today?

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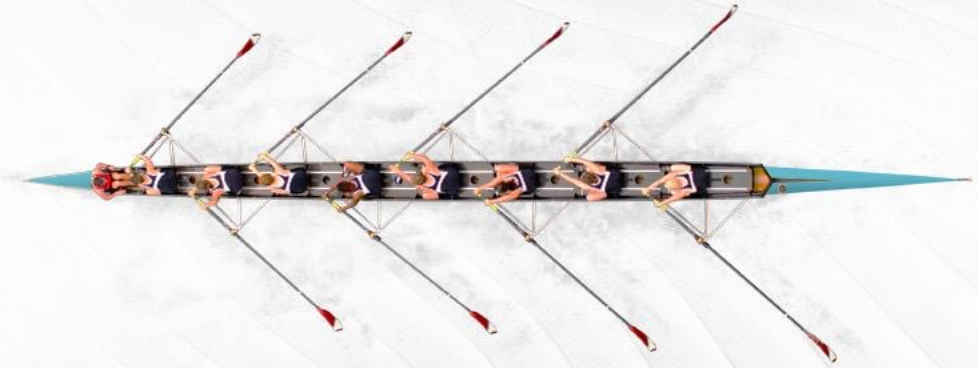

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# California Public Utilities Commission

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