<table>
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<tr>
<th>Version</th>
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| V0.99c  | 03/25/19   | Notable changes as of 3/25/19 for public view:  
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. |
| V0.99b  | 07/09/2018 | Final first public version.                                                  |
| v0.99   | 05/09/2018 | Near final first public version.                                             |
| v0.9    | 12/12/2017 | Draft sent for second management review.                                    |
| v0.5    | 10/31/2017 | Draft sent for management review.                                           |
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## Glossary

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<tr>
<td>Accelerated Replacement (AR)</td>
<td>See Measure Application Type.</td>
</tr>
<tr>
<td>Accelerated Replacement Cost (ARC)</td>
<td>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. See Section 2.3.3.1.4 for more information.</td>
</tr>
<tr>
<td>Add-On Equipment (AOE)</td>
<td>See Measure Application Type.</td>
</tr>
<tr>
<td>Aggregation (also known as population-level)</td>
<td>Method of quantifying meter-based savings claims by applying a consistent methodology to multiple sites. Claims are made at the program level, for a group of participants. Method of quantifying meter-based savings claims by comparing pre/post normalized meter data from a population of participants with pre/post normalized meter data from a population of non-participants. Claims are made at the program or population level.</td>
</tr>
<tr>
<td>Behavioral, Retrocommissioning, and Operational (BRO)</td>
<td>See Measure Application Type.</td>
</tr>
<tr>
<td>Bill Neutrality</td>
<td>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.</td>
</tr>
<tr>
<td>California Public Utilities Commission (CPUC)</td>
<td>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.</td>
</tr>
<tr>
<td>California Statewide Qualified LED Product List</td>
<td>Source for determining eligibility of non-residential LED fixtures for energy efficiency incentives and rebates offered by Pacific Gas &amp; Electric Company.</td>
</tr>
<tr>
<td>Code</td>
<td>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.</td>
</tr>
<tr>
<td>Community Choice Aggregators (CCA)</td>
<td>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.</td>
</tr>
<tr>
<td>Comparison Group</td>
<td>A population of non-participating customers similar and representative of a population of customers participating in an energy efficiency program. In an aggregation meter-based savings approach, the difference in normalized usage between the comparison group and the participating population yields the program’s savings.</td>
</tr>
<tr>
<td>Coverage Factor</td>
<td>The range in observed values of independent variables during the baseline period in a site-specific-level meter-based analysis.</td>
</tr>
<tr>
<td>Custom Measures and Projects</td>
<td>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.</td>
</tr>
<tr>
<td>Customer</td>
<td>An account holder who receives delivered energy from PG&amp;E. The parent company of the account holder and any of its subsidiaries are considered one PG&amp;E customer.</td>
</tr>
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PG&E Resource Savings Rulebook

Version 0.99c
Version 0.99b
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<tr>
<td>Database of Energy Efficiency Resources (DEER)</td>
<td>Database located at: <a href="http://www.deeresources.com">http://www.deeresources.com</a> 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.</td>
</tr>
<tr>
<td>Deemed Measure</td>
<td>A prescriptive energy efficiency measure. Energy efficiency measures with predefined savings calculations, cost, eligibility, and other measure attributes.</td>
</tr>
<tr>
<td>DEER Peak Demand Savings (through 12/31/2019)</td>
<td>The average demand impact, for an installed measure, as would be “seen” at the electric grid level, averaged over the nine hours, between 2 p.m. and 5 p.m., during the three-consecutive weekday period which contains the highest average temperature during the 12 p.m. to 6 p.m. period for those three days.</td>
</tr>
</tbody>
</table>
| DEER Peak Demand Savings (after 1/1/2020) | The average demand impact as would be “seen” at the electric grid level, averaged across 15 hours from 4 p.m. to 9 p.m. during the three-consecutive weekday period containing the highest algebraic sum of:  
  - The average temperature over the three-day period,  
  - The average temperature from noon to 6 p.m. 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. |
<p>| Delivery Channel | 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). Otherwise known as “channel”. |
| 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. |
| 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. |
| Direct Install | Energy efficiency solutions provided directly to the customer at little or no cost through installation contractors provided and managed by an Implementer. |</p>
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<tr>
<td>Disadvantaged Communities</td>
<td>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:</td>
</tr>
<tr>
<td></td>
<td>(1) Areas disproportionately affected by environmental pollution and other hazards that can lead to negative public health effects, exposure, or environmental degradation. <a href="https://oehha.ca.gov/calenviroscreen">A.17-01-013 et al.</a></td>
</tr>
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<td></td>
<td>(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.</td>
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<td>The CalEnviroScreen Tool utilizes a number of indicators to develop a composite “score,” which ranks a given census tract’s overall burden across the variety of indicators relative to all other census tracts’ scores. CalEPA, pursuant to Health and Safety Code Section 39711, defines disadvantaged communities as those census tracts scoring in the top 25 percent of census tracts statewide on the set of 20 different indicators in CalEnviroScreen. As part of its definition of disadvantaged communities, CalEPA also finds that an additional 22 census tracts that score in the highest five percent of CalEnviroScreen’s Pollution Burden indicator, but that do not have an overall CalEnviroScreen score in the top 25 percent because of unreliable socioeconomic or health data, are also defined as disadvantaged—CalEPA’s CalEnviroScreen tool is used to identify census tracts that meet the definition of a disadvantaged community. The tool can be found here: <a href="https://oehha.ca.gov/calenviroscreen">https://oehha.ca.gov/calenviroscreen</a></td>
</tr>
<tr>
<td>Downstream</td>
<td>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.</td>
</tr>
<tr>
<td>Dual Baseline</td>
<td>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 (RUL), 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.</td>
</tr>
<tr>
<td>Early Retirement (ER)</td>
<td>See Measure Application Types.</td>
</tr>
<tr>
<td>Effective Useful Life (EUL)</td>
<td>An estimate of the median number of years that the measures installed under the program are still in place and operable.</td>
</tr>
<tr>
<td>Embedded Energy</td>
<td>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).</td>
</tr>
<tr>
<td>Emerging Technologies (ET)</td>
<td>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.</td>
</tr>
<tr>
<td>Energy Efficiency (EE)</td>
<td>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.</td>
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<td>Term</td>
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| 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”.
<p>| Energy Efficiency Project | Implementation of an EE measure or group of measures at essentially one time, through a single incentive application. |
| Energy Insight (EI) | PG&amp;E software system for Trade Professionals that utilizes Salesforce to track and submit customer rebate and incentive applications. |
| Energy Service Provider (ESP) | An entity who provides electric supply services to Direct Access Customers within PG&amp;E’s service territory. An ESP may also provide certain metering and billing services to its DA Customers as provided for within these tariffs. |
| eRebates | PG&amp;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. |
| Evaluation, Measurement and Verification (EM&amp;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 &amp; Verification. |
| Ex Ante Review (EAR) | Process that estimates the potential energy savings and the customer financial incentive for an 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, which may be revised with an impact evaluation. |
| 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. |
| Experimental Design | An approach to program design which quantifies savings by identifying two similar customer groups, installing and/or implementing a set of energy efficiency measures in one group, and observing the difference in normalized usage between the two groups. |
| 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. Ex post evaluations serve the fundamental purpose of developing estimates of reliable load impacts delivered through ratepayer-funded efficiency efforts. |</p>
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<td>Free Rider</td>
<td>Program participants who would have installed and/or implemented the measure or equipment in the absence of the program. 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.</td>
</tr>
<tr>
<td>Fuel Substitution</td>
<td>Programs which are intended to substitute energy using equipment of one energy source with a competing energy source (e.g. switch from electric resistance heating to gas furnaces).</td>
</tr>
<tr>
<td>Fuel Switching</td>
<td>See Fuel Substitution.</td>
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| Full Measure Cost (FMC)                   | The total cost of the EE 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, the vendor name and address, the customer’s name and address, the invoice number, the date of sale, and the total cost. Participant costs 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. |
| 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. |
| 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). 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. |

**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.
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| Hard-to-Reach (HTR) - Residential                   | Those customers who do not have easy access to program information and/or generally do not participate in energy efficiency programs due to a language, income, housing type, geographic, and/or home ownership (split incentives) barrier. These barriers are defined as:  
- Language – Primary language spoken is other than English, and/or  
- Income – Those customers who qualify for the California Alternative Rates for Energy or the Family Electric Rate Assistance Program, and/or  
- Housing Type – Multifamily and Mobile Home Tenants (rent or lease), and/or  
- Geographic – Located in areas other than the San Francisco Bay Area, San Diego area, Greater Los Angeles Area (Los Angeles, Orange, San Bernardino, Riverside and Ventura counties) or Sacramento, or in a Disadvantaged Community (as designated by CalEPA) and/or  
- Home Ownership – Renters.  
When classifying a customer as hard-to-reach, it is considered sufficient if only two of the criteria listed above are met if one of the criteria is the geographic criteria. If the geographic criteria are not met, three of the other criteria must be met. |
| Hard-to-Reach – Non-Residential                     | Business customers who do not have easy access to program information or generally do not participate in energy efficiency programs due to language, business size, geographic location/Disadvantaged Community status, or lease (split incentive) barrier.  
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.  
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                             | 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.  
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. |
<table>
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<tr>
<td>Industry Standard Practice (ISP)</td>
<td>A measure or 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 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. In addition, an ISP can be a method or technique that has been generally accepted as superior to any alternatives because it produces results that are superior to those achieved by other means or because it has become a customer’s standard way of doing things (e.g., a standard way of complying with legal or ethical requirements, or a customer’s preference for the best product with superior efficiency in customized design). This is generally applicable to custom measures and projects.</td>
</tr>
<tr>
<td>Influence</td>
<td>See Program Influence.</td>
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</tbody>
</table>
| 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.  
 | 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.  
 | 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.  
 | 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.  
 | 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 (e.g., Pacific Gas and Electric Company)  
 | 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.  
<p>| 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/New Capacity, Normal Replacement, and Weatherization. Each of these measure application types is further defined below.  |</p>
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<tbody>
<tr>
<td>Accelerated Replacement (AR)</td>
<td>A measure application type which includes three subtypes: Early Retirement (ER), Repair Eligible (RE), and Repair Indefinitely (RI).</td>
</tr>
<tr>
<td>Add-On Equipment (AOE)</td>
<td>An Add-on Equipment (AOE) measure installs new equipment onto an existing host improving the nominal efficiency 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 is 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.</td>
</tr>
<tr>
<td>Behavioral, Retro-commissioning, and Operational (BRO-Bhv)</td>
<td>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); activities and installations that restore equipment performance to its nominal efficiency (i.e., rated, intended, or original efficiency (retro-commissioning)) but do not enhance the measure’s nominal efficiency; and measures that improve the efficient operation of installed equipment (operational).</td>
</tr>
<tr>
<td>Building Weatherization (BW)</td>
<td>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.</td>
</tr>
<tr>
<td>Capacity Expansion (CE)</td>
<td>CE includes eligible projects that increase the capacity of existing systems.</td>
</tr>
<tr>
<td>Early Retirement (ER)</td>
<td>Subset of Accelerated Replacement. The ER category is a sub-type of the larger Accelerated Replacement category, which includes replacements of existing equipment with nominally higher efficiency equipment and where there is more evidence than not that a) the existing equipment would have remained in operation for at least the remaining life of the existing equipment, performing its current service requirement and b) the energy efficiency program activity induced or accelerated the equipment replacement. The existing equipment must have at least one year of remaining useful life to qualify as Early Retirement.</td>
</tr>
<tr>
<td>New Construction (NC)/New Capacity (NEW)</td>
<td>NEW includes eligible projects where equipment is installed in a new area or one that has been subject to a major renovation, or to expand capacity of existing systems, or to serve a new load.</td>
</tr>
<tr>
<td>Normal Replacement (NR)</td>
<td>NR includes measure installations where the existing equipment has failed or no longer meets current or anticipated needs or is being replaced due to remodeling, upgrading, or replacement activities that are undertaken in the normal course of business. Measure installations where the existing equipment is still functional but does not qualify for Accelerated Replacement fall into this category. This category now includes measures that previously fit into the now-retired Replace on Burnout category.</td>
</tr>
<tr>
<td>Operational (BRO-Op)</td>
<td>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.</td>
</tr>
<tr>
<td>Term</td>
<td>Definition</td>
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<tr>
<td>Repair Eligible (RE)</td>
<td>Subset of Accelerated Replacement. A measure application subtype representing the replacement of equipment that needs to be repaired but that when broken, non-functional, or unable to provide the intended service would be repaired major repair to return the equipment to fully serving the load and that repair cost is less than 50% of the full measure cost.</td>
</tr>
<tr>
<td>Repair Indefinitely (RI)</td>
<td>Subset of Accelerated Replacement. A measure application subtype representing the replacement of equipment that exceeds its EUL and has a history of repair and maintenance and could typically continue to be maintained repaired to serve the load for the RUL of the existing equipment.</td>
</tr>
<tr>
<td>Retro-commissioning (BRO-RCx)</td>
<td>The BRO category includes measures that either restore or improve energy efficiency, 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).</td>
</tr>
<tr>
<td>Weatherization (WEA)</td>
<td>The WEA 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.</td>
</tr>
<tr>
<td>Midstream</td>
<td>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.</td>
</tr>
<tr>
<td>Net Savings</td>
<td>The savings attributable to a program realized when free ridership is accounted for. The savings is calculated by multiplying the gross savings by the net to gross ratio.</td>
</tr>
<tr>
<td>Net-to-Gross (NTG) Ratio</td>
<td>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.</td>
</tr>
<tr>
<td>New Construction/New Capacity (NEW)</td>
<td>See Measure Application Type.</td>
</tr>
<tr>
<td>Non-Resource Program</td>
<td>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.</td>
</tr>
<tr>
<td>Non-Routine Event</td>
<td>A change in site energy use that is not accounted for in the independent variables used in the baseline model or energy use, or attributable to the efficiency measures that were installed. Non-Routine Events are energy governing factors which are not usually expected to 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).</td>
</tr>
<tr>
<td>Normal Replacement (NR)</td>
<td>See Measure Application Type.</td>
</tr>
<tr>
<td>Term</td>
<td>Definition</td>
</tr>
<tr>
<td>------</td>
<td>------------</td>
</tr>
<tr>
<td>Normalized Metered Energy Consumption (NMEC)</td>
<td>A method of quantifying energy savings by normalizing to reflect typical, average, or “normal” set of conditions, and comparing energy usage data before and after an energy efficiency intervention. 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)[1]</td>
</tr>
<tr>
<td>Observed Savings</td>
<td>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.</td>
</tr>
<tr>
<td>On-Bill Financing (OBF)</td>
<td>A financing opportunity offered by PG&amp;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&amp;E bill, or, at PG&amp;E’s discretion, by separate bill.[2]</td>
</tr>
<tr>
<td>Payback Period</td>
<td>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.</td>
</tr>
<tr>
<td>Persistence</td>
<td>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, early retirement of installed equipment, and other reasons measures might be removed or discontinued.[3]</td>
</tr>
<tr>
<td>Platform</td>
<td>Rulesets for how PG&amp;E and its Implementers measure, pay for, and claim energy savings, including Deemed, Custom, Meter-Based, and Financing.</td>
</tr>
<tr>
<td>Point-of-Sale (POS) Rebate</td>
<td>Rebate for purchase of energy efficient product at the time of sale as a line item on the invoice/receipt.</td>
</tr>
<tr>
<td>Portfolio</td>
<td>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.</td>
</tr>
<tr>
<td>Preliminary Ex-Ante Review Database (PEARdb)</td>
<td>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.</td>
</tr>
<tr>
<td>Preponderance of Evidence (POE)</td>
<td>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.[4]</td>
</tr>
<tr>
<td>Program</td>
<td>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.[5]</td>
</tr>
<tr>
<td>Term</td>
<td>Definition</td>
</tr>
<tr>
<td>------</td>
<td>------------</td>
</tr>
<tr>
<td>Program Administrator (PA)</td>
<td>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.</td>
</tr>
<tr>
<td>Program Administrator Cost Test (PAC)</td>
<td>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.</td>
</tr>
<tr>
<td>Implementation Plan (IP)</td>
<td>A detailed description of a program that includes program theory and design, goals and budgets, logic models, planned processes, program activities and EM&amp;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.</td>
</tr>
<tr>
<td>Program Influence</td>
<td>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.</td>
</tr>
<tr>
<td>Project Developer (Financing)</td>
<td>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.</td>
</tr>
<tr>
<td>Proof of Payment</td>
<td>Documentation provided which shows evidence that a purchase has been made. This may take the form of an invoice, purchase receipt, lease agreement, etc.</td>
</tr>
<tr>
<td>Public Purpose Program (PPP)</td>
<td>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.</td>
</tr>
<tr>
<td>QA Provider (Financing)</td>
<td>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.</td>
</tr>
<tr>
<td>Qualified Products List (QPL)</td>
<td>List of equipment that meets specifications and qualification requirements set forth in the applicable measure specification.</td>
</tr>
<tr>
<td>Quasi-Experimental Design</td>
<td>An approach to program evaluation which quantifies savings by identifying a group of customers similar to those who received a program intervention (for example, installing and/or implementing a set of energy efficiency measures or providing information about or assistance with an energy efficiency program), and estimating the difference in normalized usage between the two groups. A quasi-experiment is similar to an experimental design in that it compares energy usage of two groups but does not use random assignment. Instead, a group of customers similar to those who receive the program intervention is identified after the fact (for example, by analyzing measurable characteristics of participants such as climate zone and prior energy usage). Quasi-experiments are not considered as rigorous as experiments that use random assignment, because un-measured differences between the two groups could contribute to differences in energy usage.</td>
</tr>
<tr>
<td>Term</td>
<td>Definition</td>
</tr>
<tr>
<td>------</td>
<td>------------</td>
</tr>
<tr>
<td>Randomized Control Trial (RCT)</td>
<td>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. Net savings is estimated as the difference in usage between the two groups.</td>
</tr>
<tr>
<td>Ratepayer</td>
<td>Those customers who pay for gas or electric service under regulated rates and conditions of service.</td>
</tr>
<tr>
<td>Rebate</td>
<td>A financial incentive paid to the customer in exchange for a specific action, typically the installation of energy efficiency equipment.</td>
</tr>
<tr>
<td>Regressive Baseline</td>
<td>Use of a Code or standard practice baseline when existing equipment efficiency exceeds code or standard practice efficiency.</td>
</tr>
<tr>
<td>Remaining Useful Life (RUL)</td>
<td>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.</td>
</tr>
</tbody>
</table>
| Remote Ex Ante Database Interface (READI) | READI is a program that allows users to examine the CPUC’s databases of ex ante measure information. With the READI program you can:  
  - Browse and examine the ex-ex-ante data tables.  
  - Find existing DEER and non-DEER measure definitions.  
  - Find and examine the Technologies that are used in the measure definitions.  
  - Examine the deemed energy impacts associated with measures in tables and graphs.  
  - Download data tables to your computer as workbook or CSV files.  
  - Create and Save new measures based on existing Scaled measure definitions. |
<p>| Repair Eligible (RE) | See Measure Application Type. |
| Repair Indefinitely (RI) | See Measure Application Type. |
| Resource Program | Energy efficiency programs that generate energy savings that are quantified and tracked by program administrators. |
| Sector | Customer groups sharing common characteristics and barriers that are building blocks to PG&amp;E’s portfolio, including Residential, Commercial, Public, Industrial, Agricultural, and Cross-Cutting. |
| Site Level Specific | Method of quantifying meter-based savings claims by analyzing pre/post normalized meter data for a particular site. Claims are made at the site or project level. |
| 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.” |</p>
<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Source BTU Consumption</td>
<td>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.</td>
</tr>
<tr>
<td>Standard Practice Baseline</td>
<td>A measure or practice used as the baseline for a specific measure that represents what the customer would implement in the absence of program influence or intervention.                                                                lässlich der Prinzipien für eine bestimmte Maßnahme wird die Baseline bestimmt, die repräsentiert, was der Kunde in der Abwesenheit von Programmbeeinflussung oder Intervention durchführt.</td>
</tr>
<tr>
<td></td>
<td>A standard practice can be established from an ISP study, from similar and recent typical activity, or from an analysis of the current viable options applicable to the customer and the customer’s typical decision-making process.</td>
</tr>
<tr>
<td></td>
<td>Where a standard practice is identified that exceeds the minimum efficiency established by a code or regulation, the standard practice is the appropriate baseline.</td>
</tr>
<tr>
<td>Third-Party Implementer</td>
<td>See Implementer.</td>
</tr>
<tr>
<td>Title 24</td>
<td>Title 24 of the California Code of Regulations is known as the California Building Standards Code. Part 6 is the California Energy Code.</td>
</tr>
<tr>
<td>Total Resource Cost Test (TRC)</td>
<td>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.</td>
</tr>
<tr>
<td>Trade Professionals</td>
<td>Any third party such as contractors, installers, retailers, distributors, manufacturers, engineers, and energy service companies, etc.</td>
</tr>
<tr>
<td>Upstream</td>
<td>The 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.</td>
</tr>
<tr>
<td>Water-Energy Savings</td>
<td>The savings of Embedded Energy that results from water-savings projects. Considered part of the Water-Energy Nexus.</td>
</tr>
<tr>
<td>Water-Energy Nexus (WEN)</td>
<td>Term applied to the energy used to treat, heat, and convey water in California and programmatic opportunities to reduce energy use and conserve water.</td>
</tr>
<tr>
<td>Weatherization (WEA)</td>
<td>See Measure Application Types.</td>
</tr>
<tr>
<td>Workpaper</td>
<td>Documentation prepared by the program administrators or program implementers that documents 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 (DEER) (D.10-04-029, footnote page 20).</td>
</tr>
</tbody>
</table>

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3. California Code of Regulations, Title 24 (Building Standards Code) and Title 20, Division 2, Chapter 4, Article 4 (Appliance Energy Efficiency Regulations).  
5. CPUC email from Peter Lai, Energy Division, April 19, 2017.  
for accelerated replacement baseline treatment.

- D. 05-18-05-041044, pg 39


- D.05-01-055, p. 53.
- Energy Efficiency Policy Manual, p. 53. This document uses the terms “fuel switching” and “fuel substitution” interchangeably. Others use fuel switching to refer to changes to a non-regulated fuel (e.g. not electricity or gas), whereas fuel substitution refers to regulated fuels (electricity or gas). See the CEC Staff Paper: Framework for Establishing the Senate Bill 350 Energy Efficiency Savings Doubling Targets (January 2017) at pp. 18-19.

- D.16-08-019, p. 105.
- D.12-05-015, p. 223.

- Generalization of EE Policy Manual definition of HVAC interactive effects.


- Accelerated Replacement currently includes ER, RE and RI, although rules regarding RE and RI are not yet defined per: California Public Utilities Commission, Energy Division, March 2, 2017, Resolution E-4819; Measure level baseline assignment and preponderance of evidence guidance to establish eligibility for an accelerated replacement baseline treatment.
Chapter 1 Introduction

1.1 Overview
In Decision 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. In anticipation of this shift, PG&E has drafted 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 2018 - 2025. In the Plan, PG&E envisions a revised portfolio structure centered on resource programs in five customer sectors that rely 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.

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1 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, 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.
| **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. |
| **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 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. |
| **Platform** | Rulesets for how PG&E and its implementers measure, pay for, and claim energy savings, including Deemed, Custom, Meter-Based, and Financing. |
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. 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 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.

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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 to be created 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 workpapers, which are technical engineering documents that prescribe pre-determined values for energy savings,
measure costs, and other ex ante values. Workpapers are generally used for homogenous, high volume interventions and have historically been developed by PAs with CPUC input and approval. The CPUC-maintained Database for Energy Efficiency Resources (DEER) provides ex ante values that can facilitate workpaper 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. The financial incentive is paid upon the completion and verification of the installation. An Implementer designing a program with custom, unique, large scale interventions would look to the Custom Rulebook to guide them.

1.4.3 Meter-Based
In the Meter-Based Platform, savings are quantified through analysis of a site’s normalized metered energy consumption (NMEC). Specifically, savings are calculated 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. Meter-based approaches are a relatively new addition to the types of savings calculation methodologies used by energy efficiency programs. Although the CPUC has established some rules and guidelines for meter-based projects, guidance will likely be rapidly evolving in the coming months and years. 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 rebates and 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.

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4 California Assembly Bill 802, passed in October 2015, authorizes this approach.
Chapter 2 Cross-Platform

2.1 Introduction

2.1.1 Applicability
This chapter contains the rules and requirements that apply to all of the platforms. The individual platforms may address any of these subjects in greater detail. All program designs that leverage platforms are subject to the ruleset in this chapter.

2.2 Eligibility

2.2.1 Customer Eligibility
It should be noted that, in addition to the requirements below, customer eligibility to participate in a particular program may be further defined by building type, climate zone, NAICs code, or another factor.

Savings claims must be associated with an active PG&E 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.5

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.6

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. See the customer’s PG&E bill for PPP surcharge information.

2.2.2 Measure Eligibility

2.2.2.1 Measure Delivery
PG&E Requirement: Deemed measures may use any of four delivery channels: upstream, midstream, downstream, or direct install. Workpapers 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.7

The following table describes the statewide requirements around each delivery channel.

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5 California Code, Public Utilities Code, PUC Section 339.8 (electric) and Sections 890-900 (gas); Energy Efficiency Policy Manual, p. 9.
6 California Code, Public Utilities Code, PUC Section 896; PG&E Tariff Gas Schedule G-PPPS.
7 D.16-08-019, p. 104.
Table 2 - CPUC Requirements for Statewide Program Delivery

<table>
<thead>
<tr>
<th>Entity with which Implementer Partners</th>
<th>Upstream</th>
<th>Midstream</th>
<th>Downstream</th>
<th>Direct Install</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturers</td>
<td>Distributors / Suppliers / Retailers (includes Instant Rebate / Point-of-Sale Programs)</td>
<td>End-use customer</td>
<td>Contractor</td>
<td></td>
</tr>
<tr>
<td>Must be offered Statewide</td>
<td>Yes</td>
<td>Yes</td>
<td>No, unless specifically ordered by the CPUC</td>
<td>No, unless specifically ordered by the CPUC</td>
</tr>
</tbody>
</table>

2.2.2.2 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 Commission, or the California Public Utilities Commission), or platform (e.g. deemed, custom, meter-based) offering.8

To prevent double dipping and double counting, Implementers should take reasonable 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.

2.2.2.3 Offerings May Change Without Notice

**CPUC Requirement:** The CPUC may provide direction on ex ante 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.

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2.2.2.4 To-Code Measures

**CPUC Requirement:** For programs that target (or will claim) to-code savings, 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:

- Where does the to-code savings potential reside? What equipment types, building types, geographical locations, and/or customer segments promise cost-effective to-code savings?
- What kinds of barriers are preventing code-compliant equipment replacements?
- Why is natural turnover not occurring within certain markets or for certain technologies?
- What program interventions would effectively accelerate equipment turnover? 9, 10

2.2.2.5 Fuel Substitution

**CPUC Requirement:** Measures that use an energy source that is different from the baseline, existing equipment, or load energy source are considered fuel substitution measures. Fuel substitution measures, projects, or programs will be considered, but these interventions may not

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9 Implementation Plans are discussed in more detail in D.15-10-028.
be predominantly load building or load retention. The Implementer carries the burden of proof that the fuel substitution intervention focuses on energy efficiency and creates net resource value. Fuel-substitution programs/projects, whether applied to retrofit or new construction applications, must pass the following three-prong test to be considered. The three-prong test requires that each measure, project, and program:

1. Must not increase source BTU consumption,
2. Must have a TRC and PAC greater than 1.0, and
3. Must not adversely affect the environment.\textsuperscript{11}

The following information is needed in order to perform the three-prong test:

- Baseline energy use (in kWh, kW, and therms);
- Proposed energy use (in kWh, kW, and therms);
- Measure end-use (Lighting, HVAC, Refrigeration, Process, Whole building, Other);
- Measure code;
- Site location;
- Measure cost; and
- Incentive amount.

The three-prong test is normally run at a project’s inception for feasibility, at project’s commitment to confirm qualification, and at 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.

The installation of natural gas fired self-generation, as well as self-generation units using other non-renewable fossil fuels, will be treated as fuel substitution. Common with other types of fuel-substitution, any costs of gas transmission and distribution, and environmental externalities, must be considered. In addition, cost-effectiveness analyses of self-generation must account for utility interconnection costs.\textsuperscript{12}

2.2.2.6 Installations Must Adhere to Laws and Codes

\textbf{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.

If a customer or contractor is the recipient of a rebate or incentive offered for an energy efficiency improvement or installation of energy efficient components, equipment, or appliances, 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 any applicable specifications or requirements set forth in the California Building Standards Code.

In addition, if a contractor performed the installation or improvement, the contractor must hold the appropriate license for the work performed.\(^{13}\)

Also, 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.

## 2.3 Ex Ante Values

Energy efficiency savings, especially those attributable to a specific program, cannot be directly measured. All energy savings estimates are relative to a counterfactual – a baseline assumption for the expected energy use if the program intervention does not take place.

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, incentive, effective useful life, net-to-gross ratio, and others.

### 2.3.1 Measure Application Type and Baseline Determination

The Implementer must assign a measure application type (MAT) in order to determine the appropriate measure baseline, which dictates the calculation basis for benefits and costs in cost-effectiveness calculations. The cost-effectiveness of a savings claim is expressed as a ratio of benefits to costs.

#### 2.3.1.1 Measure Application Types

**CPUC Requirement:** The CPUC recognizes the following standard categories of MATs\(^ {14}\):

- New Construction (NC);
- Capacity Expansion (CE) New Construction (NEW);
- Normal Replacement, including Replace and Burnout (NR);
- Accelerated Replacement (AR);
- Add-On Equipment (AOE);
- Building Weatherization, shell and related components (BW\_WEA);
- Behavioral (BRO-Bhv);
- Retrocommissioning (BRO-RCx); and
- Operational (BRO-Op) and
  - Add-On Equipment (AOE).

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\(^{13}\) California Code, Public Utilities Code Section 399.4(b)(1).

\(^{14}\) Resolution E-4952, p.A-46
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. The following table describes the default baseline for each measure application type.

<table>
<thead>
<tr>
<th>Alteration Type</th>
<th>Delivery Channel</th>
<th>Savings Platform</th>
<th>Measure Application Type</th>
<th>New Construction</th>
<th>Normal Replacement</th>
<th>Accelerated Replacement</th>
<th>Add-On-Equipment, Weatherization, Behavioral, RCx, and Operations</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Existing Condition (New Construction, expansions, added load)</td>
<td>All</td>
<td>All</td>
<td>Code / Standard Practice</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Existing Buildings (including major alterations)</td>
<td>Upstream &amp; Midstream</td>
<td>All</td>
<td>N/A</td>
<td>Code / Standard Practice</td>
<td>N/A</td>
<td>Code / Standard Practice</td>
<td>Existing</td>
</tr>
<tr>
<td></td>
<td>Downstream / Direct Install</td>
<td>Custom</td>
<td>N/A</td>
<td>Code / Standard Practice</td>
<td>Dual</td>
<td>Existing</td>
<td>Existing</td>
</tr>
<tr>
<td></td>
<td>Deemed</td>
<td>N/A</td>
<td>Code / Standard Practice</td>
<td>Dual</td>
<td>Existing</td>
<td>Existing</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Meter-Based</td>
<td>N/A</td>
<td>Existing</td>
<td>Existing</td>
<td>Existing</td>
<td>Existing</td>
<td></td>
</tr>
<tr>
<td>Non-Building Projects (including Industrial &amp; Agricultural)</td>
<td>SEM programs</td>
<td>Meter-Based</td>
<td>N/A</td>
<td>Existing</td>
<td>Existing</td>
<td>Existing</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Non-SEM programs</td>
<td>All</td>
<td>Code / Standard Practice</td>
<td>Dual</td>
<td>Existing</td>
<td>Existing</td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>MAT</th>
<th>Baseline</th>
<th>Measure Cost</th>
<th>EUL</th>
<th>RUL</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Construction</td>
<td>Code / Standard Practice</td>
<td>IMC</td>
<td>Measure EUL</td>
<td>0</td>
</tr>
<tr>
<td>Normal Replacement</td>
<td>Code / Standard Practice</td>
<td>IMC</td>
<td>Measure EUL</td>
<td>0</td>
</tr>
<tr>
<td>Accelerated Replacement</td>
<td>Dual</td>
<td>ERC</td>
<td>Lesser of measure EUL or RUL of existing</td>
<td>RUL of existing</td>
</tr>
<tr>
<td>Add-On Equipment</td>
<td>Existing</td>
<td>PMC</td>
<td>RUL of existing</td>
<td>0</td>
</tr>
</tbody>
</table>

16 Resolution E-4818, p. 4.
17 This table is a modified version of the table officially adopted in D.16-08-019 and updated in Resolution E-4818, at p. 4.

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Behavioral, Residential | Existing | FMC | 1 | 0
| Behavioral, Non-Residential | Existing | FMC | 2 | 0
| Retrocommissioning and Operational | Existing | FMC | 3 | 0
| Weatherization | Existing | FMC | Measure EUL | 0

2.3.1.1.1 New Construction and Capacity Expansion

CPUC Requirement: The New Construction (NCNEW) and Capacity Expansion (CE) MATs are 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 NCNEW 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., ~30% or more) in design occupancy. For NCNEW measures, the baseline is the Standard Practice, or Code baseline in place at the time the project commenced.²⁰

2.3.1.1.2 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 for reasons unrelated to the program.²¹ For NR measures, the baseline is the Standard Practice, or Code baseline in place at the time the project commenced.²¹ The NR MAT may be applied to any measure or program, with certain exceptions, and without a burden of proof.²²

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

2.3.1.1.3 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. AR 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. Assessment of evidence for and against both viability and influence is referred to as a "preponderance of evidence (POE) based assessment". The POE may be assessed at the measure, project, or program level. The POE determination is based on the most convincing evidence.

¹⁸ Resolution E-4818, p.66.
²¹ Resolution E-4795, p. 39.
²² Resolution E-4818, p. 67.

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evidence and its probable truth or accuracy, not on the amount of evidence presented. Program-level POE-based assessments should use broad market data to inform what fraction of program participants are likely AR versus NR.\footnote{Resolution E-4818.}
The AR MAT has three use cases:

- Early Retirement (ER);
- Repair Eligible (RE); and
- Repair Indefinitely (RI).

The ER use case involves the replacement of viable, existing equipment prior to the end of its useful life, when it would normally be replaced. The RE and RI use cases involve the replacement of existing equipment that would normally be repaired. POE-based assessments weigh: (1) whether the existing equipment could be viably operated (or repaired), and (2) whether the existing equipment would continue to be operated (or repaired) in absence of program intervention. AR measures are recorded as a single claim with a dual baseline. Resolution E-4939 adopts the use of consistent POE and reporting requirements for all three use cases of AR.

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

2.3.1.1.4 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.

AOE may use a Code, Standard Practice, or Existing Conditions baseline.

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

2.3.1.1.5 Building Weatherization

**CPUC Requirement:** The Building Weatherization (BWEA) MAT is used for non-mechanical building efficiency improvements such as windows, insulation, air sealing, and duct sealing. BWEA measures use an existing condition baseline; however, the use of a Code or Standard Practice baseline is permitted.

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24 California Public Utilities Commission, Energy Division, April 18, 2015, Disposition for Workpaper PGECOHVC126 Revision 6 (Unitary Air-Cooled Commercial A/C and H/P ≤65kBtu/h).
25 Resolution E-4939, p. 49.
26 Resolution E-4795, pp. 26-27.
27 Resolution E-4795, p. 21.
2.3.1.1.6 Behavioral, Retrocommissioning, and Operational

**CPUC Requirement:** The Behavioral, Retrocommissioning, 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 does not exceed the nominal (rated or original) efficiency of the pre-existing condition. BRO measures may use a Code, Standard Practice, or Existing Conditions baseline.

Savings from correcting deferred maintenance, performance restoration, and operational characteristics are considered within the BRO category. In cases where savings are a component of savings captured through equipment replacement, separate claims should be made for the equipment replacement savings and savings that arise from updating maintenance and operational factors.²⁸

2.3.1.2 Baseline Selection

**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.²⁹ See Table 3 in section 2.3.1.1 for more details.

2.3.1.2.1 Code/Standard Practice Baseline

**CPUC Requirement:** The Standard Practice 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.³⁰

PG&E proposed this definition to a CPUC working group in 2017. While it has not been officially adopted, it still accurately represents how the Code or Standard Practice baseline is determined today for Normal Replacement measures (and the second baseline for Accelerated Replacement measures).

A Standard Practice baseline must comply with all codes, regulations, and standards when the project commences,³¹ including but not limited to: minimum building energy efficiency requirements; emissions requirements; federal, state, and local government regulations; other regulatory agencies.³² The standard practice need not comply with local reach codes.³³

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²⁸ Resolution E-4795, p. 28.
³⁰ Resolution E-4939, p.8.
³¹ Resolution E-4795, p. 39.
³³ D.09-05-037, 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. The selected standard practice must be reasonable to implement. Industry Standard Practice studies may provide suggestions or requirements for common practices.

Standard practices are generally accepted as superior to other alternatives (e.g., a customer’s standard way of complying with legal or ethical requirements, or a customer’s preference for the best product with superior efficiency in customized design). Justification for selection of a Standard Practice baseline (e.g., current purchasing trends, customer considerations) should be provided.

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 of the less efficient Code or Standard Practice as the baseline 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.

2.3.1.2.2 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:

- 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.
- The Standard Practice baseline is applied to the period between the remaining useful life (RUL) and effective useful life (EUL), 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 full cost of equipment, including installation, for the second baseline equipment measure. The second baseline should be based on known codes and standard practices that will be in

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35 D.12-05-015.
effect at the end of the RUL.\textsuperscript{37} For measures that do not exceed Code or Standard Practice, the second period of the dual baseline has zero savings.\textsuperscript{38}

While the measure cost for the second baseline period is the full cost of the second baseline equipment measure, for logistical reasons, PG&E calculates this value from the provided Full Measure Cost and Incremental Measure Cost.

\textbf{2.3.2 Benefit Calculations}

The following sections describe the ex ante values that are used to calculate the benefits side of the “benefit-cost” (cost-effectiveness) calculation.

\textbf{2.3.2.1 Annual Savings Calculations}

\textbf{2.3.2.1.1 Direct and Indirect Energy/Demand Impacts}

\textbf{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 DEER and must be included in non-DEER workpapers. These interactive effects can only be applied to the portion of energy use that occurs within the conditioned space. Refer to DEER 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.\textsuperscript{39} The Water-Energy Calculator must be used to determine the embedded energy savings that can be claimed.

\textbf{2.3.2.2 Net-to-Gross Ratio}

\textbf{CPUC Requirement}: A net-to-gross (NTG) ratio must be determined for every claim. DEER currently has a variety of default NTG ratios, varying by parameters such as length of availability of incentives or sector (Residential vs. Non-Residential). Refer to DEER for the full list of default NTG ratios.

\textsuperscript{37} California Public Utilities Commission, Energy Division, May 12, 2010, \textit{Disposition for Workpaper 100512 (Non-DEER High Impact Measure (HIM) Review: Linear Fluorescent Measures)}.

\textsuperscript{38} Resolution E-4818, p. 68.

Accelerated Replacement measure application types use an adjustment factor of 0.75 applied to the below-code savings as shown in the equation below:

$$NTG_{RC} = NTG_{AC} \times NTG_{Adjustment \ Factor}$$

California Program Administrator energy efficiency goals have 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.

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40 Resolution E-4952, p. A-44.
2.3.2.3 Measure Life

2.3.2.3.1 Effective Useful Life

**CPUC Requirement:** The longest allowable effective useful life for a measure is 20 years.

Exception 1: Schools (K – 12 and Community Colleges) are allowed to use an EUL of up to 30 years for existing equipment only. The EE measure EUL is limited to a maximum of 20 years.

Exception 2: Water-Energy Nexus measures have an available EUL of 30 years for removed equipment.\(^{41}\)

2.3.2.3.2 EUL of Add-On Measures

**CPUC Requirement:** For AOE measures, the EUL is the lesser of the RUL of the host equipment/system or the EUL of the measure.\(^{42}\) For newly installed or replaced equipment that includes a new AOE component, the AOE savings may use the EUL rather than the RUL of the host equipment as a limit. In all cases the add-on equipment savings life is also limited by the AOE EUL value.\(^{43}\)

2.3.2.3.3 Default Remaining Useful Life of Existing Equipment

**CPUC Requirement:** The default remaining useful life for existing equipment is one-third of the existing equipment's EUL. Deviations from this RUL value should be supported by evidence such as equipment installation date, maintenance records, or other external factors.\(^{44}\)

2.3.2.3.4 BRO EULs

**CPUC Requirement:** Residential Behavioral programs measures use an EUL of 1 year. In non-residential settings, Behavioral measures are permitted to use an EUL of up to two years, while retrocommissioning and operational programs measures are permitted to use an EUL of up to three years for ex ante savings claims.\(^{45}\)

2.3.3 Cost Calculations

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

2.3.3.1 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.\(^{46}\)

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\(^{42}\) Resolution E-4818, p. 27.

\(^{43}\) Resolution E-4952, p. 56.

\(^{44}\) D.12-05-015 at 347.

\(^{45}\) D.16-08-019, p. 46.

\(^{46}\) D.05-09-043.
Customer incentive design should consider differential benefits of the above-code savings relative to the to-code savings and reflect those individual benefits in the payment structure. Incentives for projects bringing conditions up to Code or Standard Practice should be lower than incentives available for exceeding the required Code or 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.

2.3.3.1 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.\(^{47}\)

2.3.3.2 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.\(^{48}\)

<table>
<thead>
<tr>
<th>Baseline Type</th>
<th>Applicable Measure Cost Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard Practice Baseline</td>
<td>Incremental Measure Cost (IMC)</td>
</tr>
<tr>
<td>Existing Conditions Baseline</td>
<td>Full Measure Cost (FMC)</td>
</tr>
<tr>
<td>Dual Baseline</td>
<td>Accelerated Replacement Cost (ARC)</td>
</tr>
</tbody>
</table>

2.3.3.3 Project and Measure Cost Determination

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 the cost of any equipment or materials purchased, including sales tax and installation, any ongoing operation and maintenance costs, any removal costs (less salvage value), and 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, cost information should clearly itemize labor and material costs.\(^{49}\) 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.\(^{50}\)

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Methods for collecting cost data include, but are not limited to:

- Itemized invoices, which include the make, model, unit price, quantity of equipment, and the total cost;
- Technology costs from DEER (in READI Tool);
- Web-scraping (useful for measures that are sold online by retailers);
- EM&V impact evaluation studies and cost studies conducted by both the CPUC and PAs; and
- Cost data collected through previously completed projects.
- Contracted costs from manufacturers/distributors from upstream/midstream programs.

## 2.3.3.1.4 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:

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

Where:
- FMC = full measure cost
- IMC = incremental measure cost
- D = CPUC-adopted PA discount rate (7.66% for PG&E service territory)
- RUL = Remaining useful life (in years) of the early retired equipment

## 2.3.3.1.5 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. 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.
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 Quality Assurance and Quality Control

2.4.1 Projects May Be Subject to Inspection

CPUC Requirement: All projects and measures are subject to random inspection by PG&E. Implementer must ensure that customers allow a representative from PG&E, the CPUC, or any authorized third party, if requested, 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 PG&E contact. PG&E may contact the measure vendor 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.

2.4.2 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. custom ex ante review), and
- Procedure to enable third party inspections and review, including a clear description of measure details and locations.

2.4.3 Utilize PG&E’s Online Salesforce Platform, Energy Insight

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 or 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.

Energy Insight tracks all of the required program data and feeds it to PG&E’s reporting database. Information must be properly inputted into Energy Insight in order for savings to be claimed and reported to the CPUC. If a program cannot be managed in Energy Insight, the claimable savings must be reported to the CPUC through an alternate channel.

52 D.11-07-030, Attachment B.
2.4.4  PG&E Payments to Implementer or Customer

**PG&E Requirement:** In order for the Implementer or Customer to receive a rebate 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.

2.4.5  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 may be submitted anytime through the Emerging Technologies Coordinating Council idea proposal form at http://www.etcc-ca.com/idea-proposal-form.

2.5  Program Evaluation

**CPUC Requirement:** Commission Staff has the responsibility to perform research on 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 IOUs are required to cooperate and facilitate this research. Utility customers are required to cooperate with Commission Staff in this research as a condition of receipt of energy efficiency funds.\(^{53}\)

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:

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\(^{53}\) D.12-05-015.
The following list includes the typical data fields collected for each project to facilitate impact evaluations:

- Customer name;
- Account number;
- 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;
- Date of application agreement;
- Date of equipment installation;
- Hours of efficient equipment operation, if applicable, and
- Baseline determination data, 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.

2.5.1 Measure Persistence

**CPUC Requirement:** To ensure that energy savings persist, the following requirements apply to all measures:
• 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.\textsuperscript{54}

• Retrofit measures must include installation of new equipment or controls.\textsuperscript{55,56} Repair or re-deployment of existing equipment is not eligible as a retrofit but may be eligible as a BRC measure.

• For replacement measures, existing equipment must be decommissioned and removed from site. Decommissioned equipment must not be reused, sold, or retained for backup purposes.\textsuperscript{57}

Programs may impose additional eligibility requirements through their terms and conditions to ensure that measures remain installed and savings persist. For example, programs may require tenants installing energy efficiency measures to obtain the property owner’s permission via a signature on the application, in order to decrease the likelihood that the measure will be uninstalled in the event the tenant vacates.

\textsuperscript{54} 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.

\textsuperscript{55} 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.

\textsuperscript{56} Derived from EE Policy Manual definition of Energy Efficiency Measure, p. 52.

\textsuperscript{57} 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.
Chapter 3 Deemed Platform

3.1 Introduction

3.1.1 Applicability
This document applies to all residential and non-residential deemed program activities, including third party programs, statewide programs, and PG&E-implemented localized efforts.

3.2 Eligibility

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

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

3.2.2.1 Measure Eligibility Dates
PG&E Requirement: In order for savings to be accurately determined, deemed rebate applications must be received within the measure effective dates. PG&E’s Energy Insight time-stamps applications on the date they are received. The table below outlines the default policies that PG&E currently employs for its programs. 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>
<thead>
<tr>
<th>Measure Eligibility Criteria</th>
<th>Non-Residential Applications</th>
<th>Residential Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rebate Level &amp; Eligibility Determination Date</td>
<td>Date application is received by PG&amp;E</td>
<td>Purchase Date</td>
</tr>
<tr>
<td>Savings Determination Date</td>
<td>Date application is received by PG&amp;E</td>
<td>Date application is received by PG&amp;E</td>
</tr>
<tr>
<td>Available Application Submittal Options</td>
<td>Downstream / Direct Install: Online via eRebates or Energy Insight</td>
<td>Downstream / Direct Install: Online via eRebates or Energy Insight</td>
</tr>
<tr>
<td></td>
<td>Upstream: Energy Insight</td>
<td>Upstream: Energy Insight</td>
</tr>
<tr>
<td>Deadline to Submit Application</td>
<td>Within one year of purchase or installation date, whichever is later</td>
<td>Within 60 days of purchase or installation date, whichever is later</td>
</tr>
</tbody>
</table>

CPUC Requirement: Deemed values must be taken from a DEER version or workpaper effective at the earlier date of either permit issuance (if the installation requires a permit or approval from a regulatory agency) or installation completion58.

58 Resolution E-4952, p. A-47
3.2.2.2 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 workpaper document and any other public-facing collateral such as a product catalog or program handbook. See Workpapers section for further requirements and details.

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 workpaper, 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.\(^{59}\)

3.2.2.3 Qualified Products Lists

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\(^{\text{®}}\), or the U.S. Environmental Protection Agency’s ENERGY STAR\(^{\text{®}}\). 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 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 measures that leverage a QPL must be on the QPL at the time of application (PG&E default guideline), 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.

3.2.3 Contractor Eligibility

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

3.3 Ex Ante Values

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

3.3.1 Measure Development

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3.3.1.1 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:

1. 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;
2. Undertake research, in collaboration with Commission Staff, as required, to establish reasonable expected values, and
3. Assess promising new technologies and use the results of research undertaken during the assessment period to improve the ex ante values.

3.3.1.2 Current Workpaper Values

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

3.3.2 Measure Application Type and Baseline Selection

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

3.3.2.1 Baseline Selection

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

3.3.2.1.1 Existing Conditions Baseline

**CPUC Requirement:** Workpapers 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. Workpapers 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 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.

3.3.3 Benefit Input Calculations

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60 D.12-05-015, Ordering Paragraph 144, p. 431.
61 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.
62 E-4818, p. 18.
63 E-4818, p. 43.
64 E-4818, p. 46.
3.3.3.1 Best Available Data

**CPUC Requirement:** Use the latest 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.65

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.

3.3.3.2 DEER Values

**CPUC Requirement:** Workpapers must use DEER assumptions, methods, and data in the development of non-DEER values when available/appropriate and shall follow Commission Staff direction relating to the appropriate application of DEER to non-DEER values. Any proposed workpaper measure definitions that are different from DEER definitions should be calculated using DEER reference impacts.66

If DEER values and methods are not available, new values may be proposed for Commission Staff review and approval.67 For non-DEER measures, DEER values should be used as the starting point. In cases where any of the installation parameters differ from the assumptions for the DEER measure, the Implementer should apply DEER methodologies for estimating the non-DEER parameter value.68 Non-DEER values may not be used without Commission Staff approval.

Direct replacement of DEER measures is not allowed in workpapers.69

3.3.3.3 Effective Useful Life/Remaining Useful Life

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

3.3.3.4 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

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66 Disposition for Workpaper PGECOAPP128 Revision 0 (Retail Products Platform).
68 Disposition for Workpaper PGECOHVC174 (Multiple Speed Unitary Air-Cooled Commercial Air Conditioners and Heat Pumps ≥65 Bth/h).
69 PG&E Resource Savings Rulebook Version 0.99c
are removed after installation, the reduction should be captured in the EUL, not the GSIA. Commission Staff maintains a table of installation rates for DEER and non-DEER measures in READI. For any measures not listed in this table, the installation rate shall be assumed to be 1.0.

3.3.3.5 Net-to-Gross Ratio

**CPUC Requirement:** Net-to-Gross ratios must be chosen from available NTG IDs in the READI database tool that is the repository for DEER values. Uniform statewide Net-to-Gross values should be used if the variation between utilities is not significant.

Gas and electric projects must have separate Net-to-Gross values, unless the values are sufficiently similar that a single value is warranted. The DEER default NTG value of 0.7 is available to be assigned to measures that have not been in the same program for at least two years. The default residential NTG is 0.55 for measures that have been in programs greater than two years using any delivery mechanism.

3.3.3.5.1 Emerging Technologies NTG Value

**CPUC Requirement:** Commission Staff shall have the authority to accept or reject a utility Emerging Technologies measure classification and to set any Emerging Technologies measure’s Net-to-Gross at a higher or lower value than the default value (0.85), as it deems appropriate.

3.3.3.5.2 Hard-to-Reach NTG Values

**CPUC Requirement:** For direct install measures that claim a hard-to-reach (HTR) NTG value (0.85), the workpaper should detail how HTR installations will be tracked. HTR values are only applicable for measures that meet the following criteria:
### Table 7 - Hard-to-Reach Definitions by Segment

<table>
<thead>
<tr>
<th>Segment</th>
<th>Required HTR Criteria</th>
<th>Criteria Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential</td>
<td>Geographic, and At least one of the following: - Language; - Income; or - Housing Type.</td>
<td>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, <strong>OR in a disadvantaged community, as defined by CalEPA.</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Language: primary language spoken is other than English.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>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.</td>
</tr>
<tr>
<td>Commercial</td>
<td>Geographic, and At least one of the following: - Language; - Business Size; or - Leased or Rented Facility</td>
<td></td>
</tr>
</tbody>
</table>

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.\(^7^9\)

**Callout box:** The definition of hard-to-reach 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 geographic criteria.

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\(^7^9\) G-3497

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3.3.3.5.3 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.\(^{80}\)

3.3.3.6 Building Types

Workpapers 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 READI database. New building types may be proposed to the CPUC for consideration.

The workpaper developer may choose to submit ex ante values by specific building types or alternatively submit weighted average values using the applicable “Com” or “Res” building type. ("Com" or "Res" represent a weighting of all DEER commercial and residential building types respectively). If the energy savings and costs do not vary by building type, specify the building type as “Any.”\(^{81}\)

**CPUC Requirement:** When selecting building types for upstream measures, the preferred reporting method is to select a representative average building stock for the targeted sector ("Com" or "Res") rather than individually reporting each specific building type. If a workpaper author chooses to report specific building types, provide information on how the program will identify the specific building type for each claim.\(^{82}\)

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\(^{80}\) 2015 Workpaper Guidance – Lighting Retrofits; D.14-10-046, pp.163-164.
\(^{82}\) Disposition for Workpaper PGECOHVC126 Revision 6 (Unitary Air-Cooled Commercial A/C and H/P <6SkBtu/h).
3.3.7 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.\(^3\)

3.3.8 Operating Hours

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

3.3.9 Interactive Effects

**CPUC Requirement:** In DEER, the “whole building” energy impacts include interactive effects while the “direct end use” energy impacts exclude interactive effects.\(^4\) Implementers must include HVAC interactive effects in non-DEER workpapers. 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.\(^5\)

3.3.10 Fuel-Substitution

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

3.4 Cost Input Calculations

3.4.1 Deemed Incentives

**PG&E Requirement:** Implementers may propose incentive-rebate levels for deemed measures, but these levels must be approved by PG&E. The incentive-rebate governance process is still in development as of the writing of this Rulebook version. Please refer to the Cross-Platform Chapter for more information on this topic.

3.4.2 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.\(^6\)

3.5 Water-Energy Nexus Measures

**CPUC Requirement:** Implementers may propose water-energy measures to be incorporated into the existing Water Energy Nexus (WEN) workpaper, PGECOALL112.\(^7\) The information listed in this section reflects the unique requirements for water-energy measures and should be combined with requirements provided in Section 5 for workpaper development.

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\(^3\) Resolution E-4952, p. 40

\(^4\) Energy Efficiency Policy Manual, p. 34; Disposition for Workpaper PGECOAPP104 Revision 4 and Revision 5 (Energy Efficient Televisions).

\(^5\) Disposition for Workpaper PGECOAPP128 Revision 0 (Retail Products Platform).

\(^6\) D.14-10-046, pp. 163-164.

\(^7\) California Public Utilities Commission, Energy Division, Disposition for Workpaper PGECOALL112 (Water Energy Nexus (WEN)).
3.3.5.1 Use of the Water-Energy Cost-Effectiveness Calculator

**CPUC Requirement:** The Water-Energy Calculator can be found via PG&E's Hydromap website at http://www.pge.com/hydromap and must be used to calculate embedded energy savings. Implementers must provide justification for any departures from the default values contained in the Water-Energy Calculator.88

3.3.5.2 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 DEER NTG value when available. If the DEER value is not available, then the measure shall use the Metropolitan Water District (MWD) value. If neither the DEER nor MWD NTG is available, then the measure shall default to a NTG value of 0.85.89
- Effective Useful Life: WEN measures have a maximum expected useful life of 30 years for removed equipment.90
- 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.).91

3.3.5.3 Updating Workpapers with Water Savings

**PG&E Requirement:** When modifying or retiring a deemed measure, if there are water savings related to the measure, the WEN workpaper must be updated to reflect the change. The WEN workpaper must be updated when new deemed measures are offered that include water savings to include an associated water measure to claim savings for the embedded energy.

3.3.5.4 Water Savings for Water Energy Measures

**CPUC Requirement:** WEN measures shall use the water savings reported in the direct energy savings measure workpaper, where available. If water savings are not reported in the workpaper, or it is a water-only measure and therefore has no workpaper, must propose values using the Water-Energy Calculator.92 An Implementer must propose a revision to the WEN workpaper in order to have a new water-only measure available for use.

3.4 Quality Assurance and Quality Control

3.4.1 Rolling Portfolio Schedule

3.4.1.1 DEER Updates, Bus Stop Schedule

**CPUC Requirement:** Decision 15-10-028 details the mechanics for the Rolling Portfolio schedule as part of Phase II of Rulemaking 13-11-005. Key elements of the Rolling Portfolio schedule and requirements are listed below:

1. Final DEER values, updated annually by the CPUC, must be applied prospectively to Implementer programs as applicable. DEER values will be updated once per year with limited exceptions. DEER updates will be proposed by Commission Staff via resolution

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88 D.15-09-023.
89 D.15-09-023.
90 D.15-09-023.
91 D.15-09-023.
92 D.15-09-023.

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with opportunity for comment by stakeholder parties. Implementers will have an opportunity to review and comment on DEER updates.

2. The last business day in November will be the cut-off date for EM&V studies to be included in the following year’s ex ante update. Draft ex ante values will be released for comment two months later, by January 31st. PG&E suggests that Implementers consider this schedule when anticipating the incorporation of applicable evaluation results into DEER ex ante updates.

3. Commission Staff must complete DEER updates by September 1st of each year.

4. Updates to workpapers to reflect changes in DEER must be completed by January 1st of the following year. Workpaper updates that include more changes than simply conforming with the latest DEER update may be submitted at any time on the first and third Monday.93

3.4.1.2 Ex Ante Values

**CPUC Requirement:** DEER values will generally change only once per year, and there will be a delay between when changes are announced and when changes are effective so that market participants have time to incorporate changes into their activities.94

3.4.2 Workpapers

**CPUC Requirement:** All deemed measures must be supported by CPUC-approved workpapers.95 CPUC-approved workpapers provide deemed energy savings values, deemed calculations, deemed variables and factors, and the methodologies by which they were derived. Workpapers must include the applicability of the values and calculations, sources and references, assumptions, and analyses and evaluations to support the values.96 Implementers may propose new or updated workpapers to PG&E, but proposed workpapers must not provide preferential treatment to any provider of energy efficiency services.97,98

PG&E currently accepts, reviews, and submits to the CPUC Implementer-derived workpapers, leveraging the California Technical Forum (Cal TF) for review and vetting.

3.4.2.1 Workpaper Document (MS Word)

**CPUC Requirement:** Workpaper narratives shall align with ex ante data submitted. The narrative within a workpaper shall clearly tie to the values used in the Excel data submittal.99

**PG&E Requirement:** A proposed workpaper document must contain the following sections:

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93 D.15-10-028.
94 D.15-10-028, p. 119.
98 D.18-01-004.
“At-a-Glance Summary” — This summarizes the workpaper results which includes: Measure Code, Measure Description, Base Case Description, Units, Energy Savings (Base Case – Measure), Full Measure Cost ($/unit), Incremental Measure Cost ($/unit), Effective Useful Life (years), Measure Installation Type, Net-to-Gross Ratio, Important Comments.

Revision History — This section records updates required by dispositions, program changes, code changes, savings changes, format changes, author and date of modification.

Section 1 — General Measure & Baseline Data: Measure Description & Background, Technical Description, Installation Types and Delivery Mechanisms, Measure Parameters, Codes and Standards Analysis, EM&V, Market Potential, and Other Studies, Data Quality and Future Data Needs.

Section 2 — Calculation Methodology.

Section 3 — Load Shapes.

Section 4 — Costs. Base Case Cost, Measure Case Cost, Full and Incremental Measure Cost.

Appendices — This includes the data submission template and any associated references noted within the workpaper.

Please see Appendix D for the current Statewide Workpaper Template used by PAs.

3.4.2.1.1 Measure Descriptions

**CPUC Requirement:** The measure description should be detailed enough to sufficiently describe the measure without referring to other sources.\(^ {100} \)

3.4.2.2 Data Reporting Workbook

**CPUC Requirement:** All measures associated with a proposed workpaper must be submitted in the appropriate Ex Ante Specification template.\(^ {101} \) The Ex Ante Specification contains four tables: EnergyImpact, Implementation, Measure, and MeasureCost.\(^ {102} \) These tables contain all of the workpaper parameters required to claim ex ante savings and calculate cost effectiveness. Acceptable inputs to the reporting template are included in support tables located in the Ex Ante Specification data template as well as the latest version of the READI Tool\(^ {103} \), which contains updated information. The requirements listed below reflect additional information provided by the CPUC.

3.4.2.2.1 Effective Useful Life and Remaining Useful Life ID

**CPUC Requirement:** For Add-On Equipment and Retrocommissioning measures, provide the Effective Useful Life of the add-on component and the Remaining Useful Life of the equipment.

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\(^ {100} \) California Public Utilities Commission, Energy Division, October 2, 2015, *Disposition for Workpaper PGECOHVC139 Revision 3 (Residential HVAC Quality Maintenance)*.

\(^ {101} \) Refer to http://deeresources.com/index.php/ex-ante-database/ex-ante-guidance for template and guidance on submitting ex ante data.


\(^ {103} \) READI can be downloaded from http://deeresources.com/index.php/deer-versions/readi.

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that the measure is being applied to. The EUL is the minimum of the EUL of the former and the
RUL of the latter.\footnote{104}

3.4.2.2.2 EnergyImpact Table

\textbf{CPUC Requirement:} The EnergyImpact table is one component of the data reporting template for
workpapers. When an Energy Impact record is not intended to be applicable to specific
building types or climate zones, submit only one line in the EnergyImpact Table with BldgType =
Any and BldgLoc = Any.\footnote{105} Implementers shall provide the specific building types and locations
in their claims.\footnote{106}

3.4.2.2.3 Measure Implementation Reporting

\textbf{CPUC Requirement:} The Implementation table is another component of the data reporting
template for workpapers. Implementers should report each delivery channel separately in the
Implementation table.\footnote{107}

3.4.2.2.4 DEER Measure IDs

\textbf{CPUC Requirement:} If a measure is in DEER, the implementation table must reference the
DEER measure via the DEER measure ID. Implementers should not submit entries in the
Measure Table nor the Energy Impact Table.\footnote{108}

3.4.2.3 Workpaper Submittal and Approval Process

The workpaper submittal and approval process has two different tracks, Phase 1 and Phase 2,
depending on the type of submission. The following table summarizes the differences between
the two types of submission.

\footnote{104} California Public Utilities Commission, Energy Division, July 25, 2015, \textit{Disposition for Workpaper
PG3PHVC153 Revision 3 (Programmable Thermostat – Nonres)}.
\footnote{105} WPSDGENRCC0016r1 Preliminary Workpaper Review.
\footnote{106} WPSDGENRCC0016r1 Preliminary Workpaper Review.
\footnote{107} Preliminary Workpaper Review PG3PHVC159, PGECODHW125r1.
\footnote{108} California Public Utilities Commission, Energy Division, March 9, 2015, \textit{Disposition for Workpaper
PG3PHVC159 Revision 2 (Duct Test & Seal: Residential)}.
<table>
<thead>
<tr>
<th>Table 3.88 – Workpaper Submittals</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Types of Workpapers Allowed</strong></td>
</tr>
<tr>
<td>- Updates related to DEER methods, assumptions, and values;</td>
</tr>
<tr>
<td>- New workpapers with an effective date starting January 1st of the next program year;</td>
</tr>
<tr>
<td>- Workpapers updated subsequent to the DEER resolution;</td>
</tr>
<tr>
<td>- Workpapers with an update from any other source;</td>
</tr>
<tr>
<td>- Workpaper updates that are outside the scope of DEER resolutions but are submitted before January 1st of the next program year.</td>
</tr>
<tr>
<td><strong>Phase 1 Submittals</strong></td>
</tr>
<tr>
<td>- Non-DEER workpapers;</td>
</tr>
<tr>
<td>- Updates to existing workpapers not included in the scope of DEER resolutions;</td>
</tr>
<tr>
<td>- New workpapers with effective dates other than January 1st;</td>
</tr>
<tr>
<td>- Updates to existing workpapers based on code changes;</td>
</tr>
<tr>
<td>- Updates based on E-4818.</td>
</tr>
</tbody>
</table>

| **Deadline to Submit Workpaper** | By January 1st of DEER update year.109 |
| - First and third Mondays of the month.110 March through December. New workpapers with effective dates other than January 1st cannot be submitted during January or February (therefore no new submittals until March 1st). |

| **CPUC Review Timeline** | Workpapers not reviewed by March 1st will receive “interim” approval and are subject to prospective review.111 |
| - Workpapers chosen for review: 15-day preliminary review + 25-day detailed review. |
| - Workpapers not selected: “interim” approval if after allotted review timeline but remain subject to prospective review. |

| **Workpaper Effective Date** | January 1st of DEER update year, may be updated based upon March 1st disposition. |
| - For updates to existing workpapers: Upon CPUC approval of workpaper submission or 25 days from workpaper submittal; if not reviewed, “pass-through” approval. |
| - For new workpapers with effective dates other than January 1st: only reviewed March – December; then upon CPUC approval of workpaper submission or 25 days from workpaper submittal; if not reviewed, “pass-through” approval. |

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109 D.15-10-028, p. 84.
Workpapers with ex ante savings estimates are subject to Commission Staff review and approval.  

- Phase 2 workpapers chosen for review will undergo a 15-day preliminary review stage to determine whether a complete dataset is submitted in accordance with the Ex Ante Database specification, followed by a 25-day detailed review. Within 25-days of a Phase 2 workpaper submittal to the proper workpaper submission folder on the Workpaper Project Archive site, Commission Staff may (a) Request additional information needed in order for staff to complete a review of the workpaper, (b) require revisions to the workpaper, (c), approve the workpaper, or (d) reject the workpaper. In cases where Commission Staff request additional information or requires revisions, Commission Staff will review and either approve or reject the workpaper within 25 days of receiving the additional information or revised workpaper submitted to the appropriate folder on the Workpaper Project Archive site.

- If Phase 2 submitted workpapers are not reviewed within the directed timeline, the ex ante values in the workpapers will receive interim approval but remain subject to prospective review and update under Phase 2 review requirements. If workpapers include errors (such as incorrect parameter values from the current Commission-approved DEER or existing, applicable codes and standards), then ex ante corrections of those errors are retroactive.

- For Phase 2 submissions, the effective date is the date when Commission Staff approves the workpaper or once the 25-day detailed review opportunity period has passed. Claims cannot be made prior to the effective date.

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

3.4.2.3.2 Statewide Workpapers  
**CPUC Requirement:** Program Administrators will coordinate workpaper submittals so that duplicative workpapers (i.e. program administrators submit separate workpapers for the same measure) are not submitted. Only one workpaper may be submitted for each set of programs/measures which are adopted by more than one program administrator; such workpapers have been termed “statewide workpapers”. Statewide workpapers must include measures, energy impacts, and technology costs valid for all relevant service territories.

3.4.2.3.3 Workpaper Notifications  
**PG&E Requirement:** Notifications on existing workpapers are posted on the Workpaper Project Archive site maintained by the CPUC. Program Administrators currently have access to these notifications. Program Administrators will encourage the CPUC to make these notifications available to Implementers in a yet to-be-determined public forum.
3.4.4 CPUC Workpaper Dispositions

CPUC Requirement: Commission Staff may provide review recommendations or “dispositions” on reviewed workpapers. Those disposition types are listed below:

- Approved: workpaper may proceed with no changes to the submission.
- Conditional Approval: disposition includes specific revisions from the Energy Division. If agreed to by PA and Energy Division, workpaper is approved.
- Resubmission Required: Disposition includes request for additional information or specific revisions or additions.
- Rejection: workpaper does not fall within the definition of an energy efficiency measure or does not meet Commission requirements for inclusion into a utility portfolio.117

Workpapers should include guidance from prior workpaper dispositions.118

CPUC Requirement: Dispositions for workpapers reviewed after the Phase 2 review period will apply on a prospective basis. Ex ante corrections to errors are retroactive.119 A workpaper that does not get approved and receives a disposition must be updated to meet Commission requirements or it may not be included in the portfolio. Any deadlines or effective dates set forth in the disposition must be followed in order for measures to be eligible.

3.4.3 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.

3.4.3.1 Access to Customer Sites for Inspections

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

118 Disposition for Workpaper PGE3PHVC153 Revision 3 (Programmable Thermostat – Nonres); Final 2015 Efficiency Savings and Performance Incentive Ex Ante Review Performance Scores.
3.4.4 Quality Assurance and Quality Control Plan

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

3.4.5 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.

3.4.6 Dispute Resolution Process

**CPUC Requirement:** When Implementers disagree with CPUC Energy Division Staff positions on submitted workpapers, Implementers shall work with PG&E 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\(^\text{120}\), Implementers shall work with IOU staff to develop comments on the draft Resolution.

The *Energy Efficiency Policy Manual* outlines a dispute resolution process based on D.12-05-015 for when an entity submitting a workpaper 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.\(^\text{121}\)

3.4.7 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.

3.4.7.1 Energy Insight

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

3.4.7.2 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.

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\(^{120}\) 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.

3.4.7.2.1 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.

3.4.7.3 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.

3.4.7.4 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 9 - Information Requirements for PG&E-Processed Incentive Applications

<table>
<thead>
<tr>
<th>Data</th>
<th>Downstream</th>
<th>Midstream</th>
<th>Upstream</th>
<th>Direct Install</th>
</tr>
</thead>
<tbody>
<tr>
<td>Copy of Invoice and shipping document</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Equipment Manufacturer/Model</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Installation Site Address</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Invoice Number</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Project Cost</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Material and Labor Cost</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Measure Code</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Payee Name/Address/Tax Status/Tax ID (If Implementer is not payee)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Project Installation Date</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Proof of Purchase</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Quantity of Equipment Installed</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Service agreement ID (SA ID)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Site Building Type</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Site Contact Name/Phone Number/Email Address</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Special Project Flag (i.e. Hard to Reach)</td>
<td>✓ (if applicable)</td>
<td>✓</td>
<td>✓</td>
<td>(if applicable)</td>
</tr>
<tr>
<td>Store</td>
<td></td>
<td></td>
<td>(if applicable)</td>
<td></td>
</tr>
</tbody>
</table>

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

3.4.7.4.1 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.
Chapter 4 Custom Platform

4.1 Introduction

4.1.1 Applicability
The Custom Platform Rulebook provides the ruleset that applies to 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 ex ante review process as established by Commission Decision 11-07-030.  

4.2 Eligibility

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

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

4.2.2.1 Minimum Project Size
PG&E Requirement: In order to qualify as a Custom project, the calculated incentive at time of project application must be greater than or equal to $5,000. Statewide Government Partnerships have a minimum project calculated incentive of $10,000. This requirement is due to the high cost of custom project review and processing. Exceptions for future programs will be considered on a case by case basis. Currently, this requirement does not apply to Savings By Design (SBD), the Advanced Pumping Efficiency Program, or Regional Small & Medium Business (SMB) programs.

4.2.2.2 Like-For-Like Retrofits
CPUC Requirement: Proposed NR, AR, NEW, 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.

4.2.2.3 Deemed Measures
CPUC Requirement: All measures that have calculation methodologies approved in workpapers or DEER must adopt those methodologies.

Whenever possible, deemed measures should be processed through the deemed platform. This reduces processing cost and time.

122 D.11-07-030.  
123 D.12-05-015.  
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Exception 1: Deemed measures can be calculated and incentivized through the SBD program. If the entire project consists of deemed eligible measures (i.e. a Systems Approach project), then the project must use the Deemed Platform to calculate savings.

Exception 2: If the workpaper for a deemed measure does not include a building type that matches or is similar to the building type for a project (including the COM and OTR building types), the measure must be processed through the Custom Platform.

4.2.2.4 Holds on Specific Measures

CPUC Requirement: CPUC Staff have placed holds on certain custom measures, including high emissivity coatings on furnace refractory measures, variable refrigerant flow measures in custom retrofit projects, and plastic recycling machines. Please refer to Appendix C for the technology-specific guidance related to these measures.

4.3 Influence

4.3.1 Program Influence

CPUC Requirement: A narrative and supporting evidence must be provided to document the actions performed by the program that induced the customer to implement the custom energy efficiency project. The narrative should include the Implementer's engagement and communications with the customer, the customer's decision-making criteria, and the project timeline, and should describe how the project was initiated, how the measure was identified, the alternative viable options that also meet the customer's needs, and the energy and non-energy benefits. Supporting evidence with time stamps must be provided to support the narrative.\footnote{Energy Efficiency Policy Manual.}

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.\footnote{D.11-07-030 requires CPUC approval prior to incentive agreement for projects selected for ex ante review.}

Exception 1: Pre-ordering of long lead time equipment before project approval is permissible with 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:

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

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 may include significant 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.

4.4 Ex Ante Values

4.4.1 Measure Application Type and Baseline Determination
Please refer to the Cross-Platform Chapter for more information on this topic.

4.4.2 Benefit Input Calculations
Please refer to the Cross-Platform Chapter for more information on this topic.

4.4.2.1 Annual Savings Calculations

4.4.2.1.1 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.¹²⁷

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

4.4.2.1.3 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.¹²⁸ These may be accessed using the READI (Remote Ex Ante Database Interface) Tool.

Peak demand reduction calculations must be performed using the DEER defined peak demand period.¹²⁹ The DEER method for calculating peak demand reductions utilizes an estimated average grid level impact for a measure between 2 and 5 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.¹³⁰

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¹²⁹ California Public Utilities Commission, Energy Division, Disposition for Workpaper PGECOCOM102.
Resolution E-4867 directs that a working group be convened to make recommendations to update the DEER peak period. The definition presented above is current as of this writing.

4.4.2.1.4 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:

- 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.

4.4.2.1.5 Measurement and Verification (M&V) Plan

**CPUC Requirement:** Every Custom project application must include an 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, system diagrams, discussion of the accuracy of measurement equipment and uncertainty associated with the results.131

4.4.2.1.6 Water-Energy Savings Calculations

**CPUC Requirement:** Projects that save water may use the Water-Energy Cost-Effectiveness Calculator developed by Navigant and GEI Consultants under contract with the CPUC 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).132

Notes: Water savings documentation must be submitted, 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/.


132 D.15-09-023.
4.4.2.1.7 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) that are used to calculate the savings impacts and provide the non-hard coded and unlocked energy savings calculation workbook for the proposed measures. 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.

4.4.3 Cost Calculations

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

4.4.3.1 Incentive Costs

4.4.3.1.1 Incentive levels

**PG&E Requirement:** The Incentive levels for specific custom measures shall be proposed by program Implementers during program design. The levels must be selected from the following tiers, which are incentives based on measure first year gross savings:

- $0.03, $0.05, $0.08, $0.12, $0.17, or $0.24 per kWh;
- $75 or $150 per kW peak demand; and
- $0.30, $0.50, or $1 per therm.

Typically, higher incentives are offered for the following:

- Measures with longer EULs;
- Innovative or emerging technologies;
- Above-code measures;
- High capital cost measures; and
- Hard to reach customers.

Typically, lower incentives are offered for the following:

- Measures with short EULs;
- Standard or established technologies;
- To-code measures; and
- Lower cost measures.

4.5 Quality Assurance and Quality Control

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

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

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4.5.1 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,\textsuperscript{134} and to confirm proposed measures are not on site. The inspection details must be documented. Existing equipment cannot be decommissioned before PG&E approval for installation. This requirement is not applicable to Savings By Design.\textsuperscript{135}

4.5.2 PG&E Early Policy Review

PG&E Requirement: Projects with initial estimated savings that exceed 500,000 kWh or 200,000 therms must be submitted to PG&E for a policy review early in the project development stage, when measure descriptions, measure application type, and baselines are determined, but before detailed analysis or savings calculations are performed. The PG&E Custom Implementation Team (CIT) will review the project and consider it for a Collaborative Review with CPUC staff. CIT will provide guidance to the Implementer related to eligibility, influence, measure application type, and baseline to improve the project quality and to ensure compliance. PG&E reserves the right to reject projects that do not follow this protocol.

4.5.3 Project Approval Expiration

PG&E Requirement: Projects must be installed, commissioned, and submitted for post-installation review before the approval expiration deadline. Requests to extend the deadline are handled through the PG&E Exception Request process.

4.5.4 Ex Ante Review Requirements

CPUC Requirement: Project approval with an incentive agreement shall not be issued before a project is either released from CPUC Ex Ante Review after being submitted to the Custom Measure and Project Archive (CMPA) project list or approved by an EAR disposition, or otherwise allowed to proceed by the CPUC EAR team.\textsuperscript{136, 137}

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\textsuperscript{134} PG&E Customized Inspection Standard (CUST-520SS)
\textsuperscript{135} Energy Efficiency Policy Manual.
\textsuperscript{136} D.11-07-030.
\textsuperscript{137} Memo on CPUC staff EAR enhancement, October 19, 2015.
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PG&E may allow a project to proceed to installation with an approved exception, after submitting complete project documentation on the CMPA, with the understanding that the outcome of the ex ante review will impact the project savings and incentive.
4.5.5 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:\(^{138}\)

- Documentation to support program influence;
- Documentation to support baseline assignment (Code/Standard requirement, Early Retirement, Retrofit, Replace On Burnout, 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;
- 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);
- 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.

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\(^{138}\) *D.11-07-030.*
Chapter 5 Meter-Based Platform

On January 31, 2019, the CPUC issued a ruling providing guidance for measurement and verification (M&V) of programs related to energy efficiency, also referred to as NMEC, Normalized Metered Energy Consumption. The ruling also indicates that Commission Staff will update the rulebook and guidance for NMEC and convene a working group to address outstanding issues, including many of the rules that will govern population-level NMEC programs. As a result, this chapter is based on the best guidance available at the time of its release, and the requirements it contains may be subject to change in the future.

5.1 Introduction

This chapter compiles known rules and guidance associated with meter-based savings, also known as Normalized Metered Energy Consumption (NMEC) savings. On January 31, 2019, the CPUC issued a ruling providing guidance for measurement and verification (M&V) of programs and projects using NMEC approaches. The ruling also indicates that Commission Staff will update the rulebook and guidance for NMEC and convene a working group to address outstanding issues, including many of the rules that will govern population-level NMEC programs. As a result, this chapter is based on the best guidance available at the time of its release, and the requirements it contains may be subject to change in the future.


While some written guidance around meter-based approaches exists, much of the methodology is still evolving as this approach becomes more widely used. This chapter contains the best available guidance and Commission policy surrounding meter-based approaches at the time of this writing. It should be expected that language in this chapter will be expanded, modified, and clarified as the CPUC refines its guidance on meter-based approaches.

The CPUC states that meter-based savings estimation methods may be applied either at the individual site-level, or at the population-level (i.e., a grouped set of buildings, projects, or sites):

- In two fundamental approaches for estimating savings using meter-based calculations, population-level NMEC approaches:
  - Savings are determined "based on the aggregation of many buildings," and claimed at the program level, for a group of participants.
  - A consistent methodology is used to estimate savings across all sites or projects. This may include a pooled approach, in which savings from all sites or projects are estimated in a single model, or an approach in which the same model is applied to all sites or projects.
  - 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 aggregate or population-based approach (e.g., randomized control trials (RCTs) and quasi-experimental designs) estimates energy savings by comparing a group of participants' energy usage to that of a similar non-participant comparison group with essentially equal (RCT) or similar (quasi) characteristics. The M&V practitioner monitors the energy usage of the group of participants before and after implementation of an energy efficiency intervention (e.g., installation of equipment and/or initiation of operational and/or behavioral measures). The M&V practitioner also monitors the energy usage of the group of similar non-participants over the same pre- and post-implementation periods, and uses statistical methods to compare the changes in the energy usage between the participant and non-participant groups. Such methods, often referred to as the "difference-of-differences" approach, are commonly used when participants and interventions are homogenous, and the treatment groups are sufficiently large to yield statistically significant comparisons (e.g., residential applications).

- In site-level NMEC approaches:

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145 January 31, 2019 NMEC Ruling, p.1 and 4-5.

5.2 Eligibility

5.2.1 Energy Model Fitness Thresholds

**CPUC-PG&E Requirement:** For site-specific analyses, models of building 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. Currently, metrics such as the following are under discussion:

- CV(RMSE) (Coefficient of Variation of the Root Mean Squared Error);
- NMBE (Normalized Mean Bias Error); and/or
- Adjusted $R^2$ (Coefficient of Determination).

In some cases, data from suspected non-routine events (NREs) may be removed from the data set for model fitting if justification is provided. Sample thresholds for incorporating NREs can be found in the CPUC Site-level NMEC Rulebook, sec. 2, p. 5.

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149 January 31, 2019 NMEC Ruling, p. 4.
150 For general information about the site-level approach, see Southern California Edison, 2018, *Normalized Metered Energy Consumption Savings Procedures Manual: Emerging Technology Program, ET Project No. ET15SCE1130*. www.etcc.ca.org. (“Site-level NMEC Procedures Manual”). Note that this procedures manual has not been adopted by Pacific Gas and Electric Company at this time, but the background overview of the issues, and references that it provides will be useful to readers of this chapter.
151 The CPUC Site-level NMEC Rulebook, sec. 2, p. 5, defines a non-routine event as an "externally driven (i.e. not related to the energy efficiency intervention) significant change affecting energy use."
found in ASHRAE Guideline 14. Note that, while the exact values are currently under

5.2.2 Non-Utility Meters

**CPUC Requirement:** Programs may conduct site-level meter-based analyses using both utility-owned and non-utility-owned meters and sub-meters. Non-utility meters must meet minimum requirements outlined in the CPUC’s Site-level NMEC Rulebook.\footnote{CPUC Site-level NMEC Rulebook, p. 15.}

**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.\footnote{Assigned Commissioner and Administrative Law Judge’s Ruling Regarding High Opportunity Energy Efficiency Programs or Projects, December 30, 2015. (”HOPPS White Paper Ruling”).}

5.2.3 Baseline Period Requirements

**CPUC Requirement:** One year of pre-implementation usage data is required for meter-based savings calculations.\footnote{CPUC Site-level NMEC Rulebook, sec. 2, p. 4.} Discussions are ongoing about the potential use of Coverage Factor Analysis when less than one year of pre-implementation data is available. 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.\footnote{HOPPS White Paper Ruling; California Energy Efficiency Evaluation Protocols (2006).}

5.3 Influence

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

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\footnote{PG&E Resource Savings Rulebook Version 0.99c; Version 0.99c; Version 0.99b}
5.4.3 Measure Application Types and Baselines
The CPUC adopted an existing conditions baseline policy for all meter-based programs for existing buildings.\(^{157}\) Meter-based approaches are not permitted for new construction, expansions, added load, or non-building projects, including industrial and agricultural processes. Standard practice baselines apply to broken equipment.\(^{158}\) The sole exception is the Strategic Energy Management (SEM) Program that is approved for industrial facilities. The ruleset for the SEM Program is not addressed in this chapter.\(^{159}\)

5.4.1 Measure/Project Development
Please refer to the Cross-Platform Chapter for more information on this topic.

5.4.2 Measure Types

5.4.2.1 Eligible Measure Application Types

CPUC Requirement: Please refer to Table 3 in section 2.3.1 of the Cross-Platform Chapter for more information on this topic.

- The measure application type describes an energy efficiency activity and dictates the appropriate baseline and measure effective useful life. The table included in the Cross-Platform Chapter provides an overview of the applicable baselines by measure application type. It should be noted, though, that the New Construction measure application type is not allowed in meter-based approaches.\(^{160}\)
- 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.\(^{160}\)

Although both the Early Retirement and Normal Replacement measure application types are eligible for NMEC calculation approaches, both also explicitly use existing conditions as the baseline (per Resolution E-4818). Further discussion with the CPUC is necessary to define the NMEC approach for the Early Retirement Accelerated Replacement and Normal Replacement measure application types. There is no “Whole Facility” measure application type that captures savings from multiple measure types (e.g., operational measures and replacement measures).\(^{160}\)


\(^{158}\) January 31, 2019 NMEC Ruling, Sec. 5.


\(^{160}\) This is due to the fact meter-based methods require a year of pre-installation data in order to construct a counterfactual to estimate savings. In addition, code baseline must be used for new construction (see Resolution E-4818, sec. 1.3.4.1), and existing conditions baseline is used for meter-based approaches (Resolution E-4818, Sec. 1.6, Table 1.1).

\(^{161}\) Resolution E-4818, Sec. 1.6, Table 1.1. Information in this table is also available in Sec. 2.3.1 of this rulebook.

\(^{162}\) DT2-05-015, Resolution E-4818, Project Basis EUL RUL Guidance.

157 158 159 160 161 162

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Since meter-based projects always use an Existing Conditions Baseline, regressive baselines do not pertain to meter-based projects.

5.4.2.2 Commonly-Repaired Equipment

**CPUC Guideline/PG&E Requirement/CPUC 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.\(^{163}\)

5.4.2.3 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:

- a) 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
- b) 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 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.\(^{164}\)

5.4.2.4 Maintenance of Equipment

**CPUC-PG&E Requirement:** Maintenance of equipment is allowed as a meter-based measure provided that all of the following requirements are met:

1) Program participants or project owners commit to a maintenance plan for a minimum of three years, and
2) Program participants or project owners must commit to carry out a minimum set of improvements based on criteria to be established by PG&E, and
3) Implementers include training components in maintenance program offerings to ensure participants understand the value of preventive maintenance and good operational practices.\(^{165}\)

5.5 Savings Calculations

5.5.1 PG&E Energy Usage Data

**PG&E Guidance:** When necessary and available, Implementers may request customer-specific energy usage data from PG&E. PG&E may also provide additional data to facilitate program implementation. Implementers should begin discussions with PG&E about data sharing when

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\(^{163}\) HOPPS White Paper Ruling.

\(^{164}\) Resolution E-4818.

\(^{165}\) HOPPs White Paper Ruling.
they propose their program plans, and plan to finalize details including the regularity and format of data transfers prior to contract approval and program launch.

5.5.2 Gross Savings Determination

CPUC-PG&E Requirement: Any meter-based method for determining gross savings must be documented in a sufficient level of detail that another practitioner could replicate the results. For a given program or project, PG&E and the implementer will agree on a gross savings methodology, including whether to use a population-level or site-level method. Implementers will be able to use a method already approved by the CPUC, or propose a novel method. If the implementer wishes to use a novel method, the implementer will be responsible for documenting the method in order to seek CPUC approval; PG&E will review approve and submit the documentation to CPUC.

5.5.2.1 Measurement & Verification (M&V) Plans

CPUC Requirement: All third-party proposals using meter-based methods to determine gross savings must include an M&V plan as part of their bid proposal.\textsuperscript{166}

For programs and projects that will claim savings at the site level, M&V plans should cover the topics discussed in the LBNL Site-level NMEC Technical Guidance document.\textsuperscript{167} Additional guidance on M&V for site-level NMEC can be found in Southern California Edison’s NMEC Procedures Manual.\textsuperscript{168}

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.

Best Practice (site-level): For programs and projects that will claim savings at the site level, M&V plans should cover the topics discussed in the LBNL Site-level NMEC Technical Guidance document.\textsuperscript{167} Additional guidance on M&V for site-level NMEC can be found in Southern California Edison’s NMEC Procedures Manual.\textsuperscript{168}

Best Practice (population-level): 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.

For aggregate population-based approaches, gross savings are determined by composing a comparison group of non-participating customers that matches the characteristics of the participant population as closely as possible.\textsuperscript{169} The size of both the participant group and the comparison group must be large enough to support the estimation of gross savings that are sufficiently precise to meet the Enhanced level of rigor for the Gross Energy Impact Protocol as

\textsuperscript{166} January 31, 2019 NMEC Ruling, Ruling Paragraph 2, p. 9.
\textsuperscript{167} LBNL Technical Guidance.
\textsuperscript{168} Site-level NMEC Procedures Manual, p. 8.
\textsuperscript{169} Please note that gross savings are calculated as a precursor to the net savings claimed as program achievements.

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contained in the California Energy Efficiency Evaluation Protocols. Such characteristics typically include energy usage and climate zone. Note that “observed” savings, which may be calculated purely based on weather-controlled analysis of pre/post interval data, are not directly claimable. Observed savings may not normalize for typical meteorological year weather or for other non-weather factors, such as occupancy, or production, and generally do not account for systemic (that is, exogenous to the effect of the program) changes in energy use.

By definition, a comparison group cannot be identified (and thus, gross savings cannot be determined) until the participant population is established. Therefore, it is essential for programs to collect the necessary data to facilitate the identification of a robust comparison group. Programs should balance data collection costs and ease of implementation with the required standards for evaluation accuracy.

For site-specific analysis, gross savings are determined by normalizing pre- and post-energy usage for applicable variables, which may include: weather, production, occupancy, schedule, and/or non-routine events, among others.

5.5.2.2 Baseline Selection

**CPUC Requirement**: Gross savings are calculated using an Existing Conditions baseline (see Measure Application Types section above). Note that key parameters must be monitored pre-install and normalized for post-install; key parameters are defined on a program and intervention basis. See the Normalization section for more information.

5.5.2.3 Normalization

**CPUC Guideline/PG&E Requirement**: Gross savings must be normalized for any relevant factors, and the program or project M&V plan should discuss and justify the selection of these variables.

Publicly available sources (e.g. weather data from published government sources), if available, should be used for normalization factors. If such data are not publicly available, the data source must be disclosed.

**Best Practice: Coverage Factor Analysis should be used to identify which factors are relevant (e.g. outside air temperature and humidity, production, or occupancy). Publicly available sources (e.g. weather data from published government sources), if available, should be used for normalization factors. If such data are not publicly available, the data source must be disclosed.**

Programs using site-specific analysis must normalize for non-routine events (e.g. occupancy changes, equipment failure, major increases/decreases in operational hours). Programs must establish procedures to identify types of expected non-routine events, thresholds for identifying.

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171 Table 1 in Randazzo, Ridge and Wayland, 2017 illustrates how different comparison group specifications yield estimates of gross savings or something between gross and net.
172 HOPPS White Paper Ruling.
173 D.16-08-019: Resolution E-4818.
174 D.16-08-019: Resolution E-4818.

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the events, and actions to be taken to document and adjust statistically for the impact of those events on energy use.175

5.5.2.4 Metering Duration

CPUC Guideline/PG&E Requirement: Energy usage and other relevant data from participating sites and projects using site-specific analyses must be monitored for sufficient durations to meet CPUC requirements and best practices. The CPUC requires a one-year baseline period, a minimum of one year of monitoring post-implementation, and a minimum of two years of monitoring post-implementation when BRO measures are included.176

Best Practice: Best practice guidelines require monitoring for sufficient durations to meet satisfactory levels of uncertainty. What is “satisfactory” will be determined based on the model’s goodness of fit and required levels of confidence. As discussed in the Eligibility section, savings uncertainty is a function of both the interval length and the monitoring duration. Interval length and monitoring duration should be considered together when designing eligibility criteria.177

5.5.2.5 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 must be estimated using a publicly available methodology (equations and/or code) that is sufficiently documented that its results can be replicated, and to which. Programs must state the methodology used and must demonstrate that calculations are consistent with that methodology. The version number or publication date is attached to the methodology reference must be provided for each claim, project, or program. Version or methodology changes must have clearly specified effective dates.

5.5.2.6 Non-Routine Events (site-level)

Best Practice: Programs or projects using site-level approaches, site-specific analysis, must track and adjust NREs for non-routine events (e.g., occupancy changes, equipment failure, or major increase/decrease in operational hours that are large enough to affect savings). Prior to program or project initiation, Implementers should work with PG&E to 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. Expected non-routine events, thresholds for identifying the events, and actions to be taken to document and adjust statistically for the impact of those events on energy use.178

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175 HOPPS White Paper Ruling.
176 CPUC Site-level NMEC Rulebook, p. 12.
177 HOPPS White Paper Ruling.
178 ASHRAE Guideline 14.
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). 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.

5.5.2.7 Evaluability

Please refer to the Cross-Platform Chapter for information on program evaluation.

**Best Practice:** 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.

5.5.2.8 Interactive Effects

**Best Practice/PG&E Guidance:** While meter-based programs must include 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 implementation May plans how they will account for interactive effects (e.g. metering both electric and gas, metering one fuel and estimating “deeming” a value for the other).

5.5.2.9 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 evaluation team for more information.

5.5.3 Net Savings Determination

**Best Practice/CPUC Guideline/PG&E Requirement:** For site-specific analyses, Since savings goals for IOUs are based on net savings, PG&E or its contractors may estimate ex ante net-to-gross (NTG) ratios for meter-based projects and programs for savings reporting purposes. An exception is when an RCT is conducted, since gross savings equals net savings for RCT methods. PG&E may conduct NTG research when PG&E assesses that the default ex ante NTG values authorized in DEER for NMEC projects in DEER merit further study. Although ex post NTG values are determined by impact evaluations under the direction of the CPUC, IOUs are permitted to develop ex ante net savings estimates provided that there are no existing estimates, the CPUC is not already conducting or planning a project to develop them, and the IOUs receive approval from the CPUC before initiating such research.

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180 Table 1, Randazzo, Ridge and Wayland, 2017.
181 Resolution E-4952, p.A-46
182 Decision 10-04-029 page 16, issued 4/21/2010
surveys are the methodology used to estimate NTG ratios and considerable effort has been made to refine the survey instruments over the past few decades. The current NTG methodological framework and instrument prepared for the CPUC, an Excel-based self-scoring tool, and the guidelines and instrument for residential and small commercial programs are available on the PG&E Wiki. Surveys are used to generate a net-to-gross ratio, which is then multiplied by the gross claimable savings. The questions used in the NTG survey are specified in the program’s evaluation plan.

For population-based approaches, net savings may be determined by composing a comparison group that matches the characteristics of the participant population. In the case where an RCT is conducted, gross savings equals net savings. By definition, the comparison group cannot be composed (and thus, net savings cannot be determined) until the participant population is identified. Note that a comparison group composed for estimating net claimable savings may not necessarily be the same comparison group that is used to estimate gross claimable savings. Additionally, NTG surveys may alternatively be used to generate a net-to-gross ratio instead of composing a comparison group.

NTG surveys are an option for either the site-specific or population-based approach. Site-specific analyses generally are not conducive to creating comparison groups, and thus a NTG questionnaire is typically used.

Project information must be submitted to the Custom Measure and Project Archive (CMPA), but will not be required to wait for approval to proceed.

5.5.4 EUL Determination

5.5.4.1 EUL for Bundles of Measures

Best CPUC Requirement/PG&E Requirement/Practice: Calculation of a measure-weighted average EUL (where weights are derived from measures’ estimated relative contribution to first-year savings) is required for both site- and population-level NMEC approaches. Implementers may propose alternative approaches to estimating EULs, but at this time, such proposals are subject to CPUC approval.

CPUC Requirement: This measure-weighted EUL,total using tools developed by PG&E with calculations provided to PG&E if measure level savings (or the percentage of savings contribution) can be estimated and DEER EULsBehavioral interventions will use an EUL of two years in non-residential sectors, one year in residential sectors; operational and retrocommissioning interventions will use an EUL of three years.

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.

PG&E Requirement: The weighted average EUL calculation will use DEER EULs and initial measure-level savings estimates if available. If a DEER EUL does not exist for a measure, PG&E and the Implementer may work together to propose an estimated EUL. Implementers should consult with PG&E about the approach to calculating weighted average EUL, and provide their calculations and the data used.

For example:
- Measure 1: 100,000 kWh savings, 10-year EUL
- Measure 2: 200,000 kWh savings, 3-year EUL

The EUL of the bundle would be \((100,000 \times 10 + 200,000 \times 3) / (100,000 + 200,000) = 5.33\) years.

Projects with both electric and gas savings may use a similar approach by taking a weighted average of the converted BTU savings.

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.

5.6 Payment Calculations

5.6.1 Measure Costs

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

5.6.2 Incentive Structure Guidance

Best Practice: Customer and Implementer incentive designs should be structured to minimize the risk of up-front payments exceeding the value of the actual savings at the time of the savings claim. 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. However, programs and projects that use the meter-based platform may structure incentives so that a portion are not directly tied to verified meter-based savings estimates. Implementer and customer payments could be based on observed savings, gross or net first-year claimable savings, gross or net lifecycle claimable savings, time and materials, milestones, another quantifiable metric, or a combination thereof.

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188 HOPPS White Paper Ruling.
Customer payments are not required. Other sources of assistance (technical support, project financing) may be provided in addition to, or in lieu of, customer payments.\(^{190}\)

**CPUC Requirement:** Customer payment for a given measure must not exceed the full measure cost without justification and approval from Commission staff.\(^{191}\)

### 5.7 Inspections and QA/QC

**Quality Assurance and Quality Control**

**Best Practice**

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.

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

#### 5.1.1 Pre-Installation Site Inspection (site-level only)

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.

#### 5.1.2 PG&E Early Policy Review (site-level only)

PG&E Requirement: PG&E may conduct early policy review. The need will be determined on a program-by-program or case-by-case basis.

**Project Approval Expiration (site-level only)**

PG&E Requirement: Projects must be installed, commissioned, and submitted for post-installation review before the approval expiration deadline. Requests to extend the deadline are handled through the PG&E Exception Request process.

#### 5.1.3 Ex Ante Review Requirements (site-level)

CPUC Requirement: The CPUC requires that projects using site-level NMEC approaches to estimate savings must "follow a modified custom process review"\(^{192}\) so that Commission staff may provide early feedback to PAs and implementers.\(^{193}\) This review will not cause project stoppages or delays, and does not constitute approval of projects or savings claims.\(^{194}\) 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.\(^{195}\)

#### 5.1.4 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

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\(^{190}\) HOPPS White Paper Ruling; D.16-08-019.


\(^{193}\) January 31, 2019 NMEC Ruling, p. 6.

\(^{194}\) January 31, 2019 NMEC Ruling, p. 6.

\(^{195}\) January 31, 2019 NMEC Ruling, p.6.
be determined on a program-by-program or case-by-case basis. Refer to section 4.5.5 for examples that may be applicable to site-level projects. In particular, Implementers should ensure that they document program influence throughout the life of a project.

5.8 Regulatory Compliance and Reporting

5.8.1 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 Programs must provide a schedule of when payments and claims could/should 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 for claimable savings is mitigated. Programs will likely vary the interval lengths based on the budget and nature of the interventions.

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 savings.
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 Guidance: 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 Standard OBF Terms
PG&E Requirement Guidance: 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.

Table 10 - Standard OBF Loan Terms

<table>
<thead>
<tr>
<th>Loan Terms</th>
<th>Government Agency &amp; Multifamily Common Areas</th>
<th>Non-Residential Customers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interest</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Maximum Loan Amount</td>
<td>$250,000 per premise where, in PG&amp;E’s sole opinion, unique opportunities to capture large energy savings exist for unique energy savings opportunities subject to OBF availability.</td>
<td></td>
</tr>
<tr>
<td>Maximum Funding Available per Customer</td>
<td>$1,000,000</td>
<td></td>
</tr>
<tr>
<td>Maximum Term</td>
<td>120 Months</td>
<td></td>
</tr>
</tbody>
</table>

6.1.1.2 Reserved OBF Terms
PG&E Requirement Guidance: Implementers may reserve funding on an annual basis to support their programs, subject to the availability of funds. The reserved funding amount will be allocated to the Implementer for the year, with the full cost of the funding allocated to the Implementer (see section 6 Loan and Cost calculation).

6.1.1.3 Cost Buy Downs
PG&E Requirement Guidance: 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.
6.1.4 Early Repayment and Closing a PG&E Account with and 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 11.196,197

6.1.5 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:

1. 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.
2. 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.
3. 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 the customer before the loan payment is made.
4. Loan Payment: The loan is paid to the designated payee (the customer or assigned payee) following review of the project following installation.

The OBF customer and Contractor Handbook provides more detail of how to submit OBF loan applications.198

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:199

1. 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.”

2. The customer currently receives service from PG&E at the location of the retrofit project.
3. The customer has maintained an active PG&E account for the previous 24 months.
4. 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.

6.2.1.1 Direct Access/Energy Service Provider and Community Choice Aggregation 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 Section 11 for information on calculation of energy savings for DA/ESP and CCA customers.

6.2.1.2 Government Agency Customers
PG&E Requirement: For the OBF Program, a government agency customer is defined as a taxpayer funded agency of federal, state, county, or local government 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.

6.2.1.3 Multifamily Buildings
PG&E Requirement: Multifamily buildings are eligible for OBF for common areas. The building operator who pays the PG&E account for the energy charges associated with the common areas is eligible to apply for an OBF loan.

6.2.1.4 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.

6.2.2 Project Eligibility
PG&E Requirement: Any project that is developed using 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.
6.2.3 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 credentialed as project developer by in the Investor Confidence Project (ICP) network. An exception is made for those developers using the OBF lighting template for, where the developer does not need to be part of the Investor Confidence Project network.

6.2.4 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, Energystar or the California Statewide Qualified LED 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;
- Equipment to be replaced as part of the project should be functioning at the time of replacement;
- Retrocommissioning 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.

6.2.5 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 projects costs may include:

- Implementation costs, such as project capital expenditures;
- 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.

6.2.6 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);

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201 [http://www.eeperformance.org/project-developers.html](http://www.eeperformance.org/project-developers.html)

PG&E Resource Savings Rulebook
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- Basic lighting measures, defined as all non-LED lighting retrofits;
- Behavioral measures;
- Add-ons to existing renovation projects.  

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; the payment history screening must be completed before the project is installed.  

6.4 Ex Ante Values

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.

6.4.2 OBF Net Savings for the Deemed and Custom Platforms

PG&E Requirement: PG&E applies a higher NTG ratio to projects that use OBF in the Deemed and Custom Platforms, adding an incremental 0.10 to the NTG ratio for kWh, therms and kW. NTG cannot exceed 1.  

6.4.3 Cost Calculations

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.

6.4.2.1 Standard OBF Cost Allocation

PG&E Requirement: The standard OBF costs are calculated as follows:

Administration Cost: $2,000 per loan.
Capital Costs: Capital costs will vary based on the term of the loans in the Implementer's program. They will be calculated as a percentage of the loan Principal.

205 D.19-03-001
Table 11 – Capital Costs Allocated to Loans

<table>
<thead>
<tr>
<th>Loan Term (Years)</th>
<th>OBF Costs as a % of Principal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less Than 4 Years</td>
<td>5.0%</td>
</tr>
<tr>
<td>4-7 Years</td>
<td>10.0%</td>
</tr>
<tr>
<td>More Than 7 Years</td>
<td>16.5%</td>
</tr>
</tbody>
</table>

As an example, the allocated cost for a 7-year, $1,000,000 loan would be:

Table 12 - Example Calculation of OBF Cost Allocation

<table>
<thead>
<tr>
<th>Loan Principal</th>
<th>$1,000,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loan Term</td>
<td>84 months (7 years)</td>
</tr>
<tr>
<td>7-Year Capital OBF Cost @ 10% of Principal</td>
<td>$100,000</td>
</tr>
<tr>
<td>OBF Admin Costs</td>
<td>$2,000</td>
</tr>
<tr>
<td>Total Allocated OBF Costs</td>
<td>$102,000</td>
</tr>
</tbody>
</table>

In this example, with a loan term of seven years, the 10% loan term rate is used on the initial loan principal of $1,000,000.

6.4.3.2 Reserved Funding Cost Allocation

**PG&E Requirement:** Implementers are able to reserve a dedicated pool of funding for their program annually. The benefits of reserving funding for an Implementer are the additional flexibility available in the term of the loans and reduced capital costs. Capital costs are lower as PG&E can more efficiently manage the loan pool requirements. The following costs will be applied to Implementers using reserved OBF funding:

**Administration Cost:** $2,000 per loan.

**Capital Costs:** Capital costs will vary based on the term of the loans in the Implementer's program. They will be calculated as a percentage of the loan principal.

Table 13 - Capital Costs Allocated to Loans for Reserved Funding

<table>
<thead>
<tr>
<th>Loan Term (years)</th>
<th>OBF Costs as a % of Principal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less Than 4 years</td>
<td>4%</td>
</tr>
<tr>
<td>4-7 Years</td>
<td>7.5%</td>
</tr>
<tr>
<td>More Than 7 years</td>
<td>11.5%</td>
</tr>
</tbody>
</table>

Any unused funding at the year-end will have the less than four years capital cost of 4% assigned to the Implementer costs for evaluation purposes. The following table provides an example of the costs the Implementer would be assigned for reserved funding:

Table 14 - Example Calculation of OBF Cost Allocation for Reserved Funding

<table>
<thead>
<tr>
<th>Reserved Funding</th>
<th>$12,000,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Funding Used</td>
<td>$10,000,000</td>
</tr>
<tr>
<td>Weighted Average Loan Term</td>
<td>84 months (7 years)</td>
</tr>
<tr>
<td>OBF Cost @ 10% of Principal</td>
<td>$750,000</td>
</tr>
</tbody>
</table>
In this example, the Implementer reserved funding of $12 million for the year and used $10 million of the funding across 10 loans. The weighted average of the loans provided was 7 years (Note: loan costs will be assigned on an individual loan basis) and, therefore, the allocated cost is 7.5% of the principal. The administration cost is $20,000 for 10 loans. The unused funding cost of 4% is applied to the $2 million of unused funding for a total of $80,000. The total costs assigned are, therefore, $850,000.

In comparing the cost allocation methodologies, it should be noted in these comparable examples that the OBF costs are 8.5% of the overall principal using the reserved methodology, and 10.2% using the standard methodology.

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. 207

The following is an example calculation:

Table 15 - Sample OBF Loan Calculation

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Project Cost for Measures</td>
<td>$10,000</td>
</tr>
<tr>
<td>b. Rebates or Incentives</td>
<td>$1,000</td>
</tr>
<tr>
<td>c. Customer Total Loan Amount</td>
<td>$9,000</td>
</tr>
<tr>
<td>d. Customer Average Retail Rate (per kWh)</td>
<td>$0.180</td>
</tr>
<tr>
<td>e. Estimated Annual Energy Savings (kWh)</td>
<td>12,000</td>
</tr>
<tr>
<td>f. Estimated Annual Energy Cost Savings [d.* e.]</td>
<td>$2,160</td>
</tr>
<tr>
<td>g. Estimated Monthly Energy Cost Savings [f. / 12]</td>
<td>$180</td>
</tr>
<tr>
<td>h. Loan Term</td>
<td>51 Months</td>
</tr>
<tr>
<td>i. Monthly Loan Amount (rounded down to nearest full monthly payment) [c. / h]</td>
<td>$176.47</td>
</tr>
</tbody>
</table>

The customer’s loan terms in this example would be $176.47 per month for 51 months. 208

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.

207 Customers may partially fund a project. See Section 6.1.1.3 for customer buy downs.

208 Note: PG&E adds an additional month to the payback period.
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. Where the site-specific savings exceed the projected deemed savings, site-specific savings may be used as the basis of the loan calculations.

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 credential 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;
- Qualifications for person performing savings calculations do not need to be provided. The ICP Project Developer credential is sufficient;
- 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. 209

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.

6.6.1 QA Provider Eligibility

PG&E Requirement: To perform a QA review for OBF, the QA Provider must be an part of the ICP-credentialed QA Provider 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.210

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;
- 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

Table 16 – Inspections and QA/QC Requirements

<table>
<thead>
<tr>
<th>Platform</th>
<th>Project Eligibility Rules</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deemed</td>
<td>Deemed Platform Section 7</td>
</tr>
<tr>
<td>Custom</td>
<td>Custom Platform Section 7</td>
</tr>
<tr>
<td>Meter-Based</td>
<td>Meter-Based Platform Section 7</td>
</tr>
<tr>
<td>Financing</td>
<td>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.</td>
</tr>
</tbody>
</table>

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 IFMVP 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 rebates and incentives must be approved before the OBF Loan is paid. For those projects that do not receive a rebate a project must 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:

1. The final loan does not meet minimum loan amount;
2. Payback exceeds the program’s maximum limit;
3. There is no original customer signature on the OBF Loan Modification Agreement (if a loan adjustment is necessary);
4. PG&E determines that the customer no longer meets the credit requirements.

6.8 Other Ratepayer Supported Energy Efficiency Financing Programs

PG&E Requirement/Guidance: The California Alternative Energy and Transportation Financing Authority administers the statewide energy efficiency financing pilots as ordered in D.13-09-044. 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 available as the Residential Energy Efficiency Loan Assistance Program);\(^{212}\)
- Small Business;
- Commercial;
- Master Metered Multifamily.

\(^{212}\) http://www.treasurer.ca.gov/caeatfa/cheef/reel/index.asp.
Appendix A – Bibliography


California Code, Public Utilities Code, PUC Section 339.8 (electric) and Sections 890-900 (gas).

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


California Code of Regulations, Title 20, Division 2, Chapter 4, Article 4 (Appliance Energy Efficiency Regulations).


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Chapter 6 - Financing Platform


## Appendix B – Abbreviations

The following abbreviations are used throughout the document:

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Term</th>
</tr>
</thead>
<tbody>
<tr>
<td>AOE</td>
<td>Add-On Equipment Measure Application Type</td>
</tr>
<tr>
<td>AR</td>
<td>Accelerated Replacement Measure Application Type</td>
</tr>
<tr>
<td>ASHRAE</td>
<td>American Society of Heating, Refrigerating and Air-Conditioning Engineers</td>
</tr>
<tr>
<td>BRO</td>
<td>Behavioral, Retrocommissioning, and Operational</td>
</tr>
<tr>
<td>BRO-Bhv</td>
<td>Behavioral Measure Application Type</td>
</tr>
<tr>
<td>BRO-RCx</td>
<td>Retrocommissioning Measure Application Type</td>
</tr>
<tr>
<td>BRO-Op</td>
<td>Operational Measure Application Type</td>
</tr>
<tr>
<td>BTU</td>
<td>British Thermal Unit</td>
</tr>
<tr>
<td>BW</td>
<td>Building Weatherization Measure Application Type</td>
</tr>
<tr>
<td>CAL TF</td>
<td>California Technical Forum</td>
</tr>
<tr>
<td>CCA</td>
<td>Community Choice Aggregators</td>
</tr>
<tr>
<td>CE</td>
<td>Capacity Expansion Measure Application Type</td>
</tr>
<tr>
<td>CEC</td>
<td>California Energy Commission</td>
</tr>
<tr>
<td>CFL</td>
<td>Compact Fluorescent Lightbulb</td>
</tr>
<tr>
<td>CIP</td>
<td>Central Inspection Team</td>
</tr>
<tr>
<td>CIT</td>
<td>Custom Implementation Team</td>
</tr>
<tr>
<td>CMPA</td>
<td>Custom Measure and Project Archive</td>
</tr>
<tr>
<td>COM</td>
<td>Commercial Building Type</td>
</tr>
<tr>
<td>CPUC</td>
<td>California Public Utilities Commission</td>
</tr>
<tr>
<td>CV(RMSE)</td>
<td>Coefficient of Variation of the Root Mean Squared Error</td>
</tr>
<tr>
<td>DA</td>
<td>Direct Access</td>
</tr>
<tr>
<td>DEER</td>
<td>Database for Energy Efficient Resources</td>
</tr>
<tr>
<td>EAR</td>
<td>Ex Ante Review</td>
</tr>
<tr>
<td>EE</td>
<td>Energy Efficiency</td>
</tr>
<tr>
<td>EI</td>
<td>Energy Insight</td>
</tr>
<tr>
<td>EISA</td>
<td>Energy Independence and Security Act</td>
</tr>
<tr>
<td>EM&amp;V</td>
<td>Evaluation, Measurement, &amp; Verification</td>
</tr>
<tr>
<td>ER</td>
<td>Early Retirement</td>
</tr>
<tr>
<td>ERC</td>
<td>Early Retirement Cost</td>
</tr>
<tr>
<td>ESP</td>
<td>Electric Service Provider</td>
</tr>
<tr>
<td>ET</td>
<td>Emerging Technologies</td>
</tr>
<tr>
<td>EUL</td>
<td>Effective Useful Life</td>
</tr>
<tr>
<td>EM&amp;V</td>
<td>Evaluation, Measurement and Verification</td>
</tr>
<tr>
<td>FMC</td>
<td>Full Measure Cost</td>
</tr>
<tr>
<td>GSIA</td>
<td>Gross Savings and Installation Adjustment</td>
</tr>
<tr>
<td>HTR</td>
<td>Hard-to-Reach</td>
</tr>
<tr>
<td>HVAC</td>
<td>Heating, Ventilation, and Air Conditioning</td>
</tr>
<tr>
<td>ICP</td>
<td>Investor Confidence Project</td>
</tr>
<tr>
<td>IMC</td>
<td>Incremental Measure Cost</td>
</tr>
<tr>
<td>IOU</td>
<td>Investor-Owned Utility</td>
</tr>
<tr>
<td>IPMVP</td>
<td>International Performance Measurement and Verification Protocol</td>
</tr>
<tr>
<td>ISP</td>
<td>Industry Standard Practice</td>
</tr>
<tr>
<td>Abbreviation</td>
<td>Term</td>
</tr>
<tr>
<td>--------------</td>
<td>------</td>
</tr>
<tr>
<td>LED</td>
<td>Light Emitting Diode</td>
</tr>
<tr>
<td>MAT</td>
<td>Measure Application Type</td>
</tr>
<tr>
<td>M&amp;V</td>
<td>Measurement and Verification</td>
</tr>
<tr>
<td>MWD</td>
<td>Metropolitan Water District</td>
</tr>
<tr>
<td>NCEW/NEW</td>
<td>New Construction Measure Application Type</td>
</tr>
<tr>
<td>NMBE</td>
<td>Normalized Mean Bias Error</td>
</tr>
<tr>
<td>NMEC</td>
<td>Normalized Metered Energy Consumption</td>
</tr>
<tr>
<td>NR</td>
<td>Normal Replacement</td>
</tr>
<tr>
<td>NTG or NTGR</td>
<td>Net-to-Gross Ratio</td>
</tr>
<tr>
<td>OBF</td>
<td>On-Bill Financing</td>
</tr>
<tr>
<td>OTR</td>
<td>“Other” Building Type</td>
</tr>
<tr>
<td>O&amp;M</td>
<td>Operations and Maintenance</td>
</tr>
<tr>
<td>PA</td>
<td>Program Administrator</td>
</tr>
<tr>
<td>PAC</td>
<td>Program Administrator Cost Test</td>
</tr>
<tr>
<td>PC</td>
<td>Project Cost</td>
</tr>
<tr>
<td>POE</td>
<td>Preponderance of Evidence</td>
</tr>
<tr>
<td>POS</td>
<td>Point-of-Sale</td>
</tr>
<tr>
<td>PPP</td>
<td>Public Purpose Program</td>
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<tr>
<td>QA/QC</td>
<td>Quality Assurance/Quality Control</td>
</tr>
<tr>
<td>QPL</td>
<td>Qualified Product List</td>
</tr>
<tr>
<td>RCA</td>
<td>Refrigerant Charge Adjustment</td>
</tr>
<tr>
<td>RCT</td>
<td>Randomized Control Trial</td>
</tr>
<tr>
<td>RCx</td>
<td>Retrocommissioning</td>
</tr>
<tr>
<td>RE</td>
<td>Repair Eligible</td>
</tr>
<tr>
<td>READI</td>
<td>Retrofit Ex Ante Database Interface</td>
</tr>
<tr>
<td>REA</td>
<td>Retrofit Add-on</td>
</tr>
<tr>
<td>RI</td>
<td>Repair Indefinitely</td>
</tr>
<tr>
<td>ROB</td>
<td>Replace on Burnout</td>
</tr>
<tr>
<td>RUL</td>
<td>Remaining Useful Life</td>
</tr>
<tr>
<td>SBD</td>
<td>Savings by Design</td>
</tr>
<tr>
<td>TRC</td>
<td>Total Resource Cost</td>
</tr>
<tr>
<td>UES</td>
<td>Unit Energy Savings</td>
</tr>
<tr>
<td>VRF</td>
<td>Variable Refrigerant Flow</td>
</tr>
<tr>
<td>WEA</td>
<td>Weatherization</td>
</tr>
<tr>
<td>WEN</td>
<td>Water-Energy Nexus</td>
</tr>
<tr>
<td>WPA</td>
<td>Workpaper Project Archive</td>
</tr>
<tr>
<td>WRR</td>
<td>Wattage Reduction Ratio</td>
</tr>
</tbody>
</table>
Appendix C – Technology-Specific Guidance

The requirements provided in this appendix provide technology-specific requirements for workpaper development. This is not an exhaustive list of historical requirements, but rather a select subset of requirements currently in effect or with an effective date in the near future. This section will continue to be updated in future Rulebook revisions.

C.1 Lighting

C.1.1 Exterior Lighting

C.1.1.1 Baseline and EUL

**CPUC Requirement:** LEDs are considered standard practice for exterior lighting applications, which means they should be assigned savings for the RUL, not the full EUL. Savings through the EUL period would only be assigned for the highest performing LED products. Implementers using early retirement measures shall demonstrate the following:

1. Procedures for establishing preponderance of evidence of early retirement along with development of updated NTG values that take into account free-ridership above the existing conditions baseline to the standard practice baseline.
2. Standard practice baseline that represents the typical types of LED fixtures that would be installed absent the programs.
3. Measure definitions that represent the higher performing LED fixtures that exceed the performance of the standard practice baseline established per above description.\(^{213}\)

**CPUC Requirement:** As a result of the change in Standard Practice baseline to LED technologies, all currently approved outdoor lighting measures (except screw-in CFLs) will no longer qualify for the Early Retirement baseline after December 31, 2017.\(^{214}\) DEER2018 defines the standard practice for exterior lighting measures to be LED technologies for Early Retirement, effective January 1, 2018.\(^{215}\) Normal Replacement measures are to have savings above a Standard Practice baseline. – A Standard Practice baseline for NR measures shall be based on a mixture of LED and high intensity discharge (both high pressure sodium and pulse start metal halide technologies).\(^{216}\) The baseline technology mix for Normal Replacement and New Construction (ROB/NR/NC) and the second baseline for Accelerated Replacement measures shall be as follows, valid through 12/31/19 per E-492.\(^{217}\)

a. Streetlights: 100% LED;

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\(^{213}\) California Public Utilities Commission, Energy Division, March 1, 2017, *Disposition for Workpapers (Covering Exterior LED Lighting Fixtures).*

\(^{214}\) Resolution E-4795, p. 37.

\(^{215}\) Resolution E-4795, p. 37.

\(^{216}\) California Public Utilities Commission, Energy Division, March 1, 2017 and April 12, 2017, *Disposition for Workpapers (Covering Exterior LED Lighting Fixtures).*

\(^{217}\) California Public Utilities Commission, Energy Division, May 7, 2018, 2018 Outdoor Lighting Disposition for Workpaper PGECOLTG R8
b. Roadway/Area: 100% LED;  
c. Parking Garage: 20% metal halide, 20% linear fluorescent, and 60% LED;  
d. Wall-mounted: 100% LED, and  
e. Canopy: 100% LED.

### C.1.1.2 Lighting Net-to-Gross (NTG)

**CPUC Requirement:** The Net-to-Gross Ratio for all LED Outdoor Lighting categories of streetlighting, road & area, wall mounted, canopy, and parking garages utilizing a normal replacement or new construction measure application type, is 0.91.  

### C.1.1.3 Operating Hours

**CPUC Requirement:** Outdoor lighting measures must start with the ex ante approved value of 4,100 hours per year. Use consistent hours of use reductions amongst lighting workpapers for fixtures that have motion sensors.

### C.1.2 Interior Lighting

#### C.1.2.1 Measure Wattages

**CPUC Requirement:** Reference the Standard Fixture Wattage Table for existing fixture wattages when determining savings. New construction projects may use wattages from the lighting fixture cut sheets and schedules. Average measure watts may not be used as the measure definition. If the savings are calculated based on a ratio of a measure to pre-existing wattage ratio, then the measure wattage shall be the wattage at the lowest end of the wattage range. In cases where the range does not have an upper or lower range, then the wattage shall be the lowest wattage of commercially available measures within that range. If the savings are calculated based on typical wattage ratings within specific ranges, then the pre-existing wattage shall be the lowest wattage within the pre-existing range and the measure wattage shall be the highest wattage within the measure wattage range.

#### C.1.2.2 Product Tiers and Incentives

**CPUC Requirement:** Define product tiers in a way that assigns greater savings for higher performance measures and place an efficacy floor on eligible measures. For residential upstream lighting programs, the electric IOUs shall only offer incentives for LED bulbs to

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218 California Public Utilities Commission, Energy Division, May 7, 2018, 2018 Outdoor Lighting Disposition for Workpaper PGECOLTG R8  
220 Disposition for Workpapers Covering Exterior LED Lighting Fixtures.  
221 California Public Utilities Commission, Energy Division, September 30, 2016, Disposition for Workpaper SCE13LG123 Revision 0 (Interior LED Parking Garage External Driver Lamp-Style Retrofit Kits (UL Type C)).  
222 Workpaper Disposition for Lighting Retrofits, March 1, 2013.  
223 California Public Utilities Commission, Energy Division, September 29, 2017, Disposition for Workpaper PGECOLT178 Revision 3 (Covering High And Low Bay LED Fixtures).
products that are in the top half of quality on the market and that meet the Voluntary California Quality LED Specification (CEC Spec).

C.1.2.3 Operating Hours

Use DEER operating hours for lighting projects within DEER building types except for projects utilizing an IPMVP Option C or Option D analysis, provided that analysis accounts for interactive effects.

C.1.2.4 Baseline Selection

The baseline LED efficacy shall be representative of the typical performance of non-qualifying fixtures that provide the same level of service as the measure fixture. The second baseline for the AR MAT for interior lighting shall be LEDs.

CPUC Requirement: The standard practice baseline for all interior hard-wired LED ceiling fixture, grid/troffer fixtures, and retrofit kits shall be 100% LED and a minimum efficacy of 100 lumens per watt. This also applies to the NR baseline and second baseline for AR for linear LED replacement lamps.

CPUC Requirement: The standard practice baseline for interior high-bay and interior low-bay lighting applications must be based on a significant fraction of LED technology. Approved baseline percentage mixes are available in DEER. Effective January 1, 2020, the standard practice baseline must be 100% LED.

C.1.2.5 EUL For LED Ambient Fixtures

CPUC Requirement: Use an EUL of 50,000 basis hours with a 16-year maximum life for both residential and nonresidential building types for LED ambient fixtures and retrofit kits.

CPUC Requirement: DEER lighting code baselines should reflect the most recent Title 24 lighting power density requirements as well as changes in standard practice at the earliest opportunity.

Hard-Wired Interior Lighting Fixtures

CPUC Requirement: The standard practice baseline for all interior hard-wired LED ceiling fixture, grid/troffer fixtures, and retrofit kits shall be 100% LED and a minimum efficacy of 100 lumens per watt.

\[D.12-11-015, \text{OP30.}\]
\[D.12-05-015, \text{California Public Utilities Commission, Energy Division, Final Ex Ante Review Disposition, Project ID PGE-16-T-I-157.}\]
\[D.12-11-015, \text{OP30.}\]
\[\text{Resolution E-4952, p. 44.}\]
\[\text{Resolution E-4952, p.44.}\]
\[\text{Resolution E-4952.}\]

\[\text{California Public Utilities Commission, Energy Division, August 23, 2015, Disposition for Workpaper PGECOLTG179 (LED Ambient Commercial Fixtures and Retrofit Kits).}\]

\[\text{Resolution for Workpaper PGECOLTG179 (LED Ambient Commercial Fixtures and Retrofit Kits).}\]

\[\text{PG&E Resource Savings Rulebook Version 0.99cVersion 0.99cVersion 0.99b}\]

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C.1.2.6 High and Low Bay LED Baseline Selection

CPUC Requirement: The standard practice baseline for interior high-bay and interior low-bay lighting applications must be based on a significant fraction of LED technology. Approved baseline percentage mixes are available in DEER. Effective January 1, 2020, the standard practice baseline must be 100% LED. DEER establishes pulse start metal halide technologies as the Code baseline for use in interior high-bay measures. A Standard Practice baseline must be developed that reflects the typical mixture of efficiency levels that are currently selected in Normal Replacement situations. The baselines must represent the standard practice for the Normal Replacement choices that would occur outside of an IOU efficiency program. The baseline technologies have to include newer, more efficient technologies, and LEDs should make up some portion of the standard practice. The current standard practice for measures covered by the workpaper will vary from the least efficient technology such as T8 or Pulse Start Metal Halide fixtures to technologies that are very similar to those offered within an efficiency program, likely the LED.

C.1.2.7 Linear Replacement Lamps

CPUC Requirement: The Code baseline for linear fluorescent measures assumes second generation T8 lamps with normal light output ballasts. The Standard Practice baseline for 4-foot linear fluorescent Early Retirement measures assumes third generation T8 lamps (3,100 lumens) and reduced light output ballasts. All current indoor lighting measures using four-foot linear T8 lamps will no longer be approved as Early Retirement measures after December 31, 2017.

C.1.2.8 LED Specialty Lamps, Small Diameter Directional Lamps, and Reflectors

CPUC Requirement: On July 1, 2018, the approved wattage reduction ratio (WRR) values will change for savings calculations for LED Specialty Lamps and Reflectors using a baseline of incandescent lamps. The current and future WRRs are listed in the table below.

Table 17 – Wattage Reduction Ratio Values for LED Specialty Lamps and Reflectors

<table>
<thead>
<tr>
<th>Lamp Type</th>
<th>Watts</th>
<th>WRR(^\text{234}) (beginning July 1, 2018)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MR16</td>
<td>All</td>
<td>Not Eligible</td>
</tr>
<tr>
<td>PAR20</td>
<td>All</td>
<td>3.21</td>
</tr>
<tr>
<td>PAR30</td>
<td>All</td>
<td>2.34</td>
</tr>
<tr>
<td>PAR38</td>
<td>All</td>
<td>2.60</td>
</tr>
</tbody>
</table>

\(^{234}\) California Public Utilities Commission, Energy Division, March 1, 2018, \textit{Disposition for Workpaper (2018 Screw-in LED Savings Methods)}.
After July 1, 2018, MR16 and other screw-in small diameter directional lamps with diameters of 2.25 inches or less are not eligible for program offerings.\textsuperscript{235}

The approved baseline for globe and candelabra lamp shapes will be 5\% CFL, 35\% LED, and 60\% incandescent. The approved based for reflectors (except small diameter directional lamps) will be revised to 10\% CFL, 40\% LED, and 50\% incandescent.

In addition, eligible small diameter directional lamp measures must have:
- A minimum efficacy of at least 80 lumens per watt (LPW), or
- A minimum efficacy of at least 70 lumens per watt and a minimum compliance score of 165 (\textcolor{red}{\text{color rendering index} + \text{Efficacy}}).

Effective January 1, 2018 and January 1, 2019, programs shall adopt minimum efficacy requirements as specified in the table below:\textsuperscript{236}

\begin{center}
\begin{tabular}{|c|c|c|}
\hline
\textbf{R/BR} & \textbf{< 11w} & 4.17 \\
\hline
& \textbf{\geq 11w, < 14w} & 3.28 \\
\hline
& \textbf{\geq 14w} & 2.97 \\
\hline
\textbf{Candelabra} & \textbf{All} & 4.61 \\
\hline
\textbf{Globe} & \textbf{< 3w} & 4.68 \\
\hline
& \textbf{\geq 3w} & 3.10 \\
\hline
\textbf{Can Retrofit} & \textbf{All} & 2.34 \\
\hline
\end{tabular}
\end{center}

\textsuperscript{235} Disposition for Workpaper (2018 Screw-in LED Savings Methods).
\textsuperscript{236} Disposition for Workpaper (2018 Screw-in LED Savings Methods).
Table 18–Minimum Screw-In Bulb Efficacy (Lumens Per Watt)

<table>
<thead>
<tr>
<th>CRI</th>
<th>Efficacy (LPW) (beginning January 1, 2019)</th>
</tr>
</thead>
<tbody>
<tr>
<td>82</td>
<td>124.4</td>
</tr>
<tr>
<td>83</td>
<td>122.1</td>
</tr>
<tr>
<td>84</td>
<td>119.8</td>
</tr>
<tr>
<td>85</td>
<td>117.5</td>
</tr>
<tr>
<td>86</td>
<td>115.2</td>
</tr>
<tr>
<td>87</td>
<td>112.9</td>
</tr>
<tr>
<td>88</td>
<td>110.6</td>
</tr>
<tr>
<td>89</td>
<td>108.3</td>
</tr>
<tr>
<td>90</td>
<td>106.0</td>
</tr>
<tr>
<td>91</td>
<td>103.7</td>
</tr>
<tr>
<td>92</td>
<td>101.4</td>
</tr>
<tr>
<td>93</td>
<td>99.1</td>
</tr>
<tr>
<td>94</td>
<td>96.8</td>
</tr>
<tr>
<td>95-100</td>
<td>95.0</td>
</tr>
</tbody>
</table>

In addition, eligible measures must have a compliance score of 297 (= 2.3 x color rendering index + Efficacy).\(^{237}\)

\(^{C.1.2.9C.1.2.7}\) \textbf{Residential LED Operating Hours and EULs}

\textbf{CPUC Requirement}: For residential building types, the maximum allowed EUL is 20 years. The table below summarizes the ex ante annual operating hours and corresponding EUL values for common DEER building types.\(^{238}\)

\(^{237}\) \textit{Revisions to Disposition for Comprehensive Workpaper (Screw-In Lamps).}

\(^{238}\) California Public Utilities Commission, Energy Division, May 14, 2012, \textit{Disposition for Workpaper (Integral LED Lamp Replacements).}
Table 19—LED Operating Hours and EULs by Building Type

<table>
<thead>
<tr>
<th>Lamp Description</th>
<th>LED EUL (Years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Base Wattage</td>
</tr>
<tr>
<td>MR16</td>
<td>20W</td>
</tr>
<tr>
<td></td>
<td>35W</td>
</tr>
<tr>
<td>PAR20</td>
<td>All</td>
</tr>
<tr>
<td>PAR30</td>
<td>≤ 50W</td>
</tr>
<tr>
<td></td>
<td>&gt; 50W</td>
</tr>
<tr>
<td>PAR38</td>
<td>≤ 50W</td>
</tr>
<tr>
<td></td>
<td>&gt; 50W</td>
</tr>
<tr>
<td>Globe</td>
<td>&lt; 3W</td>
</tr>
<tr>
<td></td>
<td>≥ 3W</td>
</tr>
<tr>
<td>Candelabra</td>
<td>All</td>
</tr>
</tbody>
</table>

C.1.2.10 C.1.2.8 LED A-Lamp Baseline

**CPUC Requirement:** Effective July 1, 2018, the Standard Practice baseline for A-lamps and spiral CFLs shall be as follows:

- ≤ 90 LPW: 25% CFL, 75% LED; and
- > 90 LPW: 55% CFL, 20% LED, 25% halogen.

C.1.2.11 C.1.2.9 Efficacy Requirements

**CPUC Requirement:** In accordance with the Energy Independence and Security Act (EISA), the following minimum efficacy requirements must be followed for 2018 and 2019:

<table>
<thead>
<tr>
<th>EISA Wattage</th>
<th>2019 Efficacy</th>
</tr>
</thead>
<tbody>
<tr>
<td>40W</td>
<td>95</td>
</tr>
<tr>
<td>60W</td>
<td>100</td>
</tr>
<tr>
<td>75W and 100W</td>
<td>100</td>
</tr>
</tbody>
</table>

As of January 1, 2018, Title 20 requires all general service lamps manufactured for sale in California to have a minimum efficacy of 45 lumens/watt. This will eventually eliminate the availability of filament based, incandescent general service lamps as inventories of these lamps manufactured prior to this date are gradually sold out of existing inventories. The change in Title 20 necessitates revision to the standard practice baseline for energy efficient lamps measures.

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239 Disposition for Workpaper (2018 Screw-in LED Savings Methods).
240 Revisions to Disposition for Comprehensive Workpaper (Screw-In Lamps); Disposition for Workpaper (2018 Screw-in LED Savings Methods).
so that the baseline considers the likely choices for lamp purchases. Commission Staff directs Program Administrators to consider this in updates to LED A-lamp workpapers.241

C.1.2.1C.1.2.10 Product Tracking

CPUC Requirement: Wattage and rated lumen output of all program lamps must be tracked and submitted to PG&E on quarterly.242

C.1.2.13C.1.2.11 Non-DEER Operating Hours

CPUC Requirement: For lighting projects in non-DEER buildings, Implementers must employ data-loggers to track fixture operating hours in all space types within that building following the methods described in CPUC guidance or the schedules for the lighting circuits controlled automatically through an existing building energy management system may be used.243

C.2 HVAC

C.2.1 General

CPUC Requirement: For proposed HVAC measures utilizing performance maps, the full range of “enhanced” equipment offerings in the market must be cataloged, performance maps developed, and energy savings estimated for each in order to select a typical expected performance for a given set of equipment characteristics. If using performance maps different from those in DEER, either use DEER assumptions or show intermediate calculations in which cycling loss is incorporated into curves.244

C.2.2 Net-to-Gross Values

CPUC Requirement: Effective January 1, 2020, the NTG values for HVAC measures below are updated to:

<table>
<thead>
<tr>
<th></th>
<th>2019</th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercial Upstream</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Packaged Units</td>
<td>0.75</td>
<td>0.654</td>
</tr>
<tr>
<td>Commercial Quality</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maintenance</td>
<td>0.73 / 0.60</td>
<td>0.45</td>
</tr>
<tr>
<td>Residential Quality</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maintenance</td>
<td>0.78 / 0.55</td>
<td>0.55</td>
</tr>
</tbody>
</table>

C.2.3 Heat Pump and Heat Recovery Variable Refrigerant Flow Systems

244 Disposition for Workpaper PGECOHVC174 (Multiple Speed Unitary Air-Cooled Commercial Air Conditioners and Heat Pumps ≥65 Bth/h)
CPUC Requirement: For the following list of building types, Tier 1 and 2 Heat Pump and Heat Recovery VRF systems must use the comparable Title 24 VRF system as a baseline.

- Assembly
- Education – Community College
- Education – Secondary School
- Education – University
- Health/Medical – Nursing Home
- Hotel
- Large Office
- Lodging – Motel
- Manufacturing Light Industrial
- Primary Schools
- Small Office

Tier 1 efficiency must be at least 15% higher than Code energy efficiency rating and the replacement system must have a rated efficiency at least as high as the Tier 1 energy efficiency rating to qualify as a VRF measure.245

VRF fuel-switching measures are not currently allowed. They may be allowed in the future when it can be shown that the choice to adopt VRF systems is primarily influenced by Programs. VRF fuel-switching measures must also satisfy the CPUC “three-prong” test requirements.246

C.2.2.2.4 Variable Refrigerant Flow Measures in Custom Retrofit Projects

CPUC Requirement: Variable refrigerant flow (VRF) measures for existing building projects are on hold pending approved calculation methodology for customized retrofit projects. VRF systems in SBD may be included only for the purposes of setting the incentive rate in the compliance run but must be modeled as neutral for the whole building savings claim.

Note: VRF measures are available through mid/up-stream offerings for some building types.

C.2.3.2.5 High Emissivity Coatings on Furnace Refractory Measures

CPUC Requirement: “CPUC Staff requires a hold be placed on any applications with this measure until further review can be performed. The IOU must not execute any incentive agreements for projects with this measure until instructed by CPUC staff.”247

C.2.5.2.6 Residential Duct Sealing


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CPUC Requirement: A duct sealing measure is not eligible if it is part of an HVAC unit installation or replacement. Duct sealing implemented as part a new system installation is only eligible if it is part of the installation of an above code HVAC system installation.\(^\text{248}\)

C.2.5C.2.7 Non-Residential HVAC Rooftop Quality Maintenance

CPUC Requirement: Condenser coil cleaning, evaporator cleaning, and air flow adjustment are related to refrigerant charge adjustment (RCA) savings and the unit energy savings (UES) are to be calculated as prescribed below: \(^\text{249}\)

- Condenser Coil Cleaning UES Values = DEER RCA UES values * 0.125;
- Evaporator Coil Cleaning UES Values = DEER RCA UES values * 0.0625; and
- Air Flow Adjustment UES Values = DEER RCA UES values * 0.0625.

Economizer decommissioning is not an accepted measure.\(^\text{250}\)

C.2.6C.2.8 HVAC Cooling Efficiency Measures

CPUC Requirement: For all HVAC (or other) measures’ equipment sizes, in order to use the (customer average) pre-existing savings values in DEER (which indicates an accelerated replacement measure type is being assigned to a claim), program claims will be required to provide rated efficiency values for the systems that are replaced. Evidence of the pre-existing equipment rated capacity must be retained in the project files (such as a picture of the equipment and its nameplate showing the model number and rating information). This information is required to support the claim, support evaluation verification of the claim and to provide data for future refinement of pre-existing baseline values.\(^\text{251}\)

C.2.7C.2.9 Boilers and Water Heaters

Compliance with the methodology outlined in the 2018 Residential Water Heater Disposition is required for water heater measures (deemed and custom) that are covered by a UEF (uniform energy factor) rating and the following measure technologies:

- Gas and conventional electric storage water heaters with 30-, 40-, and 50-gallon capacities; and
- Small gas instantaneous water heaters.\(^\text{252}\)

\(^{248}\) California Public Utilities Commission, Energy Division, March 9, 2015, Disposition for Workpaper PGE3PHVC159 Revision 2 (Duct Test & Seal: Residential).

\(^{249}\) California Public Utilities Commission, Energy Division, May 2, 2013, Disposition for Workpaper (Non-Residential HVAC Rooftop Quality Maintenance).

\(^{250}\) Disposition for Workpaper (Non-Residential HVAC Rooftop Quality Maintenance).

\(^{251}\) Resolution E-4867, p. 23.

\(^{252}\) California Public Utilities Commission, Energy Division, March 1, 2018, Disposition for 2018 Residential Water Heaters.
C.2.10  On Demand Pump Controller for Domestic Hot Water Systems

CPUC Requirement: Savings values should be categorized based on the size of building served, “per dwelling unit” served by the domestic hot water system: “Low-Rise” (up to three stories) or “High-Rise” (from three stories and up).253

C.2.11  Chillers

CPUC Requirement: Air-cooled All chiller measures, including custom projects and non-DEER deemed measures supported by workpapers, must have efficiency levels of at least ten percent better than Title 24 minimum efficiency requirements.254 Chiller measures must be at least 10% better than Title 24 “Path A” chiller efficiency requirements for both full-load and integrated part-load efficiency. Water-cooled chiller measures must be at least 10% better than Title 24 for both full-load and integrated part-load efficiency. This applies to both “Path A” and “Path B” water-cooled chillers.

C.2.11.1  Chiller Efficiency Degradation

CPUC Requirement: In the savings analysis, account for the degradation in chiller efficiency at higher condensing temperatures in order to make the peak kW calculation accurate. This requirement is not applicable to Savings By Design or other new load projects.

C.2.11.2  Lead Chillers

CPUC Requirement: Lead chiller measures may only be utilized in custom programs and shall not be used in deemed downstream, upstream incentive or direct install programs. Custom programs for lead chiller measures shall include pre- and post-installation measurement and verifications that support the measure chiller is installed and operating as the lead chiller.255

C.2.12  Smart Thermostats

C.2.12.1  EUL

CPUC Requirement: For smart thermostat measures, the EUL used in the workpaper will need supporting evidence, otherwise the default EUL shall be the assumptions attributed to deemed Operational Measures in the baseline Resolution (3 years). Alternative EULs may be proposed with analysis and supporting evidence as part of a research plan provided to the CPUC.256
C.2.10.2.1 NTG for Parallel Smart Thermostat EE and DR Programs

**CPUC Requirement:** If the energy efficiency smart thermostat program is offered in parallel with a demand response program provided for the same measure, then the net-goes-gross value must be discounted appropriately (by 40%) to account for the increased free ridership.\(^{257}\)

C.2.10.3.1 Rebate by Fuel Type

**CPUC Requirement:** Fuel source for HVAC equipment controlled by thermostat must match the specified fuel type in the savings calculation.\(^{258}\)

C.3 Plug Loads

C.3.1 Television EUL and Load Shape

**CPUC Requirement:** When estimating EUL for televisions, take into account that: annual television usage may decrease with television age, and older televisions may eventually get displaced to locations where they see little usage.\(^{259}\)

**CPUC Requirement:** In the absence of a more similar DEER load shape, television measures should use the interior CFLs load shape in cost effectiveness calculations.\(^{260}\)

C.3.2 Power Strips

**CPUC Requirement:** The effective useful life of a power strip measure must be reduced by the fraction of customers who are expected to de-install the measure before its end of life.\(^{261}\)

**CPUC Requirement:** The Tier 2 Connected APS workpaper is not approved for use for "control outlet" devices unless supported by a field study.\(^{262}\)

C.4 Other

C.4.1 Pump Overhauls

**CPUC Requirement:** Pump overhauls fall into the Behavioral, Retrocommissioning, and Operational (BRO) measure type. The Implementer must assess the customer's standard practice in identifying and overhauling pumps, and only offer ratepayer incentives to accelerate the normal practice. The baseline for each project must be the customer's normal practice for

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\(^{257}\) California Public Utilities Commission, Energy Division, July 19, 2016, *Disposition for Workpaper WPSCG0REHC160624A Revision 0 (Residential Smart Thermostat).*


\(^{259}\) Disposition for Workpaper PGECOAPP104 Revision 4 (Energy Efficient Televisions).

\(^{260}\) Disposition for Workpaper PGECOAPP104 Revision 4 and Revision 5 (Energy Efficient Televisions).

\(^{261}\) Disposition for Workpaper PGECOAPP111 Revision 0 (Tier 2 Advanced Power Strips); California Public Utilities Commission, Energy Division, August 25, 2015, *Disposition for Workpaper WPSDGEREHE0004 Revision 0.3 (Tier 2 Advanced Power Strips).*

\(^{262}\) Disposition for Workpaper SCE17CS014 Revision 1 (Tier 2 Advanced Power Strips).
Second baseline savings impacts are zero unless the Implementer can demonstrate that the refurbished pump efficiency exceeds the OEM pump efficiency. The incremental cost used in the ARC cost calculation must be set to zero unless the Implementer can demonstrate that the program causes additional refurbishment measures which increase efficiency to be installed that would not be installed as standard practice.263

Examples of information that will likely improve program evaluability for meter-based programs include: establishing policies for, and maintaining records of, data that are / will be considered outliers, how those outliers are defined, and what actions, if any, are / will be taken with those outliers (e.g. discard, normalize, use as is), and detailing procedures to identify duplicate records and the action(s) that were / will be taken to avoid double counting. Like-for-like pump assembly replacements are not eligible and are not considered pump overhauls (See section 4.2.2.2. Pump right-sizing projects implemented to address increased or decreased demand or changes in system conditions, such as higher head requirements, do not qualify as BRO measures (See section 2.3.1.2.1).

C.4.1C.4.2 Plastic Recycling Machines

**CPUC Requirement:** "For future projects: Determine both the New Construction and retrofit market industry standard practice for plastics recycling machines, since it appears that available equipment choices are limited. Any remaining projects in the pipeline, (either NC or retrofit), shall be placed on hold until the IOUs complete an ISP study to assess and determine proper NC baseline."264

263 California Public Utilities Commission, Energy Division, Ex Ante Review Disposition, PGE-16-T-I-0046_2K1600059214+ Multiple Pump Repair Second EAR 2017-08-18
Appendix D – Statewide Workpaper Template

Workpaper SW13XX###
Revision #

Program Administrator

Workpaper Title
Read and delete/replace all notes in red.
## At-a-Glance Summary

<table>
<thead>
<tr>
<th>Measure Codes</th>
<th>List all solution/measure codes.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measure Description</td>
<td>Describe the measure.</td>
</tr>
<tr>
<td>Base Case Description</td>
<td>Describe the base case technology that will be replaced with the energy efficient technology. State whether this is the customer’s existing equipment or code/standard equipment.</td>
</tr>
<tr>
<td>Units</td>
<td>E.g. per lamp, per ton</td>
</tr>
<tr>
<td>Energy Savings</td>
<td>Provide average values, or leave the following text intact: Refer to Excel Calculation Attachment</td>
</tr>
<tr>
<td>Full Measure Cost ($/unit)</td>
<td>Provide average values, or leave the following text intact: Refer to Excel Calculation Attachment</td>
</tr>
<tr>
<td>Incremental Measure Cost ($/unit)</td>
<td>Provide average values, or leave the following text intact: Refer to Excel Calculation Attachment</td>
</tr>
<tr>
<td>Effective Useful Life</td>
<td>List all EULs and sources: E.g. 15 years (DEER EUL ID: HVAC-airAC)</td>
</tr>
<tr>
<td>Measure Installation Type</td>
<td>New Construction (NEW/NC), Replace on Burnout (ROB), Retrofit or Early Retirement (RET/ER), Retrofit First Baseline Only (REF), Retrofit Add-on (REA)</td>
</tr>
<tr>
<td>Net-to-Gross Ratio</td>
<td>List all NTG ratios and sources: E.g. 0.6 (DEER NTGR ID: Com-Default&gt;2yrs)</td>
</tr>
<tr>
<td>Important Comments</td>
<td>This work paper has a complementary Ex Ante Database data set that will be provided in a separate submission to the California Public Utilities Commission (CPUC).</td>
</tr>
</tbody>
</table>
Revision History

<table>
<thead>
<tr>
<th>Rev</th>
<th>Date</th>
<th>Author</th>
<th>Summary of Changes</th>
</tr>
</thead>
</table>
| 0   | 6/1/15| Author (PA) | Note all significant changes, including but not limited to:  
• Measure offerings and requirements  
• Calculation methodology and savings  
• Delivery mechanisms  
• DEER values: NTG, IR, Technology Fields, EUL, load shapes  
• Hours of operation  
• Costs  
• Adjustments in response to CPUC Commission Staff (CS) and California Technical Forum (Cal TF) comments. Refer to table below. |

Commission Staff and California Technical Forum Comments

<table>
<thead>
<tr>
<th>Rev</th>
<th>Party</th>
<th>Submittal Date</th>
<th>Comment Date</th>
<th>Comments</th>
<th>WP Developer Response</th>
</tr>
</thead>
</table>
| 0   | CS    | 6/2/15         | 6/15/15      | ● Comment 1  
● Comment 2 | ● Response 1  
● Response 2 |
| 0   | Cal TF | 6/2/15         | 6/15/15      | ● Comment 1  
● Comment 2 | ● Response 1  
● Response 2 |

The Cal TF approved the version X of this workpaper found under the “Approved Measures” section of the website, [http://www.caltf.org/approved-measures/](http://www.caltf.org/approved-measures/)
Section 1. General Measure & Baseline Data

1.1 Measure Description & Background

Complete the following table of measure descriptions. If there are a large number of measures, give a general description instead of detailing each one. Indicate “N/A” for fields that do not apply. You may include content from the program catalog/directory. Industry standard practice refers to an efficiency level or other condition that is common practice but not specified by a code or standard.

### Base, Standard, and Measure Cases

<table>
<thead>
<tr>
<th>Case</th>
<th>Description of Typical Scenario</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measure</td>
<td>E.g. Interior Fixture T5 Linear Fluorescent</td>
</tr>
<tr>
<td>Existing Condition</td>
<td>E.g. Metal Halide Fixture</td>
</tr>
<tr>
<td>Code/Standard</td>
<td>E.g. Pulse Start Metal Halide Fixture</td>
</tr>
<tr>
<td>Industry Standard Practice</td>
<td>E.g. Pulse Start Metal Halide Fixture</td>
</tr>
</tbody>
</table>

Complete the following table of measures and codes:

#### Measures and Codes

<table>
<thead>
<tr>
<th>Measure Codes</th>
<th>Measure Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCG</td>
<td>LT-12345 E.g. Up to 128 Watt Interior Fixture T5 Linear Fluorescent replacing 101 - 175 Watt Lamp Base Case</td>
</tr>
<tr>
<td>SDG&amp;E</td>
<td>LD123</td>
</tr>
<tr>
<td>SCE</td>
<td></td>
</tr>
<tr>
<td>PG&amp;E</td>
<td></td>
</tr>
</tbody>
</table>

Describe requirements for these measures, including:
- **Eligibility requirements**: Any specific baseline requirements or restrictions that limit measure savings or ability to be reported.
- **Implementation and installation requirements**: Eligibility of certain building types and conditions, climate zones, area types, vintages, etc.
- **Other program restrictions and guidelines**

1.2 Technical Description

Provide a detailed technical description of the measure. The workpaper should be focused on a single technology; if not, consider creating multiple work papers. Provide justification if this measure is considered an Emerging Technology (ET) and ET values are used in Section 1.4.

1.3 Installation Types and Delivery Mechanisms

Indicate the **Installation Type** and **Delivery Mechanism** of the measures and explain why these were selected. See the tables below for more information. Describe the programs that will be using these measures.
Installation Type Descriptions

<table>
<thead>
<tr>
<th>Installation Type</th>
<th>Savings</th>
<th>Life</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1st BL</td>
<td>2nd BL</td>
</tr>
<tr>
<td>Replace on Burnout (ROB)</td>
<td>Above Code or Standard</td>
<td>N/A</td>
</tr>
<tr>
<td>New Construction (NEW/NC)</td>
<td>Above Code or Standard</td>
<td>N/A</td>
</tr>
<tr>
<td>Retrofit or Early Replacement (RET/ER)</td>
<td>Above Customer Existing</td>
<td>Above Code or Standard</td>
</tr>
<tr>
<td>Retrofit First Baseline Only (REF)</td>
<td>Above Customer Existing</td>
<td>N/A</td>
</tr>
<tr>
<td>Retrofit Add-on (REA)</td>
<td>Above Customer Existing</td>
<td>N/A</td>
</tr>
</tbody>
</table>

A delivery mechanism is a delivery method paired with an incentive method. Delivery mechanisms are used by programs to obtain program participation and energy savings.

Delivery Method Descriptions

<table>
<thead>
<tr>
<th>Delivery Method</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appliance Turn-in and Recycling</td>
<td>The program motivates customers, through financial incentives, to recycle appliances that are functional but inefficient. This prevents the continued use of those appliances, by both the current owner and potential future owners.</td>
</tr>
<tr>
<td>Audit/Information/Testing Services</td>
<td>The program performs a free assessment of a customer’s facility and provides the customer with information and guidance on energy efficiency opportunities.</td>
</tr>
<tr>
<td>Commissioning and Retrocommissioning</td>
<td>The program modifies or repairs existing equipment to ensure that it works as intended.</td>
</tr>
<tr>
<td>Financial Support</td>
<td>The program motivates customers, through financial incentives such as rebates or low interest loans, to implement energy efficient measures or projects.</td>
</tr>
<tr>
<td>Innovative Design</td>
<td>The program funds new ideas that meet reasonable scientific scrutiny for potential energy savings. These innovative measures typically have small market penetration (less than 5%) or are targeted toward relatively unreached market segments.</td>
</tr>
<tr>
<td>New Construction</td>
<td>The program offers financial incentives and/or design assistance to customers involved with new building construction. This is intended to motivate customers to exceed Title 24 building energy efficiency requirements (residential or nonresidential).</td>
</tr>
<tr>
<td>Partnership</td>
<td>The program implements projects through a partnership between the utility and an institutional, government, or community-based organization.</td>
</tr>
<tr>
<td>Performance Based</td>
<td>The program offers financial incentives that vary based on the energy efficiency performance of specific projects.</td>
</tr>
<tr>
<td>Up-Stream Programs</td>
<td>See Up-Stream Incentive and Up-Stream Buy Down in the Incentive Method table.</td>
</tr>
</tbody>
</table>
Incentive Method Descriptions

<table>
<thead>
<tr>
<th>Incentive Method</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct Install</td>
<td>The program implements energy efficiency measures for qualifying customers, at no cost to the customer.</td>
</tr>
<tr>
<td>Down-Stream Incentive</td>
<td>The customer installs qualifying energy efficient equipment and submits an incentive application to the utility program. Upon application approval, the utility program pays an incentive to the customer. Such an incentive may be deemed or customized.</td>
</tr>
<tr>
<td>Mid-Stream Incentive</td>
<td>The program gives a financial incentive to a midstream market actor, such as a retailer or contractor, to encourage the promotion of efficient measures. The incentive may or may not be passed on to the end-use customer.</td>
</tr>
<tr>
<td>Up-Stream Incentive</td>
<td>The program gives a financial incentive to an upstream market actor, such as a manufacturer or distributor, to encourage the manufacture, provision, or distribution of an efficient measure. The incentive may or may not be passed on to the end-use customer.</td>
</tr>
<tr>
<td>Up-Stream Buy Down</td>
<td>The program gives a financial incentive to an upstream market actor, such as a manufacturer or distributor, with specific requirements to pass down the incentive to the end use customer. Such an incentive buys-down the cost of an efficient measure for the end-use customer by at least the amount of the financial incentive.</td>
</tr>
<tr>
<td>Giveaway</td>
<td>The program provides customers with energy efficiency equipment or services for free.</td>
</tr>
<tr>
<td>Exchange/Replacement</td>
<td>The utility program holds events where customers can trade functional equipment for similar but more energy efficient equipment, free of charge.</td>
</tr>
<tr>
<td>On-Bill Finance/Loan</td>
<td>The program offers financing for the cost efficient measures as part of the utility bill. This can be an add-on option to an existing program or can serve as an organizing principle for its own program.</td>
</tr>
</tbody>
</table>

1.4 Measure Parameters

1.4.1 DEER Data

If any of the measures in this work paper are not directly from the Database of Energy Efficient Resources (DEER), explain why DEER measures were not used and how the work paper methodology differs from DEER methodology. Complete the summary table below.

DEER Difference Summary

<table>
<thead>
<tr>
<th>DEER Item</th>
<th>Used for Workpaper?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modified DEER methodology</td>
<td>Yes or No</td>
</tr>
<tr>
<td>Scaled DEER measure</td>
<td>Yes or No</td>
</tr>
<tr>
<td>DEER Base Case</td>
<td>Yes or No</td>
</tr>
<tr>
<td>DEER Measure Case</td>
<td>Yes or No</td>
</tr>
<tr>
<td>DEER Building Types</td>
<td>Yes or No</td>
</tr>
<tr>
<td>DEER Operating Hours</td>
<td>Yes or No</td>
</tr>
<tr>
<td>DEER eQUEST Prototypes</td>
<td>Yes or No</td>
</tr>
<tr>
<td>DEER Version</td>
<td>DEER 2015, READI v2.2.0</td>
</tr>
<tr>
<td>Reason for Deviation from DEER</td>
<td>E.g. DEER assumes different operating hours; DEER does not contain this type of measure.</td>
</tr>
<tr>
<td>DEER Measure IDs Used</td>
<td>E.g. R-Out-CFLscw-Ext(100)-dWP184, R-Out-CFLscw-Ext(150)-dWP276</td>
</tr>
</tbody>
</table>
Net-to-Gross Ratio

The Net-to-Gross (NTG) Ratio is used to estimate and describe free-ridership. Choose the appropriate NTG values from READI. Provide justification for hard-to-reach (HTR) and ET values, and describe how they relate to studies or program terms and conditions.

The NTG values were obtained using the DEER READI tool. The relevant NTG values for the measures in this work paper are in the table below.

<table>
<thead>
<tr>
<th>NTGR ID</th>
<th>Description</th>
<th>Sector</th>
<th>BldgType</th>
<th>Measure Delivery</th>
<th>NTGR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Res-Default&gt;2</td>
<td>All other EEM with no evaluated NTGR; existing EEM with same delivery mechanism for more than 2 years</td>
<td>Res</td>
<td>Any</td>
<td>Any</td>
<td>0.55</td>
</tr>
<tr>
<td>Com-Default&gt;2 yrs</td>
<td>All other EEMs with no evaluated NTGR; existing EEM in programs with same delivery mechanism for more than 2 years</td>
<td>Com</td>
<td>Any</td>
<td>Any</td>
<td>0.6</td>
</tr>
</tbody>
</table>

If applicable, keep this note: Note: Direct install measures that are not hard-to-reach will use the default NTG value.

Spillage Rate

Spillage rates are not tracked in workpapers; they are tracked in an external document which will be supplied to the Commission Staff.

Installation Rate

The Installation Rate (IR) addresses the percentage of units that are claimed but not installed. Choose the appropriate IR values from READI. Most measure will use a default IR of 1. If there is a GSIA ID ending in “-All,” use it instead of an IOU-specific GSIA ID.

The IR values were obtained using the DEER READI tool. The relevant IR values for the measures in this work paper are in the table below.

<table>
<thead>
<tr>
<th>GSIA ID</th>
<th>Description</th>
<th>Sector</th>
<th>BldgType</th>
<th>ProgDelivID</th>
<th>GSIAValue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Def-GSIA</td>
<td>Default GSIA values</td>
<td>Any</td>
<td>Any</td>
<td>Any</td>
<td>1</td>
</tr>
</tbody>
</table>

Effective and Remaining Useful Life

The EUL is an estimate of the median number of years that an installed measure will remain in place and is operational. When determining the EUL, consider non-technical factors such as long-term persistence. For example, a 20% removal rate of products after year 1 but before the end of the products’ technical life will result in a reduced EUL. Specify the source of the EUL information (DEER, study, engineering judgment, etc.). If the EUL is calculated based on operating hours (usually only for lighting), show the calculation equation. If fields are not applicable, indicate “N/A.”

The EUL and RUL values were obtained using the DEER READI tool. DEER defines the RUL as 1/3 of the EUL value. The RUL value is only applicable to the first baseline period for an RET.
measure with an applicable code baseline. The relevant EUL and RUL values for the measures in this work paper are in the table below.

<table>
<thead>
<tr>
<th>EUL ID</th>
<th>Description</th>
<th>Sector</th>
<th>Use Category</th>
<th>EUL (Years)</th>
<th>RUL (Years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HVAC-airAC</td>
<td>Air Conditioners (air-cooled, split and unitary)</td>
<td>Com</td>
<td>HVAC</td>
<td>15</td>
<td>5</td>
</tr>
</tbody>
</table>

1.4.2 Codes and Standards Analysis

Indicate any relevant federal, state, regional, or other codes. Describe the impacts of those codes and provide references and the specific language from those documents. Commonly referenced sources include:

- California’s Title 24 Building Energy Efficiency Standards
- California’s Title 20 Appliance Efficiency Program Codes
- Title 10 of Electronic Code of Federal Regulations
- Air Quality Management District
- U.S. Environmental Protection Agency
- Water Resources Board

Complete the following summary table:

**Code Summary**

<table>
<thead>
<tr>
<th>Code</th>
<th>Reference</th>
<th>Effective Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Title 24 (2013)</td>
<td>Section 141.0(b)2ll Lighting System Alterations, 141.0(b)2ll Luminaire Modifications-in-Place</td>
<td>July 1, 2014</td>
</tr>
<tr>
<td>Title 20 (2014)</td>
<td>Section 1605.1(n) Luminares and Torchières</td>
<td>July 1, 2014</td>
</tr>
<tr>
<td>DOE</td>
<td>TBD</td>
<td>TBD</td>
</tr>
</tbody>
</table>

1.5 EM&V, Market Potential, and Other Studies – Base Case and Measure Case Information

Summarize relevant studies that have been reviewed for this workpaper and may influence measure development or implementation, even if they do not affect work paper calculations. Ask EM&V and SRE groups to recommend appropriate reports. Commonly used sources include:

- Evaluation, measurement, and verification studies
- Impact and market studies
- Emerging Technologies reports
- Codes and Standards reports
- Technical evaluations and demonstrations

Although studies within California may be the most applicable, do not limit the scope to only California, in particular for measures that are not weather sensitive.

For each study that has influenced this workpaper, create a new subsection based on 1.5.1, and provide the requested information.
1.5.1 Study Title #1

Provide:
- Type, author, and completion date of study
- Time frame and market covered
- Techniques used (modeling, surveys, monitoring, etc.)
- Relevance to and impacts on this work paper
- Any concerns about the quality of the survey techniques, number of respondents, etc.

1.6 Data Quality and Future Data Needs

Comment on:
- The quality of currently available data
- Any additional data that need to be gathered to support this workpaper, and how it may impact the work paper. New measures may require data collection through implementation or other longer-term studies, and products may start out as low impact but move to high impact later on.
- A timeline for future data collection and work paper revisions
- Whether the data may become out of date at a certain time, e.g. costs due to changing market

Section 2. Calculation Methodology

Provide a clear, detailed, all-inclusive, and defensible explanation of the energy savings and demand reduction calculation methodology, for electricity and/or gas. Explain all assumptions and provide sample calculations. The methodology must meet current industry standards for accuracy and acceptability. Reference relevant DEER, EM&V, CPUC, and other sources used to inform the methodology. Supporting attachments should be embedded or referenced in the Attachments and References sections. For RET/ER measures with applicable code, provide savings calculations for both baseline periods. Provide documentation for any industry standard practices used as baselines.

If any measures are taken directly from or created with READI, either embed the READI export or indicate the DEER Measure ID in the table below. If READI is not used, delete the following sentence and the “READI Data Used” table.

The following table indicates which measures are taken directly from or created with the DEER READI tool.

<table>
<thead>
<tr>
<th>Measure Code</th>
<th>Measure Name</th>
<th>README Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>LT-11111, LD123</td>
<td>13 Watt CFL</td>
<td>Embedded File or ID</td>
</tr>
<tr>
<td>LT-11112, LD124</td>
<td>18 Watt CFL</td>
<td>Embedded File or ID</td>
</tr>
</tbody>
</table>
Demand reduction estimates must consider the DEER peak demand period, which is 2:00 PM to 5:00 PM during specific weekday periods and varies by climate zone:

<table>
<thead>
<tr>
<th>Climate Zone</th>
<th>3-Weekday Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Sep 16 – Sep 18</td>
</tr>
<tr>
<td>2</td>
<td>July 8 – July 10</td>
</tr>
<tr>
<td>3</td>
<td>July 8 – July 10</td>
</tr>
<tr>
<td>4</td>
<td>Sep 1 – Sep 3</td>
</tr>
<tr>
<td>5</td>
<td>Sep 8 – Sep 10</td>
</tr>
<tr>
<td>6</td>
<td>Sep 1 – Sep 3</td>
</tr>
<tr>
<td>7</td>
<td>Sep 1 – Sep 3</td>
</tr>
<tr>
<td>8</td>
<td>Sep 1 – Sep 3</td>
</tr>
<tr>
<td>9</td>
<td>Sep 1 – Sep 3</td>
</tr>
<tr>
<td>10</td>
<td>July 8 – July 10</td>
</tr>
<tr>
<td>11</td>
<td>July 8 – July 10</td>
</tr>
<tr>
<td>12</td>
<td>July 8 – July 10</td>
</tr>
<tr>
<td>13</td>
<td>July 8 – July 10</td>
</tr>
<tr>
<td>14</td>
<td>Aug 26 – Aug 28</td>
</tr>
<tr>
<td>15</td>
<td>Aug 25 – Aug 27</td>
</tr>
<tr>
<td>16</td>
<td>July 8 – July 10</td>
</tr>
</tbody>
</table>

Section 3. Load Shapes

Load shapes are used for portfolio lifecycle cost analysis. A load shape indicates the distribution of a measure’s energy savings over one year. A load shape is a set of fractions summing to unity, with one fraction per hour (or other time period). Multiplying a savings value by the load shape value for any particular hour yields the energy savings for that particular hour.

If possible, use DEER load shapes, which are hourly. PAs also have Time-of-Use (TOU) load shapes which split a year into five or six broad time periods; they are defined by utility tariffs. PAs may have Load Shape Viewers which can be used to determine the appropriate load shape. Note: for SCE the “Occupancy” load shape is not in the Shape Viewer but is an acceptable load shape.

The ideal load shape for net benefits estimates would represent the difference between the base case and measure case. The closest load shapes that are applicable to the measures in this work paper are listed in the table below.

<table>
<thead>
<tr>
<th>Building Type</th>
<th>Load Shape</th>
<th>E3 Alternate Building Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Restaurant – Fast Food</td>
<td>DEER:Indoor_Non-CFL_Ltg</td>
<td>NON_RES</td>
</tr>
<tr>
<td>Office – Small</td>
<td>DEER:Indoor_Non-CFL_Ltg</td>
<td>NON_RES</td>
</tr>
</tbody>
</table>
Section 4. Costs

If possible, use values and methodologies from the 2010-2012 W0017 Ex Ante Measure Cost Study Final Report. Other sources for cost include:

- Cost studies by PAs or the CPUC
- Program and invoice data from PAs and their vendors
- Online retailers and point-of-sale data
- Wholesale costs supplemented by bulk purchase discounts, contractor mark-ups, warranties, and other factors that determine the retail price
- Construction estimation resources such as RS Means
- DOE or Title 24 rulemaking support documents

Describe the references and methodology used to develop the base and measure case costs. Costs should be broken down into material and labor. Indicate any incremental maintenance costs such as water consumption or reduced replacement.

4.1 Base Case Cost

Determine base case cost using the methodology above.

4.2 Measure Case Cost

Determine measure case cost using the methodology above.

4.3 Full and Incremental Measure Cost

Full and Incremental Measure Cost Equations

<table>
<thead>
<tr>
<th>Installation Type</th>
<th>Incremental Measure Cost</th>
<th>Full Measure Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1st Baseline</td>
</tr>
<tr>
<td>ROB</td>
<td>(MEC + MLC) – (BEC + BLC)</td>
<td>(MEC + MLC) – (BEC + BLC)</td>
</tr>
<tr>
<td>NEW/NC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RET/ER</td>
<td>(MEC + MLC) – (BEC + BLC)</td>
<td>MEC + MLC</td>
</tr>
<tr>
<td>REF</td>
<td>(MEC + MLC) – (BEC + BLC)</td>
<td>MEC + MLC</td>
</tr>
<tr>
<td>REA</td>
<td>MEC + MLC</td>
<td>MEC + MLC</td>
</tr>
</tbody>
</table>

MEC = Measure Equipment Cost; MLC = Measure Labor Cost
BEC = Base Case Equipment Cost; BLC = Base Case Labor Cost

Calculate FMC and IMC and insert into the table below.

Full and Incremental Costs

<table>
<thead>
<tr>
<th>Installation Type</th>
<th>Incremental Measure Cost</th>
<th>Full Measure Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1st Baseline</td>
</tr>
<tr>
<td>ROB</td>
<td>$100</td>
<td>$100</td>
</tr>
<tr>
<td>RET</td>
<td>$100</td>
<td>$500</td>
</tr>
</tbody>
</table>

PG&E Resource Savings Rulebook
Version 0.99cVersion 0.99cVersion 0.99b
Appendix D – Statewide Workpaper Template 129 of 131
Attachments

Attachments can be embedded here (using Word's Insert > Object function) or maintained separately. Attachments can include cost effectiveness data, calculation spreadsheets, specifications, studies, data sets, etc. **Do not attach confidential or customer information.** Create references for files maintained separately and note that they are available upon request.

References

Provide full citations for all references. References should be linked through endnotes to show how the references support specific workpaper content: