Pacific Gas and Electric Company®

PG&E Resource Savings Rulebook

Version 4.0

This document is maintained by the PG&E EE QC&C Team.

NOTE: This Rulebook is current as of the date of its publishing and aligns with available CPUC and PG&E requirements as of that date. Requirements are subject to periodic change and will be updated in future versions of this Rulebook.

Change Log

Version	Date	Description
v.4.0	10/2/2023	Added changes from Resolution E-5221, including: - Clarifications regarding Add-On Equipment - Measure package timeline, process, data requirements Updated natural gas efficiency requirements. Updated and added definitions. Added data collection requirements. Clarified conditions for Accelerated Replacement. Added the Market Access Approach. Added the expansion of NMEC for estimating savings.
v.3.0	8/15/2022	Added changes from Resolution E-5152, including: -Swapped DEER/READI for eTRM; -Converted text from workpaper to measure package; -Updated to DEER Resolution timeline and scope Removed Appendices C and D; Removed references / exceptions for Savings By Design.
v.2.0	7/1/2021	References are updated to the CPUC *Energy Efficiency Policy Manual*, Version 6. Deemed Platform substantially updated
v.1.0	3/27/20	Comments addressed. Clean document produced.
v.0.99F	2/25/20 2/15/20	Starting from Alison's edits Starting from John and Paul's reorg in V.0.99E and added new meter-based chapter content
v.0.99c	03/25/19	Added: 1. Updated disadvantaged communities' definition. 2. Updated MAT categories names and definitions.

		3. Updated HTR definition and criteria. 4. Updated High and Low Bay LED Baseline Selection CPUC Requirement. 5. Updated Chiller CPUC Requirements. 6. Updated Pump Overhaul CPUC Requirement. 7. Updated Meter-Based Chapter to reflect 2019 CPUC NMEC ruling. 8. Updated Financing maximum loan amount.
v.0.99b	07/09/2018	Final first public version.
v.0.99	05/09/2018	Near final first public version.
v.0.9	12/12/2017	Draft sent for second management review.
v.0.5	10/31/2017	Draft sent for management review.

Table of Contents

Glossary

Term	Definition
Accelerated Replacement (AR)	See Measure Application Type.
Accelerated Replacement Cost (ARC)	The full measure cost incurred to install the new high-efficiency measure, reduced by the net present value of the full measure cost that would have been incurred to install the standard efficiency equipment at the end of the remaining useful life period.
Add-On Equipment (AOE)	See Measure Application Type.
Avoided Cost Calculator (ACC)	An Excel-based spreadsheet model used in demand-side cost effectiveness proceedings at the California Public Utilities Commission. Specifically, the model produces an hourly set of values over a 30-year time horizon that represent costs that the utility would avoid if demand-side resources produce energy in those hours. These avoided costs are the benefits that are used in determining the cost-effectiveness of these resources.[a]
Baseline	The state of performance and/or equipment that would have happened in the absence of the program induced energy efficiency influence.
Existing Conditions	A baseline corresponding to the efficiency level of equipment, systems, or construction in place prior to the EE activity.[b]
Standard Practice	An estimate of the activity or installation that would take place absent the energy efficiency program, as required by code, regulation, or law, or as expected to occur as standard practice. The Standard Practice Baseline activity or installation must meet the anticipated functional, technical, and economic needs of the customer, building, or process and provide a level of service comparable to that provided by the energy efficiency (EE) measure. Savings claims shall be generated based on equipment choices that operate at a level of service comparable to that provided by the EE measure. If there is not a viable and comparable baseline solution that offers a comparable level of service as the EE measure, the energy use of the baseline solution must be adjusted to provide a level of service comparable to that provided by the EE measure. Previously called “Code” baseline.[c]
Baseline Cost	The total amount that would be paid by the customer to implement the baseline solution.
Behavioral, Retro-commissioning, and Operational (BRO)	See Measure Application Type.
Bill Neutrality	Monthly bill payments that do not exceed the projected monthly energy cost savings following the installation of an energy efficiency project using an OBF loan.

Term	Definition
California Public Utilities Commission (CPUC)	Regulates investor-owned electric and natural gas utilities operating in California. Regulates privately owned electric, natural gas, telecommunications, water, railroad, rail transit, and passenger transportation companies, in addition to authorizing video franchises.[d]
California Statewide Qualified LED Product List	Source for determining eligibility of non-residential LED fixtures for energy efficiency incentives and rebates offered by Pacific Gas & Electric Company.[e]
California Energy Commission (CEC)	California's primary energy policy and planning agency. The CEC has responsibility for activities that include maintaining the California Energy Code, promoting energy efficiency through appliance and building standards, and supporting renewable energy technologies.
California Energy Data and Reporting System (CEDARS)	CEDARS stores and manages energy efficiency data provided by the California Investor-Owned Utilities, Regional Energy Networks (RENs), and certain Community Choice Aggregators (CCAs) to the CPUC.
Code	In California energy efficiency context, generally refers to Title 20 (appliance energy efficiency) and Title 24 (building energy efficiency) of the California Code of Regulations but can be any codes and regulations enacted by federal and local governments and regulatory agencies that mandate a particular technology to be utilized.[f]
Community Choice Aggregators (CCA)	Organizations created by local governments pursuant to Assembly Bill 117 for the purpose of procuring power and administering energy efficiency programs on behalf of local citizens.[g]
Comparison Group	A group of non-participating customers who are as similar as possible to participants in a quasi-experimental design energy efficiency program. Comparison group members' energy consumption is compared to that of program participants in order to assess participants' energy savings resulting from the program.
Control Group	A group of customers eligible for a randomized controlled trial energy efficiency program, who were randomly assigned not to receive the program intervention (in contrast with the Treatment Group customers who were randomly assigned to receive the intervention). Control Group members' energy consumption is compared to that of the treatment group in order to assess the Treatment Group's energy savings resulting from the program.
Cost Effectiveness Tool (CET)	An online tool used to determine the cost effectiveness and examine other properties of EE programs and portfolios.
Coverage Factor	The range in observed values of independent variables during the baseline period in a site-level meter-based analysis.

Term	Definition
Custom Lite Project	An Energy Insight workflow streamlined for small lighting projects with calculated incentives of less than $25,000 for the entire lighting project. The Custom Lite workflow bypasses the Pre-Installation CMPA project stage, allowing the project to move forward with installation. These projects are required to be listed on the CMPA prior to payment and otherwise follow custom program rules.
Custom Measures and Projects	Custom measures and projects are energy efficiency efforts where the customer financial incentive and the ex ante energy savings are determined using a site-specific analysis and are finalized at project completion. An agreement is made with the customer wherein the financial incentive is paid upon the completion and verification of the installation.
Custom Project Review (CPR)	The CPUC review process that occurs before a custom or NMEC measure or project savings claim is "frozen"; undertaken to verify that the ex ante values used to calculate the reported savings are reasonable and based on best available information. For RCT and QED designs, the program implementer must submit for review a procedural work paper that outlines the method to be used to determine savings, rather than specific values. For deemed measures and previously for custom measures, this process is referred to as Ex Ante Review (EAR).
Customer	An account holder who receives delivered energy from PG&E. The parent company of the account holder and any of its subsidiaries are considered one PG&E customer.[h]
Database of Energy Efficiency Resources (DEER)	Database located at: http://www.deeresources.com that contains information on energy efficiency technologies and measures, including estimates of energy savings potential and measure costs for these technologies in residential and non-residential applications. Due to security vulnerabilities identified by the CPUC, all content from the DEEResources.com and DEEResources.net websites was migrated to the DEER Module at CPUC's CEDARS website.[i] No new content will be uploaded to DEEResources.com; new content will only be added to DEEResources.net in rare instances and until it can be uploaded to the CEDARS DEER Module.[j]
Deemed Measure	A prescriptive energy efficiency measure with predefined savings calculations, cost, eligibility, and other measure attributes.[k] A deemed measure contains offerings that use either values from eTRM (formerly DEER/READI) or an approved measure package (formerly workpaper) outlining the savings assumptions that will be applied consistently to the same measure.

Term	Definition
DEER Peak Demand Savings (new definition as of 1/1/20)	The average demand impact as would be "seen" at the electric grid level for a measure averaged across 15 hours from 4 p.m. to 9 p.m. during the three consecutive weekday periods containing the highest algebraic sum of: • The average temperature over the three-day period, • The average temperature from 4:00 pm to 9:00 pm over the three-day period, and • The peak temperature within the three-day period. The Peak Period shall fall within the dates of June 1 through September 30, inclusive. The three Peak Period days shall not include a holiday. Holidays within this window of dates include July 4th, or the nearest weekday to July 4th, and Labor Day.
Delivery Channel or Type	The target of an EE program activity is known as the delivery channel, usually described as Upstream (directed at manufacturers of EE measures), Midstream (directed at distributors of EE measures), Downstream (directed at retailers of EE measures or at retail locations where EE measures are sold), or Direct Install (directed at and provided directly to the customer).
Direct Access (DA) Customer	Customer category originally established by California Assembly Bill 1890, *Electric Utility Industry Restructuring Act*. Customers who are authorized to purchase electricity or gas from an Electricity Service Provider, instead of from a regulated electric utility. Currently governed by SB 695.[l]
Direct Energy Savings	The primary energy and demand impacts that result directly from a measure such as the savings that result from the equipment involved in a retrofit activity (e.g., savings resulting directly from the lower input wattage of newly installed efficient lighting fixtures). Associated with Resource Programs as opposed to Non-Resource Programs.[m]
Direct Install (DI)	Energy efficiency solutions provided directly to the customer at little or no cost through installation contractors provided and managed by an Implementer.
Disadvantaged Communities (DAC)	Pursuant to Section 39711 of the Health and Safety Code, the California Environmental Protection Agency (CalEPA) developed a means for identifying disadvantaged communities, which may include, but are not limited to: 1. Areas disproportionately affected by environmental pollution and other hazards that can lead to negative public health effects, exposure, or environmental degradation. 2. Areas with concentrations of people that are of low income, high unemployment, low levels of homeownership, high rent burden, sensitive populations, or low levels of educational attainment. CalEPA's CalEnviroScreen Tool is used to identify census tracts that meet the definition of a disadvantaged community. The Tool can be found here: https://oehha.ca.gov/calenviroscreen. [n]

Term	Definition
Disadvantaged Worker	A worker that meets at least one of the following criteria: • lives in a household where total income is below 50% of Area Median Income; • is a recipient of public assistance; • lacks a high school diploma or GED; • has previous history of incarceration lasting one year or more following a conviction under the criminal justice system; • is a custodial single parent; • is chronically unemployed; • has been aged out or emancipated from the foster care system; • has limited English proficiency; or • lives in a high unemployment ZIP code that is in the top 25% of only the unemployment indicator of the CalEnviroScreen Tool.[o]
Diverse Business Enterprise	A business that is designated as a Small Business Enterprise (SBE) and/or is owned by one or more women, minority, disabled veteran, lesbian, gay, bisexual, or transgender, and/or people with disabilities, as more particularly set forth in CPUC General Order 156.[p]
Downstream	Classification of program delivery in which program is delivered by agents or representatives (including installation contractors) that have direct interaction with end-use customers or through a program website.[q]
Dual Baseline	Means that an existing baseline is used for the calculation of energy savings for the remaining useful life of the removed equipment. At the end of the remaining useful life, the customer would have needed to replace the failed equipment with equipment that reflected current energy efficiency standards and/or standard practices. This second baseline is used to calculate the [reduced] savings for the remainder of the effective useful life of the measure.
Early Retirement (ER)	Early Retirement is a depreciated term. See Accelerated Replacement.
Effective Useful Life (EUL)	An estimate of the median number of years that the measures installed under the program are still in place and operable.[r]

Term	Definition
Electrification	The specification of electrically fueled appliances and equipment where the standard practice baseline fuel type for the equipment or appliance is natural gas or another non-renewable gaseous or liquid fuel. The CPUC does not consider new construction electrification to be fuel substitution because there is no pre-existing equipment to be replaced, but electrification measures should use the same tools and follow the same reporting requirements as fuel substitution until the guidance is clarified. The measure impact type for all-electric new construction in deemed is Deem-WP-NC-AE and for custom is Cust-NC-AE.
Electronic Technical Reference Manual (eTRM)	A statewide repository of California's deemed measures, including supporting values and documentation. eTRM is now the sole source for energy efficiency measure package development, submittal, review, and publishing. eTRM replaces DEER and READI.[s] All values contained in the eTRM's permutations tables are considered DEER values and all methods described in measure packages are considered DEER methods.[t]
Embedded Energy	The amount of energy (in kWh) needed to supply, move, and treat water (in million gallons or acre/ft), delivered to a user, and to treat the water post-use (if necessary).
Emerging Technologies (ET)	New energy efficiency technologies, systems, or practices that have significant energy savings potential but have not yet achieved sufficient market share (for a variety of reasons) to be considered self-sustaining or commercially viable. Emerging technologies include late stage prototypes or under-utilized but commercially available hardware, software, design tools or energy services that if implemented appropriately should result in energy savings.[u]
Energy Efficiency (EE)	Activities or programs that influence customers to reduce energy use by making investments in more efficient equipment or controls, which reduce energy use while maintaining a comparable level of service.[v]
Energy Efficiency Measure or Measure	Energy using equipment, control system, or practice whose installation and/or implementation results in a reduction of energy purchased from the distribution utility (while maintaining a comparable or higher level of a specific service or to accomplish a specific amount of work). For purposes of these Rules, solar-powered, non-generating technologies are eligible energy efficiency measures. To be included in a program, the CPUC must determine the measure to be acceptable. Also referred to simply as "measure".[w]
Energy Efficiency Project	Implementation of an EE measure or group of measures at a customer site, essentially during one construction cycle, through a single incentive application. Note: Projects are not split by meter or property lot lines. Any tiered levels of rigor will be based on cumulative customer savings over a calendar year. (Also see Rigor.)
Energy Insight (EI)	PG&E software system for Trade Professionals that utilizes Salesforce® to track and submit customer rebate and incentive applications.

Term	Definition
Energy Service Provider (ESP)	An entity who provides electric supply services to Direct Access Customers within PG&E's service territory. An ESP may also provide certain metering and billing services to its DA Customers as provided for within these tariffs.[x]
Equity Segment	Programs with a primary purpose of providing energy efficiency to hard-to-reach or underserved customers and disadvantaged communities in advancement of the Commission's Environmental and Social Justice (ESJ) Action Plan;3 Improving access to energy efficiency for ESJ communities, as defined in the ESJ Action Plan, may provide corollary benefits such as increased comfort and safety, improved indoor air quality, and more affordable utility bills, consistent with Goals 1, 2, and 5 in the ESJ Action Plan.[y]
eRebates	PG&E's customer facing electronic application workflow that supports residential and non-residential downstream deemed rebate applications.
Evaluability	An assessment of the probability that sufficient evaluation information will be available when evaluations are actually undertaken.[z]
Evaluation, Measurement and Verification (EM&V)	Activities that evaluate, monitor, measure, and verify performance or other aspects of energy efficiency programs or their market environment. The CPUC's Energy Division has management and contracting responsibility estimating savings impacts for purposes of calculating savings claims. The IOUs are authorized to contract and manage studies to evaluate program design and to assess the market. *See* Measurement & Verification.[aa]
Ex Ante Database (EAdb)	A database containing the official ex ante data available for claims processing. This resource is now accessed via eTRM.
Ex Ante Review (EAR)	Process that estimates the potential energy savings and the customer financial incentive for a deemed energy efficiency measure before it is installed and/or implemented based on predictions of typical operating conditions and baseline usage. The review process that occurs before savings for a measure or project savings claim is "frozen" and undertaken to verify that the ex ante values used to calculate the reported savings are reasonable and based on best available information.
Ex Ante Values	Estimated savings, cost, incentive, effective useful life, net-to-gross ratio, and other values that are the basis of the savings claim. The ex ante values are the values prior to the evaluation of the portfolio cycle. These values reflect the IOU-reported savings. Savings may be revised with an impact evaluation.[bb]
Exception Request	A formal request that, if approved, allows a project to proceed despite being out of compliance with one or more platform requirements. The Exception process is defined in Guidance Document *CUST-5051P Exception Management Procedure.*

Term	Definition
Ex Post Values	Estimated savings, cost, effective useful life, net-to-gross ratio, and other values that are determined by the CPUC through the Evaluation, Measurement and Verification process for energy efficiency measures, programs, and portfolios.[cc]
Free Rider (FR)	Program participants who would have installed and/or implemented the measure or equipment in the absence of the program.[dd] To prevent free ridership, implementers should avoid claiming influence if their interventions, if any, in a specific project don't happen during customer's decision-making process or result in no additional efficiency improvement over what the customer is planning to do anyway to meet today's needs.
Fuel Substitution	Refers to an energy efficiency project where all or a portion of the existing energy use is converted from one utility fuel to another (i.e., natural gas to electricity or vice versa).
Fuel Switching	Projects where all or a portion of the existing energy use is converted to or from a non-utility (unregulated) fuel, such as propane or fuel oil.
Full Measure Cost (FMC)	The total amount paid by the customer to implement the energy efficiency measure, which may include: audits, design, engineering, construction, equipment, materials, removal, recycling, overhead, sales tax, shipping, and labor directly related to the energy efficiency attributes of the measure.
Gas Measure	Any measure that burns natural gas (whether or not the measure also uses electricity) to be a natural gas measure.[ee]
Government Agency Customer (Financing)	A taxpayer-funded federal, state, county, or local government agency that uses tax revenue to pay its PG&E energy bills. Such customers may include, but are not limited to, public schools, State of California colleges and universities, public libraries, and government offices.
Gross Realization Rate	Also known as Realization Rate. The ratio of achieved energy savings to predicted energy savings that takes into account the likelihood that not all Commission-approved projects undertaken by IOUs will come to fruition. [ff]
Gross Savings	Gross savings count the energy savings from energy efficiency measures installed by program participants irrespective of whether or not those savings are from free riders. Gross savings are adjusted by a net-to-gross ratio to produce net savings (that is, to remove the savings associated with free riders).[gg] It should be noted that Gross Savings do include adjustments for Realization and Installation Rates. (See also GSIA.)
Gross Savings and Installation Adjustment (GSIA)	The GSIA is a DEER adjustment factor that combines the Realization Rate and Installation Rate. It is dependent on both the measure technology and how the measure is delivered.[hh]

Hard-to-Reach (HTR) - Residential	California Native American Tribes are hard to reach; our state's historical dispossession of Tribes now requires deliberate effort to overcome persistent barriers to providing energy efficiency programs and services to Tribes. California Native American Tribes are defined consistent with the Commission's Tribal Consultation Policy, and any subsequent modification(s).
	
	Specific criteria were developed by CPUC Staff to be used in classifying a customer as hard-to-reach. Two criteria are considered sufficient if one of the criteria met is the geographic criterion defined below. If the geographic criterion is not met, then at least three (other) criteria must be met. The exception is for California Native American Tribes, who do not need to meet any additional criteria.
	
	There are common as well as separate criteria when defining hard- to-reach for residential versus small business customers. The barriers common to both include:
	
	Customers who do not have easy access to program information or generally do not participate in energy efficiency programs due to a combination of language, business size, geographic, and lease (split incentive) barriers. The common barriers to consider include:
	
	• Geographic criterion –
	  o Customers or customer premises in areas other than the United States Office of Management and Budget Combined Statistical Areas of the San Francisco Bay Area, the Greater Los Angeles Area and the Greater Sacramento Area or the Office of Management and Budget metropolitan statistical areas of San Diego County, or
	  o Customers or customer premises in disadvantaged communities, as identified by the California Environmental Protection Agency pursuant to Health and Safety Code Section 39711.
	
	• Language criterion – Primary language spoken is other than English.
	
	For small business added criteria to the above to consider:
	
	• Business Size – 25 or fewer employees and/or classified as Very Small (Customers whose annual electric demand is less than 20 kilowatt (kW), or whose annual gas consumption is less than 10,000 therm, or both), and/or
	
	• Leased or Rented Facilities – Investments in improvements to a facility rented or leased by a participating business customer.
	
	For residential added criteria to the above to consider:
	
	• Income – Those customers who qualify for the California Alternative Rates for Energy, Energy Savings Assistance, or the Family Electric Rate Assistance Programs, and/or
	
	• Housing Type – Multi-family and Mobile Home Tenants (rent and lease).
	
	For the Public sector, customers classified as "local government" that meet the geographic criterion above may also be considered hard-to-reach.[ii]

Term	Definition
Implementation Plan (IP)	A detailed description of a program that includes program theory and design, goals and budgets, logic models, planned processes, program activities and EM&V, and program performance metrics, developed by Program Administrators and stakeholders to detail program and implementation strategies, but not formally filed with the Commission. IPs replace the previous Program Implementation Plans.[jj]
Implementer	Commercial entity involved in designing and/or implementing an energy efficiency program. An Implementer may be a separate commercial entity or a department within the IOU or program administrator. A separate entity, contracted by a program administrator, to design and deliver an energy efficiency program is also referred to as a third-party implementer.[kk, ll]
Incentive	Payments for pre-approved projects that retrofit or install new equipment to save energy and are typically much larger in scope than those that qualify for a rebate; typically, the term “incentives” (as opposed to “rebates”) applies to custom projects.
Incremental Measure Cost (IMC)	The additional cost of installing a more efficient measure calculated from the price differential between energy efficient equipment and services and standard or baseline equipment or services. Note that any cost premium resulting from features or components that do not improve the efficiency of the equipment is excluded from the incremental measure cost calculation.[mm]
Indirect Energy Savings or Interactive Effects	The secondary energy and demand impacts that result from a measure to a secondary system or equipment not directly involved in the retrofit activity (e.g., cooling or heating energy impacts resulting from the installation of efficient lighting fixtures). Associated with Resource Programs as opposed to Non-Resource Programs.[nn]
Industry Standard Practice (ISP)	A measure r practice that represents the typical current equipment purchased, or a commonly used, currently trending practice in the applicable markets absent the program. ISP represents today’s market trend, i.e., whether a technology would be commonly purchased by customers today (not in situ or saturation), with consideration of key factors or barriers driving the technology adoption. The measure or practice is considered “ISP-by-code” when the selection and adoption of that specific measure or practice is required to meet government standards, codes or regulations (including non-energy regulations). The practice is considered “ISP-by-default” when the selected measure is the only viable option considered by customer. *See* Standard Practice Baseline.
Influence	See Program Influence.
Installation Rate	The ratio of the number of verified installations of a measure divided by the number of claimed installations rebated by the utility during a claim period. Typically, Installation Rates used on an ex ante basis will be based upon previous ex post evaluations. [oo]

Term	Definition
Integrated Distributed Energy Resources (IDER)	The integrated or coordinated delivery of “distributed resources” including distributed renewable generation resources, energy efficiency, energy storage, electric vehicles, and demand response technologies.[pp]
Integrated Demand-Side Management	The integrated or coordinated delivery of three or more of: (1) energy efficiency (EE), (2) demand response (DR), (3) distributed generation (DG), (4) storage, (5) electric vehicle (EV) technologies, and (6) time-based rate programs to residential and commercial electric utility customers.”[qq]
International Performance Measurement and Verification Protocol (IPMVP)	The IPMVP provides an overview of current best practice techniques available for verifying results of energy efficiency, water efficiency, and renewable energy projects in commercial and industrial facilities. It may also be used by facility operators to assess and improve facility performance. The IPMVP is the leading international standard in M&V protocols. It has been translated into 10 languages and is used in more than 40 countries.[rr]
Investor Confidence Project (ICP)	ICP offers a series of protocols that define industry best practices for energy efficiency project development as well as a credentialing system that provides third-party validation. [ss]
ICP Targeted Commercial Protocol	This protocol, focused on commercial projects comprised of single energy conservation measures or smaller sets of related energy efficiency measures that have limited or no interactive effects (e.g., lighting, controls, or HVAC replacement), provides standardized methods for how projects are baselined, engineered, installed, operated and measured.[tt]
Investor-Owned Utility (IOU)	A business organization providing a product or service regarded as a utility (such as water, natural gas or electricity) to a service area, and managed as a private enterprise rather than as a function of government or a utility cooperative.[uu] (e.g., Pacific Gas and Electric Company).
Local Program	A program offered by a PA only to customers within their service territory, in contrast with a Statewide program which is led by a single PA on behalf of all the PAs and offered statewide.
Market Access Approach	A program design approach wherein a PA utilizes aggregators who recruit projects and interface with customers and are then compensated under uniform payment terms based on the TSB value of project savings, as measured using population-level NMEC methods.[vv]
Market Support Segment	Programs with a primary objective of supporting the long-term success of the energy efficiency market by educating customers, training contractors, building partnerships, or moving beneficial technologies towards greater cost-effectiveness.[ww]

Term	Definition
Measure Application Type (MAT)	A categorization of energy efficiency measures based on measure attributes – each measure application type has its own baseline treatment, cost basis, eligibility, and documentation requirements. There are six approved measure application types, which include: Accelerated Replacement, Add-On Equipment, Behavioral, Retro-commissioning and Operational, New Construction, Normal Replacement, and Weatherization. Each of these measure application types is further defined below.
Accelerated Replacement (AR)	Accelerated-replacement refers to projects for which an energy efficiency incentive and/or program technical services induced a customer to replace an inefficient equipment or process with one that is more energy efficient while the existing equipment or process is still functioning.[1] The Accelerated Replacement MAT is used for the replacement of existing equipment that could and would remain operational without program intervention. This MAT includes three subtypes: Early Retirement, Repair Eligible, and Repair Indefinitely.[xx] It is used in direct contrast to the NR MAT, which is used when existing equipment either could not or would not remain operational. New construction and capacity expansion cannot be classified as AR. Any AR measure is expected to pass the CPUC's preponderance of evidence criteria to be eligible.
Add-On Equipment (AOE)	New equipment installed onto an existing host improving the nominal efficiency or reducing the load of the host system. The existing host system must be operational without the AOE, continue to operate as the primary service equipment for the existing load, and able to fully meet the existing load at all times without the add-on component. The AOE must not be able to operate on its own. The actual energy reduction occurs at the host equipment, not at the add-on component, although any add-on component energy usage must be subtracted from the host savings.
Behavioral (BRO-Bhv)	The BRO category includes measures that either restore or improve energy efficiency and can be reasonably expected to produce multi-year savings. BRO-Bhv measures include information or educational programs that influence energy-related practices (behavioral).
Building Weatherization (BW)	The BW category includes improvements to non-mechanical building structures, improving the nominal efficiency of pre-existing equipment that is otherwise expected to perform essential building functions throughout the course of a building's life cycle, without regular replacement. Such measures improve the efficiency of equipment that does not burn out or when it does burn out the building can function without them; thus, the equipment is typically not replaced unless there is a major building renovation.
New Construction (NC)	The New Construction MAT is used where equipment is installed in either a new area or an area that has been subject to a major renovation, to expand capacity of existing systems, or to serve a new load.

[1] *Resolution E-5115*, p. 2.

Term	Definition
Normal Replacement (NR)	The NR MAT is used where existing equipment (including Add-On Equipment) has either failed, no longer meets current or anticipated needs, or is planned to be replaced for reasons unrelated to the program. The NR MAT may be applied to any measure or program, with certain exceptions, and without a burden of proof. This MAT includes measures that previously fit into the now-retired Replace on Burnout (ROB) MAT.
Operational (BRO-Op)	The BRO category includes measures that either restore or improve energy efficiency and can be reasonably expected to produce multi-year savings. BRO-Op measures include measures that improve the efficient operation of installed equipment.
Retro-commissioning (BRO-RCx)	The BRO category includes measures that either restore or improve energy efficiency, including those that shut-off or de-energize host equipment (controls measures),[yy] and can be reasonably expected to produce multi-year savings. BRO-RCx measures include activities and installations that restore equipment performance to its nominal efficiency (i.e., rated, intended, or original efficiency).
Measurement and Verification (M&V)	As distinguished from Evaluation, Measurement & Verification, M&V refers specifically to the process of quantifying measure- or project-level energy and cost savings resulting from improvements in energy-consuming systems. The effort required and rigor achieved from M&V should be commensurate with the project capital investment and savings risk.[zz]
Measure Package	The energy efficiency measure documentation that is needed to make a deemed energy efficiency claim. This includes but is not limited to: a narrative which describes the baseline and energy efficient case features of the energy saving technology, describes the methodologies to estimate energy impacts and incremental measure costs, provides citations and links to references and other supporting documentation, provides unit savings calculations and values for all combinations of the technology specific parameters. Replaces the term "Workpaper".[aaa]
Midstream	Type of program delivery in which incentive goes to the distributor or retailer to encourage promotion of energy efficiency products in the market. Incentive may or may not be passed to the end-use customer. Incentive may or may not be passed to the customer. Does not include programs partnering with contractors or installers.[bbb]
Net Savings	The savings attributable to a program realized when free ridership is accounted for. The savings are calculated by multiplying the gross savings by the net to gross ratio.[ccc]
Net-to-Gross Ratio (NTG or NTGR)	A ratio or percentage of net program impacts divided by gross or total impacts. Net-to-gross ratios are used to estimate and describe the free-ridership that may be occurring among energy efficiency program participants.[ddd]
New Construction (NC)	See Measure Application Type.

Term	Definition
Non-Resource Program	Energy efficiency programs that do not directly procure energy resources that can be counted, such as marketing, outreach and education, workforce education and training, and emerging technologies.[eee]
Non-Routine Event	A non-routine event (NRE) is an externally-driven (i.e., not related to the energy efficiency intervention) significant change affecting energy use in the baseline, implementation/installation, or reporting period of an NMEC project. It therefore must be accounted for in savings calculations. Typical examples of NREs include changes in facility size, changes in facility activity not affected by the energy efficiency measures (such as addition or removal of a data center) or other modifications to the facility or its operation that alter energy consumption patterns and are unrelated to the program intervention.[fff]
Normal Replacement (NR)	See Measure Application Type.
Normalized Metered Energy Consumption (NMEC)	A method of calculating savings using statistical analyses of actual pre- and post-installation energy usage data, rather than engineering analyses of forecasted savings or application of prescriptive (deemed) values. Expressed mathematically by the IPMVP: Normalized Savings = (Baseline Energy +/- Routine Adjustments to fixed conditions +/- Non-Routine Adjustments to fixed conditions) – (Reporting Period Energy +/- Routine Adjustments to fixed conditions +/- Non-Routine Adjustments to fixed conditions)[ggg]
Observed Savings	Savings calculated based on weather-normalized analysis of pre/post interval data without accounting for routine or non-routine adjustments to fixed conditions. Observed savings do not account for systemic (i.e., exogenous to the effect of the program) changes in energy use, and thus are not directly claimable.
Offering	Refers to a technology represented in a measure package. Replaces the term ‘measure’. For example, a high-efficiency clothes washer *measure* might include numerous measure *offerings* defined by combinations of washer configuration (front or top loading) and tub capacity.[hhh]
On-Bill Financing (OBF)	A financing opportunity offered by PG&E that provides zero percent (0%) interest loans to qualified customers toward the purchase and installation of new energy efficient measures or equipment at the customer’s premises. A fixed monthly loan payment amount due will appear as a line item on the customer’s PG&E bill, or, at PG&E’s discretion, by separate bill.[iii]
Payback Period	The period of time required to recoup the funds expended in an investment, whereby future income is not adjusted to account for the time value of money.

Term	Definition
Persistence	Measure life is a function of equipment life and measure persistence. Equipment life is the number of years that a measure is installed and will operate until failure. Measure persistence takes into account business turnover, accelerated replacement of installed equipment, and other reasons measures might be removed or discontinued.[jjj]
Platform	Rulesets for how PG&E and its Implementers measure, pay for, and claim energy savings, including Deemed, Custom, Meter-Based, and Financing.
Point-of-Sale (POS) Rebate	Rebate for purchase of energy efficient product at the time of sale as a line item on the invoice/receipt.
Population-Level NMEC	An approach in which energy savings are calculated based on sites' pre- and post-intervention metered energy consumption data and aggregated across a group of similar sites (population). Sites included in a population must have similar equipment and energy consumption levels; factors that affect their energy usage must be similar; and they must be expected to have similar energy savings from the program.[kkk]
Portfolio	A composition of energy efficiency programs, such as all IOU and non-IOU energy efficiency programs funded by ratepayers, that are implemented during a program year or cycle. May also refer to a group of programs sponsored, managed, and contracted for by a particular IOU.
Preliminary Ex Ante Review Database (PEARdb)	The Preliminary Ex Ante Review database (PRdb) is a supplement to the Official Ex Ante database (EAdb). While the EAdb contains the official ex ante data that is available for claims processing, the PRdb provides access to data that the ex ante team has recently developed, is currently reviewing, or has newly approved.
Preponderance of Evidence (POE)	Preponderance of evidence is a term borrowed from civil law. The preponderance of evidence standard requires that evidence for two opposing conditions be considered – in this case Accelerated Replacement and Normal Replacement baselines – and the condition more likely to be true (greater than 50% probability) be chosen.[lll]
Program	A collection of defined activities and measures that: • are carried out by the administrator and/or their subcontractors and implementers, • target a specific market segment, customer class, a defined end use, or a defined set of market actors (e.g., designers, architects, homeowners), • are designed to achieve specific efficiency related changes in behavior, investment practices or maintenance practice in the energy market, and are guided by a specific budget and implementation plan.[mmm]

Term	Definition
Program Administrator (PA)	A person, company, partnership, corporation, association or other entity selected by the CPUC and any subcontractor that is retained by an aforesaid entity to contract for and administer energy efficiency programs funded in whole or in part from electric or gas Public Goods Charge funds. For purposes of implementing PU Code Section 381.1, an "administrator" is any party that receives funding for and implements energy efficiency programs pursuant to PU Code Section 381. PAs currently include investor-owned utilities, community choice aggregators, and regional energy networks.[nnn]
Program Administrator Cost Test (PAC)	Measures the net resource benefits from the perspective of the program administrator. Like the TRC, the benefits are the avoided costs of the supply-side resources avoided or deferred. The costs are defined to include the net present value of all costs incurred by the program administrator while, unlike the TRC, the PAC excludes the costs incurred by the participating customers. As in the TRC test, the net present values for the PAC are calculated using a discount rate that reflects each utility's after-tax weighted cost of capital, based on the most recent cost of capital decision.[ooo]
Program Influence	The program services, such as technical or financial assistance, provided during a customer's decision–making process that motivate a customer to implement the more efficient, more costly energy efficiency measure than they otherwise would have.
Project Developer (Financing)	A contractor or a team/consortium of contractors and service provider(s) who plan and deliver an energy efficiency project. To participate in OBF, a Project Developer must be credentialed as project developer under the Investor Confidence Project.
Proof of Payment	Documentation provided which shows evidence that a purchase has been made. This may take the form of an invoice, purchase receipt, lease agreement, etc.
Public Purpose Program (PPP)	State-mandated gas and electric assistance programs for low income customers, energy efficiency programs, and public-interest research and development that are funded by surcharges on utility bills.
QA Provider	For Financing projects, individuals and firms that have been approved by the Investor Confidence Project (for required experience, have been trained in the ICP System, and are authorized to provide an independent third-party review of projects.[ppp]
Qualified Products List (QPL)	List of equipment that meets specifications and qualification requirements set forth in the applicable measure specification.
Quasi-Experimental Design (QED)	An approach to calculating savings that compares the outcomes of customers who choose to participate in a program and a comparison group of similar customers who do not. This approach is similar to a randomized controlled trial but does not use random assignment to compose the control and treatment groups.

Term	Definition
Randomized Control Trial (RCT)	A type of experimental design in which members of an eligible population are randomly assigned to either a Treatment Group or a Control Group. A program intervention (for example, implementation of a set of energy efficiency measures, or information about an energy efficiency program) is then provided to only the Treatment Group. The Control group's energy usage is the baseline against which to measure the treatment group's savings. (Net savings is estimated as the difference in usage between the two groups.) The approach assumes that non-program-related factors that influence energy usage among eligible customers affect the treatment and comparison groups equally.
Ratepayer	Those customers who pay for gas or electric service under regulated rates and conditions of service.[qqq]
Rebate	A financial incentive paid to the customer in exchange for a specific action, typically the installation of energy efficiency equipment.[rrr]
Regressive Baseline	Use of a Code or Standard Practice baseline when existing equipment efficiency exceeds code or standard practice efficiency.[sss]
Remaining Useful Life (RUL)	An estimate of the median number of years that a measure being replaced under the program would remain in place and operable had the program intervention not caused the replacement.[ttt]
Remote Ex Ante Database Interface (READI©)	READI is a free program that allows users to access the CPUC's databases of ex ante measure information. READI© provides access to the current official ex ante database as well as the latest data being reviewed by the ex ante review team. The official ex ante database includes data previously defined as DEER (starting with DEER2011) and non-DEER available for claims. The preliminary ex ante review (PEAR) database includes historically proposed changes and additions to the official ex ante database. These tools are no longer supported and have been replaced with the eTRM.[uuu]
Resource Program	Energy efficiency programs that generate energy savings that are quantified and tracked by program administrators.[vvv]
Resource Acquisition Segment	Programs with a primary purpose of, and a short-term ability to, deliver cost effective avoided cost benefits to the electricity and natural gas systems. Short-term is defined as during the approved budget period for the portfolio. This segment should make up the bulk of savings to achieve TSB goals.[www]

Term	Definition
Rigor	For energy efficiency, refers to the amount of documentation necessary to satisfactorily demonstrate that the energy efficiency program likely triggered the equipment upgrade. Resolution E-4818 Ordering Paragraph 22 originally named categories as Full/Tier 1/Tier 2 Rigor Levels respectively.[xxx] Resolution E-5115 renamed these categories as: • "Full Rigor" tier for the largest projects, with incentives $100,000 and greater, • "Medium Rigor" tier for projects with incentives between $25,000 and less than $100,000, • "Low Rigor" tier for projects with incentives between $7,500 and less than $25,000. • "Very Low Rigor" tier for projects with incentives less than $7,500.
Savings Claim	The energy and/or demand savings reported by the implementer as achieved by an energy efficiency intervention or program. The term pertains to all savings calculation methodologies.
Sector	Customer groups sharing common characteristics and barriers that are building blocks to PG&E's portfolio, including Residential, Commercial, Public, Industrial, Agricultural, and Cross-Cutting.
Site-Level NMEC	An NMEC approach where savings are calculated at an individual building, project, or site using normalized meter readings taken before and after the energy efficiency intervention. The exact calculation methodology used is project-specific, customized to the unique characteristics of the site or project. The site's pre-installation energy usage serves as the baseline. Savings may be adjusted to account for site-specific non-routine events (NREs) that occur after the baseline is established.
Small Business	Resolution E-4939 adopted the small business definition currently approved by the CPUC for use in IOU tariffs: "A small business customer is defined as a non-residential customer with an annual electric usage of 40,000 kilowatt hours (kWh) or less, or an energy demand of 20 kilowatt (kW) or less, or annual consumption of 10,000 therms of gas or less. Alternatively, a small business customer is a customer who meets the definition of "micro-business" in California Government Code Section 14837 (Section 14837). Section 14837 defines a micro-business as a business, together with affiliates, that has average annual gross receipts of $3,500,000 or less over the previous three years, or is a manufacturer, as defined in Section 14837 subdivision (c), with 25 or fewer employees. The California Department of General Services is authorized to amend the gross receipt amount. In January 2010 DGS increased the gross receipt amount from $2,750,000 to the current amount of $3,500,000. (See, California Office of Administrative Law, Regulatory Action Number 2000-1110-01S.) This definition does not include fixed usage or unmetered rate schedule customers."

Term	Definition
Source BTU Consumption	Conversion of retail energy forms (kWh, therms) into the BTU required to generate and deliver the energy to the site. This conversion is used to compare the relative impacts of switching between fuel sources at the source or BTU level for the three-prong test required for fuel-substitution programs.[yyy]
Standard Practice Baseline	An estimate of the activity or installation that would take place absent the energy efficiency program, as required by code, regulation, or law, or as expected to occur as standard practice. The Standard Practice Baseline activity or installation must meet the anticipated functional, technical, and economic needs of the customer, building, or process and provide a level of service comparable to that provided by the energy efficiency (EE) measure. Savings claims shall be generated based on equipment choices that operate at a level of service comparable to that provided by the EE measure. If there is not a viable and comparable baseline solution that offers a comparable level of service as the EE measure, the energy use of the baseline solution must be adjusted to provide a level of service comparable to that provided by the EE measure. The previous term for this was “code baseline” or “to-code” measure, both of which are now depreciated.
Statewide Program	A program or subprogram that is designed to be delivered uniformly throughout the four large Investor-Owned Utility service territories. Each statewide program or subprogram should be consistent across territories and overseen by a single lead program administrator. One or more statewide implementers, under contract to the lead administrator, should propose the design and deliver the program or subprogram in coordination with the lead program administrator. Local or regional variations in incentive levels, measure eligibility, or program interface are not generally permissible (except for measures that are weather dependent or when the program administrator has provided evidence that the default statewide customer interface is not successful in a particular location). Upstream (at the manufacturer level) and midstream (at the distributor or retailer level, but not contractor or installer) interventions are required to be delivered statewide. Some, but not all, downstream (at the customer level, or via contractors or installers) approaches are also appropriate for statewide administration. Statewide programs are also designed to achieve market transformation.[zzz]
Third-Party Implementer	See Implementer.
Title 24	Title 24 of the California Code of Regulations is known as the California Building Standards Code. Part 6 is the California Energy Code.
Total Resource Cost Test (TRC)	The TRC is used by the CPUC as the primary indicator of energy efficiency program cost effectiveness and is the ratio between costs and benefits. The costs are those incurred by both participants (e.g., measures/equipment installed) and the program administrator. The benefits are the avoided costs of the supply-side resources avoided or deferred.[aaaa]

Term	Definition
Total System Benefit (TSB)	An expression, in dollar terms, of the lifecycle energy, capacity, and GHG benefits of integrated distributed energy resources (IDER), such as energy efficiency, energy storage, electric vehicles, and demand response technologies, expressed on an annual basis.[bbbb] TSB also encourages “high value” load reduction and longer-duration energy savings while being fuel (electric/gas) agnostic. Beginning in 2024, the TSB metric will replace kWh, kW, and therm savings as the primary goal for the energy efficiency portfolios administered by the California investor-owned utilities and other program administrators.[cccc]
Trade Professionals	Any third party such as contractors, installers, retailers, distributors, manufacturers, engineers, and energy service companies, etc.
Underserved Community	A community that meets one of the following criteria:(1) Is a "disadvantaged community" as defined by subdivision (g) of Section 75005 of the Public Resources Code.(2) Is included within the definition of "low-income communities" as defined by paragraph (2) of subdivision (d) of Section 39713 of Health and Safety Code.(3) Is within an area identified as among the most disadvantaged 25 percent in the state according to the California Environmental Protection Agency and based on the most recent California Communities Environmental Health Screening Tool, also known as CalEnviroScreen.(4) Is a community in which at least 75 percent of public school students in the project area are eligible to receive free or reduced-price meals under the National School Lunch Program.(5) Is a community located on lands belonging to a federally recognized California Indian tribe.[dddd]
Underserved Customer	For the Residential and Public Sectors, an underserved customer is a member of an underserved community, as defined by Pub. Util. Code Section 1601(e). For the Commercial, Industrial, and Agricultural Sectors, a customer must be a member of an underserved community as defined by Pub. Util. Code Section 1601(e), and must also be an underserved business group as defined by Government Code Section 12100.63(h)(2) for the California Small Business Development Technical Assistance Program, i.e., women-, minority-, and veteran-owned businesses, and businesses in low-wealth, rural, and disaster-impacted communities included in a state or federal emergency declaration or proclamation. to be considered an Underserved Customer.[eeee]
Upstream	Type of program delivery in which an incentive goes to the manufacturer to encourage production and promotion of energy efficiency products in the market. Incentive may or may not be passed to the end-use customer.[ffff]
Water-Energy Savings	The savings of Embedded Energy that result from water-savings projects. Considered part of the Water-Energy Nexus.
Water-Energy Nexus (WEN)	Term applied to the energy used to treat, heat, and convey water in California and programmatic opportunities to reduce energy use and conserve water.[gggg]

Term	Definition
Weatherization (WEA)	See Measure Application Types.
Workpaper	Previously, the documentation prepared by the program administrators or program implementers that documented the data, methodologies, and rationale used to develop ex ante estimates that are not in already fully contained in the Database for Energy Efficiency Resources.[hhhh] This term has been replaced with “Measure Package”.

[a] Energy and Environmental Economics, Inc., *Avoided Cost Calculator User Manual*, August 2016.

[b] U.S. Environmental Protection Agency, *Guidebook for Energy Efficiency Evaluation, Measurement, and Verification: A Resource for State, Local, and Tribal Air & Energy Officials*, June 2019, p. 11.

[c] California Public Utilities Commission, October 11, 2018, *Resolution E-4939: Addressing Track 2 Working Group related energy efficiency issues pursuant to D.16-08-019 and Resolution E-4818*, T2WG Tasks 1, 3 and 4, October 11, 2018, p. 8.

[d] http://www.cpuc.ca.gov/aboutus/.

[e] http://caioulightingqpl.com.

[f] California Code of Regulations, Title 24 (Building F Standards Code) and Title 20, Division 2, Chapter 4, Article 4 (Appliance Energy Efficiency Regulations).

[g] California Public Utilities Commission, April 2020, *Energy Efficiency Policy Manual Version 6 (R.09-11-014)*. https://www.cpuc.ca.gov/WorkArea/DownloadAsset.aspx?id=6442465683

[h] CPUC email from Peter Lai, Energy Division, April 19, 2017.

[i] https://cedars.sound-data.com/deer-resources/.

[j] California Public Utilities Commission, November 3, 2022, *Resolution E-5221. Approval of the Database for Energy-Efficient Resources updates for Program Year 2024-2025 and revised version for Program Years 2023 and 2022.*, pp. 10-11.

[k] *Energy Efficiency Policy Manual*, v 6.0, p. 69.

[l] California Direct Access Program, http://www.cpuc.ca.gov/General.aspx?id=7881;

ftp://www.leginfo.ca.gov/pub/95-96/bill/asm/ab_1851-1900/ab_1890_bill_960924_chaptered.html.

[m] Generalization of *Energy Efficiency Policy Manual* definition of HVAC interactive effects.

[n] California Public Utilities Commission, May 31, 2018, *Decision 18-05-041: Decision Addressing Energy Efficiency Business Plans*, p. 39.

[o] California Public Utilities Commission, October 11, 2018, *Decision 18-10-008: Decision Addressing Workforce Requirements and Third-Party Contract Terms and Conditions*, p. B-9.

[p] California Public Utilities Commission, February 2, 2023, *Decision 23-02-002: Decision Addressing Energy Efficiency Third-Party Processes And Other Issues*, pp. 23-24.

[q] California Public Utilities Commission, August 18, 2016, *Decision 16-08-019: Decision Providing Guidance for Initial Energy Efficiency Rolling Portfolio Business Plan Filings*, p. 104.

[r] *Energy Efficiency Policy Manual*, v. 6.0, p. 70.

[s] eTRM can be accessed at: ETRM (caetrm.com).

[t] *Resolution E-5221*, p. 29.

[u] *Energy Efficiency Policy Manual*, v. 6.0, p. 70.

[v] *Energy Efficiency Policy Manual*, v. 6.0, p. 73.

[w] *Energy Efficiency Policy Manual,* v. 6.0, p. 73.

[x] PG&E Tariff, Cal. P.U.C. Sheet No. 41470-E, Electric Rule No. 1: Definitions.

[y] California Public Utilities Commission, May 20, 2021, *Decision 21-05-031: Assessment Of Energy Efficiency Potential And Goals And Modification Of Portfolio Approval And Oversight Process*, pp. 14-15.

[z] State and Local Energy Efficiency Action Network (SEEAction), December 2012, *Energy Efficiency Program Impact Evaluation Guide*, p. 8-3.

[aa] *Energy Efficiency Policy Manual*, v. 6.0, p. 73; California Public Utilities Commission, January 27, 2005, *Decision 05-01-055. Interim Opinion on the Administrative Structure for Energy Efficiency: Threshold Issues*, p. 115.

[bb] *Energy Efficiency Policy Manual*, v. 6.0, p. 74.

[cc] California Public Utilities Commission, December 31, 2016, *2013-2017 Energy Division & Program Administrator Energy Efficiency Evaluation, Measurement and Verification Plan Version 7 (Final).*

[dd] *D.05-01-055,* p. 53.

[ee] California Public Utilities Commission, June 14, 2023, *Memorandum: CPUC Guidance On Definition Of "Gas Measure" In Decision D.23-04-035*.

[ff] *Energy Efficiency Policy Manual, v. 6.0* p. 75.

[gg] *Energy Efficiency Policy Manual, v. 6.0* p. 75.

[hh] http://www.deeresources.com/index.php/22-readi-help/24-measure-catalog.

[ii] California Public Utilities Commission, June 29, 2023, *Decision 23-06-055: Decision Authorizing Energy Efficiency Portfolios For 2024-2027 And Business Plans For 2024-2031*, pp. 52-54.

[jj] California Public Utilities Commission, October 22, 2015, *Decision 15-10-028: Decision Re Energy Efficiency Goals for 2016 and Beyond and Energy Efficiency Rolling Portfolio Mechanics,* p. 59 and *Appendix 4 - Implementation Plan Template.*

[kk] *D.16-08-019*, p. 105.

[ll] California Public Utilities Commission, May 10, 2012, *Decision 12-05-015: Order Instituting Rulemaking to Examine the Commission's Post-2008 Energy Efficiency Policies, Programs, Evaluation, Measurement, and Verification, and Related Issues,* p. 223.

[mm] *Energy Efficiency Policy Manual*, v 6.0, p. 76.

[nn] Generalization of *EE Policy Manual* definition of HVAC interactive effects.

[oo] *Energy Efficiency Policy Manual*, v 6.0, p. 76.

[pp] California Public Utilities Code 769(a), https://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?lawCode=PUC&sectionNum=769.

[qq] Lawrence Berkeley National Laboratory, February 2018, *Barriers and Opportunities to Broader Adoption of Integrated Demand Side Management at Electric Utilities: A Scoping Study*, p. vi.

[rr] California Public Utilities Commission, April 2006, *California Energy Efficiency Evaluation Protocols: Technical, Methodological, and Reporting Requirements for Evaluation Professionals*, p. 229.

[ss] https://www.edf.org/energy/investor-confidence-project; http://www.eeperformance.org.

[tt] Investor Confidence Project, *Targeted Commercial Protocol, version 2.0*, February 2018, http://www.eeperformance.org/targeted-commercial.html.

[uu] http://www.energy.ca.gov/glossary/glossary-i.html.

[vv] *D.23-06-055*, pp. 73-74.

[ww] *D.21-05-031,* p. 14.

[xx] California Public Utilities Commission, March 2, 2017, *Resolution E-4818: Measure level baseline assignment and preponderance of evidence guidance to establish eligibility for an accelerated replacement baseline treatment.*, p. 29.

[yy] *Resolution E-5221*, p. 32.

[zz] U.S. Department of Energy, Federal Energy Management Program, November 2015, *M&V Guidelines: Measurement and Verification for Performance – Based Contracts, Version 4.0*, p. 2-1.

[aaa] California Public Utilities Commission, August 5, 2021, *Resolution E-5152: Approval of the Database for Energy-Efficiency Resources updates for Program Year 2023 and revised version for Program Years 2022 and 2021*, p. 7-8.

[bbb] *D.16-08-019*, p. 104.

[ccc] *Energy Efficiency Policy Manual*, v. 6.0, p. 78.

[ddd] *Energy Efficiency Policy Manual*, v. 6.0, p. 78-79.

[eee] *Energy Efficiency Policy Manual*, v. 6.0, p. 79.

[fff] California Public Utilities Commission, January 7, 2020, *Rulebook for Programs and Projects Based on Normalized Metered Energy Consumption*, version 2.0 ("NMEC Rulebook"), p. 22.

[ggg] International Performance Measurement and Verification Protocol Core Concepts, June 2014.

[hhh] California Technical Forum, *eTRM User Guide for Base Users, v. 2.2*, August 25, 2021, p. 4.

[iii] https://www.pge.com/tariffs/assets/pdf/tariffbook/GAS_SCHEDS_G-OBF.pdf.

[jjj] Evaluation, Measurement, and Verification Working Group, December 2012: *Energy Efficiency Program Impact Evaluation Guide*, p. 3-3.

[kkk] NMEC Rulebook V2.0, p. 23.

[lll] *Resolution E-4818*, p. 37.

[mmm] *Energy Efficiency Policy Manual*, v. 6.0, p. 81.

[nnn] *California Energy Efficiency Evaluation Protocols*, p. 217.

[ooo] *Energy Efficiency Policy Manual*, v. 6.0, p. 26.

[ppp] http://www.eeperformance.org/quality-assurance-assessors.html.

[qqq] *Energy Efficiency Policy Manual*, v. 6.0 p. 83.

[rrr] *Energy Efficiency Policy Manual*, v. 6.0 p. 83.

[sss] *D.12-05-015*.

[ttt] *Energy Efficiency Policy Manual*, v. 6.0 p. 83.

[uuu] http://deeresources.com/index.php/deer-versions/readi.

[vvv] *Energy Efficiency Policy Manual*, v. 6.0 p. 83.

[www] *D. 21-05-031*, p. 16.

[xxx] *Resolution E-5115*, p. 6.

[yyy] *Energy Efficiency Policy Manual*, v. 6.0 p. 84.

[zzz] *D.18-05-041*, pp. 61-62.

[aaaa] *Energy Efficiency Policy Manual*, v. 6.0 p. 85.

[bbbb] California Public Utilities Commission, May 26, 2021, *Decision 21-05-031: Assessment of Energy Efficiency Potential and Goals and Modification Of Portfolio Approval and Oversight Process*, p. 9.

[cccc] Total System Benefit Technical Guidance, v.1.2, p.1, October 25, 2021.

[dddd] Pub. Util. Code Section 1601(e).

[eeee] *D.23-06-055*, p. 47.

[ffff] *D.16-08-019*, p. 104.

[gggg] California Public Utilities Commission, Water/Energy Nexus, http://www.cpuc.ca.gov/nexus_calculator/.

[hhhh] *Energy Efficiency Policy Manual*, v. 6.0, p. 86.

Chapter 1 Introduction

1.1 Overview

In Decision (D.) 16-08-019, the CPUC directs PG&E and other Program Administrators to outsource at least 60 percent of their energy efficiency portfolio budgets to third parties which must propose, design, implement, and deliver the programs. PG&E provides this Resource Savings Rulebook (Rulebook) to inform market actors of the regulatory guidance necessary to design and deliver successful programs.

PG&E's Energy Efficiency Business Plan establishes the strategy for its energy efficiency portfolio for 2024 - 2032. In the Plan, PG&E envisions a revised portfolio structure[2] that relies on a set of four "platforms" that represent the ways to influence, calculate, and claim savings and incentivize customers to invest in energy efficiency.

The four platforms are Deemed, Custom, Meter-Based, and Financing. We envision that prospective Implementers may design programs that use one or more of these constructs. While PG&E has limited this Rulebook to the current set of Platforms, it is possible that new platforms may be developed in response to third-party program design proposals. Once a third party enters into contract with PG&E to implement a program, PG&E will provide additional training resources and compliance guidance on best practices applied to the platform requirements.

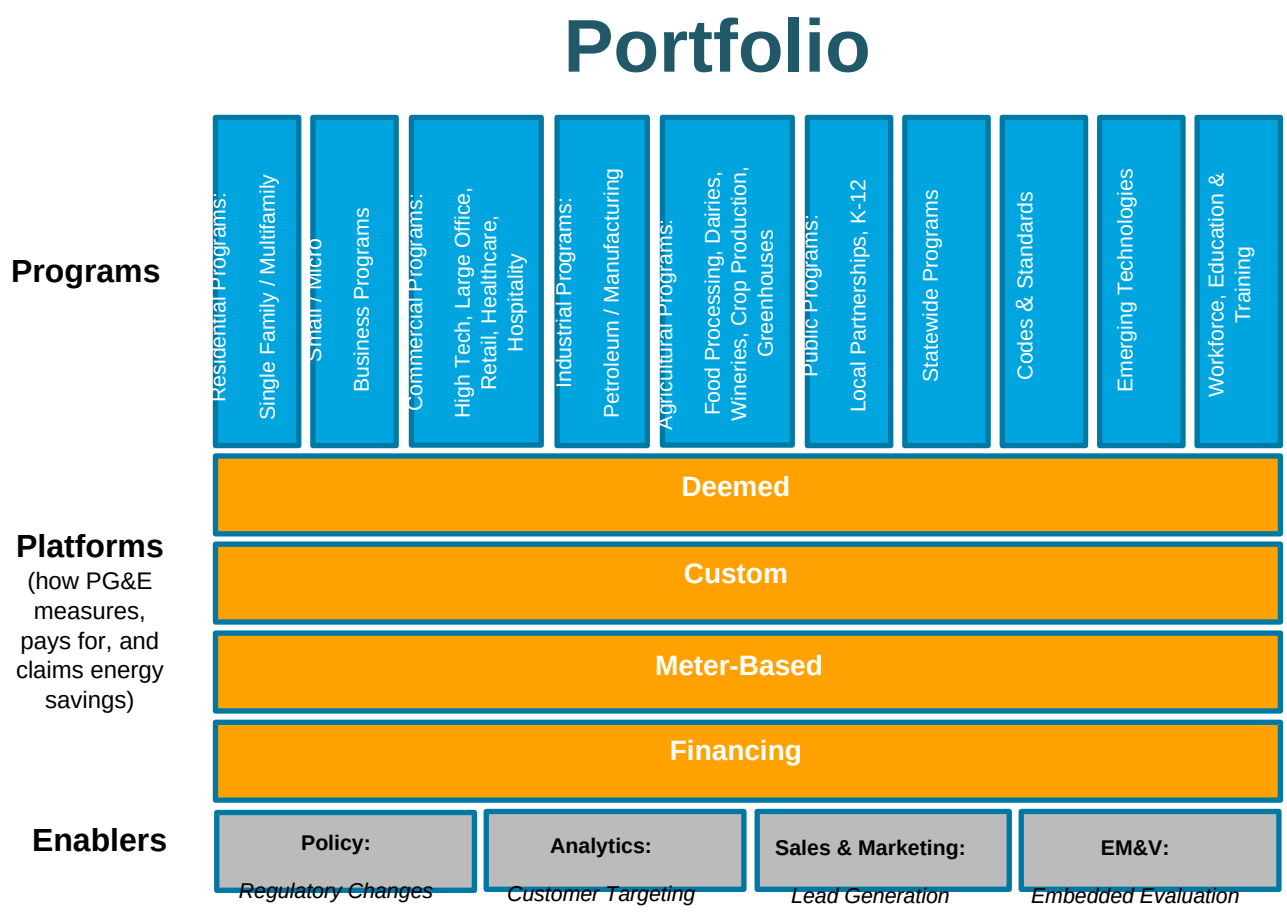
The table and diagram below demonstrate the relationship between platforms, programs, and the Business Plan customer sectors, and the portfolio as a whole. A program may incorporate information from multiple platforms as part of its strategy.

[2] The five customer sectors are: Residential, Commercial, Industrial, Public, and Agricultural. This document does not include the three cross-cutting sectors, Codes & Standards, Workforce, Education & Training, and Emerging Technologies, but does include Financing. Codes & Standards was not included because its savings are determined ex post by the California Energy Commission and the California Public Utilities Commission (CPUC). Workforce Education & Training and Emerging Technologies are excluded because they are non-resource market support and equity activities, while Financing is included because it is both resource and eligible for third-party implementation. Although Behavior was listed as a standalone platform in PG&E's Business Plan, behavioral savings are now incorporated within the other platforms.

Table 1 - Relationship Between PG&E's Portfolio, Segments, Sectors, Programs, and Platforms

Portfolio	A composition of energy efficiency programs, such as all IOU and non-IOU energy efficiency programs funded by ratepayers that are implemented during a program year or cycle. May also refer to a group of programs sponsored, managed, and contracted for by a particular IOU.
Segment	Program groupings based on their role within the portfolio. Includes: • Resource Acquisition – programs that deliver short-term, cost-effective avoided cost benefits to the electric and gas systems, • Market Support – programs to support the long-term success of the energy efficiency market, primarily through education and training, and, • Equity – programs providing energy efficiency to hard-to-reach and underserved customers, and disadvantaged communities.[3]
Sector	Customer groups sharing common characteristics and barriers that are building blocks to PG&E's portfolio, including Residential, Commercial, Public, Industrial, Agricultural, and Cross-Cutting.
Program	A collection of defined activities and measures that: • are carried out by the Program Administrator and/or their subcontractors and Implementers, • target a specific market segment, customer class, a defined end use, or a defined set of market actors (e.g., designers, architects, homeowners), • are designed to achieve specific efficiency related changes in behavior, investment practices or maintenance practices in the energy market, and are guided by a specific budget and implementation plan.
Platform	Rulesets for how PG&E and its Implementers measure, pay for, and claim energy savings, including Deemed, Custom, Meter-Based, and Financing.

[3] *D.21-05-031*.



In its role as Program Administrator (PA), PG&E must report accurate program and project ex ante savings claims to the CPUC. Ex ante savings are those that have been calculated based on assumptions prior to any evaluation, measurement and verification (EM&V). Impact evaluations, which are a key part of EM&V, measure the program-induced changes in energy and/or demand usage attributed to energy efficiency programs.[4] This Rulebook is intended to assist Implementers in achieving robust energy savings that withstand rigorous impact evaluations. More information on EM&V can be found in the Cross-Platform Chapter. When projects claiming energy savings are submitted for approval, PG&E will review and approve them based on compliance with the guidance provided in this Rulebook.

This Rulebook summarizes and details existing CPUC directives and PG&E operational requirements for making ex ante savings claims. It is intended to communicate existing rules

[4] *California Energy Efficiency Evaluation Protocols.*

and processes only; it is not intended to restrict or impede program design, and it is not a comprehensive program guidebook.

The Rulebook is a PG&E document – it represents our interpretation and understanding of the CPUC's rules and requirements. While we believe that many of the elements covered by this document are relevant to all PAs, it has not been extensively vetted statewide and is only intended to be applied to PG&E's portfolio.

1.2 Document Structure

This document contains five chapters. The first and most important is the Cross-Platform Chapter, where we present our understanding of the overarching rules and regulations of energy efficiency in California. All resource program activities should follow the rules in this chapter, regardless of the platform leveraged. We would expect any new platform created for use in PG&E Energy Efficiency programs to be consistent with the Cross-Platform Chapter.

The remaining four chapters discuss regulatory rules and procedures specific to the Deemed, Custom, Meter-Based, and Financing savings calculation approaches. These chapters are organized in the same fashion as the Cross-Platform Chapter and are intended to supplement it by highlighting the rules and requirements unique to each platform. To fully understand all the requirements for each platform, one must read the entirety of both the Cross-Platform chapter and the platform-specific chapter.

Within each chapter, requirements are categorized according to their origin, and indicated in one of the following two ways:

- **CPUC Requirement**: These are PG&E's interpretation of official CPUC rules and requirements. Implementers must comply with CPUC Requirements to fulfill the orders within various CPUC decisions, resolutions, rulings, and policies.
- **PG&E Requirement:** These are policies created by PG&E that enable compliance with CPUC reporting requirements and quality assurance expectations. Implementers must comply with PG&E Requirements to facilitate logistical scalability in administrating energy efficiency programs.

In addition, call-out boxes are provided for some requirements to add clarity or guidance. These call-outs detail PG&E's understanding of CPUC guidance and expectations. Compliance with these details is encouraged, but not required; their interpretation and application are at the discretion of the Implementer.

PG&E has cited publicly available sources for rules and glossary terms wherever possible. In most cases, rule sources can be found directly on the CPUC website. PG&E can also provide these references upon request.

1.3 Audience

This Rulebook is intended to provide current and future Implementers of PG&E energy efficiency programs a better understanding of the regulatory requirements to be followed when proposing, designing, implementing, and delivering successful programs. We also anticipate that other stakeholders of energy efficiency programs will benefit from the increased transparency and centralized guidance.

1.4 Platforms

The following sections provide an overview of the four platforms we present:

1.4.1 Deemed

In the Deemed Platform, energy efficiency savings are quantified via measure packages (formerly “workpapers”), which are technical engineering documents that prescribe pre-determined values for energy savings, measure costs, and other ex ante values. Measure packages must show savings by climate zone to reflect values statewide. Measure packages are generally used for homogenous, high volume interventions and have historically been developed by PAs with CPUC input and approval. The CPUC-sponsored Electronic Technical Reference Manual (eTRM) provides ex ante values that can facilitate measure package development.

1.4.2 Custom

In the Custom Platform, savings are quantified through a site-specific analysis of the customer’s facility. Custom projects are submitted to and approved by the PA before an agreement is made with the customer to implement the project.[5] The financial incentive is paid upon the completion and verification of the installation. An Implementer designing a program with custom, unique, large-scale interventions should follow the CPUC Statewide Custom Project Guidance documents, as well as the requirements as provided in the Custom chapter of this Rulebook.[6]

1.4.3 Meter-Based

In the Meter-Based Platform, savings are determined at the whole-building or system-level, based on a comparative analysis of pre- and post-installation metered energy consumption data from participating sites, rather than engineering analyses of forecasted savings or application of prescriptive (deemed) values. Meter-based approaches are a relatively new addition to the

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[5] California Public Utilities Commission, July 14, 2011, *Decision 11-07-030*: *Third Decision Addressing Petition for Modification of Decision 09-09-047*.

[6] CPUC Statewide Custom Project Guidance, https://www.cpuc.ca.gov/industries-and-topics/electrical-energy/demand-side-management/energy-efficiency/custom-projects-review-guidance-documents.

savings calculation methodologies used by energy efficiency programs.[7] Although the CPUC has established some rules and guidelines for meter-based projects, guidance will likely continue to evolve. The Meter-Based Chapter seeks to guide Implementers based on PG&E's current understanding of the CPUC's requirements.

1.4.4 Financing

The Financing Platform provides the ruleset for programs that seek to incorporate On-Bill Financing (OBF) into their offerings. Although financing tools other than OBF are under development, this Rulebook focuses on OBF due to its current availability. OBF enables Implementers to offer individuals in the marketplace low interest rate financing for energy efficiency projects with cost recovery through a customer's utility bill. This financing can be used alongside other incentives or on its own to incentivize customers to install energy efficiency measures.

1.5 Terminology

This Rulebook uses a variety of terms defined in the glossary at the beginning of this document. For reference, a key to abbreviations used herein is included in Appendix B.

1.6 Versioning

The Rulebook is intended to be a living document that will be updated for clarity and accuracy over time. Any new rules developed by the CPUC or PG&E will be incorporated into future versions. The current version will be indicated by the date on the cover page and in the footer. All rules described herein are effective as of the date of this document version. For deemed offerings, please also consult the latest measure package as rules are subject to change.

[7] California Assembly Bill 802, passed in October 2015, authorizes this approach.

Chapter 2 Cross-Platform

2.1 Introduction

This chapter contains the rules and requirements that apply to all platforms. All program designs that leverage platforms are subject to the ruleset in this chapter.

2.2 Eligibility

2.2.1 Customer Must Pay PPP

Savings claims must be associated with an active IOU, CCA or REN electric or gas meter, and the customer must pay the Public Purpose Programs (PPP) surcharge associated with the meter for which savings will be produced.[8] Project developers must provide evidence in the project documentation that the customer pays PPP on the meter associated with the project.

Exception: Customers who are exempt from paying gas PPP per Public Utilities Code Section 896 need not meet this requirement. These exempt PG&E customers include the United States government (federal facilities), United States Coast Guard, the American Red Cross, and Indian reservations.[9]

> While Direct Access (DA) and Community Choice Aggregation (CCA) customers purchase the electricity commodity from parties other than PG&E, these customers normally pay the PPP surcharge. If they pay the PPP, they are generally eligible to participate in PG&E's EE programs, as long as the energy purchased is being transmitted over the PG&E grid. The customer's PG&E bill showing PPP surcharge information is needed for evidence of eligibility.

2.2.2 Double Dipping and Double Counting

CPUC Requirement: Projects receiving incentives or claiming savings through any energy efficiency program must not also receive incentives (i.e., double-dip) or claim savings (i.e., double-count) for the same interventions through any other program, regardless of channel (e.g., downstream, midstream, or upstream), provider (e.g., other utilities, the California Energy

[8] California Code, Public Utilities Code, PUC Section 339.8 (electric) and Sections 890-900 (gas); *Energy Efficiency Policy Manual*, Version 6, p. 16.

[9] California Code, Public Utilities Code, PUC Section 896; PG&E Tariff Gas Schedule G-PPPS.

Commission, or the California Public Utilities Commission), or platform (e.g., deemed, custom, meter-based) offering.[10]

> To prevent double dipping and double counting, Implementers must take actions to avoid overlap with other programs involving the same measures. Additionally, Implementers should establish a quality control process with the PA to identify potential double dipping and double counting and rectify if needed. Measures offered by the statewide midstream/upstream programs are of particular concern for downstream programs offering the same measure. Please consult your PA's Third-Party Program Manager for strategies to address documentation requirements.

2.2.3 Deemed Must Go Deemed

CPUC Requirement: All measures that have calculation methodologies or measure assumptions approved in a measure package or DEER must adopt those methodologies.[11] Deemed measures can be processed through the custom programs as long as the deemed savings values are used and deemed rebates amounts are not exceeded. Deemed measures may sometimes be processed through custom programs to simplify the application process for a customer's convenience and to avoid multiple applications. Custom projects that include deemed measures, however, are required to use deemed values for energy savings and cost assumptions.[12]

> Whenever possible, deemed measures should be processed through the Deemed Platform. This reduces processing costs and time.

See section 4.4.2 Custom Savings Calculations for exceptions that apply to Custom projects.

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[10] California Public Utilities Commission, May 16, 2002, *Decision 02-05-046: Interim Opinion Selecting 2002-03 Local Energy Efficiency Programs.*

[11] *Energy Efficiency Policy Manual,* p. 36; *D.12-05-015*.

[12] *Resolution E-5152*, p. 17.

2.2.4 Offerings May Change Without Notice

CPUC Requirement: The CPUC may provide direction on parameters that trigger a change to rebate/incentive levels, savings calculations, and/or eligibility for any measure.

Implementers should ensure that customer applications and associated terms reflect the potential for such changes. Implementer systems of record should be able to manage retroactive and prospective changes to values. Project documentation should align with the Measure Package period of applicability, e.g., installed within 60 days of the sunset date.

2.2.5 To-Standard Practice Measures

CPUC Requirement: For programs that target (or will claim) savings for measures that just meet the applicable regulatory (code) or standard practice baseline, the implementation plan must describe what program design elements, data collection activities, and/or analyses will be conducted to lend insight into the following questions:

1. Where does the to-standard practice savings potential reside? What equipment types, building types, geographical locations, and/or customer segments promise cost-effective to-standard practice savings?
2. What kinds of market barriers, technological gaps, or physical limitations are preventing above-standard practice equipment replacement measures?
3. Why is natural turnover not occurring within certain markets or for certain technologies?
4. What program interventions would effectively accelerate equipment turnover?
5. To-standard practice measures must meet or exceed all requirements for Custom Accelerated Replacement measures including evidence of influence and viability of existing equipment. [13,14]

2.2.6 Fuel Substitution

CPUC Requirement: Fuel substitution[15] measures, in the context of energy efficiency programs, involve energy efficiency projects where all or a portion of the existing energy use is

[13] Implementation Plans are discussed in more detail in D.15-10-028.

[14] California Public Utilities Commission, November 9, 2017, *D.17-11-006: Decision Regarding To-Code Pilots*.

[15] The CPUC has updated their requirements for fuel substitution measures. Please refer to the recently released CPUC Fuel Substitution Decision 19-08-009 and Technical Guide using the following link: https://pda.energydataweb.com/#!/documents/2304/view.

converted from one fuel to another (e.g., natural gas to electricity or electricity to natural gas).[16] Only equipment powered by electricity and/or natural gas fuels and provided by a CPUC-regulated investor-owned utility or a municipal utility is eligible to participate under fuel substitution measures.[17]

In D.19-08-009, the CPUC replaced the “Three-Prong Test” with the “Fuel Substitution Test”. The Fuel Substitution Test states that:

> *Fuel substitution measures must offer resource value and environmental benefits. Fuel substitution measures should reduce the need for energy supply without degrading environmental quality. A measure may be “deemed” (have pre-determined savings parameters) or “custom” (have unique savings parameters) and may also be contained within a custom project. To be considered for energy efficiency ratepayer funding, a measure must meet the following requirements:*
>
> a. *The measure must not increase total source energy consumption when compared with the baseline comparison measure utilizing the original fuel, as currently defined by the baseline policies in D.16-08-019 and Resolution E-4939, Attachment A, and as may be revised by the Commission;* [18]
> b. *The measure must not adversely impact the environment compared to the baseline measure utilizing the original fuel. This means that the use or operation of the measure must not increase forecasted carbon-dioxide-equivalent emissions.*[19]

The baseline measure utilizing the original fuel, against which the fuel substitution measure is compared, must be the same for both items a. and b. above.[20] In addition, program developers shall meet the additional requirements from the Fuel Substitution Technical Guidance for Energy Efficiency.

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[16] California Public Utilities Commission, Energy Division, October 31, 2019, *Fuel Substitution Technical Guidance for Energy Efficiency Version 2, 10/13/2022.*

[17] California Public Utilities Commission, August 5, 2019, *Decision 19-08-009: Order Instituting Rulemaking Concerning Energy Efficiency Rolling Portfolios, Policies, Programs, Evaluation, and Related Issues*, pp. 12 and 53.

[18] Baseline as currently defined by the baseline policies in D.16-08-019 and Resolution E-4939, Attachment A.

[19] *D.19-08-019*, pp. 41-42.

[20] *D.19-08-019.*

Program implementers must demonstrate that the life-cycle source energy savings and CO_2 emissions reduction of their proposed measure is positive using the Fuel Substitution Calculator.[21] For life-cycle source energy saving calculations in the Fuel Substitution Calculator, EUL and RUL values corresponds to the measure technology.[22] Program developers shall follow the methodology explained in Fuel Substitution Technical Guidance for Energy Efficiency and are only allowed to alter the required measure input in the Fuel Substitution Calculator. Measure packages with fuel substitution offerings must include the completed Fuel Substitution Calculator and the site energy consumption and savings values. For the ex ante tables within measure packages, the Measure Impact Type field should be selected as “Deem-WP-FuelSub”. Consult the latest version of eTRM for the correct “NTG_ID”, to appropriately assign a net-to-gross to fuel substitution measures.

Fuel substitution measures are not required to pass cost-effectiveness thresholds at the individual measure level to be eligible for energy efficiency program funding.[23] However, since fuel substitution measures are included in the cost effectiveness analysis of a PA portfolio, program developers should still determine the cost effectiveness of fuel substitution measures.

The following CET inputs require different treatment for fuel substitution measures:

1. Measure Impact Type: In 2020, the CET was updated to include fuel substitution specific measure impact types. Users should select “Deem-WP-FuelSub" or “Deem-DEER-FuelSub” for deemed measures and “Fuel Sub-Custom" for custom measures.
2. Measure Savings: Users will input both the increase (or decrease) in kWh or Therms associated with the "new fuel” measure and the decrease in kWh or Therms associated with the replacement of the baseline “original fuel” measure.
3. Net-To-Gross (NTG): Use a default NTG ratio 1.0 unless a more specific NTG value is provided in eTRM or until impact evaluation results become available.[24]
4. Incremental Measure Costs: The measure cost may exclude any upgrades required to increase the building’s total electric or natural gas load (e.g., electric panel upgrades,

[21] The CPUC Fuel Substitution Calculator is located at: https://pda.energydataweb.com/#!/documents/2304/view

[22] California Public Utilities Commission Energy Division, October 31, 2019, *Fuel Substitution Technical Guidance for Energy Efficiency Version 2, 10/13/2022,* p. 16.

[23] *Fuel Substitution Technical Guidance for Energy Efficiency* Version 2.

[24] *D.19-08-009*, pp. 22, 42 and 58.

running new gas lines, increasing size of natural gas lines, etc.).[25] If additional upgrades are included in the measure cost, assumptions should be included in measure packages or project submittals, with appropriate justification and rationale. The necessity of such building upgrades is specific to individual buildings and the cumulative total of installed technologies in the building, and therefore, in most cases, should not be attributed entirely to a single measure technology.[26]

5. Fuel substitution measures in downstream energy efficiency programs shall track instances of building infrastructure upgrades necessitated by the installation of the fuel substitution measures and shall include this information in its energy efficiency annual report, in a form agreed upon with CPUC staff.[27]
6. In addition, fuel substitution measures may face market barriers and PAs may choose to offer rebates greater than IMC. When rebates exceed IMC or FMC, each PA will need to provide justification in an addendum that outlines the reasons be justified and approved by CPUC.[28]

This test does not apply to new construction applications but does apply to renovations of existing buildings. The Fuel Substitution Test should not be applied to energy storage technologies or systems.

Program implementers proposing fuel substitution measures must provide all assumptions and calculations for review, utilizing the most recent versions of the Avoided Cost Calculator and the Cost-Effectiveness Tool available at the time the measure is proposed.[29] A fuel substitution measure, depending on the savings platform used, will have different documentation requirements according to the current rules that pertain to those types of measures. For example, current requirements are that program administrators request approval for a deemed measure using a measure package submission.

The Fuel Substitution Test must be applied at the individual measure level. The baseline against which a fuel substitution measure is compared should be determined in the same manner as for other measures in the energy efficiency portfolio (namely, using Standard Practice, or Existing Conditions, depending on the circumstances of the measure installation). The measure must save energy and also not harm the environment (as currently measured by GHG emissions). When a fuel substitution measure passes the Fuel Substitution Test, it will be assumed to have

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[25] *D.19-08-009*, pp. 22 and 23.

[26] *Fuel Substitution Technical Guidance for Energy Efficiency Version 2, 10/13/2022.*

[27] *D.19-08-009*, p. 59.

[28] *D.12-05-015.*

[29] *D.19-08-019,* https://www.cpuc.ca.gov/about-cpuc/divisions/energy-division/building-decarbonization/fuel-substitution-in-energy-efficiency.

a NTG ratio of 1.0, until such time as evaluated NTG information is available, when the assumption shall be updated on a prospective basis.[30]

The following table describes the information needed in order to perform the Fuel Substitution Test.

Table 2 – Measure Information Needed to Perform the Fuel Substitution Test

Information Needed	Description
Measure Description	Brief description of the measure. e.g., Commercial electric steamcooker replacing gas steam cooker
Quantity	Quantity of the measure units
EUL	Effective Useful Life of the measure
Install Year	The year when the proposed measure will be installed and operational
Original Fuel	Type of fuel used in the equipment or measure being replaced
New Fuel	Type of fuel used in the replacement equipment
Measure Application Type	New Construction (NC) – not eligible, see “electrification”, Normal Replacement (NR), Accelerated Replacement (AR), Add-On Equipment (AOE), Building Weatherization, (BW); Behavioral (BRO-Bhv), Retro-commissioning (BRO-RCx), or Operational (BRO-Op)
RUL	Remaining Useful Life for Accelerated Replacement measures
Annual Usage Baseline Technology	kWh and/ or Therm usage of the Baseline Technology
Annual Usage Replacement Technology	kWh and/ or Therm usage of the Replacement Technology
Annual Usage Standard	kWh and/ or Therm usage of the Standard Practice Baseline Technology for Accelerated Replacement measures

[30] *D.19-08-019.*

PracticeBaseline Technology	

The Fuel Substitution Test is normally run at a project's inception for feasibility, prior to the project's commitment to confirm qualification, and again at the project's completion when final costs and savings are known. Additionally, Implementers that expect to include fuel substitution measures in their programs should state so in their implementation plans.

2.2.6.1 Fuel Substitution Measure Package Boilerplate Text

CPUC Requirement: Measure packages for fuel substitution offerings must include the following standardized language:

> "Per Decision 19-08-009 in Rulemaking 13-11-005, Decision Modifying the Energy Efficiency Three-Prong Test Related to Fuel Substitution,31 all fuel substitution measures must "not increase total source energy consumption when compared with the baseline comparison measure available utilizing the original fuel." Also, the measure "must not adversely impact the environment compared to the baseline measure utilizing the original fuel." Fuel substitution calculations were conducted using the CPUC "Fuel Substitution Calculator" to confirm all measure offerings pass Parts One and Two of the Fuel Substitution Test."

2.2.6.2 Required Fuel Substitution Documentation by Delivery Type

CPUC Requirement: Measure packages for fuel substitution offerings that reflect Normal Replacement in Upstream and Midstream delivery channels must include the following language to guide documentation of installations:[32]

> "For upstream/midstream delivery types, the participant baselines and spillover effects are unknown. The manufacturer or distributor will not be aware if the purchased measure is replacing a gas or an electric baseline appliance. Claimed savings for these delivery types will be adjusted using *[insert the source for the adjustment]*. These ratios will be determined from *[insert the source of the adjustment]*. The implementer shall survey 10% of the midstream installations to determine actual gas/electric baseline proportions, and the program administrator

[31] *D.19-08-009*, OP1.
[32] CPUCcomm_SWWH025-03_ResHPWHFS_022521.

shall adjust claimed savings based upon these survey results." This survey will be conducted annually. A sample survey questions are as follows:

"What was the fuel source of the equipment you replaced?" (Gas/Electric/I don't know/I'm not sure)

In addition, for midstream delivery, the implementer should provide the retailer or distribution location where the product was sold, rated capacity, and proposed building type where the product will be installed. A survey will not be issued for upstream delivery type."[33]

CPUC Requirement: Beginning January 1, 2023, all downstream (Deemed, Custom, & NMEC) fuel substitution programs are required to begin collecting data to populate the Fuel Substitution infrastructure data reporting template spreadsheet located here: https://www.cpuc.ca.gov/about-cpuc/divisions/energy-division/building-decarbonization/fuel-substitution-in-energy-efficiency.[34] This template must be completed for fuel substitution infrastructure upgrade costs to comply with D.19-08-009.

CPUC Requirement: Measure packages for fuel substitution offerings that reflect Normal Replacement, New Construction, and Accelerated Replacement in Downstream and Direct Install delivery channels must include the following language to guide documentation of installations:

"For downstream deemed and downstream direct-install delivery types, in addition to the standard information such as building type, climate zone, and capacity of the units, the following data must be submitted with each project application by the project developer:

- What is the existing fuel type for space heating?

[33] CalTF Statewide Measure Characterization Template.

[34] https://www.cpuc.ca.gov/about-cpuc/divisions/energy-division/building-decarbonization/fuel-substitution-in-energy-efficiency.

- Did the site require any electric infrastructure upgrades for the proposed electrification measure? If yes, provide the itemized invoices with infrastructure upgrade costs.
- Did the owner install any other electrification measures at this site? If yes, list the measures and provide the itemized invoices with infrastructure upgrade costs (if any)."[35]

CPUC Requirement: Residential ductless HVAC fuel substitution measure packages may use only direct install and downstream delivery types. The measure package for these measures must include eligibility requirements to decommission the existing gas system.[36]

2.2.7 Installations Must Adhere to Laws and Codes

CPUC Requirement: All measures(s) must be installed in accordance with all applicable federal, state, and local laws, building codes, manufacturers' specifications, and permitting requirements. If a contractor performs the installation or improvement, the contractor must hold the appropriate license for the work.

A rebate or incentive can only be provided if the customer or contractor certifies that the improvement or installation has complied with any applicable permitting requirements, including the California Building Standards Code (Title 24 of the California Code of Regulations). If a contractor performed the installation or improvement, the contractor must hold the appropriate license for the work performed.[37]

If a customer or contractor is the recipient of a rebate or incentive offered by an energy efficiency program specifically for the purchase or installation of air-conditioning or heat pump units, and their related fans, the rebate or incentive will be paid only if the customer or contractor provides proof of permit closure.

> The Implementer and PG&E will only verify the reasonableness, not the authenticity, of the submitted proof of permit.

[35] CPUCcomm_SWWH025-03_ResHPWHFS_022521. FS Infra Costs Data Collection - Interim Draft v4 is available at: https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/energy-division/documents/building-decarb/fs-infra-costs-data-collection---interim-draft-v4.xlsx

[36] *Resolution E-5221*, p. 24.

[37] California Code, Public Utilities Code Section 399.4(b)(1).

2.2.8 Total System Benefit

CPUC Requirement: Total System Benefit (TSB) quantifies the lifecycle energy, ancillary services, generation capacity, transmission and distribution capacity, and GHG benefits of energy efficiency activities. TSB is expressed in dollars on an annual basis. In D.21-05-031, the CPUC ordered that, starting in 2024, the Total System Benefit (TSB) metric will replace electric (kWh, kW) and gas (therm) savings as the primary objective for the California PA energy efficiency portfolios. The TSB metric will "tie the goals for program administrators directly to the avoided cost value of energy efficiency savings, which should encourage program administrators to pursue energy savings that deliver high value in some or all of the avoided cost categories: energy, generation capacity, ancillary services, transmission and distribution capacity, high global warming potential (GWP) gases, and GHGs." PAs are encouraged to achieve the highest Total System Benefit, which represents the value of the energy efficiency resources to the grid.[38] Additional details about TSB and how it is calculated are provided in the CPUC's Total System Benefit Technical Guidance.[39]

2.3 Third-Party Program Implementation

CPUC Requirement: In D.16-08-019, the CPUC defined a "third-party program" as a program proposed, designed, implemented, and delivered by non-utility personnel under contract to a utility program administrator. In D.18-01-004, pointing back to that definition, the CPUC ordered the four California investor-owned utilities to include third-party designed and implemented programs according to the following minimum percentages and dates:

a. At least 25 percent by December 31, 2018. For 2018 only, the percentage requirement was allowed to include third party programs under the definition of third party in place prior to the adoption of D.16-08-019.

b. At least 40 percent by December 31, 2020.

c. At least 60 percent by December 31, 2022.

The original 25 percent deadline was extended in D.18-05-041 to December 19, 2019.[40]

2.3.1 Third-Party Solicitation Process

CPUC Requirement: All utilities should utilize a two-stage solicitation process for third party programs unless there is a specific schedule-related reason only one stage is possible. The

[38] California Public Utilities Commission, May 26, 2021, *Decision 21-05-031: Assessment of Energy Efficiency Potential and Goals and Modification of Portfolio Approval and Oversight Process*.

[39] California Public Utilities Commission, Energy Division, October 25, 2021, *Total System Benefit Technical Guidance, version 1.2*, October 25, 2021.

[40] *D.18-05-041*, OP4.

two-stage process should be the predominant approach. [41] The two-stage solicitation requirement was modified in D.23-02-002 such that it is no longer required to be the predominant approach.[42]

2.3.2 CPUC Terms & Conditions

CPUC Requirement: With the release of D.18-10-008, the CPUC established a set of "Standard" (Attachment A) and Modifiable (Attachment B) Terms and Conditions (T&Cs) for use by the PAs in their contracts with third-party implementers.[43]

CPUC Requirement: The standard and modifiable third-party contract terms and conditions, originally adopted in D.18-10-008 and D.19-01-003, modified in D.23-02-002, shall be used with every contract between PAs and third-party EE implementers.[44] D.23-02-002 modifies the T&Cs to:

1. remove the requirement for performance assurances as a standard, non-modifiable term in third-party contracts.[45];
2. removes the requirement for cybersecurity insurance;[46]
3. remove Table 2 in the modifiable contract terms and conditions originally adopted in D.18-10-008;[47]
4. reflect the Total System Benefit metric adopted in D.21-05-031.[48]

The changes to the third-party contract terms and conditions contained in D.23-02-002 shall apply going forward to any solicitations where the request for proposals has not yet been issued. These changes also apply to local government partnerships, pursuant to D.19-08-006.

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[41] *D.18-01-004*, COL5, p. 57.

[42] *D.23-02-002*, OP7.

[43] *D.18-10-008*, pp. B-2-B-5.

[44] *D.23-02-002*, OP1.

[45] *D.23-02-002*, OP2.

[46] *D.23-02-002*, OP4.

[47] *D.23-02-002*, COL4.

[48] *D.23-02-002*, COL10.

The changes shall not apply to contracts related to the Energy Savings Assistance program and shall not apply to existing contracts already executed.[49]

As part of the Modifiable T&Cs, the CPUC required specific workforce standards related to non-residential HVAC and lighting projects, as well as requirements related to Disadvantaged Workers. These requirements are provided in the following sections.

2.3.2.1 Workforce Standards

CPUC Requirement: The CPUC's Modifiable T&Cs include the following related to Workforce Standards:[50]

> "At all times during the term of the Agreement, Implementer[51] shall comply with, and shall cause its employees, agents, representatives, subcontractors, independent contractors, and all other persons performing the Services[52] on Implementer's behalf ("Implementer Party") to comply with, the workforce qualifications, certifications, standards and requirements set forth in Section [ ] ("Workforce Standards"). The Workforce Standards shall be included in their entirety in Implementer's Final Implementation Plan.[53] Prior to commencement of any Services, once per calendar year, and at any other time as may be requested by Company,[54] Implementer shall provide all documentation necessary to demonstrate to Company's reasonable satisfaction that Implementer has complied with the Workforce Standards. {Comment: Term is subject to modification and may be negotiated by Company and Bidder[55]}

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[49] *D.23-02-002*, OP13.

[50] Note that all footnotes within the quotation are from the CPUC's original language, though the footnote numbering has been modified to align with this Rulebook's footnote numbering.

[51] "Implementer" will be defined in the Agreement as the Third-Party Program implementer who is party to the Agreement that will implement the contracted-for EE program ("Program").

[52] "Services" will be defined in the Agreement as all of the services, and any other work, performed by Implementer pursuant to the Agreement and any related purchase orders.

[53] "Final Implementation Plan" will be defined in the Agreement and will identify milestones and deliverables Implementer is required to comply with.

[54] "Company" will be defined in the Agreement as the Investor Owned Utility entering into the Agreement with Implementer.

[55] "Bidder" will be defined in the Solicitations Instructions of the IOUs Request for Abstract (RFA) and/or Request for Proposal (RFP), as an entity submitting a program proposal in response to the IOU's RFA and/or RFP pursuant to solicitation process and requirements.

[A Draft Implementation Plan[56] will be negotiated as part of the Agreement and will include Workforce Standards. In its Proposal,[57] Bidder will be required to include a section identifying all relevant workforce standards that Bidder deems applicable to the Proposed Program,[58] including any specific skills certification and/or broader occupational training and experience that would reduce the risk of lost net lifecycle energy savings from poor installation, modification, or maintenance of the energy efficiency measures that Bidder proposes to be included in the Agreement[59] (the "Proposed Workforce Standards"). Bidder's Proposed Workforce Standards will be reviewed by the Company as part of the Proposal, and if Bidder is selected to participate in the RFP by Company, Company and Bidder will negotiate the final Workforce Standards for each Proposed Program that will be included in any Agreement, if Bidder and Company execute a final Agreement. The Commission has specifically required Workforce Standards for non-residential heating, ventilation, and air-conditioning projects and lighting controls projects, as set forth below.] {Comment: modifiable RFP Instructions}

a. For Heating, Ventilation, and Air Conditioning (HVAC) Energy Efficiency Programs or Projects

For all Program Projects[60] and for each Measure,[61] installed, modified, or maintained in a nonresidential setting where the project is seeking an energy efficiency incentive of $3,000 or more, Implementer shall ensure that each worker or technician involved in the project meets at least one of the following criteria:

1. Completed an accredited HVAC apprenticeship.

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[56] "Draft Implementation Plan" will be defined in the Agreement.

[57] "Proposal" will be defined in the Company's request for proposals ("RFP") instructions ("Instructions") for the Proposed Program.

[58] "Proposed Program" means that certain energy efficiency program that Company seeks Offers for pursuant to Company's RFP Instructions.

[59] "Agreement" will be defined in the RFP Instructions and will be the agreement executed by Bidder and Company as a result of an RFP for a Proposed Program upon Company's final selection of Offers, and pursuant to the RFP process and requirements of the Proposed Program.

[60] "Program Projects" will be defined in the Agreement.

[61] "Measure" will be defined in the Agreement.

2. Is enrolled in an accredited HVAC apprenticeship.
3. Completed at least five years of work experience at the journey level according to the Department of Industrial Relations definition, Title 8, Section 205, of the California Code of Regulations, passed a practical and written HVAC system installation competency test, and received credentialed training specific to the installation of the technology being installed.
4. Has a C-20 HVAC contractor license issued by the California Contractor's State Licensing Board.

This standard shall not apply where the incentive is paid to any manufacturer, distributor, or retailer of HVAC equipment, unless the manufacturer, distributor, or retailer installs or contracts for the installation of the equipment.

{Comment: Further relevant standards beyond these requirements may be negotiated by Company and Bidder and Bidder will propose any further standards based on Program design, etc.}

b. For Advanced Lighting Control Programs or Projects:

For all Program Projects and for each Measure, installed in a non-residential setting where the project is seeking an energy efficiency incentive of $2,000 or more, Implementer shall ensure that all workers or technicians involved in the project are certified by the California Advanced Lighting Controls Training Program (CALCTP). This requirement shall not apply where the incentive is paid to a manufacturer, distributor, or retailer of lighting controls unless the manufacturer, distributor, or retailer installs or contracts for installation of the equipment.

{Comment: Further relevant standards beyond these requirements may be negotiated by Company and Bidder and Bidder will propose any further standards based on Program design, etc.}"

2.3.2.2 Disadvantaged Workers

CPUC Requirement: The CPUC's Modifiable T&Cs include the following related to Disadvantaged Workers:[62]

> "Implementer agrees to comply, and to require all Implementer Parties to comply, with the Disadvantaged Worker requirements set forth in the Final Implementation Plan. Implementer shall provide a copy of such requirements to each Implementer Party and report any Disadvantaged Worker information to Company at the interval specified in the Agreement. {Comment: placeholder for Agreement term}
>
> [In its Proposal, Bidder shall include a section describing the manner by which their proposed program will provide Disadvantaged Workers with improved access to career opportunities in the energy efficiency industry for programs that directly involve the installation, modification, repair, or maintenance of EE equipment. If Bidder is selected to engage in further contract negotiations with the Company, Company and Bidder will negotiate the requirements necessary to support improved access to career opportunities in the energy efficiency industry by Disadvantaged Workers for each applicable Proposed Program that will be included in the Agreement, if Bidder and Company execute an Agreement.] {Comment: modifiable RFP Instructions}"

2.4 Ex Ante Values

The term "ex ante" refers to all activities and estimations that take place prior to the evaluation of a savings claim. Ex ante values are the basic components of a savings claim; they include not just annual energy and demand savings, but also measure cost, effective useful life, net-to-gross ratio, and others.

2.4.1 Measure Application Type and Baseline

Energy efficiency savings cannot be directly measured. All energy savings estimates are relative to a counterfactual baseline assumption for the expected energy use, as if the program intervention did not take place.

CPUC Requirement: The Implementer must assign a measure application type (MAT) in order to determine the appropriate measure baseline, which dictates the calculation basis for benefits,

[62] Note that all footnotes within the quotation are from the CPUC's original language, though the footnote numbering has been modified to align with this Rulebook's footnote numbering.

duration of savings, and costs in cost-effectiveness calculations. The cost-effectiveness of a savings claim is expressed as a ratio of benefits to costs. The CPUC recognizes the following standard categories of MATs:[63]

- New Construction (NC)
- Normal Replacement (NR)
- Accelerated Replacement (AR)
- Add-On Equipment (AOE)
- Building Weatherization, shell and related components (BW);
- Behavioral (BRO-Bhv)
- Retro-commissioning (BRO-RCx)
- Operational (BRO-Op)

The MAT represents how an energy efficiency measure is applied to a project and provides the basis by which measure baseline, cost, and energy savings can be determined. Implementers must classify all proposed energy efficiency measures into one of the measure application types in order to determine forecasted savings.[64] The following table describes the default baseline for each measure application type.[65]

[63] California Public Utilities Commission, October 11, 2018, *Resolution E-4952: Approval of the Database for Energy-Efficient Resources updates for 2020 and revised version 2019 in Compliance with D.15-10-028, D.16-08-019, and Resolution E-4818*, p. A-46.

[64] *Energy Efficiency Policy Manual*, Version 6, pp. 39-41.

[65] *Resolution E-4818*, pp. 4 and 52.

Table 3 -- Default Baseline by MAT[66]

Alteration Type	Delivery Channel	Savings Platform	Measure Application Type				
			New Construction	Normal Replacement	Accelerated Replacement	Add-On-Equipment, and Weatherization	Behavioral, Retro-commissioning, and Operational
No Existing Condition (New Construction, expansions, added load)	Custom and Deemed	Custom and Deemed	Standard Practice	N/A	N/A	N/A	N/A
Existing Buildings (including major alterations)	Upstream & Midstream	All	N/A	Standard Practice	N/A	Standard Practice	N/A
	Downstream / Direct Install	Custom	N/A	Standard Practice	Dual	Existing	Existing
		Deemed	N/A	Standard Practice	Dual	Existing	Existing
		Meter-Based	N/A	Existing	Existing	Existing	Existing
Non-Building Projects (including Industrial & Agricultural)**	SEM programs	Meter-Based	N/A	Existing	Existing	Existing	Existing
	Non-SEM programs	All	N/A	Standard Practice	Dual	Existing	Existing

**Non-Building projects should be projects executed outside of a building such as streetlights.

[66] This table is a modified version of the table officially adopted in *D.16-08-019* and updated in *Resolution E-4818*, pp. 4 and 52. The term ”code baseline” was renamed the Standard Practice Baseline in *Resolution E-4939*, p. 8.

The MAT also dictates other ex ante values, as summarized below:

Table 4 -- Ex Ante Values Dictated By MAT

MAT	Measure Life Cycle	Measure Cost	EUL	RUL
New Construction	EUL	IMC	Measure EUL	Not Applicable, but report as 0
Normal Replacement	EUL	IMC	Measure EUL	0
Accelerated Replacement	1st Baseline Period= RUL 2nd Baseline Period= EUL-RUL	ARC	Measure EUL	RUL of existing
Add-On Equipment	EUL	FMC	The lesser of: RUL of existing host equipment[67] or Measure EUL	Not Applicable, but report as 0
Behavioral, Residential	EUL	FMC	1	0
Behavioral, Non-Residential	EUL	FMC	2	0
Retro-commissioning and Operational	EUL	FMC	3	0
Building Weatherization	EUL	FMC	Measure EUL	Not Applicable, but report as 0

2.4.1.1 New Construction

CPUC Requirement: The New Construction (NC) MAT is used where equipment is installed in either a new area or an area that has been subject to a major renovation, to expand capacity of existing systems, or to serve a new load. The NC MAT is used where there is no reference operation for existing conditions, such as with new construction, expansions, added load, a change in the function of the space (e.g., office to laboratory), or a substantial change (e.g.,

[67] Host equipment refers to the device whose efficiency is improved by the addition of the Add-on Equipment measure.

~30% or more) in design occupancy.[68] For NC measures, the baseline is the Standard Practice baseline in place at the time the project commenced.[69] New construction projects which replace "equipment that is actually broken, non-functional, or unable to provide the intended service" is eligible for normal replacement, but is not eligible for accelerated replacement.

2.4.1.2 Normal Replacement

CPUC Requirement: The Normal Replacement (NR) MAT is used where existing equipment (including Add-On Equipment) has either failed, no longer meets current or anticipated needs, or is planned to be replaced due to normal remodeling or retrofit activities during the normal course of business or ownership.[70] For NR measures, the baseline is the Standard Practice in place at the time the project commenced.[71] The NR MAT may be applied to any measure or program, with certain exceptions, and without a burden of proof.[72] This MAT includes measures that were previously characterized with the now-retired Replace on Burnout (ROB) MAT.

> Existing equipment that is not operational or is not meeting the existing service requirements, including Add-On Equipment, is categorized as Normal Replacement.

2.4.1.3 Accelerated Replacement

CPUC Requirement: The Accelerated Replacement (AR) MAT is used for the replacement of existing equipment that could and would remain operational without program intervention. It is used in direct contrast to the NR MAT, which is used when existing equipment either could not or would not remain operational. Accelerated Replacement includes measures that previously fit into the now-retired Early Retirement MAT. The AR use case involves the replacement of viable, existing equipment prior to the end of its useful life, when it would usually be replaced.

The dual baseline calculation of savings shall be applied per the current standard reflected in the *Energy Efficiency Policy Manual Version 6*. Dual baseline treatment will not vary by

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[68] *Resolution E-4818*, p. 66.

[69] California Public Utilities Commission, August 18, 2016. *Resolution E-4795: Approval of the Database for Energy-Efficient Resources (DEER) updates for 2017 and 2018, in Compliance with D.15-10-028*, p. 39.

[70] *Early Retirement Using Preponderance of Evidence*, p. 8.

[71] *Resolution E-4795*, p. 39.

[72] *Resolution E-4818*, p. 67.

Accelerated Replacement sub-category. For measures that bring buildings into compliance with, but do not exceed Standard Practice, the second baseline will have zero savings.[73]

CPUC Requirement: A default net-to-gross value of 0.85 shall be applied for the Small-Sized Business and hard-to-reach customers using a custom accelerated replacement project treatment.[74]

CPUC Requirement: Upstream and midstream delivery of AR deemed measures is not permitted—including point-of-sale midstream offerings—since documentation of the viability of the existing equipment cannot reasonably be expected to meet the "preponderance of evidence" threshold.[75]

2.4.1.3.1 Preponderance of Evidence

Accelerated Replacement measures are required to demonstrate both (1) the continued viability of the existing equipment and (2) the program influence on the decision to retire the system early. Evidence that the equipment **could** have remained operational only addresses viability; evidence indicating that the equipment **would** have remained in operation addresses both criteria. Documentation must include an assessment of evidence for and against both viability and influence, and this is referred to as a "preponderance of evidence (POE) based assessment" per Resolution E-5115 requirements for respective level of rigor.[76]

The POE may be assessed at the measure, project, or program level. The POE determination is based on the most convincing evidence and its probable truth or accuracy, not on the amount of evidence. Program-level POE-based assessments use broad market data to inform what fraction of program participants are likely AR versus NR.[77]

Programs targeting small business customers (based on the definition of Small Business adopted in Resolution E-4939) qualify for pre-approval for use of accelerated replacement

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[73] *Resolution E-4818*, p. 68, OP15.

[74] California Public Utilities Commission, February 11, 2021, *Resolution E-5115: Addresses issues related to evidence requirements for the determination of energy consumption baselines for energy efficiency programs pursuant to D.16-08-019 and Resolution E-4818*, OP3, p. 31.

[75] California Public Utilities Commission, Energy Division, August 25, 2023, *Memorandum: Proposed Guidance on the Preponderance Of Evidence Requirements For Accelerated Replacement Of Deemed Measures*, p, 2.

[76] *Resolution E-5115*. https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M366/K381/366381636.PDF.

[77] *Resolution E-4818.*

measure type. Further, the POE minimum documentation guidance provided in Resolution E-4939 and updated in Resolution E-5115 does not apply to Small-Sized Business customers or hard-to-reach customers.[78]

Projects that are sampled and verified during post-installation review (i.e., Custom Lite) may follow low rigor requirements of Resolution E-5115 regardless of incentive level. Project-level preponderance of evidence must include evidence of customer eligibility for program participation and evidence of equipment viability for the remaining useful life claimed including photographs of the existing equipment and measure.[79]

CPUC Requirement: Measure packages for accelerated replacement measure application types should include the following standardized language:

> "For accelerated replacement application types, this measure adopts the program-level "Preponderance of Evidence Assessment" described in Version 2.0 of the Accelerated Replacement Using Preponderance of Evidence report developed by the utilities and stakeholders to provide guidance for the California programs ("POEV 2.0", see Section 7).[80] "Continued viability" and "program influence" must be demonstrated as the evidence of accelerated replacement.
>
> To demonstrate the viability of the pre-existing system or to show that the program is replacing equipment that is "installed and operating," the customer must be approached by a direct install implementer. Additionally, the program must obtain and provide additional documentation, including (but not limited to) the following:
>
> - Targeted segment of the market or customers
> - Customer/site information
> - Make/model of pre-existing equipment and/or

[78] *Resolution E-5115*, OP5, p. 32.

[79] *Resolution E-4939*, p. 49.

[80] Track 1 Working Group. *Accelerated Replacement Using Preponderance of Evidence*. Version 2.0, December 7, 2016.

- Performance/flowrate measurements of pre-existing equipment, and/or
- Photograph of pre-existing equipment in place and operational
- Photograph of the installed measure

Program influence evidence can be demonstrated through one of the three alternatives listed in Section 7.3 of the Accelerated Replacement Using Preponderance of Evidence v2.0.

Specific documentation requirements will be determined by the program administrator and will be specified in the program implementation plan."[81]

CPUC Requirement: "We recognize that some customers will refuse to submit photos or videos due to security concerns. However, waiving provisions of required evidence based on customer security concerns should only be allowed when such evidence of currently installed and operating equipment divulges proprietary information or trade secrets or pertinent to national security. For example, pictures of HVAC equipment or standard off-the-shelf equipment should not be a waived requirement. A site having security constraints cannot have an automatic ability to deny the collection of evidence. The customer has the responsibility to provide evidence as needed to confirm eligibility and support their claims even if others are not able to access the site."[82] Beginning October 1, 2023, these limits to the waiving provisions of evidence requirement(s) also applies to deemed measures.

2.4.1.3.2 Rigor

CPUC Requirement: Rigor refers to the amount of program or project documentation necessary to satisfactorily demonstrate that the energy efficiency program likely triggered the equipment upgrade. Resolution E-4818 Ordering Paragraph 22 originally named the levels of rigor as Full, Tier 1, and Tier 2, in order of the most to least rigorous documentation. Resolution E-5115 renamed these categories as:

- "Full Rigor" tier for the largest projects, with incentives $100,000 and greater,
- "Medium Rigor" tier for projects with incentives between $25,000 and less than $100,000,

[81] Cal TF Statewide Measure Characterization Template.

[82] *Resolution E-5115*, Section 4.2. Preponderance of Evidence Requirements for Equipment Viability for the Very Low, Low and Medium Rigor Customer Incentive Level Tiers, pp. 16-17.

- "Low Rigor" tier for projects with incentives between $7,500 and less than $25,000.
- "Very Low Rigor" tier for projects with incentives less than $7,500.[83]

Table 5 -- Evidence Required to Show Equipment Viability and Influence[84]

Information Required to Demonstrate Equipment Viability	Information Required to Demonstrate Influence
Very Low Rigor – Incentives Less Than $7,500	
• Customer-signed Customer Affidavit Statement	The information includes the following: • Describe the project's development, including factors and decision points that led to the customer's decision to replace the existing equipment or process. • Describe the project developer's services provided to the customer and timing of developer's engagement compared to customer's decision-making process.
Low Rigor – Incentives Between $7,500 and Less Than $25,000	
• Customer-signed Customer Affidavit Statement • Photos and videos	The information includes the following: • Describe the project's development, including factors and decision points that led to the customer's decision to replace the existing equipment or process. • Describe the project developer's services provided to the customer and timing of developer's engagement compared to customer's decision-making process. • Describe the customer's maintenance and/or upgrade practices associated with the equipment or process, if applicable.

[83] *Resolution E-5115*, OP1, p. 31.

[84] *Resolution E-5115*, OP6, p. 32.

Information Required to Demonstrate Equipment Viability	Information Required to Demonstrate Influence
Medium Rigor – Incentives Between $25,000 and Less Than $100,000	
The information to demonstrate equipment viability shall include: • A customer-signed Customer Affidavit Statement • Photos and/or videos • Age of the equipment (for example, installation date or initial operation date in determination of whether the original equipment's RUL or the default RUL will be used in determination of the remaining useful life energy efficiency savings.) • Operating data • Describe the customer's current and past maintenance and repair history (for example, any maintenance and/or repair records history and/or cost information would be helpful in further demonstrating support that the equipment is working as intended and is in good operating condition.) • Information on current plans or budgeting for expansions, remodels, replacements	The information includes the following: • Describe the project's development, including the customer's motivating factors for the project development and all factors that the customer considered as it planned, designed, and selected the project to replace the existing equipment. • Describe the project developer's services provided to the customer and timing of developer's engagement compared to customer's decision-making process. • Describe the decision-making process for determining and selecting a specific energy efficiency measure option(s)? What are the customer's criteria in decision-making? • Describe the customer's scheduled maintenance or equipment upgrade practices, if applicable. • What are the customer's barriers (if any) to adopting the proposed new energy efficiency measure? What are its resource constraints (if any)? • What are the regulations (e.g., code, standards) applicable, if any, to the existing equipment or process and the relevant energy efficiency measure?

Information Required to Demonstrate Equipment Viability	Information Required to Demonstrate Influence
Full Rigor – Incentives of $100,000 and Greater	
In addition to the customer-signed Customer Affidavit Statement, the project developer shall collect information from the customer and provide a written response to the questions below to demonstrate equipment both viability and program influence. The information includes the following: • Describe this project's development (for example, in a timeline format will be helpful). • Describe the customer's main motivating factors for the project development; include all factors that the customer considered as it planned, designed, and selected the project to replace the existing equipment. This should include the eligible and viable energy efficient measure options considered by the customer and the customer's normal practice in operation and maintenance and availability of records and the range of relevant regulations and resources considered by the customer. • Describe a set of problems the customer is trying to resolve, e.g., what are the business needs and wants of production, maintenance, reliability, capacity, competitiveness, productivity, and regulations, etc. for the proposed project/measure? • Describe the decision-making process for determining and selecting a specific energy efficiency measure option(s)? What are the customer's criteria in decision-making? What are the customer's barriers (if any) to adopting a new energy efficiency measure? What are its resource constraints (if any)? Clarify the timing of the customer's decision points and compare them to when the project developer was engaged and interacted with the customer to validate influence on the proposed project/measure. • Describe the project developer's services provided to the customer and timing of the project developer's engagement compared to customer's decision-making process. When and how did the program implementers get involved in the specific custom project (e.g., in which stage of the project development), and what information and technical resources did the program implementers bring to the customer during customer's decision-making process for the specific energy efficiency measure option? Describe the customer's decision-making process and points. • Describe the age of the equipment along with its estimated remaining useful life and any major repairs performed on the existing equipment, not related to a full system overhaul, in the last 24 months. • Describe any maintenance issues for the existing equipment in the last 36 months. • Describe any regulations or standard practices and how they are applicable to the existing equipment or process and the relevant energy efficiency measure? • Has the customer updated any of its existing systems? If yes, when and what was it? Explain the reasons for switching to the new measure/system. • Describe the range of alternative solutions that the customer considered, if any? Describe the range of vendors, equipment efficiency, capacity, and costs.	

Program implementers must not disaggregate custom project measures into multiple "customer applications" that are actually a single activity carried out in phases or separate the project into multiple applications that act to avoid triggering higher-tier savings (or customer incentive) per

project, which would have required more rigorous review. Phased projects must be submitted for review with a discussion of the scope of work applicable to each phase.

2.4.1.4 Add-On Equipment

CPUC Requirement: The Add-On Equipment MAT is used for installations of new equipment onto pre-existing equipment, improving the nominal efficiency of the host system. The existing host system must be operational without the AOE equipment, continue to operate as the primary service equipment for the existing load, and be able to fully meet the existing load at all times without the add-on component. The add-on equipment must not be able to operate on its own. The actual energy reduction occurs at the host equipment, not at the add-on component, although any add-on component energy usage must be subtracted from the host savings.[85] AOE may use a Standard Practice, or Existing Conditions baseline. Using Existing Conditions as the baseline is applicable to building or non-building projects, including industrial and agricultural processes.

> The replacement of broken or poorly performing add-on equipment is considered through the NR MAT, not the AOE MAT.

2.4.1.5 Building Weatherization

CPUC Requirement: The Building Weatherization (BW) MAT is used for non-mechanical building efficiency improvements such as windows, insulation, and air sealing.[86] BW measures use an existing condition baseline; however, the use of a Standard Practice baseline is permitted. Ceiling, wall, and floor insulation as well as greenhouse heat curtains and infrared film shall no longer be considered AOE and are reclassified as the BW measure application type.[87]

2.4.1.6 Behavioral, Retro-Commissioning, and Operational

CPUC Requirement: The Behavioral, Retro-Commissioning, and Operational (BRO) MAT is used for measures that either restore or improve energy efficiency and that can be reasonably expected to produce multi-year savings. By definition, BRO measures result in performance that

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[85] *Resolution E-4795*, pp. 26-27.

[86] *Resolution E-4795*, p. 21.

[87] *Resolution E-5221,* p. 18.

does not exceed the nominal (rated or original) efficiency of the pre-existing condition. BRO measures may use a Standard Practice, or Existing Conditions baseline.

Savings from correcting deferred maintenance, performance restoration, and operational characteristics are considered within the BRO category. Separate claims should be made for savings that arise from equipment replacement and savings that arise from updating maintenance and operational factors.[88]

2.4.1.7 Baseline

CPUC Requirement: All energy efficiency measures must have a baseline from which energy savings are assessed. The baseline establishes the energy consumption profile for a participant in the absence of program influence from the energy efficiency program. The MAT and alteration type are used to determine the baseline.[89] See Table 3 in section 2.4.1 for more details.

2.4.1.8 Standard Practice Baseline

CPUC Requirement: The Standard Practice (formerly 'Code') Baseline is an estimate of the activity or installation that would take place absent the energy efficiency program as required by code, regulation, or law, or as expected to occur as standard practice. The Standard Practice Baseline activity or installation must meet the anticipated functional, technical, and economic needs of the customer, building, or process and provide a comparable level of service as the energy efficiency measure.[90]

A Standard Practice baseline must comply with all codes, regulations, and standards when the project commences,[91] including but not limited to: minimum building energy efficiency requirements; emissions requirements; federal, state, and local government regulations; other regulatory agencies.[92] The standard practice need not comply with local reach codes.[93]

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[88] *Resolution E-4795*, p. 28.

[89] *Energy Efficiency Policy Manual*, Version 6, pp. 39-41.

[90] *Resolution E-4939*, p. 8.

[91] *Resolution E-4795*, p. 39.

[92] California Public Utilities Commission, Energy Division, *Final Ex Ante Review Disposition*, Project ID x240. California Public Utilities Commission, April 2, 2021,.*Energy Efficiency Industry Standard Practice (ISP) Guidance An Update of Guidance for ISP Studies and Custom Project Development Version 3.1*, p. 8.

[93] California Public Utilities Commission, May 26, 2009, *Decision 09-05-037: Interim Decision Determining Policy and Counting Issues For 2009 to 2011 Energy Efficiency Programs*, OP 4.

The standard practice must represent a typical or commonly implemented practice, although it need not be the predominant (i.e., greater than 50%) practice.[94] The selected standard practice must be reasonable and feasible to implement. Industry Standard Practice studies - if appliable - may provide suggestions or requirements for common practices.

If only one activity or installation meets the customer's anticipated functional, technical, and economic needs, that option defines the standard practice by default. In cases where the existing conditions are more efficient than the standard practice, the existing conditions define the baseline. Use a Standard Practice that is less efficient than the existing conditions is referred to as a "regressive baseline" and is not allowed. The baseline selected for calculating energy savings may not use more energy than existing conditions.[95]

2.4.1.9 Dual Baseline

CPUC Requirement: The Dual Baseline incorporates elements of both the Existing Conditions baseline and the Standard Practice baseline. A Dual Baseline analysis is used exclusively for AR measures. The Dual Baseline reflects the difference between: 1) the savings that should be credited for the initial years of installation based upon the pre-existing or replaced equipment usage; and 2) the savings credit for later years based upon an eventual pre-existing equipment replacement (assumed to occur if the measure had not been installed as part of the program). At the later date, when the pre-existing equipment would have been replaced due to normal turnover (for reasons such as imminent failure or remodeling), an alternate equipment efficiency baseline is used. A Dual Baseline analysis requires two savings calculation periods:

1. The Existing Conditions baseline is applied to the remaining useful life period, defined as the first baseline period (see the Measure Life section for discussion of RUL determination). For this period, savings are calculated based on the difference between the measure and the Existing Conditions Baseline. The measure cost for this period is the Full Measure Cost.
2. The Standard Practice baseline is applied to the period between the remaining useful life and effective useful life, defined as the second baseline calculation period. For this period, the savings are calculated based on the difference between the measure and the Standard Practice baseline. The measure cost for this period is the incremental cost between measure and baseline, including installation, for the second baseline equipment

[94] *Energy Efficiency Policy Manual*, Version 6, pp. 39-41.

[95] *D.12-05-015*.

measure.[96] The second baseline should be based on known codes and standard practices that will be in effect at the end of the RUL.[97] The selection of the second baseline (i.e., Standard Practice baseline) shall comply with Attachment A of Resolution E-4939.[98] For measures that do not exceed Industry Standard Practice, the second period of the dual baseline has zero savings.[99]

2.4.1.10 Direct and Indirect Energy/Demand Impacts

CPUC Requirement: All direct energy/demand impacts, either positive or negative (e.g., heat recovery heat exchanger saves gas but increases electricity use), must be included in savings claims. Indirect/interactive impacts must be included in savings claims, whether positive or negative (e.g., interactive effects from efficient lighting increasing HVAC gas use). HVAC and refrigeration interactive effects are incorporated into measure packages. [100] These interactive effects can only be applied to the portion of energy use that occurs within the conditioned space. Refer to the eTRM interactive effects tables for internal gain fractions for residential appliances.

Programs should detail whether incentives are calculated based solely on direct savings, or both direct and indirect savings.

Exception: For projects that also save water, embedded (indirect) energy savings can be claimed.[101] The Water-Energy Calculator must be used to determine the embedded energy savings that can be claimed.

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[96] *Energy Efficiency Policy Manual*, Version 6, pp. 40-41.

[97] California Public Utilities Commission, Energy Division, May 12, 2010, *Disposition for Workpaper 100512 (Non-DEER High Impact Measure (HIM) Review: Linear Fluorescent Measures)*.

[98] *Resolution E-4939.*

[99] *Resolution E-4818*, p. 68.

[100] *Energy Efficiency Policy Manual*, Version 6, pp. 40-41.

[101] California Public Utilities Commission, Energy Division, March 1, 2013, *Disposition for Workpaper PGECOAPP104 Revision 4 (Energy Efficient Televisions)*; California Public Utilities Commission, Energy Division, March 27, 2013, *Disposition for Workpaper PGECOAPP104 Revision 5 (Energy Efficient Televisions)*; California Public Utilities Commission, Energy Division, March 29, 2017, *Disposition for Workpaper PGECOAPP128 Revision 0 (Retail Products Platform)*.

2.4.2 Measure Life

2.4.2.1 Effective Useful Life

CPUC Requirement: The Effective Useful Life (EUL) is an estimate of median number of years that existing equipment is expected to remain in use. It is also the duration of time that measures installed under the program are expected to be in place and operable. Routine maintenance and more extensive repairs can extend equipment life beyond the estimated EUL values. The eTRM support tables include EULs for common equipment. The longest allowable effective useful life for equipment is 20 years.[102]

For purposes of Accelerated Replacement determination, measure lives of up to 30 years will be allowed for the following:

- Custom applications may claim that existing equipment can last up to 30 years in order to justify Accelerated Replacement to qualify for Proposition 39 funds.[103]
- Water-Energy Nexus measures have an available EUL of 30 years for removed equipment.[104]
- K – 12 Schools and Community Colleges are allowed to use an EUL of up to 30 years for existing equipment only.[105]

2.4.2.2 Remaining Useful Life of Existing Equipment

CPUC Requirement: The Remaining Useful Life (RUL) is the number of years that equipment being replaced under the program would have remained in place and operable had the program intervention not caused the replacement. The default remaining useful life for existing equipment is one-third of the existing equipment's EUL. For Custom applications, deviations from this RUL value should be supported by evidence such as equipment installation date, maintenance records, or other external factors.[106] In the absence of reliable documentation of

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[102] *Energy Efficiency Policy Manual Version 6*.

[103] For more information about the California Clean Energy Jobs Act (Proposition 39), please see: http://www.energy.ca.gov/efficiency/proposition39/.

[104] California Public Utilities Commission, September 17, 2015, *Decision 15-09-023: Decision Regarding Tools for Calculating the Embedded Energy in Water and an Avoided Capacity Cost Associated with Water Savings*.

[105] California Public Utilities Commission, October 16, 2014, *Decision 14-10-046: Decision Establishing Energy Efficiency Savings Goals and Approving 2015 Energy Efficiency Programs and Budgets,* pp. 78 & 164.

[106] *D.12-05-015*, p. 347.

measure life, Custom applications should specify the most relevant CPUC-approved EUL from the appropriate eTRM EUL/RUL support table.

2.4.2.3 Measure Persistence

CPUC Requirement: To ensure that energy savings persist, the following requirements apply to all measures:

1. Measures should be permanently installed. If proposed measures are not permanently installed, the Program must demonstrate how the savings will persist over the measure life.[107]
2. Retrofit measures must include installation of new equipment or controls.[108,109] Repair or re-deployment of existing equipment is not eligible as a retrofit but may be eligible as a BRO measure.
3. For replacement measures, existing equipment must be decommissioned and removed from site. Decommissioned equipment must not be reused, sold, or retained for backup purposes.[110]

2.4.2.4 EUL of Add-On Equipment Measures

CPUC Requirement: The EUL of an AOE measure has generally been capped at the lesser of one-third the life of the host equipment (or host proxy) only because it is expected to be removed at the same time as the host equipment or the host proxy. The maximum EUL of all equipment types—including AOE—are determined by the median age at which 50 percent are no longer in service for a variety of reasons, including customer dissatisfaction. Hence, the host proxy will remain as a tool for determining the maximum EUL of AOE equipment.[111]

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[107] California Public Utilities Commission, Energy Division, *Final Ex Ante Review Disposition*, Project ID PGE-16-C-A-0112, project rejected in Ex Ante Review because savings are not expected to persist.

[108] New equipment requirement derived from requirement to incentivize higher efficiency, higher cost option as described in *PGE Final 2015 ESPI EAR Memo* and in *California Public Utilities Commission, Energy Division, Final Ex Ante Review Disposition, Project ID PGE-15-C-I-0005*.

[109] Derived from *Energy Efficiency Policy Manual, Version 6,* definition of Energy Efficiency Measure, p. 73.

[110] California Public Utilities Commission, Energy Division, *Final Ex Ante Review Disposition*, Project ID PGE-16-C-C-0110 required evidence that removed equipment not be sold into secondary market.

[111] Resolution *E-5221*, p. 32.

For AOE measures, the EUL is the lesser of the RUL of the host equipment/system or the EUL of the measure.[112] Resolution E-5152 clarifies that there may be exceptions to the EUL limit on the life of the AOE if the life of the add-on measure is not affected by the life of the host equipment.[113] Where the host proxy is part of the building system (e.g., electrical outlets or piping), the EUL of the AOE will be used to determine the measure life.[114]

Table 6 -- Measure Life for Add-On Equipment by Host and Host Proxy[115]

AOE Host	AOE Host Proxy	Measure Life	Example
AOE is typically replaced or removed from service at the same time as host equipment	None	Lesser of: • EUL of AOE • RUL of Host	AOE: Anti-Sweat Heater Controls Host: Refrigerated Case
AOE is not typically replaced or removed from service at the same time as host equipment	None	EUL of AOE	AOE: Pool Cover Host: Pool Heater
	AOE is typically replaced or removed from service at same time as host proxy	Lesser of: • EUL of AOE • RUL of Host Proxy	AOE: Aerator Host: Water Heater Host Proxy: Faucet
	AOE is not typically replaced or removed from service at same time as host proxy	EUL of AOE	AOE: Ozone Laundry Host: Water Heater Host Proxy: Building System (Piping)

2.4.2.5 BRO EULs

CPUC Requirement: Residential Behavioral measures use an EUL of one year. Behavioral measures in non-residential settings are permitted to use an EUL of up to two years, while retro-commissioning and operational measures are permitted to use an EUL of up to three years for ex ante savings claims.[116]

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[112] *Resolution E-4818*, p. 27.

[113] *Resolution E-5152*, p. 17-18.

[114] *Resolution E-5221*, p. A-12.

[115] *Resolution E-5221*, p. A-13.

[116] *D.16-08-019*, p. 46.

2.4.3 Net-to-Gross Ratio

CPUC Requirement: A net-to-gross (NTG) ratio must be determined for every claim. The eTRM support tables currently have a variety of DEER NTG ratios, varying by parameters such as length of availability of incentives or sector. Refer to eTRM for the full list of approved NTG ratios.

CPUC Requirement: All NTGRs resulting from CPUC staff's evaluation, measurement, and verification (EM&V) studies and approved via dispositions shall be rounded to the nearest 0.05 in DEER. NTGRs resulting from EM&V studies shall only be updated in DEER when the EM&V NTGR (before rounding) is at least 0.05 different from the current DEER value. If a new EM&V study determines that an existing and active measure-specific NTGR is—after rounding—equal to the relevant default NTGR for the measure type, sector or program, the measure-specific NTGR will be expired.[117]

PA energy efficiency goals were changed from gross to net effective January 2018. Although the CPUC is solely responsible for determining net savings, programs are expected to encourage participants to perform actions that would not occur without the energy efficiency program intervention. Implementers should understand how net savings are calculated for planned interventions, and programs should describe in their implementation plans how they seek to attain net savings, including any eligibility and documentation requirements the program would impose to demonstrate program influence. For example, programs may impose and tailor eligibility criteria to exclude likely free riders and include only those customers who are unlikely to adopt energy efficiency absent program support.

2.4.4 Measure Cost

The following sections describe the ex ante values that are used to calculate the costs side of a "benefit-cost" (cost-effectiveness) calculation.

2.4.4.1 Measure Cost Basis Determination

CPUC Requirement: A measure cost must be submitted for each individual measure. The cost basis is determined by the baseline type, as indicated in the following table.[118]

[117] *Resolution E-5221*, p. 19.

[118] *Energy Efficiency Policy Manual, Version 6*, p. 76.

Table 7 -- Applicable Measure Cost Basis for Measure Application Types

Baseline Type (MAT)	Applicable Measure Cost Basis
Standard Practice Baseline (NC, NR)	Incremental Measure Cost (IMC)
Existing Conditions Baseline (AOE, BRO, BW)	Full Measure Cost (FMC)
Dual Baseline (AR)	Accelerated Replacement Cost (ARC)

2.4.4.2 Full Measure Cost

Full Measure Cost (FMC) is the total amount paid by the customer to implement the energy efficiency measure, which may include: audits, design, engineering, construction, equipment, materials, removal, recycling, overhead, sales tax, shipping, and labor directly related to the energy efficiency attributes of the measure. Product or feature choices not directly related to EE should be removed.

Labor cost can be contractor or in-house if proof of direct project hours and costs are provided. Invoices should include the make, model, unit price, and quantity of equipment, vendor name and address, customer's name and address, invoice number, date of sale, and the total cost.[119]

Participant costs may include:

- Initial capital costs, including sales tax
- Ongoing operation and maintenance costs include fuel cost
- Removal costs, less salvage value
- Value of the customer's time in arranging for installation, if significant.

FMC = EE Equipment + Engineering + Construction + Permitting + Disposal + Labor

[119] California Public Utilities Commission, July 2002, *California Standard Practice Manual: Economic Analysis of Demand-Side Programs and Projects*, p. 11.

2.4.4.3 Baseline Cost

Baseline Cost is the total amount that would be paid by the customer to implement the baseline solution. A minimum of separate material and labor costs is required.

Baseline Cost = SP Equipment + Engineering + Construction + Permitting + Disposal + Labor

2.4.4.4 Incremental Measure Cost

Incremental Measure Cost (IMC) is the *marginal* cost of implementing the energy efficiency measure. This is how much *more expensive* the energy efficiency measure is than the baseline or standard practice (SP).

2.4.4.4.1 Documentation Required When Rebate Exceeds IMC

CPUC Requirement: PAs launching a program, measure, or offering rebate that exceeds the IMC must submit in the measure package documentation to justify the rebate level. In the instances where the cost of the rebate exceeds the IMC, PAs will outline the reasons for such rebate in an addendum. Since each PA program may have different rebates, each PA will need to provide a separate addendum. If the program is third-party implemented, an addendum will be required for each instance. The format and content of the required documentation is as follows.[120]

1. Add a subsection to the body of a measure package document beneath the Program Requirements header titled Incentive Requirements and add the following text:

   Incentive Requirements

   Deployment of the program may require rebates or financial incentives to participants that exceed the incremental measure cost (IMC). Incentives or rebates that exceed the incremental cost for a measure must be justified by individual PAs and/or third-party implemented programs as applicable and for each instance in addendum to measure package submissions to document program implementation practice prior to program implementation.

2. Addendum providing reasoning for cash rebates that exceed the IMC, attached below.

[120] *Addendum to Measure Package Documenting Incentive Greater than IMC_V3 2022-06-02.pdf.*

3. Addendum must be submitted to the applicable eTRM measure log with an entry stating, "Addendum to Measure Package Documenting Incentive Greater than Incremental Measure Cost".
4. CPUC Energy Division Staff reserve the right to review and request clarification.

2.4.4.5 Accelerated Replacement Measure Costs

CPUC Requirement: The Accelerated Replacement Cost (ARC) is the cost of the efficiency measure installed in an Accelerated Replacement situation. The ARC is the FMC of the efficiency measure, reduced by the net present value of the FMC that would have been incurred to install the Standard Practice second baseline equipment at the end of the RUL. The ARC is calculated using the following formula:

$$\boldsymbol{ARC = FMC - \frac{(FMC - IMC)}{(1 + D)^{RUL}}}$$

Where: FMC = full measure cost

IMC = incremental measure cost

D = CPUC-adopted PA discount rate [121]

RUL = Remaining useful life (in years) of the early retired equipment

Table 8 -- Discount Rates by PA Service Territory

Discount Rates	PA Service Territory
7.66%	PG&E
7.65%	SCE
7.38%	SCG
7.55%	SDG&E

Accelerated Replacement Cost (ARC) shall be reported as FMC (1st baseline) and IMC (2nd baseline) when it is reported to CEDARS. ARC is then calculated on the back end by CEDARS.

[121] These are the CPUC-adopted PA discount rates as of the publish date of this Guidance Document but are subject to change. Implementers should verify the currently adopted discount rate with their PA.

ARC may be used for all Accelerated Replacement measures except for those delivered via Direct Install.

2.4.4.6 Eligible Measure Costs and Documentation

CPUC Requirement: Reported measure costs must include all customer out-of-pocket expenses incurred as a result of implementing the energy efficiency measure(s). Out-of-pocket expenses include:

- Audits, design, engineering, and construction costs;
- Permit preparation and fees;
- the cost of any equipment or materials purchased, including sales tax, shipping, and installation;
- Any ongoing operation and maintenance costs;
- Any demolition, removal and recycling or disposal costs (less salvage value);
- Overhead, labor costs (contractor or in-house if proof of direct project hours and costs are provided), or the value of the customer's time in arranging for the installation of the measure (project management), if significant.

At a minimum, for program-installed measures, invoices shall be provided that clearly itemize labor and material costs.[122] Only costs related to the project or measure should be included; the costs of product or feature choices not related to energy efficiency (e.g., standby equipment) should be removed.[123]

Eligible costs may not include:

- spare parts and maintenance supplies,
- maintenance contract,
- standby/backup equipment,
- equipment that does not directly contribute to realization of energy savings.

[122] *California Standard Practice Manual*, p. 8.

[123] Measure Costs in EE Cost Effectiveness Tests. www.cpuc.ca.gov/WorkArea/DownloadAsset.aspx?id=3873.

Note: For site-specific NMEC projects with BRO measures, a three-year maintenance plan is required. In this case, the maintenance contract cost (if any) can count towards eligible measure costs.

Four methods of estimating measure costs at pre-installation are listed below in order of preference, from most to least preferrable.

Method 1: Contractor Quote

Obtain measure cost values through a written bid, quote, or proposal from a vendor, contractor, or manufacturer. The documentation should include a breakdown by technology that includes labor, materials, and other related costs (e.g., disposal costs less salvage value).

Method 2: eTRM Look-Up

Look up the specific technologies in the eTRM measure cost tables. Individual cost values should be documented by referencing the date eTRM was accessed. All costs will be tracked and documented, electronically, in a spreadsheet for easy reference.

Method 3: Cost Estimating Reference

Develop the measure costs for the proposed equipment using a cost estimating reference guide, such as RS Means Building Construction Cost Data and CPUC cost study if applicable. Use the most current cost estimating reference applicable to the project application program year. Consistent with the other methodologies above, costs and assumptions should be tracked in a spreadsheet. If necessary, the methodology may be documented in a separate document.

Method 4: Cost Approximation

If the eTRM does not include the specific technologies that are included in the project, and when Methods 1 through 3 are not feasible, values for similar measures may be used to approximate the measure costs. When using this method, a detailed explanation of the methodology and assumptions must be documented in the measure package. Consistent with the eTRM Look-up method, costs and assumptions should be tracked in a spreadsheet. If necessary, the methodology may be documented in a separate document.

Exception: Whole building new construction projects do not require post-installation itemized invoices. Whole building new construction projects must submit cost documentation at the pre-installation review stage that may be based on any approved method.

2.4.4.7 Baseline Technology Mix

CPUC Requirement: Where baseline savings are developed using a mix of technologies, baseline costs must be calculated based on the same baseline technology mix. [124]

EXCEPTION: Custom applications supported by a Standard Practice Baseline Selection demonstrating that the Standard Practice is a different technology mix than the proposed measure may use the efficiency of other technology or technology mix as the baseline.

2.4.4.8 Administration and Marketing Costs

CPUC Requirement: IOUs will forecast and report total Administrative, Marketing, Direct Implementation costs by program and subprogram in the cost categories and sub-categories.[125] For this reason, Implementers are required to track and report program expenditures in four categories: Administration, Marketing, Implementation, and Incentives. The following lists provide examples of costs that might fall into each budget category.

[124] California Public Utilities Commission, Energy Division. May 13, 2019. *Disposition Approving Pacific Gas & Electric's LED High-Bay and Low-Bay Fixtures Workpaper PGECOLTG178 Rev 4*.

[125] *Energy Efficiency Policy Manual, v 6.0,* pp. 87-94.

Administrative Costs:

- Overhead administrative labor, accounting support, IT services and support (portfolio-wide), data request responses, Commission financial audits, regulatory filings support and other ad-hoc support required across all programs;
- Travel and conference fees;
- Employee and contractor labor;
- Membership dues (i.e., trade organizations);
- Maintenance of reporting database (e.g., Customer Relationship Manager, Track It Fast, Program Builder, etc.);
- Supply management function activities to ensure oversight of contractors; and
- Administering contractor payments for services which are non-incentive related.

Marketing Costs:

- Preparing and/ or distributing collateral;
- Participation in and support related to outreach events;
- Advertising, media, newspaper, website, and magazine related marketing activities;
- Vacation and sick leave related to marketing labor;
- Marketing-specific IT costs; and
- Staff travel to undertake marketing-specific work activities (excluding conference participation).

Direct Implementation Costs:

- Salaries for employees who have a direct interface with the customer;
- Processing rebate applications;
- Inspecting rebated/incentive measures;
- Engineering related activities;
- Measurement development;
- Education and training of contractors/partners/customers;
- Project management activities (i.e., Planning scope of work, working with contractors and customers, setting goals, reviewing goals, reacting to market conditions, and responding to customer inquiries);
- Program planning, development and design;
- Customer support;
- Energy audits and participation in the Continuous Energy Improvement program;
- Market transformation and long-term strategic plan support;
- Compiling and maintaining information (i.e., data, customer records) for projects;
- Licensing fees or IT development costs for program specific applications for implementation (e.g., benchmarking tool or project management tool);
- Vacation and sick leave-related to direct implementation labor;
- Direct implementation-specific IT costs (e.g., licensing fees or IT development cost for program-specific applications);
- Staff travel to undertake direct implementation-specific work activities (excluding conference participation), and
- Program planning/design/project management and information gathering costs.

Incentive and Rebate Costs:

- Customer incentive and rebate payments; and
- Technical advice / assistance.

2.4.5 Incentives

2.4.5.1 Incentive Costs

CPUC Requirement: PAs must file an advice letter if the incentive level of a measure implemented statewide is changed by more than 50% on a cumulative basis annually. The baseline for evaluating incentive level changes resets annually in alignment with the rolling portfolio structure through which PG&E must meet energy efficiency portfolio performance targets on an annual basis.[126]

> Customer incentive design should consider differential benefits of the above-standard practice savings relative to the to-standard practice savings and reflect those individual benefits in the payment structure. Incentives for projects bringing conditions up to Standard Practice should be lower than incentives available for exceeding the Standard Practice. The cost to deliver the energy savings (i.e., $/kWh or $/therm) over the life of the EE measure may be a consideration for developing incentive levels.

2.4.5.2 Incentive Caps

CPUC Requirement: Rebates or financial incentives to participants cannot exceed the measure cost unless approved by Commission Staff. See the Measure Costs section for details on measure cost determination.[127]

2.5 Quality Assurance and Quality Control

2.5.1 Projects May Be Subject to Inspection

PG&E Requirement: All projects and measures are subject to random inspection to verify measure installation, operation, and savings. Implementer must ensure that customers allow a representative from PG&E, the CPUC, or any authorized third party, if requested, to gain reasonable access to their property to verify the installed measure before a rebate is paid. Rebates will not be paid if customer refuses to allow access for verification within 30 days of a formal request for access. PG&E or CPUC representatives may contact the measure vendor

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[126] California Public Utilities Commission, September 27, 2005, *Decision 05-09-043: Interim Opinion: Energy Efficiency Portfolio Plans and Program Funding Levels For 2006-2008 – Phase 1 Issues*.

[127] *Energy Efficiency Policy Manual, Version 6,* p. 26.

and/or installer, if needed, to verify purchase and/or installation and may provide customer name and/or address to third parties to complete this verification.

2.5.2 Quality Assurance Plan

PG&E Requirement: Implementers must have a Quality Assurance Plan in place applicable to each platform utilized by their program. The Plan, subject to approval by PG&E, must be designed to ensure compliance with all applicable platform requirements. Examples of QA Plan elements include:

- Measure Verification: Describe, at a minimum, the percentage of inspections to be conducted, the name of the inspection agent, and who will pay inspection costs;
- Approved materials/equipment and installation standards;
- Mechanism for tracking and resolving customer complaints;
- Plan for avoiding double dipping;
- Dispute resolution procedures (applies to subcontractors and customers);
- Procedures to ensure that eligibility conditions are met during the product development and implementation phases;
- Procedures to ensure that regulatory processes are followed (e.g., CPUC custom project review),[128] and
- Procedure to enable third party inspections and review, including a clear description of measure details and locations.

2.5.3 Energy Insight Online Salesforce Platform

PG&E Requirement: PG&E will provide the Implementer access to its Salesforce platform, Energy Insight. Implementers will be provided with a template file or direct entry access and training to upload project and financing application data into Energy Insight. Implementers must track all projects in Energy Insight using the data submission methodology provided, subject to PG&E's internal validation requirements. Implementers shall use PG&E's Energy Insight portal for all project management documentation, transactions, reports, and communications. Upon successful upload, Implementers will be able to track applications as they go through the process, including rebate status and savings data.

[128] *D.11-07-030*, Attachment B.

2.5.4 PG&E Payments to Implementer or Customer

PG&E Requirement: In order for the Implementer or Customer to receive a rebate or incentive payment, PG&E must receive a complete application meeting all program requirements. PG&E reserves the right to withhold any payment pending review and approval of the claim documentation and inspection results.

2.5.5 Emerging Technologies

PG&E Requirement: Emerging technologies are generally those with greater uncertainty around performance against stated metrics, savings values, and/or savings persistence. PG&E may require that emerging technology measures be submitted for evaluation and additional data collection by the Emerging Technologies Program before introduction into the portfolio.

> Ideas for novel measures may be submitted anytime through the Emerging Technologies Coordinating Council idea proposal form at http://www.etcc-ca.com/idea-proposal-form. The California Technical Forum, managers of the eTRM, also support a new measure review process that may be used by implementers seeking to implement new measures.

2.5.6 Program Measurement and Verification

CPUC Requirement: PAs shall ensure adequate data collection procedures and requirements exist in third-party contracts for all programs, such that source data required to conduct EM&V (e.g., customer names and addresses where installations occurred) is collected and verified. Furthermore, tracking of site verification activities is required for upstream and midstream programs unless an exception is made through a Tier 2 advice letter.[129] Details on the specific data to be collected can be found in section 3.3.3.

2.5.7 Program Evaluation

CPUC Requirement: CPUC Staff has the responsibility to perform research on parameters such as free ridership and market effects and to use the results of that research to develop updated NTG values for use in portfolio planning and utility reporting. The PAs are required to cooperate and facilitate this research. Utility customers are required to cooperate with CPUC Staff in this research as a condition of receipt of energy efficiency funds.[130]

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[129] *D.23-06-055*, pp. 30-3.

[130] *D.12-05-015*.

Implementers will be expected to respond in full to all requests from PG&E (or the CPUC and its contractors) to facilitate program evaluation. Implementers will also be responsible for ensuring the evaluator's access to customers and their premises.

In the box below, PG&E provides a simplified (and by no means comprehensive) example of the typical data fields that are often collected in a project to enable impact evaluations:

The following list includes the typical data fields collected for each project to facilitate impact evaluations:

- Customer name;
- Utility billing statement showing customer account number and PPP charges;
- Address where efficient equipment was installed;
- Customer's telephone number and email address;
- Existing / previous equipment characteristics (could include photos/movies), if applicable;
- New equipment installed (measure code);
- Quantity of energy efficient measures installed, if applicable;

Implementer is responsible for collecting and providing all program data to PG&E and CPUC in an agreed upon format and shall provide the name and full contact information of Implementer's dedicated data request personnel in the program proposal. PG&E's EM&V team will review the Implementer's proposed EM&V approach and will direct Implementer to remedy any deficiencies.

Chapter 3 Deemed Platform

3.1 Introduction

This document applies to all residential and non-residential deemed program activities, including third party, statewide, and local PG&E programs. This Rulebook Version 4.0 includes interim updates from the SW Deemed WP Rulebook Version 4.0. The SW Deemed WP Rulebook Version 4.0 is currently being updated and will be published after the release of PG&E Resource Savings Rulebook, Version 4.0. There may be some slight differences for a short period time, but the overall spirit of the rulebooks should align.

3.2 Eligibility

3.2.1 Natural Gas Efficiency Measures

CPUC Requirement: Beginning January 1, 2024, ratepayer-funded incentives are eliminated for gas energy efficiency measures that: (1) do not meet the definition of exempt, and (2) do not meet the definition of cost-effective, as specified in D.23-04-035. This policy applies to deemed measures in the Resource Acquisition and Market Support segments of all energy efficiency portfolios for:

- Residential and commercial new construction with no existing gas line; and
- Residential and commercial new construction with an existing gas line, if gas usage will materially increase.[131]

If a project involves a “greenfield” construction (i.e., no existing gas infrastructure) or the project will result in a substantial increase in gas consumption (regardless of whether the site has an existing gas line), the prohibition on incentives for new gas measures / infrastructure in new construction will apply. If a project involves existing gas infrastructure and will result in a substantial increase in gas consumption, it will also be subject to the prohibition on incentives for new gas measures / infrastructure. For purposes of determining whether an increase is substantial, D.23-04-035 relies on the current specification of a substantial change in design occupancy, which is a change of 30 percent (or more) as currently reflected in Resolution E-4818.[132]

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[131] California Public Utilities Commission, April 6, 2023, *Decision 23-04-035: Decision Addressing Codes And Standards Subprograms And Budgets And Staff Proposal On Reducing Ratepayer-Funded Incentives For Gas Energy Efficiency Measures*, OP3.

[132] D.23-04-035, pp. 21-22.

Cost-effectiveness for natural gas new construction measures will be determined at the eTRM permutation level. PAs shall use the Cost Effectiveness Tool to assess the TRC benefit to cost ratio for each permutation of non-exempt natural gas new construction measures with all available known costs.[133]

PA programs and third-party contracts shall comply with this policy no later than October 1, 2023 or 90 days after the issue date D.23-04-035, whichever date is later. All existing and new contracts must comply with the policies adopted D.23-04-035 by the time each policy takes effect.[134]

3.2.2 Deemed Must Go Deemed

CPUC Requirement: All measures that have calculation methodologies or measure assumptions approved in a measure package, DEER, or eTRM permutation must adopt those methodologies.[135] Deemed measures can be processed through the custom programs as long as the deemed savings values are used and deemed rebates amounts are not exceeded. Deemed measures may sometimes be processed through custom programs to simplify the application process for a customer's convenience and to avoid multiple applications. However, Custom projects that include deemed measures are required to use deemed values for energy savings values and cost assumptions. It is not acceptable to select a Custom approach for a Deemed measure in order to increase the incentive or rebate amount.[136]

> Whenever possible, deemed measures should be processed through the Deemed Platform. This reduces processing costs and time.

3.2.3 CPUC Coordination on New Measure Development

CPUC Requirement: When proposing new deemed measures for the energy efficiency program portfolio, the PAs and any third party (Implementer or non-Implementer) must:

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[133] D.23-04-035, p. 15.

[134] D.23-04-035, p. 22.

[135] *Energy Efficiency Policy Manual,* p. 36; *D.12-05-015*.

[136] *Resolution E-5152*, p. 17.

- Use due diligence when developing the proposed ex ante values such that those new ex ante values represent the expected electricity and natural gas savings, costs, and lifetime of the measure;
- Undertake research, in collaboration with Commission Staff, as required, to establish reasonable expected values;
- Assess promising new technologies and use the results of research undertaken during the assessment period to improve the ex ante values; and[137]
- Propose measures that will not supersede or hinder safety regulations and code (e.g., keeping hot water at a required temperature in some facilities to avoid legionnaire issues).

3.3 Measure Packages

3.3.1 Measure Packages Replace Workpapers

CPUC Requirement: All deemed measures must be supported by CPUC-approved statewide measure packages (formerly called workpapers).[138] Beginning with the 2017 Workpaper Guidance and continuing in Resolution E-5009, the CPUC required the replacement of existing utility-specific deemed measure workpapers with statewide workpapers.[139,140] Resolution E-5152 further clarified that the statewide deemed workpapers should now be referred to as measure packages. As part of this transition, all existing PA-specific workpapers were retired and replaced with statewide measure packages, where appropriate and still relevant.[141]

CPUC-approved measure packages provide deemed energy savings values, deemed calculations, deemed variables and factors, and the methodologies by which they were derived. Measure packages must include the applicability of the values and calculations, sources and references, assumptions, and analyses and evaluations to support the values.[142] Implementers

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[137] *D.12-05-015*, OP144, p. 431.

[138] Based on California Public Utilities Commission, April 21, 2015, *Decision 05-04-051: Interim Opinion – Updated Policy Rules for Post-2005 Energy Efficiency and Threshold Issues Related to Evaluation, Measurement and Verification of Energy Efficiency Programs*, p. 25.

[139] 2017 Workpaper Guidance." Memorandum submitted to California Energy Efficiency Program Administrators. November 14, 2016. Accessed at: http://deeresources.com/files/2013_14_exante/downloads/2017_Workpaper_Guidance_Memo_OUT.pdf.

[140] *Resolution E-5009*, p. 3.

[141] *Resolution E-5152,* p. 7.

[142] 2017 Workpaper Guidance November 14, 2016; California Public Utilities Commission, January 11, 2018, *Decision 18-01-004: Decision Addressing Third Party Solicitation Process for Energy Efficiency Programs*.

may propose new or updated measure packages to any of the PAs, [143] but implementers should use the California Technical Forum (Cal TF) screening tool prior to developing the measure package.[144] Measure packages must not provide preferential treatment to any provider of energy efficiency services.[145]

Implementers may work with any of the California IOUs to submit a measure package, but must follow the Cal TF measure screening process. PG&E currently accepts, reviews, and submits to the CPUC Implementer-derived measure packages, leveraging the California Technical Forum (Cal TF) for review and vetting.

3.3.2 Statewide Measure Packages

CPUC Requirement: For PY2020 and beyond, measure packages must use a statewide approach and provide a complete set of values to cover the entire state of California and all DEER-approved climate zones.[146]

3.3.3 Measure Package Format and Contents

CPUC Requirement: In consultation with the PAs and CPUC, Cal TF developed the Statewide Measure Characterization Template as well as style and QA/QC guidelines for use when proposed a new measure package.[147] All elements of the measure package shall be internally consistent and reflect both the latest technologies available on the market, the latest code requirements, and up-to-date measure costs.[148]

PG&E Requirement: A proposed measure package must contain all the sections from the Measure Characterization Template, as provided on the Cal TF website,[149] including, but not limited to the following sections:

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[143] *Energy Efficiency Policy Manual*, v 6.0, p. 62.

[144] http://www.caltf.org/submit-a-measure.

[145] *D.18-01-004*.

[146] *Resolution E-5009,* September 12, 2019.

[147] http://www.caltf.org/tools.

[148] California Technical Forum, June 20, 2023, *Statewide Measure Development and QA/QC Guidelines v.2.5*, p. 4.

[149] The guidelines for proposing, developing, and submitting a measure are available on the Cal TF website at: https://www.caltf.org/submit-a-measure.

- Technology Summary – brief explanation of the energy saving opportunity and the mechanism of the technology along with studies or references that support the need for this technology.
- Measure Case and Base Case Description – well defined descriptions/criteria of Measure and Bases Cases without referring to other sources. [150] If there are multiple cases, please define how each one is different such as different tier level (Pump HP- 50-100 HP, >100HP). It is encouraged to include summary tables for easier understanding.
- Code Requirements – list and explain applicable portions of the state (typically CA Appliance Efficiency Regulations – Title 20, CA Building Energy Efficiency Standards – Title 24) and federal code and standards.
- Program Requirements – include Implementation Eligibility table (allowed combinations of measure application type, delivery type and sector), Eligible Products, Eligible Building Types and Vintages, Eligible Climate Zones.
- Gas and Electric Savings – provides DEER data or energy saving formulas with input definitions and constant values with references.
- DEER Differences Analysis – provides a summary of DEER-based inputs and methods, and the rationale for inputs and methods that are not DEER-based.
- Revision History – This section records updates required by dispositions, program changes, code changes, savings changes, format changes, author, and date of modification.

CPUC Requirement: The following data collection requirements must be added to measure packages updated for PY2023 and PY2024, and any new measure packages thereafter, for all offerings using the UpDeemed delivery type. At a minimum, the data collected through the program must allow identification of each piece of incented equipment for EM&V verification purposes. Minimum data requirements that must be described in the measure package include:

- Site Identifier – A unique identifier for the shipping destination (upstream) or installed location (midstream) of the incentivized equipment (e.g., site address)
- Equipment Identifier - A unique identifier for each unit of incentivized equipment (e.g., serial number)
- Quantity per sales transaction, project, or site – Total units of incentivized equipment located at the site or project.

[150] California Public Utilities Commission, Energy Division, October 2, 2015, *Disposition for Workpaper PGECOHVC139 Revision 3 (Residential HVAC Quality Maintenance)*.

The specific data requirements will be reviewed on a case-by-case basis through the measure package review process. The following are examples of additional data fields that may be required.

- Building Type – Commercial or residential building type, e.g., Asm, RSD, MFm
- Measure Size category – General size or capacity range specific to each measure type, for example HVAC equipment would be AHRI product type and size range
- Equipment manufacturer – Manufacturer of the incentivized equipment, e.g., Carrier, Trane, Nest, Philips, GE, etc.
- Equipment model number – Manufacturer number that can be used to lookup size, features, performance, etc. for the incentivized equipment
- Rated capacity – Actual size, capacity, load rating, etc. for the incentivized equipment
- Rated efficiency unit (EfficUnit) – The engineering unit basis for the efficiency or performance rating, e.g., Unit Energy Factor (UEF), thermal efficiency (TE), seasonal energy efficiency ratio (SEER)
- Rated efficiency (ref. EfficUnit) – Efficiency or performance rating value for the Rated efficiency unit basis
- Quantity per sales transaction, project, or site – Total units of incentivized equipment located at the site or project
- Control strategy – document the relevant control strategy to demonstrate compliance with measure specifications (e.g., for space-heating boiler measures, supply hot water temperature reset strategy based on outside-air temperature).[151]

CPUC Requirement: Starting with PY2026 measure packages, the entire responsibility for calculating the unit energy savings values for all deemed measures is shifted to the measure package developers.

CPUC Requirement: PAs may use the Measure Package Plan template to request feedback from CPUC Staff on a measure package prior to its submission. Early feedback on measure package submittals will identify concerns, so they can be addressed in the measure package development, rather than through a disposition. Measure package plans will be required for all new measure package submittals or for new measures added to existing measure packages. In

[151] *Resolution E-5221*, pp. 10, A-5, A-6.

addition, CPUC may request a measure package plan for an in-development measure package from time to time.

The measure package plan should be updated as changes occur to schedules or requests for review.[152]

3.3.3.1 Measure Package Timeline for Submittal, Review, and Approval Process

CPUC Requirement: The DEER2023 Resolution (PY2023) established the transition from the annual DEER cycle to a two-year cycle which started with the DEER2024 Resolution (PY2024-25). For PY2023 measure packages, PG&E made necessary adjustments to savings estimates based on research and modeling and submitted the measure packages for CPUC staff review and approval. Staff-approved values were presented in the draft DEER2024 Resolution for adoption. Adopted values were locked for planning and claims in PY2024-25. Mid-cycle error corrections (i.e., correction of typographical and clerical errors, and other obvious, inadvertent errors and omissions) will be handled on a case-by-case basis and assessed based on their impact to the portfolio.

CPUC Guidance: CPUC staff will work with PAs to set a prioritized schedule of updates for all PY2026-27 measure packages as determined in the Measure Lifecycle Management and Research Needs for PY2026-27. PAs may submit additional updates to measure packages beyond what is directed and may include additional measure packages for update during that time. Only measure packages adopted in the future resolution for DEER2026 will be included in the set of deemed measures for the PY2026-27 program cycle.

3.3.3.2 New Measures

New measure packages and measure packages that solely include the addition of new measures may be submitted for CPUC staff review at any time during the biennial cycle and must follow the submittal, review, and approval process enumerated below. Newly approved ex ante values adopted into the portfolio are not subject to an effective date 90-day after approval. Instead, they will become effective upon approval and can be used for off-cycle claims. Notification of new measure packages or new measures added to existing measure packages will be communicated to stakeholders through CPUC staff measure package dispositions, eTRM published values, DEER support tables, and/or stakeholder meetings.[153]

1. All new measure package submissions may be submitted at any time during the cycle, and independent of the exact time submitted, will be considered to have been submitted on the first or third Monday of the month; measure packages actually submitted after the

[152] https://cedars.sound-data.com/deer-resources/deemed-measure-packages/guidance/file/2952/download.

[153] *Resolution E-5221*, p. 14.

close of business of the first Monday will be considered submitted on the third Monday and measure packages submitted after the close of business of the third Monday will be considered submitted on the first Monday of the following month. This will be herein considered the “original submittal date.”

2. PAs will be required to submit a measure package plan (previously workpaper plan) (MPP) for review and approval prior to a new measure package submission. In addition, CPUC may require MPPs for select measure package revisions. Furthermore, PAs requesting feedback from CPUC on in-development measures packages must submit an MPP.
3. CPUC has a 15-day (calendar) preliminary review period following the original submittal date to identify any additional information necessary to support approval of the measure package. In this event, CPUC will post a request for information which will stop the review clock. If no request for information is posted, CPUC has an additional 20-day (calendar) detailed review period to conduct the review and issue an approval or rejection.
4. Upon receipt of a measure package resubmission with all necessary information, CPUC has a 35-day (calendar) review period which starts on the day of the measure package resubmission date. If the CPUC does not issue a disposition by the end of the 35-day review period, a measure package will achieve interim approval.
5. In certain instances, for example, when a large batch of measure packages are submitted in quick succession or management approval of a complex measure package is needed, CPUC may request additional time to review or to conduct Senior Management review. CPUC will provide notice to PA if additional time is necessary to review measure packages.[154]

3.3.3.3 Error Corrections

CPUC Guidance: Reasonable error corrections to DEER and measure packages (i.e., “correction of typographical and clerical errors, and other obvious, inadvertent errors and omissions.”) can occur at any time during the biennial cycle, shall become effective immediately. As stated in Resolution E-5152, “such errors will be handled on a case-by-case basis and assessed based on their impact to the portfolio.” Notification of reasonable error corrections shall be communicated to stakeholders through CPUC staff measure package dispositions, eTRM published values, guidance documents, DEER support tables, DEER change log, and/or stakeholder meetings.

Error corrections that are egregious and have a large impact to the savings portfolio or claims (i.e., NTG values, measure eligibility requirements, or other measure packages requirements that can retroactively impact potential savings claims) may be allowed only on a very limited

[154] *Resolution E-5152*, pp. 13-14.

basis and will be handled case-by-case. CPUC staff shall hold the authority to decide whether an off-cycle update is considered critical in these circumstances. This will be communicated to stakeholders through CPUC staff measure package dispositions, guidance documents, eTRM published values, DEER support tables, DEER change log, and/or stakeholder meetings.

3.3.3.4 Existing Measure Packages

PG&E Requirement: When available, Implementers must use an existing measure package. A new measure package may not be developed unless the measure substantially differs from the existing approach. Updates to existing measure packages are encouraged to reflect new/best available data.

3.3.4 CPUC Measure Package Dispositions

CPUC Requirement: Commission Staff may provide recommendations or "dispositions" on reviewed measure packages. Those disposition types are listed below:

- Approved: measure package may proceed with no changes to the submission;
- Resubmission Required: Disposition includes request for additional information or specific revisions or additions;
- Rejection: measure package does not fall within the definition of an energy efficiency measure or does not meet Commission requirements for inclusion into a utility portfolio.[155]

Measure packages should include guidance from prior dispositions (which can be found on CEDARS Dispositions for Deemed Measures website: https://cedars.sound-data.com/deer-resources/deemed-measure-packages/dispositions/)

3.3.4.1 Measure Package Notifications

The Cal TF maintains the Statewide Measure List, which includes recent updates to measure packages, as well as a more detailed revision list of changes to measures. The Statewide Measure List can be found at: http://www.caltf.org/statewide-measure-list. The CPUC posts on CEDARS Monthly Measure Package Summaries, to detail measure package activity during the month, including dispositions issued, dispositions in progress, and measure packages considered for future review. These Monthly Measure Package Summaries are available at: https://cedars.sound-data.com/deer-resources/deemed-measure-packages/monthly-summaries/.

[155] *Energy Efficiency Policy Manual V.5,* Appendix G, p. 94.

3.3.4.2 Technologies with a Single Manufacturer/Vendor

CPUC Requirement: Measure packages are allowed for technologies supported by one vendor only. However, in these measure packages, technologies and their energy efficiency features must be described generically and using basic engineering principles and should not identify a specific vendor or developer.[156] All other measure package requirements apply.

3.3.5 Measure Level Requirements

PG&E Requirement: Measure specifications and eligibility requirements must be set for each deemed measure and should be well-defined to clearly align with the measure case description. Specifications and eligibility must be included in a CPUC-approved measure packages and any other public-facing collateral such as a product catalog or program handbook.

In order to qualify for a rebate, program participants must follow all applicable measure level requirements. This includes, but is not limited to: building type, climate zone, and delivery type. Unless otherwise specified in the Program Implementation Plan and applicable measure package, all equipment must be new and, prior to application submission, properly installed and completely operational (following the operational requirements of the equipment). Measures must be more efficient than the pre-existing condition.[157]

3.3.6 Qualified Products Lists

PG&E Requirement: When an Implementer sets the measure-level requirements, the Implementer may choose to leverage a Qualified Products List (QPL) to assist program participants to determine which equipment qualifies for the measure.

PG&E Requirement: If the Implementer chooses to require equipment to be included on a QPL when defining measure level requirements, the Implementer is responsible for determining whether to reference external QPLs such as those maintained by national standard setting and qualifying bodies such as the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE), the California Energy Commission, the DesignLights Consortium®, or the U.S. Environmental Protection Agency's ENERGY STAR®. If measure-level specifications and eligibility differ from such external QPL specifications, a separate "independent" QPL must be provided in a publicly accessible website with retrievable .csv file that can be integrated into

[156] California Public Utilities Commission, 2019*, Informational Memo on Allowing a Sole Source measure in a Workpaper,.* Memorandum submitted to Cassie Cuaresma, SE; Henry Liu, PG&E, Ed Reynoso, SDG&E; Chan U Paek, SoCalGas.

[157] California Public Utilities Commission, Energy Division, March 1, 2013, *Disposition for Workpaper (2013-2014 Lighting Retrofits)*.

PG&E's Energy Insight. If a separate "independent" QPL is provided for a deemed measure, the QPL must be maintained and updated on an agreed-upon schedule appropriate to the pace of equipment turnover in that category. Implementer is responsible for the accuracy of "independent" QPLs.

Equipment purchased for deemed offerings that leverage a QPL must be on the QPL at the time of application, or at the time the Implementer has indicated in its program terms & conditions, to qualify for a rebate and the equipment model must match exactly as it appears on the QPL.

3.3.7 Measure Delivery

PG&E Requirement: Deemed measures may use any of four delivery channels: upstream, midstream, downstream, or direct install. Measure packages may include up to all four delivery types, but programs must implement controls to avoid double-dipping in the event more than one intervention strategy is implemented for a particular measure.

CPUC Requirement: All upstream and midstream interventions must be delivered statewide.[158] The following table describes the statewide requirements around each delivery channel.

Table 9 -- CPUC Requirements for Statewide Program Delivery

	Upstream	Midstream	Downstream	Direct Install
Implementer Partners	Manufacturers	Distributors / Suppliers / Retailers (includes Instant Rebate / Point-of-Sale Programs)	End-use customer	Contractor
Must be offered Statewide	Yes	Yes	No, unless specifically ordered by the CPUC	No, unless specifically ordered by the CPUC

[158] *D.16-08-019*, p. 104.

3.3.7.1 Statewide Programs

CPUC Requirement: Statewide programs or subprograms shall be consistent across territories and overseen by a single lead program administrator. One or more statewide implementers, under contract to the lead administrator, shall propose the design and deliver the program or subprogram in coordination with the lead program administrator. Local or regional variations in incentive levels, measure eligibility, or program interface are not generally permissible (except for measures that are weather dependent or when the program administrator has provided evidence that the default statewide customer interface is not successful in a particular location). Upstream (at the manufacturer level) and midstream (at the distributor or retailer level, but not contractor or installer) interventions are required to be delivered statewide. Some, but not all, downstream (at the customer level, or via contractors or installers) approaches are also appropriate for statewide administration. Statewide programs are also designed to achieve market transformation.[159]

3.3.8 Claimable Energy Savings

PG&E Requirement: The claimable energy savings applicable to a measure depend on a variety of factors. The table below outlines the default policies that PG&E currently employs for its programs. PG&E date-stamps rebate applications upon receipt so that the correct measure package and energy savings are applied. Implementers may propose their own program guidelines as long as applications are received by PG&E via eRebates or Energy Insight within the measure effective dates.

Table 10 -- Default Measure Eligibility Dates

Measure Eligibility Criteria	Non-Residential Applications	Residential Applications
Rebate Level & Eligibility Determination Date	Date application is received by PG&E	Purchase Date
Savings Determination Date	Date application is received by PG&E	Date application is received by PG&E
Available Application Submittal Options	Downstream / Direct Install: Online via eRebates or Energy Insight Upstream: Energy Insight	Downstream / Direct Install: Online via eRebates or Energy Insight Upstream: Energy Insight

[159] *D.18-05-041*, pp. 61-62.

Deadline to Submit Application	≤ 60 days of purchase date, installation date, or account establishment date (SAID activated), whichever is latest	≤ 60 days of purchase date

CPUC Requirement: Deemed values must be taken from a DEER version (now eTRM) or measure package effective at the earlier date of either permit issuance (if the installation requires a permit or approval from a regulatory agency) or within 60 days of installation completion.[160]

3.3.9 Current Measure Package Values

CPUC Requirement: The CPUC often approves savings and measure attributes for a specific effective time period.[161] The Date Approved (StartDate) is the first date for which a Measure Package is approved for use and Expiry Date is the date after which the measure is no longer eligible.

PG&E Requirement: In order to help reduce a significant divergence of EM&V Gross Realization Rates (GRRs), wherever possible use DEER savings at the same level as program offering. This is especially important where DEER permutation savings vary significantly across primary characteristics (e.g., climate zone, building type, HVAC type, etc.). For example, if DEER has measure values for multifamily and manufactured homes but PAs use the single-family values for all residential building types covered by the program, then the GRR is going to be divergent from 100 percent.

3.4 DEER and eTRM Updates

3.4.1 Transition to eTRM

CPUC Requirement: PAs and third-party implementers previously developed service-territory specific measure values which were approved in workpapers and catalogued in the Database for Energy Efficient Resources (DEER) Ex Ante database (EAdb) tables and Ex Ante Database Archive (deeresource.net) file directory. With the consolidation of territory-specific EE measures into Statewide measure packages, the CPUC has also approved the transition from DEER and

[160] *Resolution E-4952*, p. A-47.

[161] Implementers must ensure that they use valid workpaper values in all savings and cost calculations. Current CPUC-approved workpapers can be found at http://deeresources.net/workpapers.

READI to the electronic Technical Resource Manual (eTRM).[162] eTRM offers a relational database format and is accessible through an online user interface and through an Application Programming Interface (API). This resource offers access to approved measure packages as well as CPUC-approved deemed measure data. As of January 1, 2022, DEER no longer refers to the Ex Ante and Preliminary Ex Ante Review (PEAR) databases since these data will reside in the eTRM. With the release of Version 2.3 in March 2022, eTRM is the Official Source of California Energy Efficiency Measure Data,[163] and is now the sole source for energy efficiency measure package development, submittal, review, and publishing.[164]

3.4.2 DEER Update Cycle

CPUC Requirement: Historically, DEER values have generally changed once per year via DEER Resolution.[165] Beginning with PY2023, the DEER Resolution changed from an annual cycle to a two-year cycle such that the DEER2024 Resolution covers PY2024 and 2025. Further, the DEER Resolution release date was changed from September 1 to November 1. The DEER2024 Resolution was the first to fully meet D.21-05-031 and lock in values to be used for planning and claims for PY2024-25. Only measure packages adopted in the DEER2024 are included in the set of deemed measures for the PY2024-25 program cycle. The last day to submit measure packages for consideration in the 2024-25 vintage of deemed values was June 1, 2022 to be approved for the DEER2024 Resolution on November 1, 2022.

3.5 Ex Ante Values

3.5.1 Data Reporting Workbooks and Support Tables

All data reporting workbooks and support tables are now incorporated in eTRM.

3.5.2 Existing Conditions Baseline

CPUC Requirement: Measure packages for deemed measures that utilize an Existing Conditions baseline must establish reliable aggregate data reflective of the existing condition and circumstance (buildings, customers, climate zones, etc.) where the measure is to be applied. Measure packages that are submitted for ex ante review and approval by the CPUC may also request an Accelerated Replacement baseline (or blend of Normal and Accelerated Replacement) for specified program deliveries, customer types, and/or measures applications. Such requests should specify the types of evidence collected from participants that will ensure

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[162] *Resolution E-5082*.

[163] https://www.caetrm.com/.

[164] *Resolution E-5221*, p. 7.

[165] *D.15-10-028*, p. 119.

compliant program delivery. Program designs, program rules, and customer eligibility criteria are submitted to the Commission for approval, with a strong argument or data supported case that is highly indicative of inducing accelerated replacement. The program rules must specify the customer eligibility criteria and the evidence of customer and measure eligibility that will be collected for each program installation. The specified evidence must be collected for each installation as part of the program implementation, and this evidence must be made available to the Commission upon request and submitted as supporting documentation with related energy savings claims.[166]

3.5.3 Preponderance of Evidence for Accelerated Replacement

Beginning October 1, 2023, deemed measures will no longer require completion of questionnaires to demonstrate a Preponderance of Evidence for some customers. Instead, every customer implementing the accelerated replacement of a deemed measure—except for Small-Sized Business customers and hard-to-reach customers[167]—must complete the Deemed Measure Customer Affidavit Statement, as follows.

Customer Affidavit Statement

I, (name), hereby certify that I am authorized to make this declaration as the Customer or as an authorized representative of the Customer (name). By signing below, I certify the following to the best of my knowledge:

____ The existing equipment being replaced is in operating condition.

____ Without the program's rebate and energy savings information, we would have continued to maintain the existing equipment for at least another year.

I acknowledge that misrepresentation will result in a rejection of all or part of the project and that the Customer may being subjected to additional scrutiny and may result in Customer probation or suspension from current and future incentive programs.

For those customers required to sign the Customer Affidavit Statement, additional evidence requirements may be required, depending on the level of Rigor. These additional evidence requirements are provided in the following table.

[166] *Resolution E-4818*, p. 46.

[167] *Resolution E-5115*, OP5, p. 32.

Table 11 – Additional Evidence of Equipment Viability Requirements[168]

Rigor	Equipment Viability Requirements	
	Physical Evidence of Equipment Viability	**Program Influence Information**
Very Low (Incentive < $7,500)	None	None
Low (Incentive ≥ $7,500 and < $25,000)	1. Photos or videos showing the age of existing equipment (for example, installation date or initial operation date)	1. Describe the customer's scheduled maintenance or equipment upgrade practices, as applicable
Medium (Incentive ≥ $25,000 and < $100,000)	Photos or videos, plus application developer* to collect additional information: 1. Age of existing equipment (for example, installation date or initial operation date) 2. Operating history or EMS data of existing equipment, as applicable	1. Describe the customer's scheduled maintenance or equipment upgrade practices, as applicable. 2. Describe the application's development, including the customer's motivating factors and decision criteria that were considered as it planned, designed, and selected the efficient equipment to replace the existing equipment. 3. What are the customer's barriers (if any) to adopting the proposed new energy efficiency measure? What are its resource constraints (if any)? 4. What are the regulations (e.g., code, standards) applicable, if any, to the existing equipment and the relevant energy efficiency measure?
Full (Incentive ≥ $100,000)	Photos or videos, plus application developer* to collect additional information: 1. Age of existing equipment (for example, installation date or initial operation date) 2. Operating history or EMS data of existing equipment, as applicable	1. Describe the customer's scheduled maintenance or equipment upgrade practices, as applicable. 2. Describe the application's development, including the customer's motivating factors and decision criteria that were considered as it planned, designed, and selected the efficient equipment to replace the existing equipment. 3. What are the customer's barriers (if any) to adopting the proposed new energy efficiency measure? What are its resource constraints (if any)? 4. What are the regulations (e.g., code, standards) applicable, if any, to the existing equipment and the relevant energy efficiency measure? 5. Describe the project developer's services provided to the customer and timing of developer's engagement

[168] California Public Utilities Commission, Energy Division, August 25, 2023, *Memorandum: Proposed Guidance on Preponderance Of Evidence Requirements For Accelerated Replacement Of Deemed Measures*, pp. 3-4.

		compared to customer's decision-making process, as applicable. 6. Describe any maintenance issues for the existing equipment in the last 36 months.

* Application developers include program administrators and third-party program implementers.

3.5.4 Installation-Rate / Gross Savings Installation Adjustment

CPUC Requirement: The installation rate (IR) or Gross Savings Installation Adjustment (GSIA) represents the percentage of units for which incentives were paid but not installed. If measures are removed after installation, the reduction should be captured in the EUL, not the GSIA. Commission Staff maintains a table of installation rates measures in the eTRM. For any measures not listed in this table, the installation rate shall be assumed to be 1.0.[169]

3.5.5 Net-to-Gross Ratio

3.5.5.1 Emerging Technologies NTG Value

CPUC Requirement: A measure package can have a higher NTG value for an Emerging Technology (ET) measure under the following conditions:

- it has not been offered by any EE program (PA or third-party Implementer) for more than two years; and
- the CPUC agrees a higher NTG is warranted due to ET designation.

Commission Staff have the authority to accept or reject a utility ET measure classification and to set any ET measure's net-to-gross at a higher or lower value than the default value (0.85), as it deems appropriate.[170]

After an Emerging Technology has been offered in the marketplace by **any** program for more than two years, it is no longer considered an ET measure and can no longer be claimed as 0.85 by **anyone**.[171] A measure package with a higher NTG based on ET or "All-Default<=2yrs" will

[169] California Public Utilities Commission, Energy Division, *Disposition for Workpaper PGECOALL111 Revision 0 (Tier 2 Advanced Power Strips)*.

[170] *D.12-05-015*, p. 62; DIS.02272013.CPUC, Workpaper Disposition for Lighting Occupancy Sensor Controls, February 27, 2013.

[171] Guidance for Emerging Technology NTG Values-pjb-11-10-2020.

need a measure package revision to an appropriate NTG>2 years after it is introduced in programs.

3.5.5.2 NTG Values for Schools and Constrained Areas

CPUC Requirement: Projects undertaken by K-12 schools and community colleges, and programs that target specific transmission, distribution, or generation constrained areas (other than bottoming-cycle combined heat and power projects) may use a NTG value of 0.85 for above code measures.[172]

3.5.5.3 Hard-to-Reach NTG Values

CPUC Requirement: HTR NTG values are only applicable for measures installed by or for customers who meet the following criteria:

California Native American Tribes are hard-to-reach; our state's historical dispossession of Tribes now requires deliberate effort to overcome persistent barriers to providing energy efficiency programs and services to Tribes. California Native American Tribes are defined consistent with the Commission's Tribal Consultation Policy, and any subsequent modification(s).

Specific criteria were developed by CPUC Staff to be used in classifying a customer as hard-to-reach. Two criteria are considered sufficient if one of the criteria met is the geographic criterion defined below. If the geographic criterion is not met, then at least three (other) criteria must be met. The exception is for California Native American Tribes, who do not need to meet any additional criteria.

There are common as well as separate criteria when defining hard- to-reach for residential versus small business customers. The barriers common to both include:

Customers who do not have easy access to program information or generally do not participate in energy efficiency programs due to a combination of language, business size, geographic, and lease (split incentive) barriers. The common barriers to consider include:

- Geographic criterion –
    - Customers or customer premises in areas other than the United States Office of Management and Budget Combined Statistical Areas of the San Francisco Bay Area,

[172] 2015 Workpaper Guidance – Lighting Retrofits; D.14-10-046, pp. 163-164.

the Greater Los Angeles Area and the Greater Sacramento Area or the Office of Management and Budget metropolitan statistical areas of San Diego County, or

  - Customers or customer premises in disadvantaged communities, as identified by the California Environmental Protection Agency pursuant to Health and Safety Code Section 39711.

- Language criterion – Primary language spoken is other than English.

For small business added criteria to the above to consider:

- Business Size – 25 or fewer employees and/or classified as Very Small (Customers whose annual electric demand is less than 20 kilowatt (kW), or whose annual gas consumption is less than 10,000 therm, or both), and/or
- Leased or Rented Facilities – Investments in improvements to a facility rented or leased by a participating business customer.

For residential added criteria to the above to consider:

- Income – Those customers who qualify for the California Alternative Rates for Energy, Energy Savings Assistance, or the Family Electric Rate Assistance Programs, and/or
- Housing Type – Multi-family and Mobile Home Tenants (rent and lease).

For the Public sector, customers classified as “local government” that meet the geographic criterion above may also be considered hard-to-reach.[173]

[173] California Public Utilities Commission, June 29, 2023, *Decision 23-06-055: Decision Authorizing Energy Efficiency Portfolios For 2024-2027 And Business Plans For 2024-2031*, pp. 52-54.

Table 12 -- Hard-to-Reach Definitions by Segment

Segment	Required HTR Criteria	Criteria Definition
Residential	Member of the California Native American Tribes -OR- Geographic, and At least one of the following: - Language; - Income; or - Housing Type.	**Geographic**: homes or businesses in areas other than the US Office of Management and Budget Combined statistical areas of the SF Bay Area, the greater LA area, and the greater Sacramento area OR in a disadvantaged community, as defined by CalEPA. **Language**: primary language spoken is other than English. **Income**: those customers who qualify for the California Alternative Rates for Energy or the Family Electric Rate Assistance Program Housing Type: multifamily and mobile home tenants (rent and lease). **Business Size**: less than ten employees and/or classified as Very Small (customers whose annual electric demand is less than 20 kW, or whose annual gas consumption is less than 10,000 therm, or both). **Leased or Rented Facility**: investments in improvements to a facility rented or leased by a participating business customer.
Commercial	Member of the California Native American Tribes -OR- Geographic, and At least one of the following: - Language; - Business Size; or - Leased or Rented Facility	

If a customer does not have a geographic barrier, a customer that meets three of the other barriers listed above will qualify as hard-to-reach.[174]

[174] California Public Utilities Commission, December 18, 2014, *Resolution G-3497: Pacific Gas and Electric Company (PG&E), San Diego Gas & Electric (SDG&E), and Southern California Gas Company (SoCalGas) requesting approval of program year 2012 and partial 2013 energy efficiency incentive awards.*

The definition of hard-to-reach (HTR) is for a customer, not a building. If a measure is installed into a site owned by a business while occupied by either one or more businesses or residential customers, the ratepayer customer who pays for the energy use impacted by the measure installation is the customer to consider when applying the hard-to-reach definition. When classifying a customer as HTR, two criteria are considered sufficient if one of the criteria met is the geographical criteria.

CPUC Requirement: A NTG of 0.85 shall be used only for direct install measures delivered to hard-to-reach (HTR) customers, as defined in D.18-05-041, Section 2.5.3. Program administrators (PA) can still claim that their programs are targeting or serving HTR customers through delivery channels other than DI, if the customers served meet the criteria in D.18-05-041. For programs, projects or measures that target HTR customers through delivery channels other than DI, the PAs shall use the most appropriate non-HTR NTG ratios available in California eTRM. When a NTG ratio for a program, project, or measure does not exist in the California eTRM, PAs should consult with the CPUC's Energy Division measure review team.[175]

The CPUC Energy Division added the following Measure Application Types to be eligible under the direct install delivery channel:

- Building Weatherization (BW);
- Behavioral, Retrocommissioning, and Operational-Retrocommissioning (BRO-RCx); and
- Add-On Equipment (AOE).[176]

When using the HTR NTG value (0.85), the measure package shall detail how HTR installations will be tracked. [177]

3.5.6 Savings Calculations

[175] Guidance for NTG ratios for HTR with DI 2-3-2022.pdf.

[176] 2022-05-27 CPUC HTR Memo Addendum.pdf.

[177] WPSDGENRRN0009r1 Preliminary Workpaper Review, DEER, Resolution G-3510, p. 58-59.

3.5.6.1 Best Available Data

CPUC Requirement: Use the latest approved evaluation, measurement and verification studies published in the development of ex ante values including energy impacts, cost data, effective useful life, remaining useful life, and net-to-gross ratios.[178]

If a given measure tier is proposed to be applicable to more than one technology, then several samples of each technology need to be evaluated to ensure that the proposed measure performance is typical of the range of performance available in the market for those same technologies. For example, multi-speed indoor fan and compressor measures which can be qualified by equipment utilizing one of: (1) variable speed compressor(s), (2) multiple-step compressor(s), or (3) multiple compressors operating on a single refrigeration circuit (tandem compressors).

3.5.6.2 DEER Values

CPUC Requirement: New measure packages must use DEER assumptions, methods, and data when available/appropriate and shall follow Commission Staff direction relating to the appropriate application of values. Any proposed measure package offering definitions that are different from DEER definitions should be calculated using DEER reference impacts.[179] eTRM is updated on an annual basis. Measure packages must use the appropriate DEER version based on their program implementation year.

If DEER values and methods are not available, new values may be proposed for Commission Staff review and approval.[180] In cases where any of the installation parameters differ from the assumptions for the DEER measure, the Implementer should apply DEER methodologies for estimating new parameter value.[181] Direct replacement of DEER measures is not allowed in measure packages.[182]

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[178] *Energy Efficiency Policy Manual v.6,0, p. 36-37.*

[179] *Disposition for Workpaper PGECOAPP128 Revision 0 (Retail Products Platform).*

[180] *Energy Efficiency Policy Manual*, v 6.0 Rules VI 4-6 pp. 38-39.

[181] *Energy Efficiency Policy Manual*, v 6.0 pp. 38-39.

[182] *Disposition for Workpaper PGECOHVC174 (Multiple Speed Unitary Air-Cooled Commercial Air Conditioners and Heat Pumps ≥65 Bth/h)*

3.5.6.3 Building Types

Measure packages must indicate which building types are eligible for the measure and include the associated savings for each eligible building type. Eligible DEER building types can be found in the eTRM support tables. New building types may be proposed to the CPUC for consideration.

CPUC Requirement: For downstream programs and—where possible—for midstream and upstream programs, claims shall be based on actual building type rather than using Com or Res, particularly those that deliver Unitary Air-Cooled Air Conditioners or Heat Pumps.[183]

3.5.6.4 Building Vintage

CPUC Requirement: The median building vintage shall be used for claims of measures that are applied to buildings whose age is unknown or undocumented.[184]

3.5.6.5 Operating Hours

CPUC Requirement: Use the operating hours values and methods from the most recent version of DEER if the measure values are available.

3.5.6.6 Update to CZ2022

CPUC Requirement: New weather data for all 16 climate zones were created using the time period of 1998 to 2017. All simulated and weather-dependent non-residential deemed measures have been updated to use the new CZ2022 peak days for PY2023. The 2022 Title 24 update, effective January 1, 2023, will also reflect CZ2022 weather data. Residential weather dependent measure updates will take effect in PY2024.

3.5.6.7 Consolidate Savings by Climate Zone to Eliminate PA-specific Records

CPUC Requirement: Starting in PY2020 consistent with the use of Statewide measure packages, only a single savings value will be used for each climate zone instead of PA-specific values when it is available in eTRM. If statewide values (field PA= “Any”) are not available in

[183] *E-5221*, p. 24.

[184] *Resolution E-4952, p. 40.*

eTRM for the affected measures, the table below presents the predominant PA and the corresponding savings value to be used for each climate zone.[185]

Table 13 -- Predominant PA to use for Statewide Climate Zone Savings Values

CA Climate Zone	Predominant PA
CZ05	PG&E
CZ06	SCE, for electric measures SCG, for gas measures
CZ08	
CZ09	
CZ10	
CZ13	PG&E
CZ14	SCE, for electric measures SCG, for gas measures
CZ15	
CZ16	

3.5.6.8 Interactive Effects

CPUC Requirement: In DEER, the "whole building" energy impacts include interactive effects while the "direct end use" energy impacts exclude interactive effects.[186] In DEER, the "whole building" energy impacts include interactive effects while the "direct end use" energy impacts exclude interactive effects. Interactive effects must only be applied to the portion of energy use that occurs within the conditioned space. Refer to DEER for internal gain fractions of residential appliances.[187]

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[185] California Public Utilities Commission, September 16, 2019, *Resolution E-5009: Approval of the Database for Energy-Efficiency Resources updates for Program Year 2021 and revised version for Program Year 2020*, pp. A-6 & A-7.

[186] *Energy Efficiency Policy Manual*, v 6.0 p. 34; *Disposition for Workpaper PGECOAPP104 Revision 4 and Revision 5 (Energy Efficient Televisions)*.

[187] *Disposition for Workpaper PGECOAPP128 Revision 0 (Retail Products Platform).*

3.5.6.9 Water-Energy Nexus

One of the state's largest end uses of electricity is in the treatment, heating, and conveyance of water in California, which is referred to as the "Water-Energy Nexus" (WEN).[188] PG&E and the other PAs offer a variety of incentive programs in the areas of energy efficiency, demand response, and distributed generation related to the Water-Energy Nexus. These measures were previously catalogued in the statewide WEN measure package, SWMI001-02. Water-Energy savings are no longer to be reported in a single rolled-up measure package (SWMI001); instead, the WEN calculated savings are to be included with each measure package involving water savings. PAs can now add the embedded energy savings to the direct energy savings from these WEN measures to claim incentives which will count towards PAs' energy efficiency goals.[189]

3.5.6.9.1 Use of the Water-Energy Cost-Effectiveness Calculator

CPUC Requirement: The latest Water-Energy Calculator (v.2.0) can be found via the CPUC's Water Energy Nexus website at http://www.cpuc.ca.gov/nexus_calculator/ and must be used to calculate embedded energy savings associated with water conservation measures. Implementers must provide justification for any departures from the default values contained in the Water-Energy Calculator.[190]

The CET has been updated to allow for the direct energy savings and embedded energy savings of WEN measures to be entered separately into the CET. Embedded-water-energy savings continue to be calculated using the Water-Energy Calculator, but the embedded energy savings will be stored independently of the direct energy savings within the eTRM to facilitate reporting and cost-effectiveness calculations.[191]

3.5.6.9.2 Water-Energy Measure Parameters

CPUC Requirement: The following parameters shall be applied when calculating savings for water-energy measures:

- Net-to-Gross: WEN measures shall use the eTRM NTG value when available. If the DEER value is not available, then the measure shall use the Metropolitan Water District

[188] https://www.cpuc.ca.gov/nexus_calculator.

[189] *Resolution E-5221*, p. A-3.

[190] *D.15-09-023*.

[191] *Resolution E-5221*, p. A-4.

(MWD) value. If neither the eTRM nor MWD NTG is available, then the measure shall default to a NTG value of 0.85.[192]

- Effective Useful Life: WEN measures have a maximum expected useful life of 30 years for removed equipment.[193]
- Direct Energy Savings: For measures that have both direct and embedded energy savings, the measure attributes for the direct energy saving measure will be used for embedded energy savings even if they do not directly apply to the water efficiency portion of the measure (for example, load shape, climate zone, building type, etc.).[194]

3.5.6.9.3 Water Savings for Water Energy Measures

CPUC Requirement: WEN measures shall use the water savings reported in the direct energy savings offering measure package, where available. If water savings are not reported in the measure package, or it is a water-only measure and therefore has no measure package, the Implementer must propose values using the Water-Energy Calculator.[195]

3.5.6.10 DEER Water Heater Calculator

The DEER Water Heater Calculator (DWHC) was initially developed for DEER2015 water heater measures. The tool utilizes representative water heater "technologies", hourly hot water loads (in gallons per minute, by DEER building type) and ambient conditions (incoming "mains" water temperature, ambient space dry and wet-bulb temperature) to estimate hourly energy use of each modeled water heater.

The DEER Water Heater Calculator is updated regularly. The CPUC released version 5.1 of the Water Heater Calculator, "DEER WaterHeater Calculator v.5.1.xlsm," on August 29, 2022. This new version of the calculator encompassed the following updates:

- Residential hot water profiles using data that had been gathered and analyzed to inform the California Energy Commission (CEC) residential code compliance software (research version)30 for the 2022 update to Title 24;
- Heat pump water heater (HPWH) performance curves;
- Water heater sizing methodology and TechIDs using recent American Heating and Refrigeration Institute (AHRI) product data;

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[192] *D.15-09-023*.

[193] *D.15-09-023*.

[194] *D.15-09-023*.

[195] *D.15-09-023*.

- Embedded macro enabling users to save 8,760 load shapes to a comma-separated value (csv) file format;
- To improve alignment between HPWH ratings and those used for all other water heaters, the normalizing unit used by the calculator to determine measure savings was modified from a unit's rated input capacity to its rated output capacity.

3.5.6.11 Refrigerant Avoided Cost Calculator

CPUC Requirement: Per Resolution E-5152, starting in PY2022, the reporting of refrigerant leakage avoided costs (RLAC) is required for all energy efficiency measure claims as calculated from the CPUC's Refrigerant Avoided Cost Calculator (RACC)[196] for measure packages where the retrofit involves adding (not replacing) equipment that uses refrigerant. These include fuel substitution and electric resistance to heat pump measures—or where low-GWP measure benefits will be claimed. In a memorandum issued on November 24, 2021, CPUC staff provided guidance on the new process required by PAs for submittal of an addendum to measure packages for the inclusion of the updated version of the RACC and a cover sheet summarizing the changes. The updates to the RACC required adding language to the non-energy impacts section of the eTRM Measure Characterization and two new fields to the eTRM permutations table. These new fields were also added to CEDARS reporting data and to CET inputs.

The Deemed Measure RACC Workbook was updated on August 25, 2023, and it is consistent with the revised methodology to handle the end-of-life emissions for accelerated replacement MAT, etc. Measure developers will need to submit the updated RACC for applicable measure packages.

3.5.7 Incentives

3.5.7.1 Incentives for Schools and Constrained Areas

CPUC Requirement: Projects undertaken by K-12 schools and community colleges, and programs that target specific transmission, distribution, or generation constrained areas (other than bottoming-cycle combined heat and power projects) shall provide customer incentives that are the higher of 75% of incremental measure cost, or what is available under prior policies.[197]

[196] http://deeresources.com/index.php/racc-resources.

[197] *D.14-10-046*, pp. 163-164.

3.5.7.2 Payment Processing

Best Practice: PG&E may pay deemed rebate payments directly to recipients (e.g., end-use customers, distributors, contractors, retailers, or manufacturers), or through Implementers. The sections below provide the requirements for both scenarios.

3.5.7.3 PG&E-Processed Payments

PG&E Requirement: For rebate applications submitted directly to PG&E for payment, a complete application must include the following information and documentation:

Table 14 -- Information Requirements for PG&E-Processed Incentive Applications

Data	Downstream	Midstream	Upstream	Direct Install
Copy of Invoice and shipping document			✓ (If applicable)	
Equipment Manufacturer/Model		✓	✓	✓
Installation Site Address	✓	✓		✓
Invoice Number		✓		✓
Project Cost	✓	✓		✓
Material and Labor Cost				✓
Measure Code	✓	✓	✓	✓
Payee Name/Address/Tax Status/Tax ID (If Implementer is not payee)	✓	✓	✓	✓
Project Installation Date	✓	✓	✓	✓
Proof of Purchase	✓			
Quantity of Equipment Installed	✓	✓	✓	✓
Service agreement ID (SA ID)	✓			✓
Site Building Type	✓	✓		

Site Contact Name/Phone Number/Email Address	✓	✓		✓
Special Project Flag (i.e., Hard to Reach)	✓ (if applicable)			✓ (if applicable)
Store			✓ (if applicable)	

*Applicability of a data requirement is determined by program. This table describes requirements based on current PG&E programs.

3.5.7.4 Implementer Processed Payments

PG&E Requirement: Implementer may be responsible for payment of the deemed rebate to the customer/contractor/distributor/retailer/manufacturer and PG&E will reimburse the Implementer.

3.6 Quality Assurance and Quality Control

3.6.1 Project Inspections

PG&E Requirement: The PG&E Central Inspection Program (CIP) inspects and provides QA/QC of energy savings programs. CIP ensures customer safety, protects PG&E against liability, identifies potential fraud, and validates energy savings. Examples of CIP inspection areas include: verification of bill amount versus found amount, Natural Gas Appliance Testing, AC Tune Up, Duct Testing, and HVAC Treatments.

PG&E will create and maintain CIP Procedures for all deemed measures. PG&E will determine which measures require mandatory inspections and which are subject to non-mandatory, random inspections. CIP inspection timing duration is typically within 15 calendar days of application received date.

Mandatory inspections: All project applications for measures with mandatory inspections will be inspected and will not be paid until pass is received. CIP will contact customer to schedule inspection.

Non-Mandatory Inspections: PG&E will determine the inspection percentages for deemed measures. If selected, the project application will be held for payment until the inspection is passed. CIP will contact customer to schedule inspection. If CIP is unsuccessful in its attempts to contact the customer, the application will be accepted, and CIP will proceed to another project application.

3.6.2 Equipment Location List

Best Practice: Implementers shall track where equipment is installed and provide an installed equipment location list to PG&E upon request to assist in the inspection process. For example, if multiple equipment types are installed in one building or location, the Implementer shall record sufficient descriptors to enable an inspector to properly locate the newly installed equipment.

3.6.3 Incomplete Applications

PG&E Requirement: If an application is incomplete or needs further clarification, PG&E will request the missing information and provide the time frame by which the information or clarification is required. Applications may be rejected if the missing information is not provided in the time frame expected. Rejected applications that are resubmitted will be subject to the eligibility requirements, incentive levels, and funding available at that time of re-application.

3.6.4 Proof of Measure Requirements

PG&E Requirement: The Implementer must take the following steps before a rebate check is issued:

1) Verify adherence to measure requirements, including:
    a) Customer eligibility;
    b) Equipment make and model matches Qualified Products List (QPL), if applicable; and
    c) Specifications and eligibility as stated in product catalog and/or via communications from PG&E Program Manager (i.e. Participation Agreement, Energy Efficiency Communications).
2) Proof of purchase/installation (as required by customer type or delivery channel).
3) Validate rebate calculations.
4) Collect Signed Program Participation Agreement.
5) Collect Signed Access Agreement, where required.
6) Collect Free Ridership Form, if applicable.
7) Collect HVAC Certification, if applicable.
8) Collect HTR Questionnaire, if applicable.

3.6.5 Application Records

PG&E Requirement: The Implementer must maintain application records and provide them at PG&E's or CPUC's request. PG&E reserves the right to withhold reimbursement payments pending review and approval of the supporting documentation and field inspection results.

3.6.6 Dispute Resolution Process

CPUC Requirement: When Implementers disagree with CPUC Energy Division Staff positions on submitted measure packages, Implementers shall work with lead IOU staff to set up meetings with Commission Staff to discuss the disagreement and work toward consensus. If the disagreement persists past meetings with Commission Staff and Staff's recommendations on

the disputed values are included in a draft Resolution, Implementers shall work with IOU staff to develop comments on the draft Resolution. [198]

The *Energy Efficiency Policy Manual Version 6* outlines a dispute resolution process based on D.12-05-015 for when an entity submitting a workpaper (now measure package) to Commission Staff finds the Staff requirements for that workpaper unacceptable. In this case, Commission Staff and the IOU will schedule one or more meetings to work toward agreement. If agreement is reached, Commission Staff will upload the workpaper to the Workpaper Project Area at which point the workpaper will become effective. Disputes that cannot be resolved through meetings with Staff will be addressed through the Resolution review process. In this case, Commission Staff will include recommendations on the disputed ex ante values in a draft Resolution. The IOUs will have an opportunity to submit comments on Staff's proposed adjustments to the disputed values in the draft Resolution, and the Resolution will be subject to Commission vote. Draft Resolutions will be issued every six months to address disputed ex ante values for workpapers submitted during the previous six months. [199]

[198] Please note the two uses of the word "resolution" in this section. A "dispute resolution process" is the general process used to resolve disagreements and reach consensus with Commission Staff. The "draft Resolution" refers to the Commission's formally published documents upon which interested parties may comment.

[199] *Energy Efficiency Policy Manual*, v 6.0 p. 96-97.

Chapter 4 Custom Platform

4.1 Introduction

The Custom Platform Rulebook provides the ruleset that applies to PG&E programs that include custom measures (also termed “calculated” measures). Custom measures are energy efficiency efforts where the customer financial incentive and the ex ante energy savings are determined using a site-specific analysis and are finalized at project completion. An agreement is made with the customer wherein the financial incentive is paid upon the completion and verification of the installation. In addition, Custom projects are subject to the CPUC custom project review (CPR) process as established by Commission Decision 11-07-030.[200]

4.2 Eligibility

4.2.1 Projects Split Into Multiple Incentive Applications

CPUC Requirement: Projects or activities should not be split into multiple incentive applications to avoid higher levels (tiers) of rigor. The applicable level of rigor for phased projects or projects with multiple installation locations is based on the customer level cumulative incentive, and not the site level, unless there is evidence presented that the decisions to implement the project were made at the site level.[201]

4.2.2 Minimum Project Size

PG&E Requirement: PG&E no longer has a fixed minimum project size for custom project applications. It is now subject to the program design as proposed by the third-party implementer and covered by their respective implementation plan. Any deviations from their implementation plan are at the discretion of the IOU program manager. Implementers are encouraged to group measures for customers/sites where completion lands in the same program year.

4.2.3 Project Payback

CPUC Requirement: A custom project’s EUL must be greater than the Simple Payback Period. If a custom project's simple payback period exceeds its effective useful life, the PA may review and approve projects on a case-by-case basis taking into consideration the entirety of the project including, but not limited to, how much longer is the simple payback period compared to the EUL for all of the measures that comprise a project, the reasonableness of the costs of the measures, cost-effectiveness from a ratepayer-funding perspective and program influence. Any

[200] *D.11-07-030*.

[201] *Resolution E-5115*.

project where the simple payback based on incentives only is greater than the EUL will not be eligible. Program influence must be carefully assessed and documented for any project that is not economically beneficial to the customer based on energy cost savings alone.[202]

4.2.4 Whole Building Performance Measures

CPUC Requirement: For new construction programs with projects involving whole-building performance measures, the facility must be occupied, and its measures must remain in place and operational for five years before that project may participate in a subsequent ratepayer-funded energy efficiency incentive program.

Exception: New construction whole-building projects that provide evidence that the building was not required to commission the building (per Title-24 building energy efficiency standards) may participate in an RCX program no sooner than two years after the program incentive was paid.

4.2.5 Custom Lite Measures

PG&E Requirement: Projects delivered via Direct Install are limited to a maximum billing demand (kW) at the customer premise not to exceed 200 kW at any time within the 12 months prior to installation. All non-DI downstream projects are limited to a maximum billing demand (kW) at the customer premise to not exceed 500 kW at any time within the past 12 months.[203] The previous 2019 Regional SMB manual (DI) specified eligibility:

> "At least 75% of program energy savings achievements must come from non-residential customers up to 200 kW in annual maximum peak electric demand. Up to 25% of program energy savings achievements may come from non-residential customers between 200-500 kW in annual maximum peak electric demand."

NOTE: These requirements will be superseded by a new statewide Early Opinion in either late 2023 or early 2024. Official communication is expected to be sent by the QC&C team may invalidate some or all of this section.

[202] *Statewide Custom Project Guidance Document v.1.4, p. 13*.

[203] PG&E Streamlined ReviewProcess_Small Lighting Projects_EO_v3_CPUC Staff Response_20200730, p. 5.

4.2.6 Holds on Specific Measures

CPUC Requirement: CPUC Staff have placed holds on certain custom measures, including high emissivity coatings on furnace refractory measures,[204] variable refrigerant flow measures in custom retrofit projects,[205] and plastic recycling machines.[206]

Note: The CPUC considers some measures ineligible for incentives due to violations of the Evaluation Framework or other fundamental Energy Efficiency Policies. For example, "impermanence of the measure" was cited in the PY2020 CPUC CIAC ex-post evaluation findings that a removable, pin-based LED retrofit kit was ineligible because it can be removed.[207]

4.2.7 Non-IOU Supply Framework

CPUC Requirement: To qualify for incentives, the customer's reduction in energy usage due to the EE measure must coincide with periods the customer is purchasing energy from utility and thus reducing grid/system impact. The time period is hourly for electricity and monthly for natural gas with some exceptions for small commercial customers and for customers with on-site photovoltaic solar systems on a net energy metering rate. See CPUC Guidance Document for analysis details.[208]

4.2.8 Project Completion Deadline

CPUC Requirement: IOUs should only include savings for measures installed in the same year they are claiming incentives.[209] This rule is triggered when the measure has been physically installed and has become operational to deliver savings, but the savings claims were not submitted until the following year. Claims may be extended into the next year only if the project is subject to post-installation M&V data collection (including projects selected for CPR) that continues into the following year as shown in the timestamps of the data logger output. [210]

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[204] California Public Utilities Commission, Energy Division, *Final Ex Ante Review Disposition, Project ID X329*.

[205] California Public Utilities Commission, Energy Division, *Disposition for Workpaper: (Variable Refrigerant Flow (VRF) Systems),* March 1, 2017.

[206] California Public Utilities Commission, Energy Division, *Final Ex Ante Review Disposition, Project ID X435*.

[207] California Public Utilities Commission, Energy Division, PY2020-21 CIAC Ex-Post Evaluation, Appendix A, findings for PRJ - 02327112.

[208] California Public Utilities Commission, Energy Division, November 6, 2015, *Guidance Document: Energy Efficiency Savings at Sites with Non-IOU Fuel Sources*.

[209] Energy Efficiency Policy Manual, p. 11.

[210] California Public Utilities Commission, Energy Division, *PY2020-21 CIAC Ex-Post Evaluation, Appendix A*, findings for PRJ - 02327112 provides the following references in support of this rule. "The annual installation date based claims requirement was introduced in D.04-09-060 (at 33 and Findings of Facts 14), clarified and reiterated in D.05-04-051 (at 55, Findings of Fact 36-42), Conclusion of Law 3, Ordering Paragraph 17), D.05-09-043 (at 84) and again in Resolution G-3510 (at 13), Resolution E-4807 (OP10), and Resolution E-4897 (at 15-16)."

PG&E Requirement: Project approvals are generally valid for two years but vary by program. The completion deadline clock begins when installation is approved. To meet the completion deadline, a project must complete installation, M&V, and be approved for payment. Additional extensions must be requested through the PG&E exceptions process.

4.3 Influence

4.3.1 Program Influence

CPUC Requirement: A narrative and supporting evidence must be provided that demonstrates what the customer was planning to do prior to the energy efficiency program intervention and how the program induced the customer to improve efficiency. The documentation must cover how this specific measure was first brought up for discussion and what steps the program representative took to screen for free ridership. A free rider is a program participant who would have installed the measure absent the program.

4.3.2 PG&E Approval Before Implementation

PG&E Requirement: Custom measure equipment may not be ordered, purchased, or installed before PG&E has provided written project approval. This approval is either indicated by the project record in Energy Insight advancing to “Approved for Installation” stage or can be provided by a formally granted exception as described below.[211]

Exception 1: Pre-ordering of long lead time equipment before project approval is permissible with advance written PG&E approval in the form of an approved Exception Request. Customer may be asked to demonstrate that the equipment has a long lead time. This approval typically only applies to ordering equipment – not demolition or installation. Approval of preorder requests will be considered when all three of the below considerations are met:

- PG&E or Implementer influence on the project is clearly demonstrated.
- The customer, project, and measure are clearly determined to be eligible.
- PG&E has confidence in the early savings claims calculations.

[211] *D.11-07-030* requires CPUC approval prior to incentive agreement for projects selected for ex ante review.

4.3.3 Substantial Changes in Project Scope

PG&E Requirement: If the scope of a custom project changes substantially from what was identified in the original project application review, the change must be disclosed to PG&E. Substantial changes include modifications to the proposed equipment type, size, quantity, or configuration, the expansion of a project to include additional retrofits, or the splitting of a project into multiple phases. The revised project scope and supporting calculations are subject to a new review and approval prior to the removal of existing equipment/systems or the installation of the replacement equipment/systems. PG&E's Custom Project Quality Control (CPQC) can approve scope changes.

4.4 Ex Ante Values

4.4.1 Measure Application Type and Baseline

4.4.1.1 Like-For-Like Retrofits

CPUC Requirement: Proposed NR, AR, NC, AOE, and WEA measures must be more efficient than existing equipment. Installing equipment that is of the same efficiency as the existing equipment, even if existing equipment is no longer operational, is defined as a like-for-like replacement, which is not eligible for incentives.[212]

4.4.1.2 Accelerated Replacement Measure Type

CPUC Requirement: Resolution E-5115 specified the minimum evidence requirements to support custom projects accelerated replacement measure type[213], including:

- Documentation required to demonstrate that existing energy inefficient equipment would continue to operate at an expected level of service for its remaining useful life,[214]
- Guidance on the minimum documentation required to demonstrate program influence,

Resolution E-5115 Ordering Paragraph 10 further directs "CPUC staff shall update the existing Preponderance of Evidence Guidance Document to include the appropriate incentive tier levels and informational requirements for preponderance of evidence of deemed measures equipment

[212] *D.12-05-015*.

[213] *Resolution E-5115*, Section 1. Summary, p. 2.

[214] Required documentation varies by incentive level.

viability and program influence to support an accelerated replacement baseline consideration."[215]

4.4.2 Savings Calculations

4.4.2.1 Deemed Measures in Custom Projects

CPUC Requirement: All measures that have calculation methodologies or measure assumptions approved in a measure package or DEER must adopt those methodologies.[216] Custom projects may include deemed measures for the sake of simplifying the application process. Such deemed measures must use the deemed values and rebate amounts as provided in eTRM. In cases where there is no deemed rebate available, the Implementer must provide evidence as part of the project documentation files to support the rationale for using the proposed incentive rate. Whole building and whole system projects (such as NMEC-approved building programs) are excepted from using deemed savings values when processed through custom or calculated platforms.[217]

Exception 1: Deemed measures may be included in a Custom project as long as there is at least one Custom measure also included in the project. (See *Deemed Measures in Custom Projects.*)

Exception 2: If the measure package for a deemed measure does not include the savings parameter (building type, vintage or climate zone) that matches the project details, the measure must be processed through the Custom Platform.

4.4.2.2 DEER Values and Methodologies

CPUC Requirement: When available, Implementers must use measure values, methods, and assumptions including: operating hours, EUL, interactive effects, coincident diversity factors, and DEER defined peak periods from the most recent version of DEER to estimate ex ante savings.[218] These may be accessed using California's statewide electronic Technical Reference Manual (eTRM).[219] All values contained in the eTRM's permutations tables will be considered

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[215] California Public Utilities Commission, Energy Division, August 25, 2023, *Memorandum: Preponderance Of Evidence Requirements For Accelerated Replacement Of Deemed Measures*, pp. 1-2.

[216] *Energy Efficiency Policy Manual,* p. 36; *D.12-05-015*.

[217] *Resolution E-5152*, p. 18.

[218] *Energy Efficiency Policy Manual*; D.12-05-015.

[219] https://www.caetrm.com/.

DEER values and all methods described in measure packages are considered DEER methods.[220]

Peak demand reduction calculations must be performed using the DEER defined peak demand period.[221] The DEER method for calculating peak demand reductions utilizes an estimated average grid level impact for a measure between 4 and 9 p.m. during a “heat wave” defined after the fact by identifying the three consecutive weekdays with the hottest weather conditions that are expected to produce a regional grid peak event.[222]

For PY2023, demand savings calculations shall use the updated DEER peak demand period start and end dates for each of the sixteen (16) California Climate Zones as described in the new CZ2022 weather file data and provided in Table 11 below.

Table 15 -- DEER Peak Demand Dates by Climate Zone

Climate Zone	Peak Demand Dates
CZ01 – CZ04	August 26 - 28
CZ05	September 16 - 18
CZ06 – CZ08	September 2 - 4
CZ09	September 1 - 3
CZ10 – CZ15	June 29 – July 1
CZ16	August 12 - 14

It should be noted that the current version (v.1.4) of the Statewide Custom Project Guidance Document has not been updated to the dates listed in Resolution E-5152. In this instance, the PG&E Platform Rulebook supersedes the Statewide Custom Project Guidance Document.

4.4.2.2.1 NTG

CPUC Requirement:

[220] *Resolution E-5221*, p. 29.

[221] California Public Utilities Commission, Energy Division, *Disposition for Workpaper PGECOCOM102*.

[222] California Public Utilities Commission, August 10, 2017, *Resolution E-4867. Approval of the Database for Energy-Efficient Resources (DEER) updates for 2019 and, revised versions 2017 and 2018 in Compliance with D.15-10-028, D.16-08-019, Resolution E-4818, Resolution E-4952.*

- The default NTG ratio for electric savings of custom commercial measures is decreased from 0.60 to 0.50.
- The default NTG ratio for custom agricultural measures is decreased from 0.70 to 0.50.
- The NTG ratio for custom, direct-install lighting measures is decreased from 0.60 to 0.45.[223]

4.4.2.3 Water-Energy Savings Calculations

CPUC Requirement: Projects that save water may use the CPUC's Water-Energy Cost-Effectiveness Calculator to calculate the embedded energy (energy used to pump and treat water and wastewater upstream and downstream of the customer) from water savings on a customer's site. A customer must receive water from an off-site source (i.e., municipal and irrigation district supplied).[224] Embedded energy savings (electric and/or natural gas, as applicable) from water efficiency measures may be claimed as part of the Total System Benefit, as long as there are actual energy savings and not just water savings.[225]

Note: Water savings documentation must be submitted to PG&E with project application documentation, and the Calculator must be included. Refer to the following site for the Water-Energy Cost-Effectiveness Calculator and user guide: http://www.cpuc.ca.gov/nexus_calculator/.

CPUC Requirement: Until the CPUC implements the Long-term Solution, existing and new WEN-measure packages will use the following method to calculate the embedded energy savings produced by a water efficiency measure and add it to the direct (site) energy savings generated by that measure. The measure or measure update will add the energy-intensity values in Table 1 to eTRM. The embedded energy savings for the measure will be the result of dividing the number of gallons saved by the measure by 1000 and multiplying that result by the "Total IOU Embedded Water Energy Intensity" value in the table below, based on whether the measure is an indoor or outdoor measure. For IOUs, the embedded-water-energy intensity is 5.44 kWh/kgal for indoor measures, and 3.28 kWh/kgal for outdoor measures, for all climate zones.

[223] *Resolution E-5221*, p. 24.

[224] *D.15-09-023*.

[225] *D.23-06-055,* p. 38.

Table 16 -- Embedded Water Energy Intensities

Climate Zone	Sector	Water Use Type	Marginal Supply	Total IOU Embedded Water Energy Intensity (kWh/kgal)	Total Non-IOU Embedded Water Energy Intensity (kWh/kgal)
All	Urban	Indoor	Recycled Water (Non-Potable)	5.44	0.25
All	Urban	Outdoor	Recycled Water (Non-Potable)	3.28	0.19

Once the embedded energy savings have been calculated, they will be automatically added in eTRM to the direct energy savings of the measure (per D.17-12-010). That combined value, along with other site-specific savings values, will then be input into the Cost-Effectiveness Tool (CET) through California Energy and Data Reporting System (CEDARS) to calculate the measure's cost effectiveness. Program Administrators (PAs) will also use the combined value if they submit a claim for this measure. This approach is only suitable for measures that use the default marginal water supply— recycled water (non-potable). PAs may claim measures that use a different marginal supply only if they use the Long-term Solution, and thus must wait until that solution is implemented. Additionally, per D.15-09-023, where PAs depart from default values, they must show that the departure is reasonable in all documents submitted to CPUC.[226]

4.4.2.4 Reviewable Calculations

CPUC Requirement: All calculations and associated attachments submitted in relation to a custom project must be readable and transparent. For complex calculations, implementers must provide the actual equations (proposed formulas) used to calculate the savings impacts and provide the non-hard coded and unlocked energy savings calculation workbook for the proposed measures.[227] Implementers must document their sources for inputs to the calculations and provide justification to support the basis for assumptions. For projects where an energy model is submitted, appropriate explanation of the model inputs and outputs must be provided. Energy models should have the software version clearly indicated in the project files.

4.4.2.5 Standard Calculation Tools

PG&E Requirement: PG&E has created Standard Calculation Tools that are available to Implementers and must be used for the following measures:

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[226] DEER_Deemed_Measure_Guidance_short-and-long-term-solutions-for-integrating-embedded-energy-savings-into-cedars_2022313..pdf

[227] California Public Utilities Commission, Energy Division, *Final Ex Ante Review Disposition*, Project ID X436; California Public Utilities Commission, Energy Division, *Phase I Custom Ex Ante Review Disposition*, Project ID X205.

- Pool Pumps – Addition of a variable frequency drive to a commercial pool pump to reduce flow during unoccupied hours;
- Pumps – Addition of a variable frequency drive to pumping applications;
- Air Compressors – For the few measures available above-code, and for the to-code ER and AOE measures available;
- Lighting;
- HVAC; and
- Refrigeration.

These Standard Calculation Tools are available from PG&E upon request.

4.5 Quality Assurance and Quality Control

Please refer to the Cross-Platform Chapter for more information on this topic.

PG&E's technical reviewers perform a policy review and a technical review of custom measures to ensure that high quality ex ante values are determined for every custom measure and project.

4.5.1 Measurement and Verification Plan

CPUC Requirement: Every Custom project application must include a Measurement and Verification (M&V) plan to verify savings post-installation. The M&V plan must indicate how the pre-installation M&V data was used to establish each measure baseline and how the post-installation M&V data will be used to true-up the final ex ante savings estimates. Provide concise equations with explanations demonstrating how the final savings estimates will be determined using the measured data. The level of rigor should be commensurate with the size and complexity of the project. Small or simple projects may require only verification. M&V plans for most other projects must provide concise descriptions of measurement points, measurement period, measurement interval, measurement equipment, and system diagrams.[228]

[228] California Public Utilities Commission, Energy Division, *Final Ex Ante Review Disposition*, Project ID x239; California Public Utilities Commission, Energy Division, *Final Ex Ante Review Disposition*, Project ID PGE-17-T-I-0180.

4.5.2 Pre-Installation Site Inspection

CPUC Requirement: The implementer or technical reviewer must perform a pre-installation site inspection to verify existing equipment and loads on the equipment, in accordance with PG&E's Inspection Standard, and to confirm proposed measures are not on site.[229] The inspection details must be documented. Existing equipment cannot be decommissioned before PG&E approval for installation.

4.5.3 CPUC Custom Project Review Requirements

CPUC Requirement: Project approval with an incentive agreement shall not be issued before a project is either released from CPUC Custom Project Review after being submitted to the Custom Measure and Project Archive (CMPA) project list or approved by an CPR disposition, or otherwise allowed to proceed by the CPUC CPR team.[230, 231]

4.5.4 Project Documentation Requirements

CPUC Requirement: For custom projects, the specific records to be maintained may vary based on the type of project. Examples of the expected data elements include:[232]

- Documentation to support program influence;
- Documentation to support baseline assignment (Accelerated Replacement, Add On Equipment Normal Replacement, Standard Practice, CPUC policy, etc.);
- Existing system controls and operating status description;
- Existing system output capacities – current output and maximum/design capacity;
- Pre-installation inspection report;
- Post-installation inspection report;
- Proposed modifications with schematic as applicable;
- Preliminary savings calculations and supporting data with documentation to ensure replicability;

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[229] *PG&E Customized Inspection Standard (CUST-5205S).*

[230] *D.11-07-030*.

[231] *Memo on CPUC staff EAR enhancement, October 19, 2015.*

[232] *D.11-07-030*.

- Manufacturer's cut sheets when used to estimate ex ante savings or when needed to ensure replicability;
- Fuel switching considerations and any required analysis per CPUC policy regarding fuel switching projects (see *Energy Efficiency Policy Manual Version 6*);
- Other fuel savings and/or load increases resulting from the project;
- HVAC interactive effects values and methods used to develop those values, when measures cause a change in HVAC system loads;
- Interactions between multiple measures that act to increase or decrease savings relative to a measure stand-alone savings estimate;
- Pre/post production output data when used in savings calculations and the source of such records;
- Billing history - one-year pre installation, with interval data required when available; when ex ante estimated values rely upon a per-unit-production changes based on multi-year production data, corresponding billing histories are required;
- IOU or Implementer program manual (a single archive of these documents should be referenced rather than including the documents in each project archive);
- Transparent calculations;
- M&V plans, reports and raw data archives, where applicable; and
- EUL/RUL value, analysis, or source.

4.5.5 Project Pre-Screening Checklist

Custom projects being submitted for pre-installation review must have a "Pre-Screening Checklist" completed by the project developer prior to submitting for technical review. The intention of the checklist is to:

- Screen for "showstoppers" that would make a project ineligible for custom incentives.
- Screen for common project/measure issues (correct application of MAT and associated rules, use of standard tools when applicable, correct weather data set, correct DEER Peak dates, etc.).
- Ensure all required documents are included in the project submission package and are named correctly.

The latest version of the checklist is hosted on the PG&E wiki page.[233]

[233] https://pge.wiki/Custom_Project_Pre-Screen_Checklist.

Chapter 5 Meter-Based Platform

5.1 Introduction

This chapter compiles the current rules and guidance associated with meter-based savings approaches at the time of this Rulebook's release. The Meter-Based Platform comprises several approaches, including Randomized Controlled Trials (RCTs), Quasi-Experimental Designs (QEDs), Normalized Metered Energy Consumption (NMEC), and Strategic Energy Management (SEM). The specifics of each approach are discussed below, but the common threads that connect them all include:

- Savings determinations are based on a comparative analysis of pre- and post-installation metered energy consumption data from all participating sites;
- Savings are determined at the whole building- or system-level, rather than through calculations at the level of individual measures or interventions;
- Savings determination methods are embedded in program design; and
- Meter based savings analyses may be used to inform continuous program improvement.

5.2 Background

California Assembly Bill (AB) 802 modified California Public Utilities Code §381.2(b) to allow meter-based energy efficiency programs, authorizing PAs to "provide financial incentives, rebates, technical assistance, and support to their customers to increase the energy efficiency of existing buildings based on all estimated energy savings and energy usage reductions, taking into consideration the overall reduction in normalized metered energy consumption as a measure of energy savings. Those programs shall include:

- Energy usage reductions resulting from the adoption of a measure or installation of equipment required for modifications to existing buildings to bring them into conformity with, or exceed, the requirements of Title 24 of the California Code of Regulations;
- Operational, behavioral, and retro-commissioning activities reasonably expected to produce multi-year savings; and
- Electrical corporations and gas corporations shall be permitted to recover in rates the reasonable costs of these programs. The commission shall authorize an electrical corporation and gas corporation to count all energy savings achieved through the authorized programs created by this subdivision, unless determined otherwise, toward overall energy efficiency goals or targets established by the commission."[234]

[234] California Public Utilities Commission, *Rulebook for Programs and Projects Based on Normalized Metered Energy Consumption v.2.0 "NMEC Rulebook*", January 7, 2020, p. 5 and Section 381.2(b) (bullets and paragraph breaks added for clarity).

5.3 Meter-Based Analytical Approaches

EE interventions seek to reduce energy usage. This can make their impact difficult to measure, because doing so requires determining how much energy would have been used in the absence of the intervention. Approaches within the Meter-Based Platform use different methods to determine that baseline—which may be based on a control or comparison group, or a site's own pre-installation energy usage, adjusted for outside factors like weather and schedule. Because each approach studies participants' energy usage over a period of time, meaning that factors and other equipment outside of the program intervention can also affect energy usage, meter-based approaches must find a way to capture the change in energy usage that is due to the project itself.

5.3.1 Randomized Controlled Trials

Randomized Controlled Trials are "true" experiments: they determine whether participants receive an intervention at random (for example, by tossing a coin).[235] Those assigned to receive the intervention are called the Treatment Group; those assigned not to are called the Control Group. Checks are performed to confirm the groups do not differ in meaningful ways. After the Treatment Group receives the intervention, each group's energy consumption is observed and the difference in their outcomes is considered the intervention's effect. In other words, the Control Group's energy usage is the baseline against which to measure the Treatment Group's savings. The approach assumes that non-program-related factors that influence energy usage among eligible customers affect the treatment and comparison groups equally.

RCT programs are referred to as "opt-out" rather than "opt-in" because Treatment Group members do not choose to receive the intervention. However, participants assigned to the Treatment Group may request to leave the program. The "opt-out" nature of the design means that only certain programs are suitable for an RCT.

Savings are determined and claimed at the program level, after sufficient post-intervention metered energy consumption data can be collected and analyzed. The M&V methods used to randomly assign participants and analyze data are codified in a procedural work paper submitted for CPUC review and approval.

5.3.2 Quasi-Experimental Design

Programs that use Quasi-Experimental Design also compare the outcomes of customers who receive an intervention and those who do not, but do not use random assignment. In a QED

[235] Angrist, Joshua D. Summer 2003. "Randomized Trials and Quasi-Experiments in Education Research," NBER Reporter Research Summary. https://www.nber.org/reporter/summer03/angrist.html.

program, customers choose to participate in a program or receive an intervention (the Treatment Group, sometimes also called the “Program Group” to avoid confusion with RCT terminology). Then, a Comparison Group of similar customers is chosen to serve as a baseline.

The Comparison Group is designed to be as similar as possible to the Treatment Group: participants must also be eligible for the program, and when possible, they may be chosen due to other known characteristics such as geography and/or pre-program consumption levels. As with a true experimental control group, the Comparison Group is intended to experience the same external, non-program-related factors that affect the Treatment Group’s energy consumption.[236] However, the groups are not as equivalent as those in an RCT: the Treatment Group chose to receive the intervention, and comparison group members did not. Other differences that cannot be observed may have helped drive that decision. As a result, statistical analysis techniques that can address those differences are used.

Savings are determined and claimed at the program level, after sufficient post-intervention metered energy consumption data can be collected and analyzed. The M&V methods used to construct the comparison group and analyze data are codified in a procedural workpaper submitted for CPUC review and approval.

5.3.3 Normalized Metered Energy Consumption

Under the Normalized Metered Energy Consumption (NMEC) approach, energy savings are determined by comparing participants’ pre- and post-intervention energy consumption data, after mathematically accounting for factors that affect energy usage and are unrelated to the energy efficiency intervention(s). Each site’s own pre-intervention data, normalized to normal conditions, serves as a baseline against which to measure savings.

Specific requirements for this approach are discussed in the modeling approaches section. The NMEC approach may utilize either a population-level or a site-level approach.

5.3.3.1 Population-Level NMEC

Population-level NMEC is an approach in which energy savings are calculated based on sites’ pre- and post-intervention metered energy consumption data and aggregated across a group of similar sites (population). Sites included in a population must have similar equipment

[236] Agnew, K.; Goldberg, M., 2017, Chapter 8: Whole-Building Retrofit with Consumption Data Analysis Evaluation Protocol, The Uniform Methods Project: Methods for Determining Energy-Efficiency Savings for Specific Measures. Golden, CO; National Renewable Energy Laboratory. NREL/SR-7A40-68564. http://www.nrel.gov/docs/fy17osti/68564.pdf, p. 9.

and energy consumption levels; factors that impact both consumption over a 12-month period, as well as energy savings from program interventions, will be similar across all sites.[237]

Measurement methods and calculation software are set before the program starts; they remain consistent throughout and apply to all sites in a uniform fashion.[238] Data collection is consistent across all sites or projects, data cleaning steps are applied consistently across all sites, and any eligibility rules are applied consistently across all sites. The savings calculation approach for a population-level NMEC program is documented in a Program-level Measurement and Verification plan submitted prior to program launch. In this approach, savings are claimed at the program level.[239]

5.3.3.1.1 Market Access Approach (MAA)

Market Access is a program design approach wherein a PA utilizes aggregators who recruit projects and interface with customers, and then are compensated under uniform payment terms based on the TSB value of project savings, as measured using population-level NMEC methods.

This approach has several benefits, including: (1) PAs may be able to use both IRA and ratepayer funding in a market access-style program, without impacting the cost-effectiveness calculations of the program. (2) allows for incorporating innovative measures into energy efficiency programs, since this approach allows experimentation with measures and customer offerings without going through lengthy solicitation processes. (3) can be used to enable integrated demand side management (IDSM) opportunities.

Other benefits to the energy efficiency portfolio of the MAA include:

- Providing a streamlined pathway for energy efficiency aggregators to participate in energy efficiency portfolios and deliver projects, especially enabling smaller aggregators to participate more easily;
- Allowing for market innovation that can be fast-paced and implemented quickly by aggregators;

[237] NMEC Rulebook, p. 12.

[238] NMEC Rulebook, p. 23.

[239] NMEC Rulebook, p. 17.

- Rewarding aggregators based on the benefits their projects deliver to the grid (based on TSB), thus encouraging aggregators to maximize the TSB of their projects;
- Encouraging market competition, because aggregators compete for customers, which will result in continuous improvements to the program delivery and customer experience;
- Minimizing ratepayer risk because aggregators are only paid based on measured savings; and
- Minimizing risk of portfolio underperformance, acting as a hedge against underperformance by non-MAA programs and implementers.

CPUC Requirement: All of the non-REN PAs (IOUs plus Marin Clean Energy [MCE]) shall make available programs using the Market Access Approach to address both residential and commercial downstream retrofit opportunities in their territories, with start dates no later than July 1, 2024. In the MCE territory, MCE (as the originator of this program approach) should administer the MAP and not PG&E. PAs shall use existing processes (the true-up advice letter, third-party program advice letters, fund-shifting notifications, implementation plan submissions, etc.), as needed, to incorporate market access plans into their portfolios. The Market Access approach is now part of the overall energy efficiency portfolio and, as such, programs following this approach are no longer exempt from the cost-effectiveness requirements.[240]

5.3.3.2 Site-Level NMEC

Using the site-level NMEC approach, savings are calculated at an individual building, project, or site using normalized meter readings taken before and after the energy efficiency intervention. The exact calculation methodology used is project-specific, customized to the unique characteristics of the site or project[241], and may include adjustments for site-specific non-routine events (NREs) that occurred at the site during the baseline, reporting, or installation period. [242] The site's normalized pre-installation energy consumption, serves as the baseline.

The general savings calculation approach for a site-level NMEC program must be documented in a Program Level M&V plan submitted prior to program launch. For each specific project, the M&V method, including non-program related factors for which M&V practitioners will normalize, must be detailed in a project-level measurement and verification

[240] *D.23-06-055*, pp. 73-76.

[241] NMEC Rulebook, p. 5.

[242] The NMEC Rulebook V2.0, sec. 4, p. 22, defines a non-routine event as an "externally driven (i.e., not related to the energy efficiency intervention) significant change affecting energy use."

plan, which must also conform to the program-level M&V Plan. Savings are claimed at the project-level.[243]

5.3.3.3 Strategic Energy Management

Strategic Energy Management (SEM) is a holistic, whole-facility approach to energy savings that focuses on business practice change affecting organizational culture to reduce energy waste and improve energy intensity through behavioral and operational change. SEM programs use site-level analysis of metered energy consumption data to determine savings from program activities at the facility and measure the savings over two years, and up to six years with continued enrollment. If an SEM project does not meet the requirements to use the NMEC savings methodology in a given reporting period, it may use engineering calculations in compliance with the SEM Design and M&V guides.[244]

For large capital measures, an SEM participant may elect to use Custom pathway alongside SEM methodology. These Custom projects may occur simultaneously at the site, use an Existing Conditions baseline with Custom savings methodology following the Custom requirements, and their savings are subtracted out of the "SEM" savings. "Strategic Energy Management" as used by the CPUC refers to specific, standalone programs designed by consultants to the investor-owned utilities.[245] The IOUs and their consultants jointly developed a single SEM program design and evaluation protocol, which is currently implemented by third parties individually under contract to each IOU. Originally, the PA/Consultant-designed SEM program was the only program in which NMEC was allowed to be used to assess savings, and only in industrial facilities from operations and maintenance (O&M) or behavior, retro-commissioning, and operations (BROs)-type activities.[246] With D.23-02-002, PAs may begin offering strategic energy management-style programs beyond the industrial sector.[247]

Because the SEM approach provides for project tracking by the customer and the program implementer, these programs will naturally document project influence and allow a default

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[243] NMEC Rulebook, p. 5.

[244] *D.16-08-019*, p. 38.

[245] Evolving guidance on SEM programs is available at https://pda.energydataweb.com/ and found by entering *Strategic Energy Management* in the search box. The Guides are considered living documents that may be updated during the course of the implementation of the current SEM programs and thereafter. These documents are considered part of the entire NMEC Guidance overseen by CPUC Staff.

[246] *D.18-01-004*, p. 47.

[247] *D.23-02-002*, OP14, p. 81.

net-to-gross ratio (NTGR) of 1.0 to apply to custom projects when program influence is evident.[248]

5.4 Eligibility

5.4.1 Expansion of NMEC for Estimating Savings

CPUC Requirement: Programs that meet all of the following characteristics are required to use NMEC, randomized control trials, strategic energy management, or another meter-based method, as appropriate, to measure and report energy savings, unless using these methods is not feasible and/or cost-effective:

- Is approved in D.23-06-055 and launching on or after January 1, 2024, except for third-party programs for which the request for proposals or request for abstracts is issued prior to October 1, 2023;
- Uses a downstream delivery approach;
- Is a resource acquisition retrofit program;
- Is in the residential or commercial sector; and
- Is eligible to use the NMEC rules (according to the NMEC Rulebook).

In the implementation plans for new programs that meet all of the above characteristics but do not use a meter-based method, PAs will be required to include justification for not using NMEC or another meter-based method of estimating savings, and the PA must justify an exception based on feasibility or cost-effectiveness, or both, as defined below.

It is feasible to use NMEC in the following circumstances:

- The program meets the Commission's eligibility and intent for using NMEC, as expressed in Commission policy and/or the NMEC Rulebook (i.e., program is for existing sites, does not use industrial processes, etc.);
- Required meter and other data is available and collection of this data does not unreasonably impede program operations; and
- Use of NMEC or another meter-based savings calculation methodology is appropriate for the program design.

[248] *D.16-08-019*, p. 41.

The use of NMEC will be found to be cost-effective as long as the cost of the measurement and verification itself does not render the program non-cost-effective, and/or the value of using meter-based measurement (instead of other methods) is not exceeded by the cost of the measurement and verification.[249]

5.4.2 Customer Eligibility

Please refer to the Cross-Platform Chapter for more information on this topic.

[249] *D.23-06-055*, pp. 41-42.

5.4.3 Site Eligibility

5.4.3.1 Site Eligibility for RCT and QED

PG&E Requirement: Site eligibility will be determined by criteria outlined in the program's procedural workpaper.

5.4.3.2 Site Eligibility for NMEC

CPUC Requirement: Only projects in existing buildings are eligible for NMEC; new construction projects are not eligible.[250]

PG&E Requirement: PG&E must provide fuel at the service point(s) included in an NMEC project continuously for the 12 months before and 12 months after implementation. Otherwise, sufficient metered energy consumption data will not be available for analysis.

CPUC Requirement: (Population-level NMEC only) Sites included in a population must have similar equipment types, drivers of energy consumption over a 12-month period, and levels of energy consumption. They must also reasonably be expected to have similar savings resulting from the intervention.[251]

CPUC Requirement: (Site-level NMEC only) Projects should follow the baseline modeling guidance provided in the CPUC's NMEC Rulebook, including:

1. The baseline model must use at least 12 months of data (consumption, weather, etc.).
2. The baseline energy consumption shall be adjusted for non-routine events, as needed.
    a. Suspected non routine events may be removed from the data, if the event spans less than 25% of the data (by number of points), and CV(RMSE) may be re computed. If the suspected event spans more than 25% of the data, the building may be removed from the analysis.[252]

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[250] NMEC Rulebook, p. 8.

[251] NMEC Rulebook, p. 12.

[252] Guidance for Program Level M&V Plans: Normalized Metered Energy Consumption Savings Estimation in Commercial Buildings, version 1.0, March 1, 2018, available at ftp://ftp.cpuc.ca.gov/gopher-data/energy_division/EnergyEfficiency/RollingPortfolioPgmGuidance/LBNL_NMEC_TechGuidance_Draft.pdf, last accessed March 22, 2019.

3. Baseline models must be assessed for goodness-of-fit, following CPUC guidance, and it is strongly suggested that projects be screened for feasibility of proposed methods.[253]

5.4.3.3 Utility Meters

PG&E Requirement: Implementers must identify the meters within the project boundary at the outset of the project and use PG&E meters when feasible.

5.4.3.4 Non-Utility Meters

CPUC Requirement: Submetering is permissible for NMEC projects.[254] Non-utility meters must meet minimum accuracy requirements outlined by meter type in the CPUC's NMEC Rulebook.[255] For projects with metering not in conformance with the NMEC Rulebook, CPUC approval must be sought and granted on a case-by-case basis through the ExAnte project review process.[256]

PG&E Requirement: M&V Plans for programs and projects that will use submeters must address the submetering requirements and how they will be met. If non-utility meters are to be used, the implementer shall obtain permission from PG&E to use the alternate meter type.

PG&E Requirement: Non-utility meters must be calibrated according to the manufacturer's recommendations; any calibration records must be maintained by the customer and available for PG&E to review upon request. Calibration records are not required for utility meters. If non-utility meters measure a non-energy parameter (e.g., current, flow), programs should justify why it is appropriate to measure those parameters in lieu of energy. Those justifications may be made at either the project or program level, as appropriate.[257]

5.4.4 Intervention Eligibility (Allowable Projects and Measures)

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[253] NMEC Rulebook, p. 15.

[254] NMEC Rulebook, p. 19.

[255] NMEC Rulebook, pp. 19-20.

[256] CPUC's response to EO Request PG&E 2021-06: Customer Owned Meter Accuracy Requirements.

[257] California Public Utilities Commission, December 30, 2015, *Assigned Commissioner and Administrative Law Judge's Ruling Regarding High Opportunity Energy Efficiency Programs or Projects ("HOPPS White Paper Ruling*").

5.4.4.1 Savings Detectability

PG&E Requirement: (RCT, QED) Statistical analysis must demonstrate that the proposed intervention is expected to produce statistically significant reductions in energy consumption, to at least a 90/50 precision and confidence level.

CPUC Requirement: (Population-level NMEC): Population-level NMEC programs must be designed to meet or exceed a 90% confidence / 25% range fractional savings uncertainty (FSU) as calculated using a CPUC-compliant method (e.g., ASHRAE Guideline 14 methods applied to daily data), or must seek an exception. These levels may be modified in the future.[258]

CPUC Requirement: (Site-level NMEC) The CPUC recommends, but does not require, that site-level NMEC projects strive for minimum savings of 10% of annual consumption.[259] Programs and/or projects targeting savings that comprise less than 10% of annual consumption must provide a rationale and explanation in the program and project-level M&V Plans of how savings will be distinguishable from normal variations in consumption.[260]

Best Practice: Because many factors, including those that cannot be reliably captured in a mathematical model, can cause small variations in energy consumption in a building, meter-based approaches are most appropriate for deep, multi-measure interventions. However, for a well-designed RCT or QED with large treatment and control/comparison groups, savings of a relatively small magnitude may be detectable at the program level.

5.4.4.2 Measure Eligibility

CPUC Requirement: In a program using normalized metered energy consumption to measure gross savings, the following measures are permissible:

- Measures currently allowable through the deemed and calculated energy efficiency programs,
- Other measures where the program documentation and program-level M&V Plan demonstrates that the savings and EUL forecasts are reasonable for these measures; and

[258] NMEC Rulebook, p. 12.

[259] NMEC Rulebook, p. 9.

[260] NMEC Rulebook, p. 9.

- Behavioral, retro-commissioning, and operational measures are allowed, including maintenance and repair. Maintenance and repair measures should follow the guidance and additional requirements as described in the CPUC's NMEC Rulebook.

5.4.4.3 Eligible Measure Application Types

CPUC Requirement: Please refer to Table 3 in section 2.4.1 of the Cross-Platform Chapter for more information on this topic. Normal Replacement, Accelerated Replacement, Add-On-Equipment, Weatherization, Behavioral, Retro-commissioning, and Operational measure application types are permitted for meter-based projects, and use existing conditions baseline.[261]

> Since meter-based projects always use an Existing Conditions Baseline, regressive baselines do not pertain to meter-based projects.

5.4.4.4 Commonly Repaired Equipment

PG&E Requirement: Programs that provide incentives and/or claim savings for replacement of failed equipment must make a data-supported case that a given piece of equipment has a history of being repaired rather than replaced to justify use of an Existing Conditions baseline.[262]

5.4.4.5 Repair of Non-Essential Component(s) of Equipment or Systems

CPUC Requirement: Non-essential components are those that, when failed or not operating as designed or optimally, only reduce efficiency and do not prevent the equipment from delivering the original service or function. Repair of non-essential components of existing equipment or systems is allowed provided that, when failed, the full system can perform the design function at near design capacity, and, when failed, the overall annual system efficiency is reduced by more than 20%, and either:

- the failure type/component is not considered "standard" or "routine" maintenance and there is no requirement to do so to maintain warranty or service coverage or for health and/or safety reasons, or
- the failure typically remains unrepaired for 2-3 years or more and is not no cost or low cost. These types of repairs are allowed provided that the intent is to support an activity

[261] *Resolution E-4818*, Sec. 1.6, Table 1.1. Information in this table is also available in Sec. 2.3.1 of this Rulebook.

[262] *HOPPS White Paper Ruling*, p. 17.

to bring enhanced maintenance and system optimization practice into standard practice at a facility, and not simply to transfer standard maintenance activities and costs to be a ratepayer funded activity. See Resolution E-4818 for more information.[263]

5.4.4.6 Maintenance of Equipment

CPUC Requirement: Site-level NMEC Implementers shall include training components in all repair and maintenance program offerings in order to ensure participants understand the value of preventive maintenance and good operational practices. This requirement should be carried out consistent with statutorily-defined or Commission-adopted workforce standards.[264]

5.4.4.7 Fuel Substitution Measures

PG&E Requirement: Programs targeting fuel substitution measures must address related M&V and reporting issues in their Program-level M&V plan.

5.4.4.8 Industrial Projects and NMEC

CPUC Requirement: PG&E requires programs to follow all CPUC rules related to NMEC and the industrial sector, which at the time of this publication limits industrial operations and maintenance (O&M) and behavior, retro-commissioning, and operational (BRO) projects to use NMEC only when carried out under a Commission-defined Strategic Energy Management program. NMEC projects are permitted in industrial buildings when they are similar to projects that would be performed in a commercial building.[265] Contact the Meter-based platform Lead for questions around NMEC and the industrial sector and PG&E's interpretation of the current regulatory environment.

PG&E Requirement: NMEC savings calculation methods may be used for industrial O&M and BRO projects as part of an IPMVP Option C-compliant Custom project. However, the project must follow all Custom rules. PG&E will revise this requirement for the Industrial sector to respond to any regulatory changes from the CPUC around NMEC in the industrial sector.

5.4.4.9 Double Dipping and Double Counting

CPUC Requirement: Participants in meter-based programs are subject to the same double dipping limitations placed on all EE program participants. Namely, projects receiving incentives or claiming savings through any energy efficiency program must not also receive incentives (i.e.,

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[263] *Resolution E-4818.*

[264] NMEC Rulebook p. 10

[265] NMEC Rulebook, p. 8.

double-dip) or claim savings (i.e., double-count) for the same interventions through any other program, regardless of channel (e.g., downstream, midstream, or upstream), provider (e.g., other utilities, the California Energy Commission, or the California Public Utilities Commission), or platform (e.g., deemed, custom, meter-based) offering.[266]

PG&E Requirement: Because savings for meter-based programs and projects are measured using metered energy consumption data from before and after program participation, the checks on double counting differ from those for deemed and custom program participants. If a customer participates in an EE program during the pre-intervention baseline period, that could reduce baseline model goodness-of-fit. If a customer participates in an EE program unrelated to the meter-based project during the installation period or post-intervention reporting period, that unrelated intervention could affect our ability to accurately measure savings that result from the meter-based program. Program implementers must address double-counting in their program level M&V plans or procedural workpapers. In addition, NMEC program implementers must screen customers for double-counting and obtain commitment from participants that they will not participate in any other energy efficiency programs during the pre- or post-intervention period. Implementers must get PG&E approval for any deviation from this requirement.

5.5 Savings Calculations and Data Management

Savings calculations at the program and project level will be described in procedural workpapers for RCT and QED programs, and Program and/or Project-level M&V plans for NMEC and SEM programs.

5.5.1 Gross Savings Determination

PG&E Requirement: For a given program or project, PG&E and the implementer will agree on a gross savings methodology, including the meter-based approach to use, and collaborate on a final procedural workpaper (RCT, QED) or M&V plan (NMEC, SEM). PG&E is the final arbitrator of savings calculations.

CPUC Requirement: Methods used to calculate savings for NMEC programs must be documented in the program-level M&V plan sufficiently so that they can be replicated by other involved stakeholders (for example, ex post evaluators).[267]

PG&E Requirement: Methods used to calculate savings for meter-based programs—including data cleaning and editing steps, calculation methods and tools, methods for handling non-

[266] *D.02-05-046*.

[267] NMEC Rulebook, p. 18.

routine events, program eligibility, and disqualification rules—must be documented in the final M&V plan or procedural workpaper in sufficient detail that another practitioner could replicate them.

5.5.1.1 Program Measurement & Verification (M&V) Plans

CPUC Requirement: All third-party proposals using NMEC methods to determine gross savings must include an M&V plan as part of their bid proposal.[268] The bid M&V plan is a program-level document that does not constitute the final M&V plan for the program, but serves as a basis for discussion, negotiation, and planning. It shall include:

1. A description of the program target population and participant eligibility criteria;
2. Documentation of the expected costs, energy savings, DEER peak impacts, and effective useful life (EUL) of planned measures and intervention strategies;
3. Identification of the method(s) and calculation software that will be used to calculate savings, including required information as outlined elsewhere in this rulebook; and
4. Approach to ensure adequate data collection, monitoring and documentation of energy savings for each project over the reporting period.

5.5.1.2 Final Program M&V Plans

PG&E Requirement: NMEC Implementers shall collaborate with PG&E to finalize a program-level M&V plan to be filed with their Implementation Plan. PG&E approval of the final M&V plan is required. [269]

[268] NMEC Ruling, Ruling Paragraph 2, January 31, 2019, p. 9.

[269] Guidance for Program Level M&V Plans: Normalized Metered Energy Consumption Savings Estimation in Commercial Buildings, version 1.0, March 1, 2018, available at ftp://ftp.cpuc.ca.gov/gopher-data/energy_division/EnergyEfficiency/RollingPortfolioPgmGuidance/LBNL_NMEC_TechGuidance_Draft.pdf, last accessed March 22, 2019.

For programs and projects that will claim savings at the site level, M&V plans should address the topics discussed in the LBNL Site-level NMEC Technical Guidance document. Additional guidance on M&V for site-level NMEC can be found in PG&E M&V Requirements for Site Level NMEC.

For programs that will claim savings at the population level, M&V plans should address topics including the data that will be used to estimate savings, its source(s), what method will be used, and why it is appropriate.

5.5.1.3 Baseline Model Development

All meter-based savings calculation methodologies are based on the premise that the baseline for determining savings is the state / condition of the site before any energy efficiency intervention takes place. For RCTs and QEDs, the pre-intervention condition (baseline) is determined using comparison groups. For NMEC and SEM, the baseline is based on normalized pre-intervention savings data at the participating building.

5.5.1.4 Normalization

PG&E Requirement: Gross savings must be normalized for relevant factors, and the program or project M&V plan should discuss and justify the selection of these variables.

Best practices call for publicly available sources (e.g., weather data from published government sources), in M&V where possible. If such data are not publicly available, the data source must be disclosed. Implementers may also be required to make non-public data available to PG&E and CPUC evaluators.

CPUC Requirement: Specific or nearby weather data for baseline model development and avoided energy use calculations are allowed. Final savings claims must be normalized by long term weather based upon the most up-to-date weather files (such as CALEE 2018). Weather and other normalizing adjustments should be applied to the baseline and performance period.[270]

[270] NMEC Rulebook, p. 16.

5.5.1.5 Metering Duration

PG&E Requirement: Energy usage and other relevant data from participating sites and projects must be monitored for sufficient durations to meet CPUC requirements and best practices to ensure reasonable persistence of savings. The CPUC requires a one-year baseline period, a minimum of one year of monitoring post-implementation for all site-specific and population NMEC projects.

5.5.1.6 Calculations and Eligible Tools

PG&E Requirement: PG&E and the Implementer will agree on a method to be used to calculate savings estimates on which payments and savings claims will be based. Savings will be estimated using a publicly available methodology (equations and/or code) that is sufficiently documented that its results can be replicated, and to which a version number or publication date is attached. Version or methodological changes must have clearly specified effective dates.

5.5.1.7 Software Requirements

CPUC Requirement: All analytical methods, including tools, algorithms and software used in savings and incentive or compensation payment calculations, must be made available to Commission staff and its consultants upon request.[271]

CPUC Requirement: For Population-level NMEC programs, the specific measurement method(s) and calculation software must be determined before the program begins and applied uniformly to all sites in the program.[272]

PG&E Requirement: PG&E savings claims and implementer performance payments will be based on measurement methods and calculation software or tools that are publicly available; sufficiently documented that their results can be replicated, reviewed, and understood; and approved by PG&E prior to program launch.

PG&E Requirement: Proprietary software may be used for implementer/customer interactions and customer incentive payments. Implementers choosing to use proprietary software for this purpose will be required to follow all CPUC guidelines related to proprietary software, will need to document and justify any variance between PG&E claim calculations and proprietary calculations, and must allow PG&E and their consultants to review the software and methodologies upon request.

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[271] NMEC Rulebook, p. 18.

[272] NMEC Rulebook, p. 18.

5.5.1.8 Evaluability

Please refer to the Cross-Platform Chapter for information on program evaluation.

> Examples of information that will likely improve program evaluability for meter-based programs include: establishing policies for, and maintaining records of, data that are considered outliers, how those outliers are defined, and what actions, if any, were taken with those outliers (e.g. discard, normalize, use as-is), and detailing procedures to identify duplicate records and the action(s) that were taken to avoid double counting of savings with other energy efficiency programs.

5.5.1.9 Adjustments for Non-Routine Events (NREs)

A non-routine event is a change in site energy use that is not accounted for in the independent variables used to develop the baseline model or energy use, and not attributed to the efficiency measures installed. Non-routine events involve energy-governing factors which do not usually change (such as: the facility size, the design and operation of installed equipment, the number of weekly production shifts, or the type of occupants). Non-Routine Events should be distinguished from energy-governing factors expected to change routinely during the reporting period (such as: weather or production volume).

PG&E Requirement: Prior to program or project initiation, Implementers should work with PG&E to define NREs in the program or project context and establish clear procedures to identify potential NREs, confirm which events meet the NRE definition or threshold, and adjust savings calculation methods to account for them.

CPUC Requirement: Programs or projects using site-level approaches should track and adjust for NREs (e.g., occupancy changes, equipment failure, or major increases/decreases in operational hours that are large enough to affect savings).[273] Once NREs are identified and agreed to by the program implementer and PA the models must be adjusted to account for the resulting changes in energy consumption. The appropriate non-routine event adjustment is typically determined using an engineering analysis to normalize the project characteristics across the reporting period.[274] For a complete list of approved NRE adjustments, please refer to "IPMVP Application Guide on Non-Routine Events & Adjustments" document.[275]

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[273] NMEC Rulebook, p. 15.

[274] California Industrial SEM M&V Guide Version 1.0, February 8, 2017, p. 29.

[275] IPMVP Application Guide on Non-Routine Events & Adjustments, October 2020, available from www.evo-world.org.

5.5.1.10 Interactive Effects

CPUC Requirement: While meter-based programs must consider interactive effects, it may not be necessary to perform a meter-based analysis on both electric and gas, depending on the program interventions. Programs should describe in their M&V plans how they will account for interactive effects (e.g., metering both electric and gas, metering one fuel and calculating a value for the other).

5.5.1.11 Load Shapes

CPUC Requirement: Currently, Implementers may use and report only load shapes provided in DEER. Alternatively, a weighted blend of DEER load shapes based on metered data may be calculated and provided. Please consult a member of PG&E's Program Management team for more information.

5.5.1.12 EUL for Bundled Measures

CPUC Requirement: Project lifecycle savings must be based on a weighted average EUL method unless staff approves an alternative method for EUL calculation. EULs should be based on DEER, workpaper or other Commission adopted values, where available.

CPUC Requirement: Behavioral interventions will use an EUL of two years in non-residential sectors, one year in residential sectors; operational and retro-commissioning interventions will use an EUL of three years.[276]

PG&E Requirement: Weighted average EULs should comprise the best available estimate of the relative contribution of different measures to total savings, based on available data. Programs that use a population-level approach should calculate a population-level weighted average EUL; programs/projects that use a site-level approach should calculate a site- or project-level weighted average EUL. Implementers should consult with PG&E about the approach to calculating weighted average EUL and provide their calculations and the data used.

Weighted average EUL example:

- Measure 1: 100,000 kWh savings, 10-year EUL

[276] *D.16-08-019*, pp. 94 and 101.

- Measure 2 200,000 kWh savings, 3-year EUL

The EUL of the bundle would be (100,000 * 10 + 200,000 * 3) ÷ (100,000 + 200,000) = 5.33 years.

PG&E Requirement: To facilitate EUL estimation, Implementers must collect site-level data on the measures installed or implemented (including in programs that will claim savings using a population-level approach). Implementers who will use a site-level approach must also document any equipment being replaced, and implementers using a population-level approach may be required to do so as well.

5.5.2 Net Savings Determination

CPUC Requirement: The CPUC has assigned default net-to-gross ratios to meter-based programs and projects. As of the time of publication of this Rulebook, those were:[277]

- RCT programs: 1.00;
- NMEC projects that install a combination of measures (different NTGRs apply by sector):
  - Non-Residential: 0.95;
  - Residential Single-Family: 0.85;
  - Residential Multi-Family: 0.55; and
  - SEM: 1.00.

As of the time of publication of this rulebook, a default NTGR was not available for QEDs.

5.6 Payments and Incentives

5.6.1 Customer Payments

CPUC Requirement: Customer payments are not required. Other sources of assistance (technical support, project financing) may be provided in addition to, or in lieu of, customer

[277] *Resolution E-4952*, Attachment: DEER 2020 and Revised DEER2019 Update Statement, p. A-45.

payments. If given, customer payment for a given measure must not exceed the full measure cost without justification and approval from Commission staff.[278]

5.6.2 Incentive Structure in the M&V Plan

CPUC Requirement: Program-level M&V plans must include a description of the incentive structure, including a) a description of which entity receives compensation at each stage of the project; and b) method(s) and tools utilized in the calculation of incentives and/or compensation.[279]

5.6.3 Incentives Must Pay for Performance

CPUC Requirement: For meter-based programs, a "significant portion" of the incentives paid through the program shall be determined based on NMEC-measured performance (i.e., payments should be based on a pay-for-performance model).[280] Incentive payments shall be structured to limit and mitigate the risk associated with up-front payments that could exceed the value of realized savings.[281]

CPUC Requirement: Final incentives paid in meter-based programs may not be based on deemed or ex ante savings. Final incentives should pay only for interventions influenced by the program. [282]

5.6.4 BRO Incentives

CPUC Requirement: Recipients of behavioral, retro-commissioning, and operational measures shall only be paid incentives after participant has committed to a minimum three-year maintenance plan (evidence must be made available to Commission staff upon request). [283]

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[278] *Energy Efficiency Policy Manual.*

[279] NMEC Rulebook, p. 7.

[280] NMEC Rulebook, p. 9.

[281] *HOPPS White Paper Ruling*, Attachment A, at 11-12.

[282] NMEC Rulebook, p. 9.

[283] NMEC Rulebook, p. 9.

5.6.5 CPUC Incentive Guidance

CPUC Requirement: When developing incentives, program implementers should strive to follow CPUC guidance provided in D.18-05-041.[284]

5.7 Quality Assurance and Quality Control

PG&E Requirement: Programs and projects that use the meter-based platform should include a feedback mechanism in which meter-based savings estimates are shared with Implementers and/or customers in order to communicate program performance and help improve programs over time.

5.7.1 Pre-Installation Site Inspection *(Site-Level)*

PG&E Requirement: PG&E may conduct pre-installation site inspections. The need will be determined on a program-by-program or case-by-case basis.

5.7.2 PG&E Early Policy Review (*Site-Level)*

PG&E Requirement: PG&E may conduct early policy review or in the case of SEM, will be conducted during both the hypothesis model and final model review stages. For NMEC, the need will be determined on a program-by-program or case-by-case basis.

5.7.3 Custom Project Review Requirements *(Site-Level)*

CPUC Requirement: The CPUC requires that projects using site-level NMEC approaches to estimate savings "follow a modified custom process review" so that Commission staff may provide early feedback to PAs and implementers.[285] This review will not cause project stoppages or delays and does not constitute approval of projects or savings claims. Project information must be submitted to the Custom Measure and Project Archive (CMPA) but will not be required to wait for approval to proceed. Implementers should review Chapter 4 for general information on the custom process. Project-level review is **not** required for population-level NMEC approaches.[286] Additionally, dispositions provided by the CPUC will be advisory only.

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[284] *D.18-05-041*, Conclusions of Law, Item 3, pp. 169-170.

[285] January 31, 2019 NMEC Ruling, p. 1.

[286] January 31, 2019 NMEC Ruling, p. 6.

5.7.4 Project Documentation Requirements (*Site-Level and Population-Level*)

PG&E Requirement: As with the Custom platform, the specific records to be maintained for meter-based projects may vary based on the type of project. Documentation requirements will be determined on a program-by-program or case-by-case basis. Refer to section 4.5.4 for examples that may be applicable to site-level projects. In particular, for NMEC Implementers should ensure that they document program influence throughout the life of a project. Influence for SEM projects do not need any special documentation aside from the regular submittals of cohort meetings and treasure hunt activities.

5.7.5 Energy Model Fitness Thresholds

PG&E Requirement: Models of building or facility energy usage for participating customers should demonstrate the ability to sufficiently characterize energy use by meeting certain goodness-of-fit metrics to which the Implementer and PG&E agree at the outset of the program.

5.7.6 Baseline Period Requirements

CPUC Requirement: One year of pre-implementation usage data is required for meter-based savings calculations.[287]

> Savings uncertainty is a function of both the interval length and the monitoring duration (e.g., hourly readings of electric usage for twelve months), so programs must specify both parameters. Both interval length and monitoring duration should be considered together when designing eligibility criteria. The effects of an energy efficiency intervention must be observable when interval length, monitoring duration, effect size (i.e., percentage of savings), coefficient of variation of the model, and confidence interval are accounted for. See the Savings Calculations section of this document (Section 5.5) for details.

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5.7.7 Timing of Payments and Claims

PG&E Requirement: PG&E will agree with the Implementer on a payment schedule for each program. Implementers may propose a schedule of when payments and claims could be made. Payments tied to performance should be made after at least a sufficient amount of monitoring time, and within a reasonable amount of time of implementation, so that the risk of over or underpayment is mitigated. Programs will likely vary the interval lengths based on the budget and nature of the interventions.

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[287] NMEC Rulebook, sec. 2, p. 4.

[288] *HOPPS White Paper Ruling*; *California Energy Efficiency Evaluation Protocols*.

Consideration should be given to the nature of the measures installed (e.g., weather-dependent energy savings should include heating and cooling seasons in determining the measurement payment period). Conversely, measures that affect only baseload may only require three months for payment determination, but the energy savings determination should be trued up at the end of the requisite measurement period to verify persistence of saving.

5.8 Additional Resources

Meter-based approaches are discussed in detail and periodically updated in several publications available on the CPUC's Rolling Portfolio Guidance page.

Chapter 6 Financing Platform

6.1 Introduction

The Financing Platform guides energy efficiency program Implementers and energy efficiency project developers to incorporate financing into their energy efficiency programs. On-Bill Financing (OBF) and other financing offerings may be used with incentives or independently to motivate customers to install energy efficiency measures.

6.1.1 OBF Loans

PG&E Requirement: OBF loans are available for loan terms of up to 120 months for eligible energy efficiency projects. The availability of OBF loans is subject to availability of funds. The loan is an interest free loan, with monthly repayments integrated into the customer's PG&E bill with repayments sized to be equal to the project's projected monthly energy savings.

6.1.1.1 OBF Terms

PG&E Requirement: The Standard OBF loan is available for all eligible energy efficiency projects, subject to application approval and funding availability. The standard OBF terms may be changed at PG&E's discretion. Projects qualifying for OBF under Tier 1A are eligible for loans between $5,000 and $100,000 per premises and loan period of up to 72 months.

Table 17 -- Standard OBF Loan Terms

Loan Terms	Non-Residential Customers	Tier 1A
Interest	0%	0%
Maximum Loan Amount	Typically, $250,000 per premises, however, loans of up to $4,000,000 per premises may be awarded where, in PG&E's sole opinion, unique opportunities exist to capture large energy savings, and the customer is not receiving any other rebates and incentives.	Loans start at $5,000 per premises up to $100,000.
Maximum Term	120 Months	72 Months

6.1.1.2 Cost Buy Downs

PG&E Requirement: Where a project's payback period exceeds the maximum loan term, customers may "buy-down" the project cost to meet the necessary loan terms. This buy-down

reflects the amount that will not be covered by On-Bill Financing and should be coordinated directly with the customer. The buy-down is not paid to PG&E.

6.1.1.3 Early Repayment and Closing a PG&E Account with an OBF Loan

PG&E Requirement: A customer may pre-pay the loan without penalty (customer or Implementer should contact PG&E prior to prepayment of loan balance). If there is a loan balance on a closed account, the balance is due in full on the customer's final utility bill. If the customer with the loan agreement opens a new account at a new location, they may make payment arrangements with PG&E's credit team. The loan balance will be treated as a past due bill, not as a continuation of the OBF loan. If the customer breaks the payment arrangement, the customer risks meter shut-off pursuant to the discontinuance provisions in PG&E's tariff under Rule 11.[289,290]

6.1.1.4 Obtaining an OBF Loan

PG&E Requirement: Customers and Implementers must follow the loan application procedures in order to obtain the OBF Loan. The steps to obtaining an OBF Loan are as follows:

a. Payment History Screening: PG&E will review the customer's eligibility for the OBF Loan based on payment history. Customers with a history of late payment may be ineligible for a loan.

b. Customer Pre-Installation Loan Agreement (optional): In order to guarantee funding, pre-qualify the project as eligible, and pre-qualify a customer as eligible, a project may be submitted for pre-installation review by PG&E. Sufficient information on the measures, costs, and energy savings must be provided to PG&E to establish eligibility for a pre-installation loan agreement. The loan agreement must be signed by the customer for the funding to be reserved.

c. Post-Installation Review: Following installation, supporting information (i.e., invoices, engineering review, project QA review) must be submitted to PG&E. PG&E will use this information to determine the final loan amount. If the loan size changes between pre-install and post-install, then the loan agreement shall be reissued and must be signed by the customer before the loan payment is made.

d. Loan Payment: The loan is paid to the designated payee (the customer or assigned payee) following review of the project following installation.

[289] https://www.pge.com/tariffs/assets/pdf/tariffbook/ELEC_RULES_11.pdf.

[290] https://www.pge.com/tariffs/assets/pdf/tariffbook/GAS_RULES_11.pdf.

The OBF Customer and Contractor Handbook provides more detail of how to submit OBF loan applications.[291]

6.2 Eligibility

6.2.1 Customer Eligibility

PG&E Requirement: OBF is available to non-residential PG&E customers that meet the following conditions throughout the duration of the retrofit project:[292]

- The PG&E customer must be a business customer or a federal, state, county or local government agency (see definition of government agency customer below). Business customers and government agency customers are collectively referred to as "customer."
- The customer currently receives service from PG&E at the location of the retrofit project.
- The customer has maintained an active PG&E account for the previous 24 months.
- The customer must be in good credit standing from when the customer's program application is approved through the funding of the loan. A customer's credit standing will be determined according to a payment history screening, which may be based upon the existence of any 24-hour disconnection notices in the last 12 months.

If the customer's account does not satisfy all of the requirements of the payment history screening, the customer will receive an email notification within five business days stating the reason for disqualification. If the customer does not pass the payment history screening, customer may submit an appeal to the OBF Program team through a PG&E Account Representative.

6.2.2 DA, ESP, and CCA Accounts

PG&E Requirement: DA and CCA customers who install qualifying energy efficiency measures are eligible for OBF if they receive a monthly bill from PG&E, which includes PG&E charges. See the latest On-Bill Financing guidance document for information on calculation of energy savings for DA/ESP and CCA customers.

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[291]https://www.pge.com/includes/docs/pdfs/mybusiness/energysavingsrebates/rebatesincentives/taxcredit/onbillfinancing/handbook_obf.pdf.

[292] https://www.pge.com/tariffs/assets/pdf/tariffbook/GAS_SCHEDS_G-OBF.pdf.

6.2.3 Net Metered Accounts

PG&E Requirement: Net Energy Metered customers may participate in OBF if they receive a monthly bill from PG&E. Energy savings incorporated into the OBF loan terms will be calculated based on net usage rather than gross usage.

6.2.4 Project Eligibility

PG&E Requirement: To qualify for OBF, a project must meet the project eligibility criteria described in the Deemed, Custom or Meter-Based Platforms is eligible for On-Bill Financing. Project developers and Implementers should follow the guidelines, procedures and requirements described in those platforms. Projects that do not follow the procedures outlined in the Deemed, Custom, or Meter-Based Platforms should follow the procedures in this section to establish project eligibility. PG&E reserves the right to disqualify any project that PG&E determines is not an appropriate fit for OBF, regardless of the project meeting eligibility requirements as set forth in this Rulebook.

To support the wide variety of EE measures, OBF defines two tiers of projects, Tier 1 and Tier 2. The tier system provides a guideline to help contractors understand the information, associated costs and expected level of detail and effort typically required to be accepted by OBF.

Tier 1 projects typically consist of small, simple measures that do not fundamentally change building design, such as lighting retrofits.

Tier 2 projects will include simple measures that cover multiple system and system types or will involve limited redesign and multiple complex measures for one building system with limited interactive effect.

Customers with lower average usage than required to participate in Tier One will qualify for participation in Tier 1A. Specifically: customers who seek shorter loan terms and contractors who lack timing and resources to meet the current OBF program requirements. In these circumstances, the contractor will utilize an automated energy savings QA/QC application template for single system measures. The application template will include engineering estimates for each measure and serve as the rationale for project approval for financing.

6.2.5 Project Developer Eligibility

PG&E Requirement: The Project Developer is a contractor or a team/consortium of contractors and service provider(s) who plan and deliver the energy efficiency project. To participate in OBF,

the developer must be project developer in the Investor Confidence Project (ICP) network.[293] An exception is made for those developers using the OBF lighting template, where the developer does not need to be part of the Investor Confidence Project network.

6.2.6 Measure Eligibility

PG&E Requirement: For OBF-only projects, the following measure eligibility criteria apply:

- The energy efficiency measure must be calculated to decrease the amount of energy used to provide a specific service or to accomplish a specific amount of work;
- Any lighting measures that are part of the project scope must be included on the DesignLights Consortium's Qualified Product List;
- Non-advanced (i.e., non-LED) lighting measures are not eligible;
- Any lighting controls installed must not exceed 20 percent of project costs, and must exceed the requirements of Title 24;
- Any screw-in LED lighting must not exceed 20 percent of project costs, must be on ENERGY STAR or DesignLights Consortium's Qualified Product List, and must not be reasonably able to be replaced by the Customer;
- Equipment to be replaced as part of the project should be functioning at the time of replacement;
- Retro-commissioning measures that will be included in the loan must have a minimum three-year maintenance plan;
- The average EUL of the energy efficiency measures included in the project must be at least as long as the loan term. [294]

6.2.7 Eligible Costs

PG&E Requirement: An OBF loan may only cover those costs associated with the required components of the energy efficiency project (EE Project). Eligible project costs may include:[295]

- Implementation costs, such as project capital expenditures

[293] http://www.eeperformance.org/project-developers.html.

[294] https://www.pge.com/tariffs/tm2/pdf/GAS_3697-G.pdf.

[295] https://www.pge.com/tariffs/tm2/pdf/GAS_3697-G.pdf.

- Project Developer development fees
- Initial and ongoing M&V expenses, only if paid upfront under the loan disbursement
- O&M activities, including costs for customer O&M training, if paid upfront under the loan disbursement
- Quality Assurance Provider costs
- An EE Project performance guarantee

6.2.8 Equipment and Charges Not Eligible for Financing

PG&E Requirement: The following items are not eligible for financing through OBF:

- Customer in-house labor or customer project management costs for the energy efficiency measure installation (e.g., time spent by staff coordinating with contractors at customer facilities)
- Basic lighting measures, defined as all non-LED lighting retrofits
- Behavioral measures
- Add-ons to existing renovation projects [296]

6.3 Influence

PG&E Requirement: Projects that establish eligibility for OBF by complying with the influence-related rules of the Deemed, Custom, or Meter-Based Platforms shall follow the influence rules described in those chapters. For projects that will only use financing, the OBF loan must only be used for projects that otherwise would not be installed.[297]

6.4 Ex Ante Values

[296] https://www.pge.com/tariffs/tm2/pdf/GAS_3697-G.pdf.

[297] California Public Utilities Commission, March 14, 2019, *Decision 19-03-001: Application of Southern California Edison Company (U 338-E) for Approval of its 2009- 2011 Energy Efficiency Program Plans And Associated Public Goods Charge (PGC) And Procurement Funding Requests.*

6.4.1 Savings Claims Methodology

PG&E Requirements: OBF projects do not have a unique savings claim methodology. Savings will be calculated using the appropriate savings calculation methodology.

- Projects that are eligible due to their compliance with the project eligibility in the Deemed, Custom, or Meter-Based Platforms should use the respective platform rules for claiming savings.
- Projects that are qualified using the OBF-only methodology described in the project eligibility section above will use the savings calculation methodology applicable to the Meter-Based platform where possible.

Projects seeking an OBF loan exception are screened on factors such as project type, cost-effectiveness, baseline predictability, consumption history, and depth of savings for eligibility within the standard OBF population NMEC cohort. If deemed ineligible, the project will be directed to either the site specific NMEC or custom savings claim methodologies. Projects following the site specific NMEC or custom pathway must adhere to the platform-related rules as described in the Meter-Based or Custom chapters.

6.4.2 Cost Allocations

PG&E Requirement: OBF costs will be allocated to the program Implementer for the purposes of program evaluation. As ratepayer-funded OBF funds are returned to PG&E with no interest, PG&E will allocate the cost of the projects based on:

- Capital Costs – The real cost to ratepayers for deploying non-earning capital plus anticipated default costs.
- Administration Costs - The costs to PG&E of administering OBF.
- QA Costs – Where PG&E pays the costs of the QA review on an OBF project, the costs of those QA costs will be allocated to the program.

6.5 Payment Calculations

6.5.1 Loan Calculations

PG&E Requirement: The OBF Loan is limited in size by the project's estimated energy cost savings. The savings must be sufficient to repay the loan during the maximum allowable payment term to fully fund a project. The monthly OBF payment is calculated based on a project's estimated monthly energy savings.

The following is an example calculation:

Table 18 -- Sample OBF Loan Calculation

Line	Term	Amount
a	Project Cost for Measures	$10,000
b	Rebate or Incentive	$1,000
c	Customer's Total Loan Amount	$9,000
d	Customer's Average Retail Rate	$0.180 per kWh
e	Estimated Annual Energy Savings	12,000 kWh
f	Estimated Annual Energy Cost Savings (d x e)	$2,160
g	Estimated Monthly Cost Savings (f / 12)	$180
h	Loan Term	51 months
i	Monthly Loan Payment (rounded)	$176.47

The customer's loan terms in this example would be $176.47 per month for 51 months.

In the case where the energy cost savings are insufficient to support a loan within the maximum loan term a customer may buy-down the cost of the project (see Section 6.1.1.3). While projected bill neutrality for the project is a requirement for the loan, no guarantee of bill neutrality is provided to the customer and no amendments to the loan are made once the loan has been provided.

6.5.1.1 Determining Average Rates for DA and CCA Customers

PG&E Requirement: To estimate the monetary value of gas and electric savings for the purpose of the OBF payback calculation for Direct Access and Community Choice Aggregation customers, PG&E will use the customer's actual average past 12-month transportation cost ($/therm or $/kWh) plus the customer's actual 12-month weighted average cost of gas ($/therm) and electricity ($/kWh) from their commodity provider(s). If actual weighted average cost is unavailable, PG&E's average past 12-month weighted average cost of gas ($/therm), and electricity ($/kWh) can be used as a proxy for the commodity cost.

6.5.1.2 Establishing Energy Savings for Loans Qualified through other Platforms

PG&E Requirement: For projects that use the Deemed, Custom or Meter-Based methodologies, PG&E will use the projected energy savings for the project using those procedures.

6.5.1.3 Establishing Energy Savings for all Other Projects

PG&E Requirement: Project energy savings calculations must be submitted for review by a third-party QA Provider for verification of completeness and accuracy (see QA section for more information). The QA Provider may request a review of the calculation methods, baseline assumptions, utility billing history, or calculation tools as needed. The development of energy savings calculations and cost estimates shall be in accordance with Section 4 of the ICP Targeted Commercial Protocol, with the following exceptions:

- The person performing savings calculations does not need a specific qualification or certification however the organization must be part of the ICP Project Developer network. An exception is made where the developer is using the OBF lighting template, where the organization are not required to be part of the ICP Project Developer network;
- Cost estimates for all projects must be based on actual project bids from the installing contractor, not estimates calculated by the Project Developer or others. Cost estimates must be broken out by individual energy efficiency measure and Project Developer must provide an itemized invoice.

6.6 Inspections and QA/QC

PG&E Requirement: Projects that establish eligibility for an OBF loan using the Deemed, Custom or Meter-Based Platform should refer to the QA requirements described in those sections. All other projects should follow the rules described in this section.

Projects qualifying for OBF under Tier 1A are subject to site inspections to confirm measure installation. Projects are selected at random, and Implementers and project developers should expect at least one site inspection annually.

Table 19 – Inspections and QA/QC Requirements

Platform	Location of Quality Assurance Requirements In This Document
Deemed	Deemed Platform, Section 3.6
Custom	Custom Platform, Section 4.5
Meter-Based	Meter-Based Platform, Section 5.7
Financing	Savings calculations and project eligibility must be reviewed and validated by an eligible QA provider prior to issuance of a Pre-installation loan agreement, and prior to the loan funds being disbursed.

6.6.1 QA Provider Eligibility

PG&E Requirement: To perform a QA review for OBF, the QA Provider must be part of the ICP QA network. A single firm or individual can be both a QA Provider and a Project Developer but cannot serve both functions for the same individual project.[298]

6.6.2 Operational Performance Verification

PG&E Requirement: Every project should have a short Operational Performance Verification (OPV) plan that establishes the scope and performance criteria for verifying a given project, and for adjusting the energy savings estimates as necessary. The verification of the installation, and verification that it is installed and operates correctly, shall be in accordance with Section 5.0 of the ICP Targeted Commercial Protocol, with the following exceptions:

- A qualified OPV Authority does not need to be appointed;
- Qualifications for person performing OPV do not need to be provided;
- Statements by the Project Developer, that the project as designed and built “conforms with the intent and scope of the original project and has the ability to achieve predicted energy savings” does not need to be provided. This statement is inherent in the application to PG&E;

[298] https://www.pge.com/tariffs/tm2/pdf/GAS_3697-G.pdf.

- Updated energy savings calculations, which reflect the installed condition of the project, must be provided. This energy savings calculation(s) provided at the time of the installation form the basis of the loan amount.

6.6.3 Operations and Maintenance (O&M)

PG&E Requirement: All projects require a brief O&M Plan which describes the planned scope of O&M activities, O&M services and training provided by the Project Developer, and training materials. O&M services may be included in the loan amount provided the project cost meets the program requirements. The operations and maintenance requirements shall be in accordance with Section 6.0 of the ICP Targeted Commercial Protocol, with the following exceptions:

- Annual follow-up monitoring or evaluation is required for all projects; and
- An O&M plan must be written and included in the project package.

6.6.4 Measurement and Verification Plan

PG&E Requirements: The Project Developer team must develop an IPMVP-compliant Measurement and Verification (M&V) plan that describes how the energy savings and performance will be monitored over time and reported to the customer. The M&V plan will be shared with the customer and will establish the expected outcomes for the project, including how to analyze and remedy variances between actual and expected energy performance. The measurement and verification requirements, including the requirements for the M&V Plan, shall be in accordance with Section 7.0 of the ICP Targeted Commercial Protocol, with the exception that justification for the IPMVP option(s) applied is not required.

6.7 Payment Processing

6.7.1 Post Installation

PG&E Requirement: The OBF loan is paid upon completion of the project. All incentives must be approved before the OBF Loan is paid. For those projects that do not receive an incentive, the project must complete the post-installation QA review.

6.7.2 Loan Modification

PG&E Requirement: If the final scope of the project differs from the scope detailed in the original Loan Agreement, a Loan Modification Agreement (form that must be completed and signed by an authorized representative of the customer) may be required. For projects where the final loan amount changes by less than $100 and there is no change to the loan term, a loan modification may be requested, but will not be required.

6.7.3 OBF Check Disbursement

PG&E Requirement: Once the signed Loan Modification Agreement (if applicable) is received by PG&E, the loan will be created, and the loan check will be issued to the customer or the contractor in accordance with the loan agreement. The check will be mailed to the address specified on the loan agreement. The loan disbursement cannot be split into multiple checks. PG&E is not obligated to fund the loan after installation under one or more of the following conditions:

- The final loan does not meet minimum loan amount;
- Payback exceeds the program's maximum limit;
- There is no original customer signature on the OBF Loan Modification Agreement (if a loan adjustment is necessary);
- PG&E determines that the customer no longer meets the credit requirements.

6.8 Other Ratepayer-Supported EE Financing Programs

PG&E Requirement: The California Alternative Energy and Transportation Financing Authority administers the statewide energy efficiency financing pilots as ordered in D.13-09-044.[299] The financing pilot programs are supported by PG&E ratepayer funds, and savings are attributed to the PG&E energy efficiency portfolio. The financing pilot programs use a combination of credit enhancements, and on-bill repayment to make low cost private financing available to customers implementing energy efficiency projects.

Program Implementers may integrate these programs, and any other future ratepayer funded financing program, into programs in combination with incentives or as stand-alone offerings. The financing programs will cover the following sectors: Single Family Residential (currently

[299] California Public Utilities Commission, September 19, 2013, *Decision 13-09-044: Decision Implementing 2013-2014 Energy Efficiency Financing Pilot Programs;* http://www.treasurer.ca.gov/caeatfa/cheef/index.asp.

available as the Residential Energy Efficiency Loan Assistance Program), Small Business, Commercial, and Master-Metered Multifamily. [300]

[300] http://www.treasurer.ca.gov/caeatfa/cheef/reel/index.asp.

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Appendix B – Abbreviations

The following abbreviations are used throughout the document:

Acronym	Term
AOE	Add-On Equipment Measure Application Type
AR	Accelerated Replacement Measure Application Type
ARC	Accelerated Replacement Cost
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers
BRO	Behavioral, Retro-Commissioning, and Operational
BRO-Bhv	Behavioral Measure Application Type
BRO-RCx	Retro-Commissioning Measure Application Type
BRO-Op	Operational Measure Application Type
BTU	British Thermal Unit
BW	Building Weatherization Measure Application Type
CALCTP	California Advanced Lighting Controls Training Program
CAL TF	California Technical Forum
CCA	Community Choice Aggregators
CE	Capacity Expansion Measure Application Type
CEC	California Energy Commission
CFL	Compact Fluorescent Lightbulb
CIT	Custom Implementation Team
CMPA	Custom Measure and Project Archive
COM	Commercial Building Type
CPQC	Custom Project Quality Control
CPR	Custom Project Review
CPUC	California Public Utilities Commission
CV(RMSE)	Coefficient of Variation of the Root Mean Squared Error

Acronym	Term
DA	Direct Access
DAC	Disadvantaged Communities
DEER	Database for Energy Efficient Resources
DI	Direct Install
EAdb or EAD	Ex Ante Database
EAR	Ex Ante Review
EE	Energy Efficiency
EFLH	Equivalent Full-Load Hours
EI	Energy Insight
EISA	Energy Independence and Security Act
EM&V	Evaluation, Measurement, & Verification
ESP	Energy Service Provider
ET	Emerging Technologies
eTRM	Electronic Technical Reference Manual
EUL	Effective Useful Life
EM&V	Evaluation, Measurement and Verification
FMC	Full Measure Cost
FR	Free Rider
GHG	Greenhouse Gas
GSIA	Gross Savings and Installation Adjustment
GWP	Global Warming Potential
HTR	Hard-to-Reach
HVAC	Heating, Ventilation, and Air Conditioning
ICP	Investor Confidence Project
IMC	Incremental Measure Cost
IOU	Investor-Owned Utility

Acronym	Term
IP	Implementation Plan
IPMVP	International Performance Measurement and Verification Protocol
IR	Installation Rate
ISP	Industry Standard Practice
LED	Light Emitting Diode
MAT	Measure Application Type
M&V	Measurement and Verification
MWD	Metropolitan Water District
NC	New Construction Measure Application Type
NMBE	Normalized Mean Bias Error
NMEC	Normalized Metered Energy Consumption
NR	Normal Replacement
NTG or NTGR	Net-to-Gross Ratio
OBF	On-Bill Financing
OTR	“Other” Building Type
O&M	Operations and Maintenance
PA	Program Administrator
PAC	Program Administrator Cost Test
PC	Project Cost
PEARdb	Preliminary Ex Ante Review database
PG&E	Pacific Gas and Electric Company
POE	Preponderance of Evidence
POS	Point-of-Sale
PPP	Public Purpose Program
QA/QC	Quality Assurance/Quality Control
QED	Quasi-Experimental Design

Acronym	Term
QPL	Qualified Product List
RACC	Refrigerant Avoided Cost Calculator
RCA	Refrigerant Charge Adjustment
RCT	Randomized Control Trial
RCx	Retro-Commissioning
READI	Remote Ex Ante Database Interface
REA	Retrofit Add-on
ROB	Replace on Burnout
RUL	Remaining Useful Life
SP	Standard Practice
TRC	Total Resource Cost
TSB	Total System Benefit
UES	Unit Energy Savings
VRF	Variable Refrigerant Flow
WEA	Weatherization
WEN	Water-Energy Nexus
WPA	Workpaper Project Archive
WRR	Wattage Reduction Ratio