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2019 Custom Industrial, Agricultural, and Commercial (CIAC) Impact Evaluation

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List of Acronyms and Abbreviations

Acronym/ Abbreviation	Description	
AB802	Assembly Bill 802	*
ABAL	annual budget advice letter	
ALCS	advanced lighting control system	
AOE	add-on equipment	*
AR	accelerated replacement	*
ASHRAE	American Society of Heating and Refrigeration Engineers	
BRO	behavioral, retrocommissioning and operational	*
C&S	codes and standards	*
CATI	computer-assisted telephone interview	
CCA	community choice aggregator	
CEC	California Energy Commission	*
CEDARS	California Energy Data and Reporting System	*
CET	cost-effectiveness tool	*
CIAC	Custom Industrial, Agricultural, and Commercial	
CPR	Custom Project Review	
CPUC	California Public Utilities Commission	*
DAC	disadvantaged community	
DDR	due diligence review	*
DEER	Database of Energy Efficiency Resources	*
DER	distributed energy resources	
EM&V	evaluation, measurement, and verification	*
ER	early replacement, now called accelerated replacement (AR)	
ESPI	Efficiency Savings and Performance Incentive	
EUL	effective useful life	*
GRR	gross realization rate	*
HOPPs	high opportunity program and projects	
HTR	hard-to-reach	
HVAC	heating, ventilation, and air-conditioning	
IDSM	integrated demand-side management	
IIS	indirect influence score	
IMC	incremental measure cost	
IOU	investor-owned utility	*
ISP	industry standard practice	
kW	kilowatt	
kWh	kilowatt-hour	
NMEC	Normalized Metered Energy Consumption	
NR	normal replacement	

Acronym/ Abbreviation	Description	
NRNC	Non-Residential New Construction (Savings By Design)	
NTGR	net-to-gross ratio	*
OBF	on-bill finance	
PA	program administrator	*
PAC	program administrator cost	
PAI	program attribution indicator	
PG&E	Pacific Gas and Electric	
POE	preponderance of evidence	
QA	quality assurance	
QC	quality control	
READI	Remote Ex Ante Database Interface	*
REN	Regional Energy Network	*
ROB	replace on burnout	
ROBNC	replace on burnout, new construction	
RUL	remaining useful life	*
SBD	Savings By Design	*
SCE	Southern California Edison	
SCG	Southern California Gas Company (SoCalGas)	
SDG&E	San Diego Gas and Electric Company	
SRA	self-report approach	
TDV	time-dependent value of energy	*
TRC	total resource cost	
ZNE	Zero Net Energy	*

* See Glossary of Terms on page 205 for a detailed explanation.

Executive Summary

In this report, we—the SBW team—describe how we evaluated the 2019 impacts of custom industrial, agricultural, and commercial (CIAC) energy-efficiency[1] programs in California. We independently determined how much energy was saved and how much electric demand was reduced by the custom programs offered by the five program administrators (PA)[2] that had custom project claims in 2019.

Objectives

The objectives of this evaluation were:

- **Gross Savings**. Estimate first year and life-cycle gross kWh, kW, and therm savings for the custom-project portfolio, excluding the portion attributable to the Industrial SEM program, which is covered under a separate workplan.
- **Net Savings**. Estimate a net-to-gross ratio, or the portion of gross energy savings that are a direct result of ratepayer-funded efficiency programs, which can be used to calculate the net savings attributable to custom projects within each domain.
- **Cost Effectiveness Data Collection**. Collect data on incremental cost, effective and remaining useful life, and load shape (gas and electric) needed to estimate the cost effectiveness of the PA portfolios. The CPUC will need to combine impact evaluation data from deemed-measure programs—that is, programs that use pre-determined, standardized measure savings estimates--and custom-measure programs to estimate the cost effectiveness of PA portfolios.
- **Reproducible Results**. Document all our primary data-collection efforts, modelling, and data-processing procedures to ensure that our results are transparent and can be reproduced by other parties.
- **Recommendations**. Develop actionable recommendations for improving the PA savings claims for future custom projects and future evaluation methods.

Methodology

For each PA and fuel type (electric or gas), we selected random samples to provide separate estimates of gross and net first-year and life-cycle savings for important domains of study. Net savings are energy savings that direct result from PA energy efficiency programs. Gross savings are the net savings, plus additional savings that would have occurred even without the efficiency

[1] *Custom* refers to programs that offer efficiency projects tailored to each customer site, as opposed to highly standardized, or *deemed* programs.

[2] The five PAs are MCE, Pacific Gas & Electric, Southern California Edison, Southern California Gas, and San Diego Gas & Electric.

programs. These groupings included projects subject to custom-project review (CPR) by CPUC staff, as well as these project types: billing analysis (IPMVP Option C), new construction (including Savings By Design) and direct-install lighting. We used the PA's claimed savings for each project to optimize our selection within each grouping and thereby achieve the most precise estimate possible within the resources of this evaluation.

We evaluated gross savings for 235 unique sampled projects by first gathering a full record of what the programs did from project files and supplemental information requests. The first step for each was to determine if the project had followed the policy directions provided by the CPUC and the statewide custom program participation requirements. Those that violated the rules were declared ineligible and given evaluated savings of zero. Individual IOU program rules were not assessed due to resource constraints but should be in future evaluations.

For eligible projects, we carefully reviewed this record of the methodology, data, and analysis underpinning the efficiency savings claimed for each project. From that, we developed and executed a measurement-and-verification plan for each project that detailed the appropriate approach for collecting data, including interviews, on-site inspections and measurements of affected equipment, and other sources. The COVID 19 pandemic made on-site data collection particularly difficult, necessitating virtual visits and other alternative means of collecting data to verify measures were installed and operating as expected. This additional information, gathered long after the PAs completed the project, gave us a clear idea of how projects are performing. We also collected data on incremental cost, effective and remaining useful life, and fuel load shape. These values can support future estimates of the cost effectiveness of the PA portfolios.

To determine the net savings attributable to the PA programs, we estimated a net-to-gross ratio (NTGR) for 228 unique sampled projects. This ratio is simply the net savings, as defined earlier, divided by the gross savings.

Taking these values together, this ratio represents the portion of the gross savings caused by the program. Our approach drew upon CPUC-approved methods for non-residential programs in use since 2006 in California and at least four other states. These methods rely on multiple information sources to help us understand how the program influenced a customer's decision to take an energy efficient action that it otherwise would not have in absent of the program. Sources included carefully structured telephone interviews with key decision makers, as well as documentation and databases submitted by the PAs. The interview script contained NTGR questions identical to those used in the corresponding 2013-15 CIAC evaluations.

Once we completed work on the gross and net samples, we extrapolated the results to estimate gross savings, NTGR, and other factors for the groups of projects defined by the sample design. Ultimately, we used the sample to estimate gross and net savings for each PA and statewide.

Findings

Gross Savings

Lower evaluated savings. We found substantial differences between our estimates of life-cycle gross savings and those claimed by the PAs. Table 1 shows the gross realization rates (GRR), that is, the ratio of evaluated gross savings to PA claimed gross savings. The evaluation determined realized savings of 47%[3] of the electric savings claimed by the PAs, statewide. The table also shows results by PA. For electric savings, realized gross savings percentages ranged from 41% for SDG&E to 78% for MCE. The corresponding first-year gross savings values in Table 2 show similar, though slightly higher, results because the EUL adjustments made by the evaluation team are not reflected in the first-year savings.

For gas, our evaluation determined realized savings of 40% of the life-cycle savings claimed, statewide, by the PAs, as shown in Table 3. Across PAs, evaluated gross savings as a percent of claimed savings ranged from 14% for SCG to 52% for SDG&E. As with the electric savings, the corresponding first-year gas savings values in Table 4 are slightly higher than the life-cycle savings because the EUL adjustments made by the evaluation team are not reflected in the first-year savings.

Reasons our savings differed. The most prevalent reasons that our savings estimates differed from PA claims are listed in descending order of frequency below. One significant reason for major differences was ineligible measures being assigned zero savings. We encountered some COVID-related disruptions, including several projects where the pandemic caused the facility to shut down and go out of business. In many cases, though, the pandemic's effect on savings was small.

1. **Calculation methods.** We applied a more reliable way to estimate savings, or corrected errors in the calculation algorithms, based on standard or common calculations practices.
2. **Operating conditions.** Based on our data collection, we determined different actual operating hours, production levels, or other conditions.
3. **Baseline specification.** When appropriate, we specified a more appropriate baseline, depending on the measure application type and applicable codes or standard practice.
4. **Ineligible measure.** We determined eligibility based primarily on CPUC policies/rules and statewide custom program participation rules.
5. **Other reasons.** We applied adjustments unique to the project, which didn't fall in the defined list of reasons.

Net Savings

Lower evaluated savings. We found less program influence on customers' decisions to implement efficiency improvements than PAs claimed. The PAs based their net claims on

[3] That is, the gross realization rate (GRR), which is the ratio of evaluated savings to claimed savings.

CPUC-approved default values in the statewide Database of Energy Efficiency Resources (DEER). Those values ranged from 0.59 to 0.89 at the PA level. Evaluated NTGRs, based on our surveys with decision makers in the organizations that implemented custom projects, ranged from 0.40 to 0.51. Applying these program-influence findings—that is, the NTGR values—to our gross-savings findings yielded net savings.

Table 1 presents evaluated life-cycle net savings for each PA and statewide. The evaluation-estimated actual net savings is 47% of evaluated gross electric savings. These percentages ranged from 40% for MCE to 51% for SCE. The corresponding first-year net savings values shown in Table 2 are similar.

For gas savings, our evaluation found 48% actual net savings of the statewide life-cycle gross savings, as shown in Table 3. Results for the PAs varied, ranging from 44% for SCG to 51% for SDG&E. As with the electric savings, the corresponding first-year gas savings values in Table 4 show similar results.

Table 1: Life-Cycle Gross and Net Electric Savings, by PA and Statewide

PA	Life-Cycle Electric Savings				
	Forecast (MWh)	Gross Evaluated (MWh)	GRR	Net Evaluated (MWh)	NTGR
MCE	5,467	4,274	0.78	1,705	0.40
PG&E	1,646,957	782,703	0.48	358,349	0.46
SCE	410,565	194,323	0.47	99,304	0.51
SDG&E	124,397	51,053	0.41	24,866	0.49
Statewide	**2,187,387**	**1,032,354**	**0.47**	**484,224**	**0.47**

Table 2: First-Year Gross and Net Electric Savings, by PA and Statewide

PA	First-Year Electric Savings				
	Forecast (MWh)	Gross Evaluated (MWh)	GRR	Net Evaluated (MWh)	NTGR
MCE	1,145	853	0.74	342	0.40
PG&E	143,148	75,664	0.53	34,091	0.45
SCE	51,513	27,555	0.53	14,237	0.52
SDG&E	13,645	6,960	0.51	3,211	0.46
Statewide	**209,451**	**111,031**	**0.53**	**51,880**	**0.47**

Table 3: Life-Cycle Gross and Net Gas Savings, by PA and Statewide

PA	Life-Cycle Gas Savings				
	Forecast (Therm)	Gross Evaluated (Therm)	GRR	Net Evaluated (Therm)	NTGR
PG&E	35,844,513	16,379,244	0.46	7,807,045	0.48
SCG	8,645,567	1,192,599	0.14	521,803	0.44
SDG&E	2,792,407	1,453,342	0.52	735,236	0.51
Statewide	**47,282,487**	**19,025,185**	**0.40**	**9,064,084**	**0.48**

Table 4: First-Year Gross and Net Gas Savings, by PA and Statewide

PA	First-Year Gas Savings				
	Forecast (Therm)	Gross Evaluated (Therm)	GRR	Net Evaluated (Therm)	NTGR
PG&E	2,705,548	2,198,136	0.81	1,011,051	0.46
SCG	677,763	142,886	0.21	62,517	0.44
SDG&E	418,725	219,086	0.52	103,598	0.47
Statewide	**3,802,036**	**2,560,108**	**0.67**	**1,177,167**	**0.46**

Effective Useful Life (EUL)

Impacts of inaccurate lifetime estimates. The PAs assigned what they believe to be the most appropriate EULs from DEER to each claim, considering project-specific conditions. These values represent the typical number of years over which the program measures are expected to yield savings and can range from 3 to 20 years.

Our detailed project reviews found that claimed EULs were often too high. One common error was for add-on equipment measures that assigned an EUL for the underlying equipment, such as an HVAC unit, rather than the lesser value for the actual measure equipment or RUL of the underlying equipment. Another common error for claims with multiple measures that had different EULs, was that the PA selected the highest EUL measure, rather than using a savings weighted average of the different measures based on their savings contribution. Our corrections for each PA and fuel type ranged from -0.8% to -48.3% (reduced by 48.3%) of the claim EUL. The higher range of these adjustments significantly reduced both gross and net life-cycle savings, and partially explain the previously discussed downward adjustments of evaluated savings compared to the PA savings claims.

Comparison to Previous Evaluation Findings

The CPUC has commissioned impact evaluations of custom projects covering claims for 2015 and 2018, though the draft evaluation of 2018 custom programs was not ultimately finalized due to methodological issues with the study. Table 5 compares the 2019 estimates of GRR and NTGR with those for these past years. The two major methodological differences between the 2019 and the 2018 draft evaluations are that (1) the 2018 draft evaluation included gross savings for all ineligible claims, while in 2019, such claims were set to zero, and (2) the 2018 draft evaluation used a different net survey battery that was not fully vetted, while in 2019, we applied the same net survey battery from 2015.

Overall, the GRRs and NTGRs fluctuated between the evaluated years. Notable differences between the 2019 results and the draft 2018 evaluation include:

- Lower 2019 GRRs generally because of the large number of ineligible claims set to zero.
- Higher 2019 GRR for MCE from improved baseline specification.
- Higher 2019 therm GRR for SDG&E from better quality Savings By Design savings claims.

Table 5: Comparison of 2019, 2018, and 2015 Life-Cycle GRR and NTGR

		2019 Evaluation		2018 Evaluation		2015 Evaluation	
PA	Ratio	kWh	Therm	kWh	Therm	kWh	Therm
MCE	GRR	0.78	NA	0.28	NA		
	NTGR	0.40	NA	0.38	NA		
PG&E	GRR	0.48	0.46	0.80	0.74	0.52	0.52
	NTGR	0.46	0.48	0.59	0.49	0.53	0.53
SCE	GRR	0.47	NA	0.69	NA	0.46	0.46
	NTGR	0.51	NA	0.55	NA	0.57	0.57
SCG	GRR	NA	0.14	NA	0.45	NA	0.56
	NTGR	NA	0.44	NA	0.45	NA	0.57
SDG&E	GRR	0.41	0.52	0.53	0.16	0.52	0.52
	NTGR	0.51	0.53	0.33	0.46	0.50	0.50
Statewide	**GRR**	**0.47**	**0.40**	**0.74**	**0.54**	**0.50**	**0.54**
	NTGR	**0.47**	**0.48**	**0.57**	**0.46**	**0.54**	**0.54**

Recommendations

We base our recommendations on data quality and analysis issues that we observed during this evaluation. Some apply to all projects, while others apply only to retrofit or new-construction projects. Implementing them will not only improve the accuracy of program-savings claims, but also enhance future evaluators' ability to verify those claims expeditiously. Unless otherwise

noted, PAs should be responsible for carrying out these recommendations. In summary, our most important recommendations are:

Overall

1. **Ensure that claim documentation is complete, consistent, and accurate.** Provide detailed information about the customer and the measures, and how the latter save energy.
2. **PA support of evaluation recruitment** by actively helping recruit customers sampled for evaluations. PAs should contact and remind participants that they are obligated to participate. This will increase the response rates encountered during this evaluation.
3. **Use correct estimates of measure life.** PAs should ensure that EULs, particularly for add-on equipment (AOE) or behavioral, retro-commissioning, or operational (BRO) measures, are assigned appropriately.
4. **Improve documentation of program influence** by developing guidance documents to support the development of program influence narratives and documentation. Share these documents with program implementers and project developers.
5. **Check program guidelines for compliance with CPUC policy**. Programs should be designed to comply with CPUC policies. When approval to deviate from CPUC policy is granted, documentation supporting the approval should be provided.
6. **Avoid submitting custom projects comprised entirely of deemed measures.** Per DEER Resolution E-5152, deemed measures may sometimes be processed through custom programs to simplify the application process for a customer's convenience and to avoid multiple applications. Custom projects that include deemed measures, however, are required to use deemed values for energy savings and where appropriate retain deemed incentive amounts. In all cases where there is not an available deemed incentive amount, it must be documented and supported by evidence the rationale for using the customized program incentive rate in the project documentation files. Whole building and whole system projects (such as NMEC-approved building programs) are excepted from using deemed savings values when processed through custom or calculated platforms.
7. **Submit documentation that matches savings claim**. Final savings calculations and supporting documentation need to be clearly marked so that it is easy to identify documentation, calculation, and sequence of the project development, implementation, and completion.
8. **Clearly identify project approval and installation dates**, so eligibility can be confirmed.
9. **Reduce time between project completion and post-installation review**, which stretched to more than a year in some cases, for no documented reason.
10. **Conduct non-IOU fuel analysis for projects with on-site generation**, per existing CPUC guidance, and clearly document.
11. **Inform CPUC staff promptly when a project selected for evaluation is withdrawn**.

12. **Calculate savings-weighted EUL** for projects with multiple measures within a single claim based on the claimed savings.

Retrofit Projects

1. **Prohibit projects installed in other years.** Allow claims installed in prior years only if measurements had to continue into the current program year for which saving claims are being filed. File savings claims according to the rules and guidance prevailing at the time savings claims are due.
2. **Improve project documentation.** Thoroughly document the characteristics and operating parameters of baseline and installed equipment. These include operating hours, control methods and sequences, efficiencies, interaction with other systems, presence of on-site generation, and the age and condition of existing equipment. Provide functioning versions of calculation models, along with measured data and savings normalizing information.
3. **Do not claim ineligible projects**. Project applications that do not comply with statewide custom program participation rules or PA program rules should be rejected. Also, projects rejected during CPUC staff's custom project review must not be claimed, and do not include savings claims for fuel types not provided by the PA.

Option C Projects[4]

1. **Provide measure type and project life information**. PA documentation should clearly identify the measure application type (MAT) of the sub-measures within the project to assess whether IPMVP methods are appropriate for the project. PAs should also provide a measure savings-weighted EUL for the overall project as directed by the CPUC.
2. **Provide incremental savings claims** for projects with multiple reporting periods. For projects that featured multiple M&V submissions over multiple years, savings claims from one year to the next should be incremental to avoid double-counting savings over the EUL of the project.
3. **Identify and adjust for non-routine events** in Option C projects. Project implementers and developers should screen all projects for non-routine events as part of the model development and make non-routine adjustments as needed.

New Construction Projects

1. **Provide standardized project-documentation packages.** Standardize the submittal packages of Savings By Design projects. They should include as-built plans and other component submittals sufficient to verify inputs to the simulation models. Document measure descriptions, calculations for deriving model inputs from equipment specifications, and relevant building model input and output files.

[4] Option C projects are defined as projects that require IPMVP Option C analysis (pre/post whole building energy use regression analysis) such as for the Normalized Metered Energy Consumption (NMEC) program.

2. **Validate and update modeling software.** To reduce errors, implement a rigorous simulation-model validation and vetting process before approving software for the Savings By Design program. Also, update software to follow Savings By Design baseline guidance and build-in methods for calculating savings weighted EUL.
3. **Improve training and quality control.** Eliminate significant errors by improving procedures. Focus on proper building model inputs, such as window specifications. Training and QC should focus on building inputs for properly defining window (glazing) properties, and completely defining the model when running in noncompliance mode.
4. **Document system sizing calculations.** Provide documentation of simulation-software calculations involving peak-load determination and HVAC-equipment sizing. This should include calculation inputs derived from the building description and the routines used to calculate peak loads and size HVAC equipment. Any projects using design-day simulations should provide input and output files for the sizing runs.
5. **Do not file savings claims based on software with known errors**. Base claims on the best available version of modeling software, avoiding or mitigating previously identified errors.
6. **Introduce methods for estimating savings for variable-refrigerant-flow systems,** by working with software developers to accurately model their performance.
7. **Require submetering for projects not separately metered.** PAs should require submetering of whole building electricity and gas consumption for new buildings receiving Savings By Design whole building incentives and submittal of the submetered data as part of the project documentation package**,** such as for buildings on large campuses.
8. **Improve software training** for those using **Integrated Environmental Solutions Energy Modeling Software (IESVE) for Saving By Design projects.** Review of projects using the IESVE software revealed modeling errors related to application of SBD baseline model guidance. These errors indicate a lack of knowledge about SBD modeling rules within the IESVE user community. PAs should provide additional training and guidance for developing and reviewing IESVE models.

CPUC

1. **CPUC support of evaluation recruitment.** Consider enforcing the authority granted in D.10.04.029 and developing stronger rules to ensure that customers meet their obligation to participate in EM&V studies. Dropping sampled customers from the study and selecting alternate projects often widens the error bound of savings estimates.
2. **Clarify unclear topics in guidance documents.** For all option C project analyses, the CPUC should clarify instructions regarding baseline model goodness-of-fit statistics and uncertainty of fractional savings, as well as provide guidance on peak demand savings methods.
3. **Resolve EUL inconsistencies**. Interior LED fixture measure life values, which are not clearly defined in DEER and/or may conflict with related workpapers, should be resolved.

Comparing our recommendations to those made by the evaluators for the 2013-15 program years, we observed several consistent themes. Each evaluation emphasized the importance of improving project documentation, assigning appropriate measure lives, and correctly applying baselines and calculating savings. While the specifics might vary, these continuing recommendation themes suggest the need for additional efforts and new approaches to improve in these areas.

1 Introduction

In this report, we—the SBW team—describe how we completed the 2019 Custom Industrial, Agricultural, and Commercial (CIAC) Impact Evaluation and the resulting findings. Our goal was to conduct an independent evaluation of the gross and net savings—kilowatt-hour (kWh), kilowatt (kW), and therm—associated with the custom projects reported by program administrators (PA) during 2019. This study continues the history of similar CPUC-mandated evaluations of custom projects that began with the 2006-08 program cycle.

1.1 Objectives

The objectives of this evaluation were as follows:

- **Gross Savings**. Estimate first year and life-cycle gross kWh, kW, and therm savings for the custom-project portfolio, excluding the portion attributable to the Industrial SEM program, which is covered under a separate workplan. Estimate savings for sample domains, as described in section 2.
- **Net Savings**. Estimate a net-to-gross ratio that can be multiplied by gross savings to calculate the net savings attributable to custom projects within each domain.
- **Cost Effectiveness Data Collection**. Collect data on incremental cost, effective useful life/remaining useful life, and load shape (gas and electric) needed to estimate the cost effectiveness of the PA portfolios. The CPUC would need to combine data from deemed and custom-measure impact evaluations to estimate the cost effectiveness of PA portfolios.
- **Reproducible Results**. Document all our primary data-collection efforts, modelling, and data-processing procedures to ensure that our results are transparent and can be reproduced by other parties.
- **Recommendations**. Develop actionable recommendations designed to improve the PA savings claims for future custom projects and to improve future evaluation methods.

1.2 CPUC Policies and Guidance

When designing and implementing our evaluation, we considered the following CPUC policies and guidance. Our evaluation considered the policy and guidance documents, as well as any codes and regulations that were in effect at the time of project approval.

- *CPUC Energy Efficiency Policy and Procedures Manual* (v. 6) [5]

[5] CPUC. 2020. *Energy Efficiency Policy Manual Version 6 Applicable to Post-2018 Programs.* San Francisco, CA: https://www.cpuc.ca.gov/-/media/cpuc-website/files/legacyfiles/e/6442465683-eepolicymanualrevised-march-20-2020-b.pdf

- *Statewide Custom Project Guidance Document v. 1.0*[6]
- *Utility Statewide Custom Policy and Procedures Manual*[7]
- *Statewide Savings By Design Participant Handbook*[8]
- Savings By Design Baseline Guidance Document[9]
- PA-specific policy and procedures manuals[10]
- Energy Efficiency Industry Standard Practice (ISP) Guidance v. 2.0[11]
- Assigned Commissioner and ALJ Ruling Regarding High Opportunity Energy Efficiency Programs or Projects[12]
- ALJ Ruling on Certain Measurement and Verification Issues, including for Third Party Programs[13]
- Site-Level NMEC Technical Guidance v. 1.0[14]
- NMEC Rulebook v. 1.0[15]
- Industry standard-practice (ISP) studies completed before or in 2019 as applicable
- Title 20[16] and 24[17] requirements in place when projects were permitted
- CPUC policy papers and state-government memos addressing topics such as the EUL/RUL preponderance-of-evidence requirements[18] and non-IOU fuel sources[19]

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6 PG&E, SCE, SoCalGas, SDGE 2019. Statewide Custom Program Guidance Document ver. 1.0. https://www.cpuc.ca.gov/General.aspx?id=4133

7 PG&E, SCE, SoCalGas, SDG&E. 2019. *2019 Statewide Customized Offering Procedures Manual for Business.* San Francisco, CA. https://www.pge.com/pge_global/common/pdfs/save-energy-money/facility-improvements/custom-retrofit/Customized-Policy-Procedure-Manual.pdf

8 PG&E, SCE, SoCalGas, SDGE. 2019. Statewide Savings By Design Participant Handbook. https://www.sdge.com/sites/default/files/documents/2019%20SBD%20Handbook.pdf

9 SCE 2019. Savings by Design Baseline Guidance Document 2019.

10 SCE. 2019. *Customized Calculated Savings Guidelines for Non Residential Programs Version 23.0.*

11 CPUC and PG&E 2019. Energy Efficiency Industry Standard Practice (ISP) Guidance v. 2.0. https://pda.energydataweb.com/api/downloads/2134/ISP%20guidance%20update_draft_Feb%2022%202019.docx

12 CPUC. Assigned Commissioner and Administrative Law Judge's Ruling Regarding High Opportunity Energy Efficiency Programs or Projects, 30 December 2015.

13 CPUC. 2019 ALJ Ruling on Certain Measurement and Verification Issues, including for Third Party Programs. January 31 2019.

14 LBNL. 2018. Site Level NMEC Technical Guidance v.1.0.

15 CPUC. 2018. NMEC Rulebook ver 1.0

16 California Energy Commission. n.d. *California Code of Regulations Title 20, Division 2.* Accessed June 2019.

17 California Energy Commission. n.d. *Title 24 Online Resource Center.* Accessed June 2019. https://www.energy.ca.gov/title24/orc/.

18 CPUC. 2014. "Early Retirement Using Preponderance ." *Early Retirement Using Preponderance* . July 16. Accessed January 21, 2019. http://www.cpuc.ca.gov/General.aspx?id=4133.

19 CPUC. 2015. "Energy Efficiency Savings Eligibility at Sites with non-IOU Supplied Energy Sources - Guidance Document." November 6. http://cpuc.ca.gov/WorkArea/DownloadAsset.aspx?id=11610

- CPUC resolution E-4867 approving the DEER updates for 2019[20]
- CPUC resolution E-4952 revising DEER update for 2019[21]
- CPUC resolution E-5009 approving DEER updates for 2021 and revising DEER updates for 2019 and 2020.[22]
- CPUC resolution E-4818[23] affecting assignment of project baselines
- Dispositions of reviews of custom projects by CPUC staff[24]
- Tables supporting NTGR and EUL/RUL downloaded from READI v.2.5.1[25]
- CPUC resolution E-4939[26] affecting preponderance-of-evidence requirements for accelerated-replacement projects and definition of small-business customers. Although portions of the resolution were effective in October 2018, not many projects completed and claimed in 2019 were affected.
- New construction permit requirements for the PAs as specified in SB-1414[27]
- CPUC D.19-08-009 Fuel Substitution Decision. This modification of the 3-prong test established in D.92-02-075 was effective in August of 2019, thereby affecting some 2019 claims.[28]

1.3 Structure of this Report

The balance of our report consists of the following sections:

- **Methodology.** This section describes the methods we used to estimate gross and net savings.

[20] CPUC. 2017. Resolution E-4867 Approval of the Database for Energy-Efficient Resources updates for 2020 and revised version 2019 in Compliance with D.15-10-028, D.16-08-019, and Resolution E-4818. Accessed July 2019.

[21] CPUC 2018. Resolution E-4952. Approval of the Database for Energy-Efficient Resources updates for 2020 and revised version 2019 in Compliance with D.15-10-028, D.16-08-019, and Resolution E-4818. Accessed July 2020. https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M232/K459/232459122.PDF

[22] CPUC 2019. Resolution E-5009. Approval of the Database for Energy-Efficiency Resources updates for Program Year 2021 and revised version for Program Year 2020. Accessed June 2021. https://docs.cpuc.ca.gov/SearchRes.aspx?docformat=ALL&DocID=313350826

[23] CPUC. 2017. Resolution E-4818. Measure Level Baseline Assignment and Preponderance of Evidence Guidance to Establish Eligibility for an Accelerated Replacement Baseline Treatment. San Francisco, CA: CPUC. http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M171/K557/171557623.PDF

[24] CPUC. n.d. *Utilities Disposition Abstract Forms.* Accessed June 2019. http://deeresources.com/index.php/custom-project-review/custom-project-disposition-abstracts.

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

[26] CPUC. 2018. Resolution E-4939. Addressing Track 2 Working Group Related Energy Efficiency Issues Pursuant to D.16-08-019 and Resolution E-4818. San Francisco, CA: CPUC. https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M232/K460/232460214.PDF

[27] California State Legislature 2016. Senate Bill 1414 2016 Wolk. Accessed July 2019. https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201520160SB1414#:~:text=SB%201414%2C%20Wolk,.new%20residential%20and%20nonresidential%20buildings

[28] CPUC 2019. Decision D.19-08-009 Decision Modifying the Energy Efficiency Three Prong Test Related to Fuel Substitution. Accessed June 2021. https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M310/K159/310159146.PDF

- **Findings.** This section presents our estimates of gross and net savings for each PA and statewide. It also describes the reasons our savings differ from the PA's claims and explores the determinants of the NTGR.
- **Recommendations.** This section presents our recommendations to improve claim reporting, review of reported claims, review of custom projects, and evaluation of custom projects.
- **Data Products.** This section describes the data products that we have prepared to assist the PAs and other stakeholders in their review of this report.
- **Appendices.** In these appendices we provide detailed tabulations of our findings and recommendations, as well as additional information describing our methods.
- **Glossary.** This section provide definition for phrases and abbreviation used throughout this report.

2 Methodology

Most of the methodology for this evaluation is described in the published final workplan[29]. This section documents as-implemented methodology, including planned additions as identified in the workplan as well as changes that were discussed with the PCG. These include (a) information about projects dropped to create the sample frame, (b) sample completion and response rates, and (c) guidance from CPUC staff for evaluating gross and net savings, and the approach for estimating FY and LC savings.

2.1 Sampling Custom Projects

2.1.1 Develop Sample Frame

Table 6 shows how we constructed the CIAC 2019 sample frame. The starting point was all claims in the CEDARS Custom Measures table. We then deleted the categories of measures shown. Finance projects were assigned to another evaluation group. SEM projects were assigned to the separate SEM evaluation effort. All other categories were outside of scope of the custom evaluation. Appendix E contains a more detailed table breaking down these categories by PA.

Table 6: Projects Dropped to Create CIAC Sample Frame

All Categories Dropped	Project Count	Life-Cycle Forecast Gross Savings		
		MW	MWh	MTherm
Custom	**32,477**	**5,048**	**22,956,309**	**725,878**
On Billing Finance Alternative Pathway	5	97	402,099	1,870
Codes And Standards	36	2,342	9,744,287	644,949
Emerging Technologies	6			
Energy Savings Assistance	13	135	1,104,876	-10,465
Evaluation Measurement And Verification	4			
Finance	7			
On Billing Finance	1			
Other	4			
Public - Residential (Res)	518	16	147,153	-438
Residential	28,599	2,189	9,479,732	46,898
Workforce Education And Training	6			
Non Resource	17			

[29] 2019 Commercial, Industrial, and Agricultural Custom (CIAC) Impact Evaluation Plan – Final, Published 6/29/2021. https://pda.energydataweb.com/#!/documents/2519/view

All Categories Dropped	Project Count	Life-Cycle Forecast Gross Savings		
		MW	MWh	MTherm
Strategic Energy Management (SEM)	22		83,452	3,458
Why Savings Zeroed	348	2	26,189	959
Dropped	**29,586**	**4,780**	**20,987,786**	**687,230**
CIAC Frame	**2,891**	**268**	**1,968,523**	**38,648**

2.1.2 Sample Completions and Response Rates

This section documents the number of projects completed for the net and gross samples, by fuel frame (electric and gas) for each of the PAs. The response rate (RR)[30] is based on the total number of projects that we contacted and varies substantially between the gross and net samples. Table 7and Table 9 show the gross electric and gas sample response rates, respectively, while Table 8 and Table 10 show the corresponding net response rates. These four tables show the project counts not the savings associated with the project counts. There are corresponding tables in the appendices that show the life-cycle savings values and include Table 38: Net Life-Cycle Savings (MWh) savings values which include Table 35: Gross Life-Cycle Savings (MWh), Table 36: Gross Life-Cycle Savings (MW), and Table 40: Net Life-Cycle Savings (Therm).

We dropped 14 of the 235 projects from the gross sample because either we were unable to contact the customer, or they declined to participate in the evaluation. We selected replacement projects for the dropped projects and were able to complete the evaluation for seven of them which resulted in 228 completed unique projects. The total evaluated count for electric is 200 projects and for gas is 62 projects. There were 34 gross evaluation projects completed for both the electric and gas frames which contribute to the response counts for both frames. The response rates for the net sample were much lower, as many decision makers could not be contacted or were unwilling to participate in the survey. We were able to complete NTGR surveys for 228 unique projects of which 40 overlapped with the completed gross project evaluations. The total NTGR survey count was 220 in the electric frame and 25 for the gas frame with 16 net surveys that were in both the electric and gas frame and contribute to the response counts for both frames.

The statewide response rate for the NTGR surveys was about 22%, far lower than historical NTGR-survey-response rates of, for example, 40% for the 2010-12 custom evaluation. The COVID-19 pandemic resulted in some disruptions to business operations and may have exacerbated the problem of contacting the decisionmakers. Nonetheless, such low rates are inconsistent with the fact that each participant confirmed on their program application that they had read and agreed to the terms and conditions in the *Statewide Customized Offering Procedures*

[30] This response rate is consistent with guidelines provided by American Association for Public Opinion Research (see AAPOR.org).

Manual for Business, which states that in exchange for ratepayer-funded energy-efficiency incentives:

> "All parties consent to participate in any evaluation of the program. The CPUC or its representatives may contact participants to answer questions regarding their Statewide Customized Offering experience and/or request a site visit. All participants agree to comply with such program evaluations."

We provided details of these refusals to Energy Division staff to help inform future program-participation rules.

In addition to the participants' unresponsiveness and refusal to participate in the interviews, the survey team experienced challenges administering the survey due to the poor quality of program data provided. For roughly 52% of the sampled and sampled projects, the project information and customer-contact information provided in the program-tracking data was either incomplete (e.g., lacked alternative phone numbers and email addresses), invalid (e.g., phone number did not work, or email bounced back), outdated (e.g., the decision maker no longer worked there), incorrect (e.g., phone numbers reached fax machines), or inconsistent (e.g., decision maker contacts reached contractors instead of customers).

One strategy we used was to ask the PAs to help contact customers who either refused to participate, did not respond after three attempts from the survey team, or had missing contact information. We sent a list of these customers to the PAs and asked them to contact the customer directly to encourage them to participate or provide updated contact information. While the response from the PAs sometimes contained some new contact information, some of the new information was again invalid. Despite the new contact information and follow-up from the PA to the customer to encourage participation, the survey team had little success reaching these respondents.

A list of key recommendations for improving data quality and response rates is summarized in the Executive Summary and presented in detail in section A.13 of Appendix A.

Table 7: Response Rate for Gross Electric Sample

Gross Electric Sample Strata					Projects			Response Rate (%)
PA	CPR	Project Type	Lighting Type	Stratum	Population	Sample Target	Evaluated	
MCE	No	Other Retro		1	32	5	5	100.0
MCE	No	Other Retro		2	15	5	5	100.0
MCE	No	Other Retro		3	13	8	6	75.0
MCE	No	Other Retro		Excluded	5	NA	NA	NA
MCE	No	Other Retro		Certainty	1	1	1	100.0
MCE-No-Other Retro Total					**66**	**19**	**17**	**89.5**
MCE Total					**66**	**19**	**17**	**89.5**
PG&E	Yes	DI Ltg	Ext	Certainty	4	4	4	100.0
PG&E-Yes-DI Ltg-Ext Total					**4**	**4**	**4**	**100.0**
PG&E	Yes	DI Ltg	Int	Certainty	7	7	7	100.0
PG&E-Yes-DI Ltg-Int Total					**7**	**7**	**7**	**100.0**
PG&E	Yes	Other Retro		1	6	4	4	100.0
PG&E	Yes	Other Retro		2	5	3	3	100.0
PG&E	Yes	Other Retro		Certainty	1	1	1	100.0
PG&E-Yes-Other Retro Total					**12**	**8**	**8**	**100.0**
PG&E	No	DI Ltg	Ext	1	149	2	2	100.0
PG&E	No	DI Ltg	Ext	2	91	2	2	100.0
PG&E	No	DI Ltg	Ext	3	48	2	2	100.0
PG&E	No	DI Ltg	Ext	4	18	4	4	100.0
PG&E	No	DI Ltg	Ext	Excluded	14	NA	NA	NA
PG&E	No	DI Ltg	Ext	Certainty	1	1	1	100.0
PG&E-No-DI Ltg-Ext Total					**321**	**11**	**11**	**100.0**
PG&E	No	DI Ltg	Int	1	1,172	14	14	100.0
PG&E	No	DI Ltg	Int	2	492	12	12	100.0
PG&E	No	DI Ltg	Int	3	188	12	12	100.0
PG&E	No	DI Ltg	Int	Certainty	2	2	2	100.0
PG&E-No-DI Ltg-Int Total					**1,880**	**40**	**40**	**100.0**
PG&E	No	SBD		1	18	9	6	66.7
PG&E	No	SBD		2	8	5	5	100.0
PG&E	No	SBD		Certainty	1	1	1	100.0
PG&E-No-SBD Total					**27**	**15**	**12**	**80.0**

Gross Electric Sample Strata					Projects			Response Rate (%)
PA	CPR	Project Type	Lighting Type	Stratum	Population	Sample Target	Evaluated	
PG&E	No	Other Retro		1	186	14	14	100.0
PG&E	No	Other Retro		2	63	11	10	90.9
PG&E	No	Other Retro		3	23	10	10	100.0
PG&E	No	Other Retro		Excluded	1	NA	NA	NA
PG&E	No	Other Retro		Certainty	2	2	2	100.0
PG&E-No-Other Retro Total					**275**	**37**	**36**	**97.3**
PG&E Total					**2,526**	**122**	**118**	**96.7**
SCE	Yes	SBD		Certainty	1	1	1	100.0
SCE-Yes-SBD Total					**1**	**1**	**1**	**100.0**
SCE	Yes	Other Retro		Certainty	6	6	6	100.0
SCE-Yes-Other Retro Total					**6**	**6**	**6**	**100.0**
SCE	No	SBD		1	18	5	4	80.0
SCE	No	SBD		2	10	5	4	80.0
SCE-No-SBD Total					**28**	**10**	**8**	**80.0**
SCE	No	OptC		Certainty	1	1	1	100.0
SCE-No-OptC Total					**1**	**1**	**1**	**100.0**
SCE	No	Other Retro		1	71	4	3	75.0
SCE	No	Other Retro		2	26	4	3	75.0
SCE	No	Other Retro		3	9	6	6	100.0
SCE	No	Other Retro		Excluded	2	NA	NA	NA
SCE	No	Other Retro		Certainty	2	2	2	100.0
SCE-No-Other Retro Total					**110**	**16**	**14**	**87.5**
SCE Total					**146**	**34**	**30**	**88.2**
SDG&E	Yes	OptC		1	9	3	3	100.0
SDG&E	Yes	OptC		Certainty	2	2	2	100.0
SDG&E-Yes-OptC Total					**11**	**5**	**5**	**100.0**
SDG&E	Yes	Other Retro		Certainty	1	1	1	100.0
SDG&E-Yes-Other Retro Total					**1**	**1**	**1**	**100.0**
SDG&E	No	SBD		1	15	4	4	100.0
SDG&E	No	SBD		2	8	5	5	100.0

Gross Electric Sample Strata					Projects			Response Rate (%)
PA	CPR	Project Type	Lighting Type	Stratum	Population	Sample Target	Evaluated	
SDG&E	No	SBD		Certainty	2	2	2	100.0
SDG&E-No-SBD Total					**25**	**11**	**11**	**100.0**
SDG&E	No	OptC		1	30	3	3	100.0
SDG&E	No	OptC		2	5	4	4	100.0
SDG&E	No	OptC		Excluded	4	NA	NA	NA
SDG&E	No	OptC		Certainty	1	1	1	100.0
SDG&E-No-OptC Total					**40**	**8**	**8**	**100.0**
SDG&E	No	Other Retro		1	18	9	8	88.9
SDG&E	No	Other Retro		Certainty	2	2	2	100.0
SDG&E-No-Other Retro Total					**20**	**11**	**10**	**90.9**
SDG&E Total					**97**	**36**	**35**	**97.2**
Statewide					**2,835**	**211**	**200**	**94.8**

Table 8: Response Rate for Net Electric Sample

Net Electric Sample Strata					Projects			Response Rate (%)
PA	CPR	HTR	Project Type	Stratum	Population	Sample Target	Evaluated	
MCE	No	Yes	Other Retro	1	1	1	0	NA
MCE-No-Yes-Other Retro Total					**1**	**1**	**0**	**NA**
MCE	No	No	Other Retro	1	65	57	18	32.7
MCE-No-No-Other Retro Total					**65**	**57**	**18**	**32.7**
MCE Total					**66**	**58**	**18**	**32.1**
PG&E	Yes	Yes	DI Ltg	1	1	1	0	NA
PG&E-Yes-Yes-DI Ltg Total					**1**	**1**	**0**	**NA**
PG&E	Yes	No	DI Ltg	Certainty	10	10	2	20.0
PG&E-Yes-No-DI Ltg Total					**10**	**10**	**2**	**20.0**
PG&E	Yes	No	Other Retro	Certainty	12	9	1	16.7
PG&E-Yes-No-Other Retro Total					**12**	**9**	**1**	**16.7**
PG&E	No	Yes	DI Ltg	1	882	96	38	41.8
PG&E-No-Yes-DI Ltg Total					**882**	**96**	**38**	**41.8**
PG&E	No	Yes	Other Retro	1	6	5	0	0.0
PG&E-No-Yes-Other Retro Total					**6**	**5**	**0**	**0.0**
PG&E	No	No	DI Ltg	1	1,319	397	81	20.6
PG&E-No-No-DI Ltg Total					**1,319**	**397**	**81**	**20.6**
PG&E	No	No	SBD	1	27	27	3	11.5
PG&E-No-No-SBD Total					**27**	**27**	**3**	**11.5**

Net Electric Sample Strata					Projects			Response Rate (%)
PA	CPR	HTR	Project Type	Stratum	Population	Sample Target	Evaluated	
PG&E	No	No	Other Retro	1	269	206	36	17.8
PG&E-No-No-Other Retro Total					**269**	**206**	**36**	**17.8**
PG&E Total					**2,526**	**751**	**161**	**21.9**
SCE	Yes	No	SBD	1	1	1	0	NA
SCE-Yes-No-SBD Total					**1**	**1**	**0**	**NA**
SCE	Yes	No	Other Retro	1	6	1	1	100.0
SCE-Yes-No-Other Retro Total					**6**	**1**	**1**	**100.0**
SCE	No	Yes	Other Retro	1	1	1	0	NA
SCE-No-Yes-Other Retro Total					**1**	**1**	**0**	**NA**
SCE	No	No	SBD	1	28	25	5	22.7
SCE-No-No-SBD Total					**28**	**25**	**5**	**22.7**
SCE	No	No	Other Retro	1	110	83	14	17.3
SCE-No-No-Other Retro Total					**110**	**83**	**14**	**17.3**
SCE Total					**146**	**111**	**20**	**18.9**
SDG&E	Yes	No	Other Retro	1	12	11	1	9.1
SDG&E-Yes-No-Other Retro Total					**12**	**11**	**1**	**9.1**
SDG&E	No	No	SBD	1	25	25	4	16.7
SDG&E-No-No-SBD Total					**25**	**25**	**4**	**16.7**
SDG&E	No	No	Other Retro	1	60	51	16	32.0
SDG&E-No-No-Other Retro Total					**60**	**51**	**16**	**32.0**
SDG&E Total					**97**	**87**	**21**	**24.7**
Statewide					**2,835**	**1,007**	**220**	**22.4**

Table 9: Response Rate for Gross Gas Sample

Gross Gas Sample Strata				Projects			Response Rate (%)
PA	CPR	Project Type	Stratum	Population	Sample Target	Evaluated	
PG&E	Yes	Other Retro	Certainty	4	4	4	100.0
PG&E-Yes-Other Retro-Certainty Total				**4**	**4**	**4**	**100.0**
PG&E	No	SBD	1	11	7	4	57.1
PG&E	No	SBD	Certainty	2	2	2	100.0
PG&E-No-SBD-Certainty Total				**13**	**9**	**6**	**66.7**
PG&E	No	Other Retro	1	36	7	6	85.7
PG&E	No	Other Retro	2	7	7	6	85.7
PG&E	No	Other Retro	Certainty	1	1	1	100.0
PG&E-No-Other Retro-Certainty Total				**44**	**15**	**13**	**86.7**
PG&E Total				**61**	**28**	**23**	**82**
SCG	Yes	OptC	Certainty	1	1	1	100.0
SCG-Yes-OptC-Certainty Total				**1**	**1**	**1**	**100.0**
SCG	Yes	Other Retro	Certainty	1	1	1	100.0
SCG-Yes-Other Retro-Certainty Total				**1**	**1**	**1**	**100.0**
SCG	No	SBD	1	25	5	4	80.0
SCG	No	SBD	2	13	7	6	85.7
SCG	No	SBD	Excluded	2	NA	NA	NA
SCG-No-SBD-Excluded Total				**40**	**12**	**10**	**83.3**
SCG	No	OptC	Certainty	1	1	1	100.0
SCG-No-OptC-Certainty Total				**1**	**1**	**1**	**100.0**
SCG	No	Other Retro	1	12	5	5	100.0
SCG	No	Other Retro	Excluded	1	NA	NA	NA
SCG	No	Other Retro	Certainty	2	2	2	100.0
SCG-No-Other Retro-Certainty Total				**15**	**7**	**7**	**100.0**
SCG Total				**58**	**22**	**20**	**91**
SDG&E	Yes	OptC	1	1	1	1	100.0
SDG&E	Yes	OptC	Certainty	1	1	1	100.0
SDG&E-Yes-OptC-Certainty Total				**2**	**2**	**2**	**100.0**
SDG&E	No	SBD	1	15	5	5	100.0
SDG&E	No	SBD	2	4	3	3	100.0
SDG&E	No	SBD	Excluded	1	NA	NA	NA
SDG&E	No	SBD	Certainty	1	1	1	100.0
SDG&E-No-SBD-Certainty Total				**21**	**9**	**9**	**100.0**
SDG&E	No	OptC	1	5	5	5	100.0
SDG&E-No-OptC-1 Total				**5**	**5**	**5**	**100.0**
SDG&E	No	Other Retro	1	4	3	3	100.0
SDG&E-No-Other Retro-1 Total				**4**	**3**	**3**	**100.0**

Gross Gas Sample Strata				Projects			Response Rate (%)
PA	CPR	Project Type	Stratum	Population	Sample Target	Evaluated	
SDG&E Total				32	19	19	100
Statewide				151	69	62	90

Table 10: Response Rate for Net Gas Sample

Net Gas Sample Strata					Projects			Response Rate (%)
PA	CPR	HTR	Project Type	Stratum	Population	Sample Target	Evaluated	
PG&E	Yes	No	Other Retro	1	4	3	1	100.0
PG&E	**Yes**	**No**	**Other Retro**		**4**	**3**	**1**	**100.0**
PG&E	No	No	SBD	1	13	13	1	7.7
PG&E	**No**	**No**	**SBD**		**13**	**13**	**1**	**7.7**
PG&E	No	No	Other Retro	1	44	35	9	26.5
PG&E	**No**	**No**	**Other Retro**		**44**	**35**	**9**	**26.5**
PG&E Total					**61**	**51**	**11**	**22.9**
SCG	Yes	No	Other Retro	1	2	2	0	NA
SCG	**Yes**	**No**	**Other Retro**		**2**	**2**	**0**	**NA**
SCG	No	No	SBD	1	40	28	6	24.0
SCG	**No**	**No**	**SBD**		**40**	**28**	**6**	**24.0**
SCG	No	No	Other Retro	1	16	8	0	NA
SCG	**No**	**No**	**Other Retro**		**16**	**8**	**0**	**NA**
SCG Total					**58**	**38**	**6**	**17.1**
SDG&E	Yes	No	Other Retro	Certainty	2	2	1	50.0
SDG&E	**Yes**	**No**	**Other Retro**		**2**	**2**	**1**	**50.0**
SDG&E	No	No	SBD	1	21	21	3	15.0
SDG&E	**No**	**No**	**SBD**		**21**	**21**	**3**	**15.0**
SDG&E	No	No	Other Retro	1	9	8	4	50.0
SDG&E	**No**	**No**	**Other Retro**		**9**	**8**	**4**	**50.0**
SDG&E Total					**32**	**31**	**8**	**26.7**
Statewide					**151**	**120**	**25**	**22.1**

Table 11 shows that a very high percentage, though not all, of interviews yielded usable PAI scores. Sometime participants did not know how to answer one of the PAI questions. Most commonly, a participant said they had different decision-making processes for more than one measure. Often the original decision maker was no longer with the company, so the respondent did not know the answer.

Each component of the NTGR scores had extremely high completion rates but the rate was a bit lower when considering a minimum of two components to comprise the NTGR for a given claim. We decided that we would report a NTGR for a claim only if there were at least two PAI scores available. Under that policy, 100% of completed interviews provided at least two PAI scores for at least one claim per project.

Table 11: Project Level Response Rates for Net Survey PAI Scores

PAI Scores	Completed Projects	Percent of Completes
PAI1	225	99%
PAI2	222	97%
PAI3	223	98%
At least 2 PAI Scores	227	100%
All PAI Scores	215	94%

Projects often encompassed multiple claims, however, and this could mean that different decision-making processes and personnel could be involved in the different claims. We established early in the interview whether all claims were handled the same or whether they were subject to different processes or decision makers. When there were differences, we proceeded through the NTGR battery for up to three different claims. This was not common, but did happen and when it did, the respondent could often not answer enough program-influence questions to yield at least two PAI scores. This is reflected in the slightly lower rate of PAI completions based on claims rather than on projects, as shown in Table 11 and Table 12.

Table 12: Claim Level Response Rates for Net Survey PAI Scores

PAI Scores	Completed Claims	Percent of Completes
PAI1	318	95.2%
PAI2	327	97.9%
PAI3	317	94.9%
At least 2 PAI Scores	320	95.8%
All PAI Scores	308	92.2%

2.2 Evaluate Gross Savings

This section identifies significant changes to the methodology documented in final CIAC impact evaluation workplan[31], and represent the as-implemented methodology. These changes were presented to the PAs during the regular PCG meetings.

[31] 2019 Commercial, Industrial, and Agricultural Custom (CIAC) Impact Evaluation Plan – Final, Published 6/29/2021. https://pda.energydataweb.com/#!/documents/2519/view

2.2.1 Eligibility

Appendix G of the workplan defines the evaluation criteria for determining ineligible projects which resulted in setting the evaluated savings to zero. Subsequently, the following two exceptions were also allowed for SBD projects:

- **2019 install date.** SBD projects that were installed prior to 2019 without M&V in 2019 were considered ineligible but an exception was granted if the project was a joint project between two PAs. If the initiating PA invoiced the partner PA for incentive and analysis costs after closing the project causing the partner PA to claim savings in a year after the initiating PA claim year, then as long as the invoices from the initiator are available in the partner PA documentation, the project was considered eligible for the partner PA.
- **Installation time limit exceeded.** SBD projects that did not meet the allowable four-year installation time limit after project approval, and no time extension documentation was found, were exempt and considered eligible.

2.2.2 Dropped Projects and Zero Savers

The evaluation subsequently added the following additional criteria for dropping or zeroing savings of eligible projects:

- **Business shut down**. When we determined that the business was closed and the building was vacant with unknown future occupancy, we set savings to zero.
- **Business owner change**. When we determined that the business ownership had changed and there was not adequate documentation of the baseline conditions, we set savings to zero.
- **Unevaluable project.** When project documentation was missing critical information for verifying measure savings, we set the savings to zero. Examples of such missing information include the savings calculation model or building plans and equipment specifications, without which we could not validate or recalculate savings. We requested supplemental data from PAs to give them opportunities to provide the missing critical information.

2.2.3 PA Response Rules for Projects with No Savings

We provided lists of projects with zero savings to each PA with descriptions of the reasons for assigning zero savings. The following process was developed for PA responses to projects in the zero-saver list. We presented this to the PAs during the PCG meeting on September 1, 2021.

1. PAs could post their responses any time after receiving the zero-saver information up to the date that the draft report comments are due.

2. PAs could not post opinions about the eligibility criteria as part of the project specific response. They could offer only post documentation or other information to support justification that the savings should not be zero.
3. PAs could not submit documentation or justification for any project that was installed prior to 2018.
4. SBW would not respond or change eligibility of any responded-to project prior to the draft report, but if first SBW and then CPUC staff determine that the PA has successfully defended eligibility, SBW would complete a file-review evaluation of the project and incorporate the savings into the final report. The PAs were encouraged to respond quickly for any projects successfully defended as eligible, so that SBW would have more time to complete file-review evaluations before the final report.

2.2.4 First-Year, As-Observed, and Life-Cycle Savings

The first year (FY) savings remained unchanged from the workplan definition, that is, the evaluated savings associated with the 12-month period following installation.

We calculated as-observed (AO) savings as the annual savings based on the "as-observed" condition at the time of data collection. For measures where savings vary with weather, production, or other seasonal impacts, we based energy savings on the 12-month period before the time of data collection. For projects with accelerated replacement (AR) measure application type (MAT), the as-observed savings included both first baseline and second baseline savings values associated with the RUL and EUL periods, respectively.

We calculated life-cycle (LC) savings using these equations:

- AR, dual-baseline measures:

  LC savings = (FY savings × 1 year) + (AO first baseline savings × (RUL – 1) years) + (AO second baseline savings × (EUL – RUL) years))

- NR and other single-baseline MATs:

  LC savings = (FY savings × 1 year) + (AO first baseline savings × (EUL – 1) years)

2.2.5 Deemed Measures

Instead of passing through all deemed savings in the custom project as stated in the workplan, we zeroed out savings for some deemed measures that were identified at the time of project application. If the claimed savings and incentive were consistent with the deemed values, we passed the savings through, however, if either the savings or incentive values were based on custom-calculated values then the deemed measure was considered ineligible and assigned zero savings If the entire claim consisted of one or more ineligible deemed measures, savings were set to zero only for the identified ineligible deemed measure, not the entire claim. While the sample did not include any projects that were classified as deemed claims, we found certain custom

projects that included all deemed measures or certain custom projects included one or more deemed measures.

2.2.6 Lighting

The workplan states that we rely on the Modified Lighting Calculator (MLC) Version 11.3 to evaluate interior-lighting projects and custom spreadsheets to evaluate exterior-lighting projects. Deviating from the work plan, we used the MLC for both interior-and exterior-lighting project calculations, as it automatically determines the appropriate industry-standard-practice (ISP) baseline for a particular lighting measure. Additionally, we considered the easy Lighting Calculator (eLC) to be interchangeable with the MLC for calculating savings of both interior and exterior lighting. The eLC automatically determines savings beyond Title24 energy codes rather than ISP for a particular lighting measure. If a project used a custom calculator (not MCL or eLC) for forecast savings, the evaluation engineer either verified the savings using the submitted calculator or recalculated using the MLC or eLC. If the MLC or eLC were used for forecast savings, we also use the same calculator for the evaluation except for a couple of cases that used eLC where we entered the information into the MLC when needed such as when we were unable to verify floor area but knew the fixture types and counts.

The work-plan also stated that we would directly enter customer-reported equivalent full-load annual operating hours instead of using calculator defaults. Per CPUC staff directive, we did not overwrite the default DEER hours of operation unless either: (a) the site-reported hours of operation were significantly different (±25%) from the hours of operation used by the default calculator or (b) metering had been conducted to obtain hours of operation. We adjusted site-reported hours of operation using the adjustment factors presented in the *2017 Nonresidential ESPI Deemed Lighting Impact Evaluation Final Report*, based on space use and type of lighting fixture. We then calculated the measure EUL based on these resulting hours of operation and the rated life of the lighting product installed.

2.3 Evaluate Net Savings

There were no changes in the methodology for evaluating net savings from the published workplan.

3 Findings

In this section, we present our findings related to gross and net savings and address related topics including the impact of accelerated replacement (AR), reasons for differences in gross savings, changes in effective useful life (EUL), and comparison of findings to those from a similar evaluation of 2015 custom project claims. We also examine the reliability, sensitivity, and drivers of the net-to-gross ratio (NTGR), which measures the program influence on decisions to implement efficiency measures.

3.1 Gross Savings and Gross Realization Rates

These sections contain our findings regarding first-year and life-cycle gross savings. The tables show results by sample domain. The figures are color coded to indicate NC/SBD projects and retrofit projects. The latter include all projects with other measure application types that are not included in the NC/SBD category.

3.1.1 Electric Savings

Table 13 shows our findings for gross life-cycle kWh and kW savings for each domain. The domains are defined by PA, Custom Project Review (CPR), Project Type, and Lighting Type. CPR domains include "Yes" if projects underwent such reviews and received a disposition, or "No" review was completed. Project types include direct install lighting (DI Ltg), Other Retrofit, Savings By Design and new construction (SBD), and IPMVP Option C analysis (OptC).

This table also summarizes our findings by PA and statewide. Statewide, the MWh GRR is 0.47, indicating that 47% of the savings claimed by PAs statewide was realized. The MWh GRR for each PA fell into a narrow range, except for the value for MCE. The latter was significantly greater (nearly 70% greater than the next largest value), but since it accounts for a very small portion of the statewide total savings, it had little impact on the statewide value. The evaluated statewide MW GRR of 0.51 is greater than the MWh GRR, with a less variation across PAs.

Domain-level GRR varies greatly across combinations of project type and CPR influence. In two of the three OptC domains, the GRR is greater than one, which means that we found more savings than the PAs forecast. No other domains resulted in GRRs greater than one. One key factor that reduced GRRs were ineligible projects that had zero savings. We discussed this in section 3.9. Other identified reasons for savings differences are discussed in section 3.3.

We found several projects that were submitted in the wrong project type. PAs provided the flags to identify the projects that underwent CPR review (identified as interior or exterior DI Ltg, or OptC) since these are not indicated directly in the CEDARS data. During our documentation review, we discovered that some projects had not been correctly classified. For example, we found some OptC, SBD, and DI Ltg projects in the Other Retro domain. We did not correct the

domains for these projects so that we could maintain the integrity of the evaluation sample. Instead, we simply made anecdotal observations. These misclassifications also slightly complicated drawing definitive conclusions about the GRR of domains.

Table 13: Life-Cycle Gross Electric Savings and GRR, by Domain

Gross Electric Sample Domain				Life-Cycle Gross Electric Savings and GRR							
				MWh				MW			
PA	CPR	Project Type	Lighting Type	Forecast	Evaluated	GRR	RP (%)	Forecast	Evaluated	GRR	RP (%)*
MCE	No	Other Retro		5,467	4,274	0.78	22.8	1.14	0.89	0.78	28.5
MCE Total				**5,467**	**4,274**	**0.78**	**22.8**	**1.14**	**0.89**	**0.78**	**28.5**
PG&E	Yes	DI Ltg	Ext	6,122	1,644	0.27	0.0	0.00	NA	NA	NA
PG&E	Yes	DI Ltg	Int	2,956	620	0.21	0.0	0.62	0.12	0.19	0.0
PG&E	Yes	Other Retro		15,457	4,970	0.32	5.3	1.24	0.45	0.36	0.0
PG&E	No	DI Ltg	Ext	187,246	46,609	0.25	77.8	0.99	0.00	0.00	NA
PG&E	No	DI Ltg	Int	623,346	209,372	0.34	32.6	116.34	49.16	0.42	63.5
PG&E	No	SBD		133,193	123,244	0.93	26.0	25.72	28.34	1.10	31.1
PG&E	No	Other Retro		678,636	396,243	0.58	23.1	90.50	41.14	0.45	55.6
PG&E Total				**1,646,957**	**782,703**	**0.48**	**15.8**	**235.41**	**119.21**	**0.51**	**33.3**
SCE	Yes	SBD		18,118	15,723	0.87	0.0	5.42	3.92	0.72	0.0
SCE	Yes	Other Retro		30,995	377	0.01	0.0	5.50	0.05	0.01	0.0
SCE	No	SBD		71,961	6,095	0.08	70.5	16.56	6.70	0.40	49.4
SCE	No	OptC		4,952	5,219	1.05	0.0	0.35	0.43	1.21	0.0
SCE	No	Other Retro		284,538	166,909	0.59	25.1	17.41	9.75	0.56	58.9
SCE Total				**410,565**	**194,323**	**0.47**	**21.7**	**45.24**	**20.85**	**0.46**	**31.8**
SDG&E	Yes	OptC		6,589	10,105	1.53	1.1	0.33	0.73	2.19	0.0
SDG&E	Yes	Other Retro		171	0	0.00	NA	0.00	NA	NA	NA
SDG&E	No	SBD		64,205	28,031	0.44	18.2	12.09	6.98	0.58	41.2
SDG&E	No	OptC		12,936	6,508	0.50	33.2	1.45	1.31	0.90	22.4
SDG&E	No	Other Retro		40,496	6,410	0.16	86.6	1.99	1.16	0.58	26.6
SDG&E Total				**124,397**	**51,053**	**0.41**	**15.4**	**15.85**	**10.18**	**0.64**	**28.6**
Statewide				**2,187,387**	**1,032,354**	**0.47**	**12.7**	**297.65**	**151.13**	**0.51**	**26.7**

* Relative precision at the 90% confidence level.

Table 14 shows evaluation findings for gross first-year MWh and MW savings for each domain. The GRRs were similar to the life-cycle values in Table 13, but were slightly higher for each of the PAs and statewide. Several factors affected the differences between first-year and life-cycle

savings. These included EUL differences, and MAT corrections (which affect the baseline used for a portion of the measure lifetime). Covid-19 impacts between the first-year and life-cycle savings were minimal as described in section 3.10.

Table 14: First-Year Gross Electric Savings and GRR, by Domain

Gross Electric Sample Domain				First-Year Gross Electric Savings and GRR							
				MWh				MW			
PA	CPR	Project Type	Lighting Type	Forecast	Evaluated	GRR	RP (%)	Forecast	Evaluated	GRR	RP (%)*
MCE	No	Other Retro		1,145	853	0.74	17.1	0.24	0.19	0.77	19.1
MCE Total				**1,145**	**853**	**0.74**	**17.1**	**0.24**	**0.19**	**0.77**	**19.1**
PG&E	Yes	DI Ltg	Ext	510	293	0.57	0.0	0.00	NA	NA	NA
PG&E	Yes	DI Ltg	Int	301	81	0.27	0.0	0.06	0.02	0.30	0.0
PG&E	Yes	Other Retro		1,888	1,308	0.69	17.8	0.32	0.14	0.43	0.0
PG&E	No	DI Ltg	Ext	15,603	5,194	0.33	71.2	0.08	0.00	0.00	NA
PG&E	No	DI Ltg	Int	55,719	23,229	0.42	32.8	10.63	4.11	0.39	30.3
PG&E	No	SBD		10,139	7,373	0.73	20.1	1.92	1.76	0.92	27.2
PG&E	No	Other Retro		58,987	38,187	0.65	19.7	7.99	3.99	0.50	40.4
PG&E Total				**143,148**	**75,664**	**0.53**	**15.1**	**21.00**	**10.02**	**0.48**	**20.9**
SCE	Yes	SBD		1,208	1,332	1.10	0.0	0.36	0.33	0.92	0.0
SCE	Yes	Other Retro		4,113	75	0.02	0.0	0.75	0.01	0.01	0.0
SCE	No	SBD		5,847	344	0.06	51.0	1.32	0.40	0.31	42.1
SCE	No	OptC		1,054	1,194	1.13	0.0	0.08	0.10	1.30	0.0
SCE	No	Other Retro		39,291	24,609	0.63	19.8	2.95	0.77	0.26	47.8
SCE Total				**51,513**	**27,555**	**0.53**	**17.7**	**5.45**	**1.62**	**0.30**	**25.1**
SDG&E	Yes	OptC		2,202	2,646	1.20	0.8	0.11	0.15	1.37	0.0
SDG&E	Yes	Other Retro		57	0	0.00	NA	0.00	NA	NA	NA
SDG&E	No	SBD		4,363	1,888	0.43	20.7	0.83	0.48	0.58	46.5
SDG&E	No	OptC		3,899	1,857	0.48	43.4	0.37	0.35	0.94	29.4
SDG&E	No	Other Retro		3,123	569	0.18	63.5	0.14	0.07	0.54	30.6
SDG&E Total				**13,645**	**6,960**	**0.51**	**13.9**	**1.45**	**1.05**	**0.73**	**23.5**
Statewide				**209,451**	**111,031**	**0.53**	**11.2**	**28.14**	**12.87**	**0.46**	**16.7**

* Relative precision at the 90% confidence level.

Figure 1 shows the distribution of kWh GRR based on life-cycle savings by PA. Each marker represents one of the sampled projects. The color of the marker indicates projects that fall into the two program types, NC/SBD and retrofit. The red horizontal line on each panel corresponds to the PA's overall GRR. The red horizontal lines are based on unweighted values and are therefore different than the PA totals in Table 13 which incorporate weighting factors for the data rollup to PA totals. The GRRs of projects from the PAs deviate substantially. For example, PG&E has a project with a GRR nearly eight times that of their overall GRR. At the other extreme, all four PAs have projects with a GRR of zero because those projects were either

ineligible, unevaluable, or were evaluated with resulting zero savings. In general, among each PA's projects, the distribution of GRR is similar across both program types.

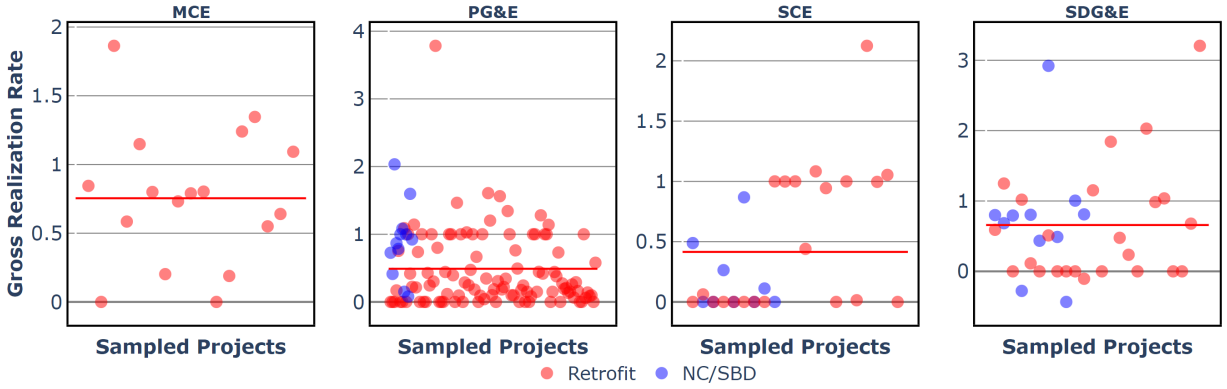

Figure 1: Distribution of kWh GRR (Life-Cycle Gross Savings), by PA

Figure 2 shows the relationship between evaluated and forecast life-cycle gross electric savings for the sampled projects for each PA. The color of the markers on the plots indicate the program type. If a project's evaluated savings is equal to the forecast savings the marker falls on the diagonal line and it would have a GRR = 1. Markers below the diagonal line represent projects for which the evaluation found less savings than forecast by the PA. For those above the line, we found more savings than the PA claimed. Most projects are relatively small and are clustered near the origin of the plots. All MCE projects fall in the "small" category, which is clear from the vertical-axis scale compared to the other PAs. Several projects scatter to the right and have much larger savings. Some of these are far below the diagonal line, so they have a large impact on the GRR for their respective PAs. The projects with largest savings belong to PG&E and SCE, and for these, the single largest project for each falls on the diagonal line indicating a GRR of 1.0. SDG&E has a small number of projects with negative evaluated savings, which decreased their GRR.

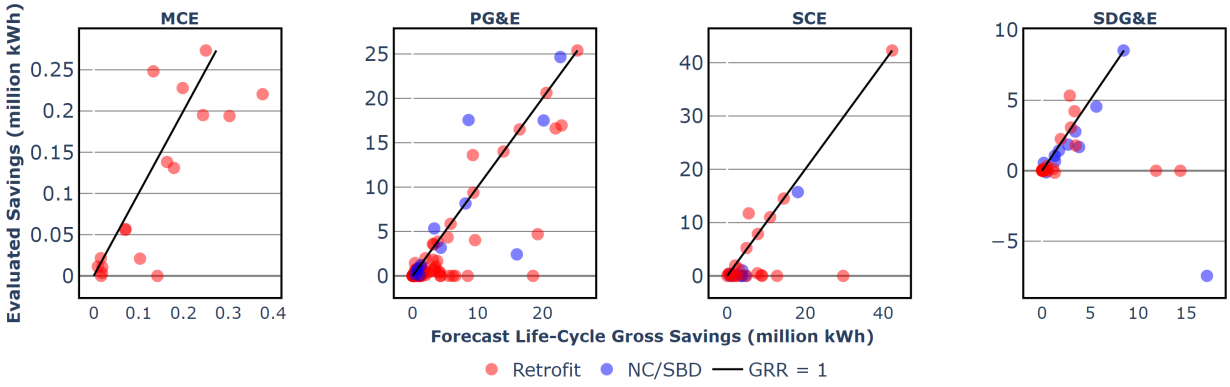

Figure 2: Evaluated vs. Claim Life-Cycle Gross kWh Savings, by PA

Figure 3 is similar to Figure 1 but shows the distribution of kWh GRR based on first-year (not life-cycle) gross electric savings by PA. First-year savings are those that occur in the 12-month period immediately following measure installation. The red horizontal line on each panel represents the PA's GRR. The first year PA-level GRRs for each appear to be greater than the life-cycle GRRs, except for SDG&E's, which appears to be very similar. Several factors can explain the differences between first-year and life-cycle savings, including differences in EUL as well as corrections made to the MAT for NR versus AR, which affects the baseline used for a portion of the measure lifetime. Covid-19 impacts between first year and as-observed saving were minimal.

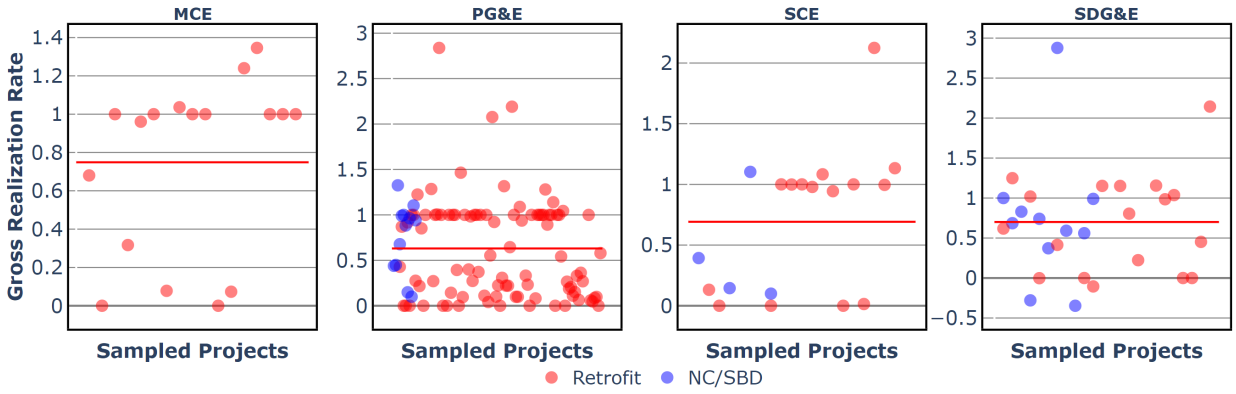

Figure 3: Distribution of kWh GRR (First-Year Gross Savings), by PA

Figure 4 is similar to Figure 2 but shows the relationship between evaluated and forecast kWh savings based on first-year gross (rather than life-cycle) electric savings. When comparing these two figures, note that the first-year values for MCE are all on or below the diagonal line, whereas many more of the life-cycle values lie above the diagonal. SDG&E also has more first-year values further to the right and above the right and above the diagonal. The distributions of first-year and life-cycle values for PG&E and SCE are much more similar.

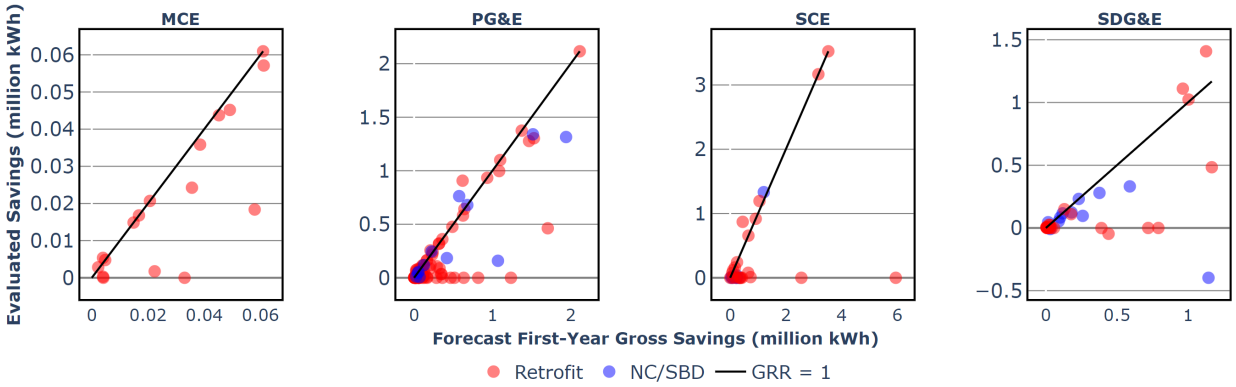

Figure 4: Evaluated vs. Claimed First-Year Gross kWh Savings, by PA

Some of the results shown in these tables and figures were unexpected, for a variety of reasons. For example, we tested the hypothesis that CPR reviews increase gross realization rates. We included sample domains that distinguished projects that underwent CPR review from those that had no such review. The results were quite variable and no conclusive statement could be made.

The sample counts in CPR domains tended to be small because the number of projects that did receive CPR reviews was relatively small, since CPR was paused from July 2017 to July 2019. We also identified two CPR projects were completed and claimed despite having been identified as ineligible. We defined these projects as ineligible in our evaluation. We identified a significant number of other projects across most domains that were ineligible, some of which were also in the CPR domains. The primary reason for ineligibility was due to installation prior to 2019 with no M&V occurring in 2019. The large number of ineligible projects, along with other factors, such as the impact of the use of incorrect baselines and flawed calculation methods yielded some low realization rates.

3.1.2 Gas Savings

Table 15 shows evaluation findings for gross life-cycle therm savings for each domain. The domains are defined by PA, Custom Project Review (CPR), Project Type, and Lighting Type. This table also summarizes our findings by PA and statewide. Statewide the therm GRR is 0.40, indicating that 40% of the savings claimed by PAs, statewide, was realized. The therm GRR for SCG is far lower than those at 14%, of the other two PAs.

GRR varied greatly across combinations of project type and CPR influence, though there are no values greater than one. One key factor that reduced GRRs were ineligible projects that received zero savings. We discuss this in section 3.9, and other identified reasons for savings differences in section 3.3.

Table 15: Life-Cycle Gross Gas Savings and GRR, by Domain

Gross Gas Sample Domain			Life-Cycle Gross Gas Savings and GRR			
			Therm			
PA	CPR	Project Type	Forecast	Evaluated	GRR	RP (%)*
PG&E	Yes	Other Retro	1,310,925	5,415	0.00	0.0
PG&E	No	SBD	5,971,570	3,899,678	0.65	1.1
PG&E	No	Other Retro	28,562,017	12,474,151	0.44	7.7
PG&E Total			**35,844,513**	**16,379,244**	**0.46**	**5.9**
SCG	Yes	OptC	42,768	12,955	0.30	0.0
SCG	Yes	Other Retro	711,128	0	0.00	NA
SCG	No	SBD	2,602,788	638,756	0.25	50.5
SCG	No	OptC	293,001	198,040	0.68	0.0
SCG	No	Other Retro	4,995,882	342,848	0.07	53.7

Gross Gas Sample Domain			Life-Cycle Gross Gas Savings and GRR			
			Therm			
PA	CPR	Project Type	Forecast	Evaluated	GRR	RP (%)*
SCG Total			**8,645,567**	**1,192,599**	**0.14**	**31.2**
SDG&E	Yes	OptC	531,837	350,040	0.66	0.0
SDG&E	No	SBD	1,490,517	948,003	0.64	35.1
SDG&E	No	OptC	333,124	93,192	0.28	0.0
SDG&E	No	Other Retro	436,929	62,106	0.14	47.1
SDG&E Total			**2,792,407**	**1,453,342**	**0.52**	**23.0**
Statewide			**47,282,487**	**19,025,185**	**0.40**	**5.7**

* Relative precision at the 90% confidence level.

The first-year GRRs in Table 16 were greater than the life-cycle values in Table 15. Several factors affected the differences between first-year and life-cycle savings. These included EUL differences and MAT corrections (which affect the baseline used for a portion of the measure lifetime). Covid-19 COVID impacts between first year and as-observed savings were minimal.

Table 16: First-Year Gross Gas Savings and GRR, by Domain

Gross Gas Sample Domain			First-Year Gross Gas Savings and GRR			
			Therm			
PA	CPR	Project Type	Forecast	Evaluated	GRR	RP (%)*
PG&E	Yes	Other Retro	99,236	5,523	0.06	0.0
PG&E	No	SBD	398,105	210,778	0.53	2.6
PG&E	No	Other Retro	2,208,208	1,981,835	0.90	6.8
PG&E Total			**2,705,548**	**2,198,136**	**0.81**	**6.1**
SCG	Yes	OptC	3,564	1,460	0.41	0.0
SCG	Yes	Other Retro	64,648	0	0.00	NA
SCG	No	SBD	171,473	38,774	0.23	46.7
SCG	No	OptC	97,667	30,609	0.31	0.0
SCG	No	Other Retro	340,411	72,042	0.21	66.6
SCG Total			**677,763**	**142,886**	**0.21**	**35.9**
SDG&E	Yes	OptC	177,279	114,879	0.65	0.0
SDG&E	No	SBD	100,725	61,241	0.61	41.4
SDG&E	No	OptC	111,041	30,445	0.27	0.0
SDG&E	No	Other Retro	29,679	12,521	0.42	83.5
SDG&E Total			**418,725**	**219,086**	**0.52**	**12.5**
Statewide			**3,802,036**	**2,560,108**	**0.67**	**5.7**

* Relative precision at the 90% confidence level.

Figure 5 has the same elements as Figure 1, but shows the distribution of therm GRR by PA. The scales are different, and thus hard to compare, because the maximum and minimum GRR varies greatly across the PAs. Most projects for all PAs, however, fall in similar ranges except for one SDG&E project that has a very large GRR. SDG&E also has a few projects with negative GRRs and include both program types.

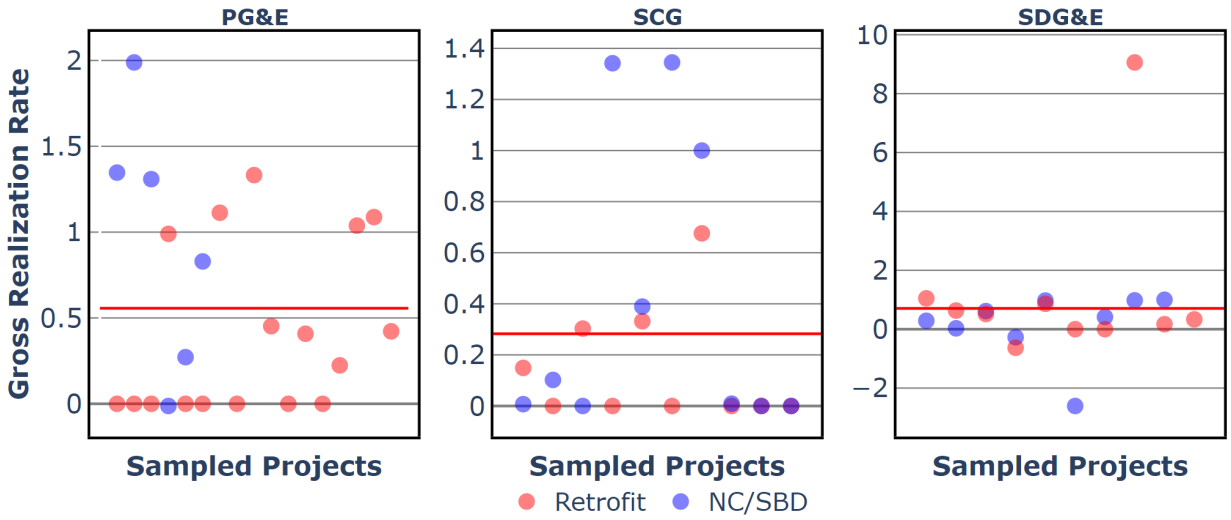

Figure 5: Distribution of Therm GRR (Life-Cycle Gross Savings), by PA

Figure 6 has the same elements as Figure 2 ,and shows the relationship between evaluated and forecast life-cycle gross gas savings. All three gas-serving PAs have mostly relatively small projects, except one PG&E project that was significantly larger. The evaluated savings of most projects are less than or equal to the claimed savings. SDG&E had at least two projects with negative evaluated savings. Even with the one SDG&E project with a very large GRR (see Figure 5), there is no corresponding very large evaluated savings value. This is because the forecast savings for the project is small.

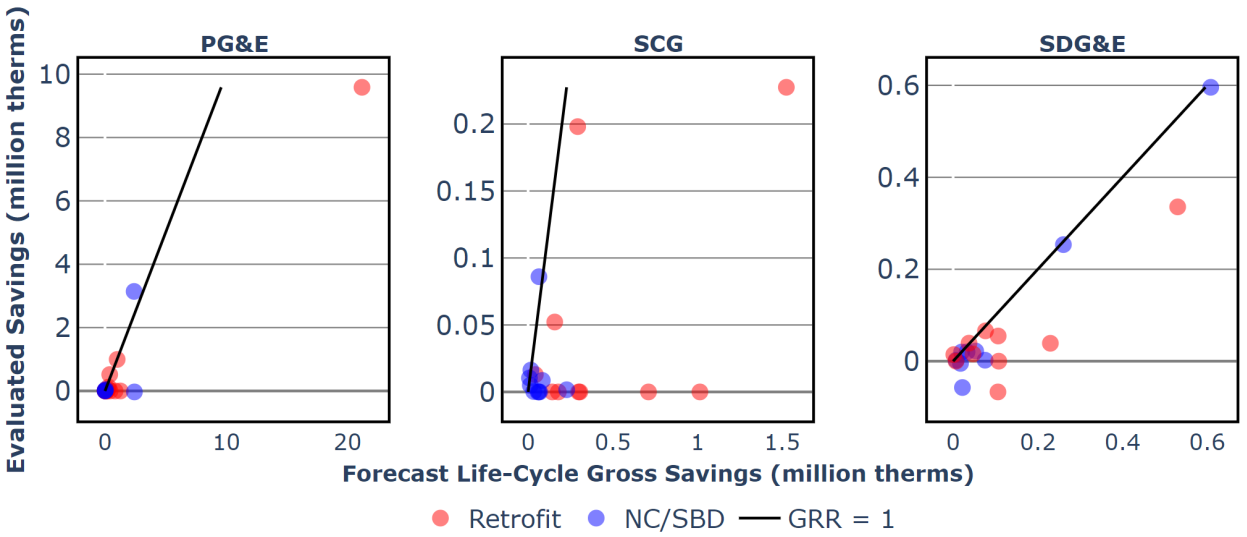

Figure 6: Evaluated vs. Claimed Life-Cycle Gross Therm Savings, by PA

Figure 7 is similar to Figure 5 but shows the relationship between evaluated and claimed therm savings based on first-year (rather than life-cycle) gross gas savings. Notably, the distribution of first-year and life-cycle figures, GRRs are similar except the average GRRs.

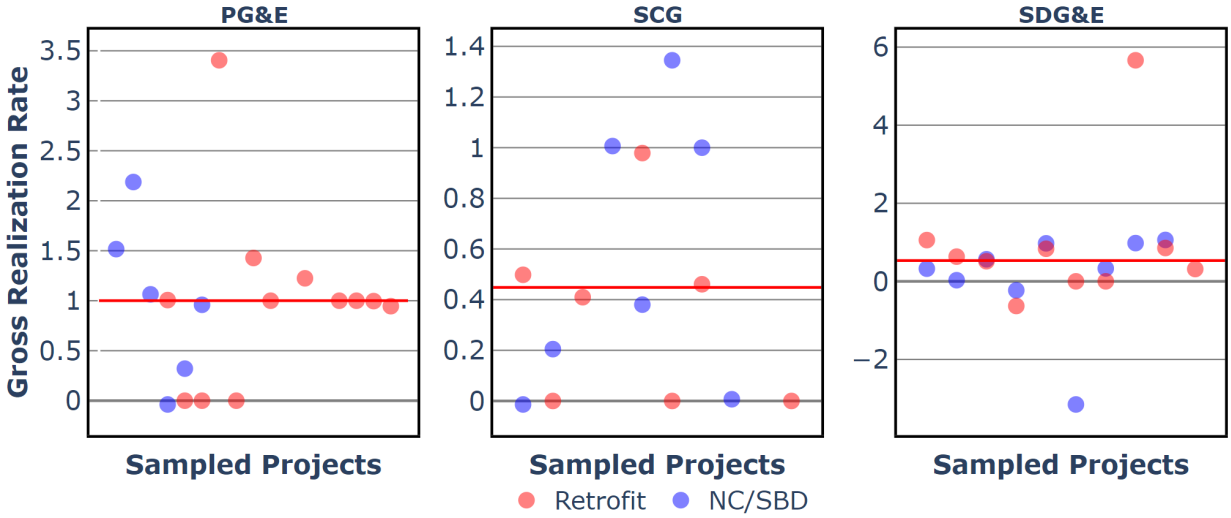

Figure 7: Distribution of Therm GRR (First-Year Gross Savings), by PA

Figure 8 is similar to Figure 6 but shows the relationship between evaluated and forecast therm savings based on first-year (rather than life-cycle) gross gas savings. When comparing these first-year to life-cycle figures to the corresponding life-cycle values, distributions are similar.

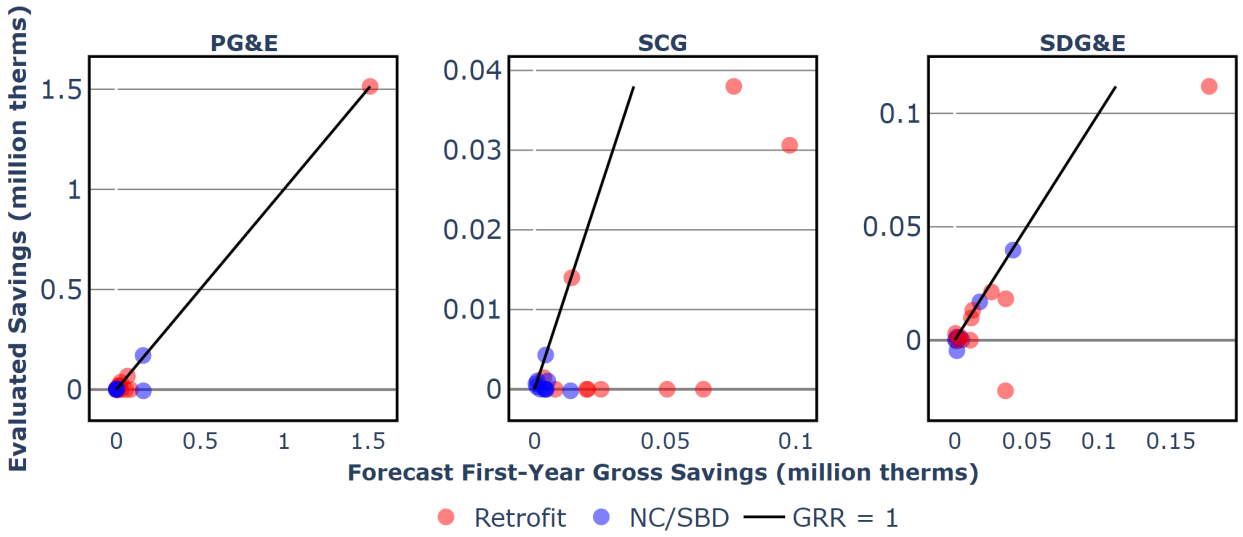

Figure 8: Evaluated vs. Claimed First-Year Gross Therm Savings, by PA

3.2 Impact of Accelerated Replacement

Many programs tried to stimulate the accelerated replacement of energy-using equipment. The PAs were expected to provide evidence that the program had, in fact, caused end users to replace equipment before the existing equipment had reached the end of its useful life. By substantiating accelerated replacement, PAs could claim savings based on the existing equipment rather than a standard-practice baseline. Programs mandated using a standard-practice baseline if equipment was replaced when it failed. We examined the evidence for the gross-savings sample. For all equipment replacement measures, we surveyed the customer to determine whether accelerated replacement indeed occurred.

Figure 9 compares PA claims to our evaluation findings for the percent of total life-cycle gross kWh savings associated with AR projects. The PA claims are generally consistent with our evaluation findings. We did identify several MCE claims that were NR, instead of AR, as claimed. The overall impact on statewide results was minor, though, since the MCE total electric savings is a very small portion of the sample frame.

A similar comparison for life-cycle therm savings could not be made since there were no eligible AR claims in the sample.

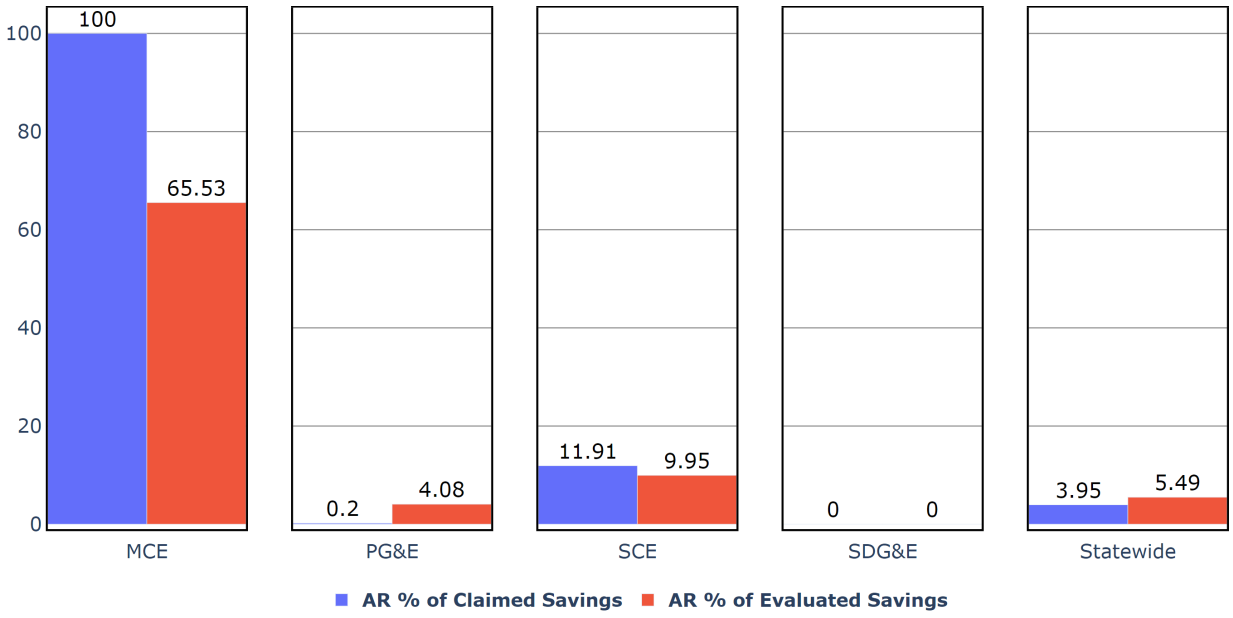

Figure 9: Impact of Accelerated Replacement on Life-Cycle Gross kWh Savings

3.3 Reasons for Differences in Gross Savings

We determined the primary reasons for differences between our evaluated gross savings and the PA's gross savings claims. We defined the following possible reasons and then established whether they applied.

- **Baseline Specification.** We identified an error in the baseline specification. This was common for lighting-retrofit measures, where we specified industry-standard practice baseline instead of energy-code baseline.
- **Calculation Method.** We concluded an alternative calculation method was appropriate. One example was using approved EnergyPro models with correct equipment sizing, instead of commonly used EnergyPro models with known errors. Another was applying regression analysis of pre- and post-installation energy consumption, instead of engineering calculation analyses.
- **Claim Data Entry Error.** The approved savings results found in the project documentation were inconsistent with the savings in the CEDARS claim.
- **COVID Impact on Operation.** We identified if the operation of the measure equipment was impacted by the pandemic. An extreme example was when a customer went out of business and the facility was completely closed down.
- **Inoperable Equipment.** We identified equipment installed as part of a measure was inoperable or overridden. For example, a customer manually set an installed VFD to 100% speed because they were dissatisfied with system performance at lower speeds.

- **Ineligible Measure.** We identified measures that were ineligible and set the savings to zero. For example, a measure was installed in a year prior to 2019 and the forecast savings did not include M&V that extended into 2019.
- **Number of Installed Units.** We identified a different number of units installed than was indicated in the claim. Example: number of lighting fixtures.
- **Operating Conditions.** We identified that the operating conditions of the equipment were different than those stated in the claim. One example is VFD pumps that operated at different speeds over different hours per year than assumed in the claim.
- **Operating Hours.** We identified different operating hours for the affected equipment. One example is lighting operated at different hours than the default DEER schedules.
- **Production.** There was a change in production from that assumed in the claim. For example, a food processor experienced a 28% increase in production during the first year after installation, because of the new efficient equipment.
- **Other – see notes.** Some differences did not clearly fall into other categories. In other cases, it was hard to identify the primary reason among multiple reasons for the savings difference.

For accelerated replacement (AR) claims, there are two savings estimates, as described in section 3.2. We determined the primary reasons separately for each of the savings estimates.

3.3.1 Electric Savings

Figure 10 shows the percent of claims associated with each of the primary reasons for the difference between the kWh savings forecast by the PA and the savings we evaluated. The percentages only represent the number of claims and do not represent the savings impact however there is information about the ineligible measure savings impact in section 3.9 Effect of Impact of Rule Violations on Savings. While there could also be secondary reasons, these are the primary reasons for differences We identified reasons for differences between both the first and second baseline estimates of savings. This figure shows the first-year savings of the first baseline, so it is based on a mix of AR and NR claims. For the AR claims, the savings are relative to the existing equipment. For the NR claims, the savings are relative to the prevailing energy code or standard practice. For our findings regarding the second baseline, which is only estimated for AR claims, see the companion Excel workbook described in section 5.1.

Four of the reasons explain the largest percentage of claims with variant savings estimates:

- baseline specification,
- calculation method,
- other, and
- ineligible measures.

The highest rate of variation is for SCE's baseline specification.

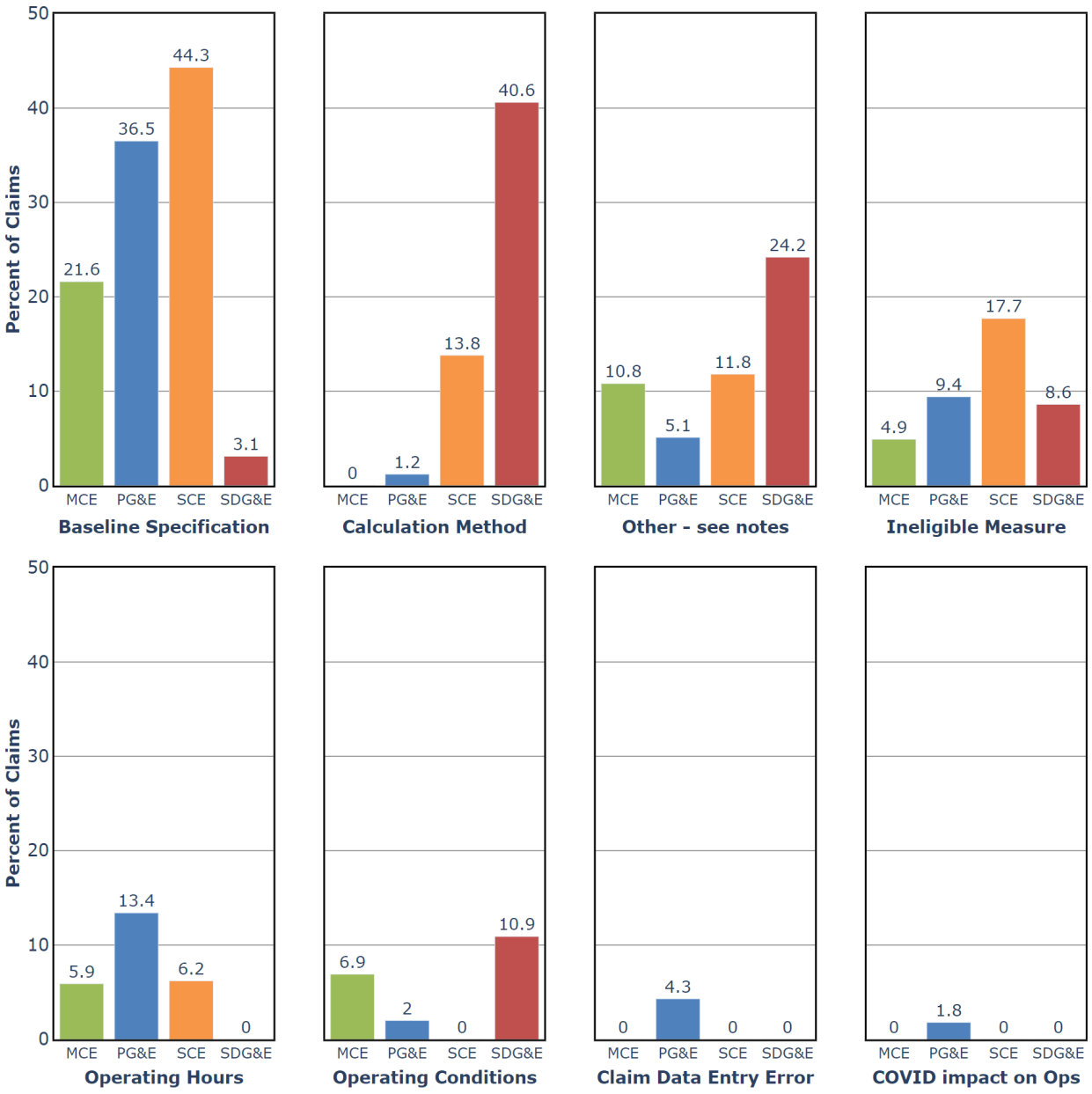

Figure 10: Primary Reasons for Differences in First Baseline (All Claims) Gross Savings (kWh)

3.3.2 Gas Savings

Figure 11 shows the percent of claims associated with each of the primary reasons for the difference between the claim and evaluated therm savings by PA. Four of the reasons explain the largest percentage of claims with variant savings estimates:

- calculation method,
- ineligible measures,
- other, and

- claim data entry error.

The highest rate of variation is for SDG&E's calculation method.

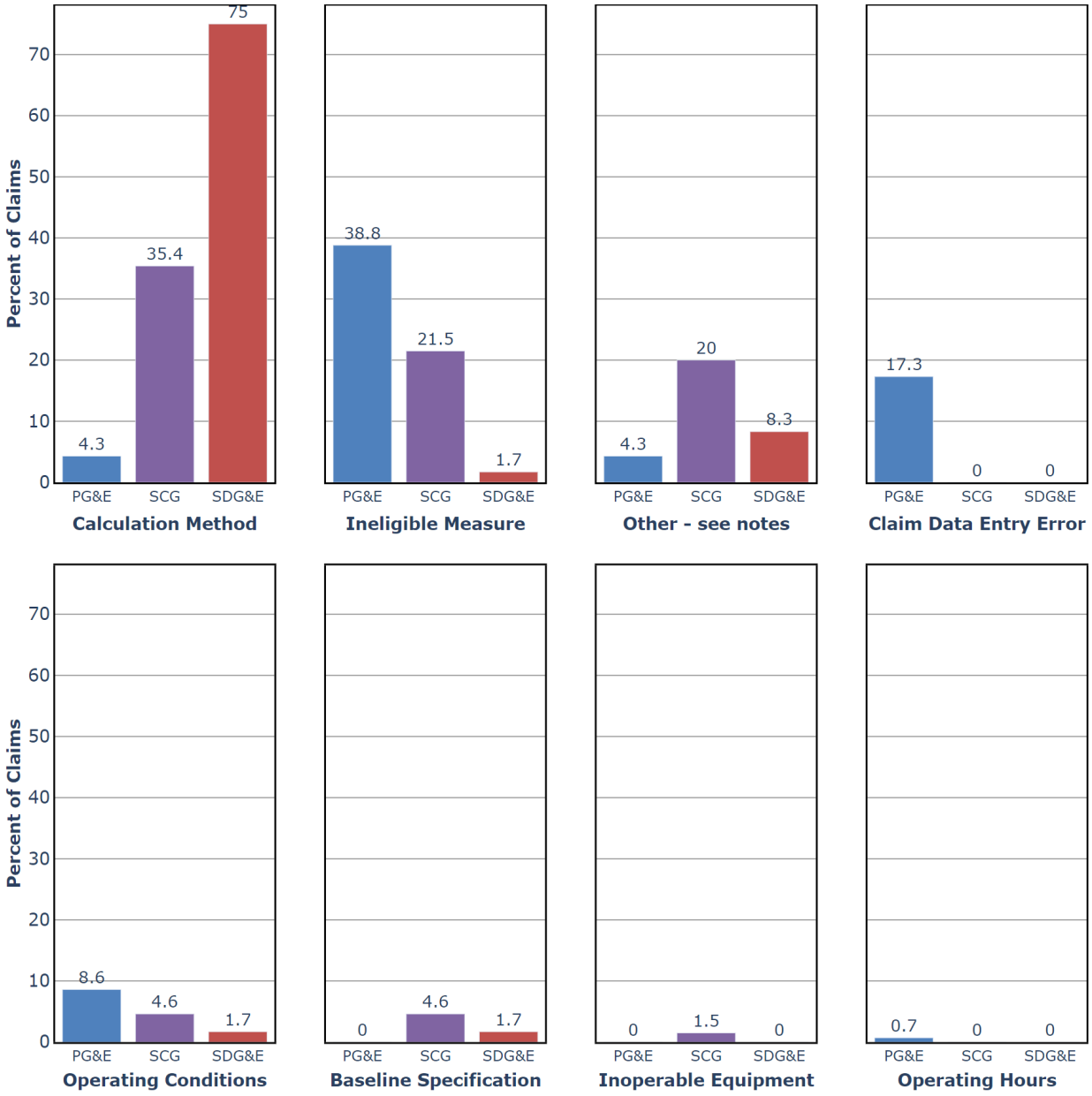

Figure 11: Primary Reasons for Differences in First Baseline (All Claims) Gross Savings (Therm)

3.4 Net Savings and Net-to-Gross Ratio (NTGR)

In this section, we present our findings regarding the net savings from 2019 custom projects and the associated net-to-gross ratio (NTGR). We present these results at the PA by program type level, which we call the collapsed domain level. While we sampled by net domain, as described in section 2.3, it did not make sense to report at that level due to small sample sizes in several

net and gross domains. Rather, we treated net domains as strata within collapsed domains to produce NTGRs and related statistics at that level.

3.4.1 Electric Savings

Table 17 contains results of the net analysis for life-cycle savings for each domain by PA and program type (Retrofit and SBD/NC). This table also summarizes our findings for each PA and statewide. The net (and gross) savings were considerably reduced by the large number of projects classified as ineligible due to their completion date, per the guidance of Energy Division staff.

Table 17: Life-Cycle Net Electric Savings and NTGR, by Domain

Sample Domain		Sampled Projects	Life-Cycle Net Electric Savings and NTGR					
			Evaluated MWh			Evaluated MW		
PA	Project Type		Net	NTGR	RP (%)	Net	NTGR	RP (%)*
MCE	Other Retro	18	1,705	0.40	15.7	0.37	0.42	14.7
MCE Total		**18**	**1,705**	**0.40**	**15.5**	**0.37**	**0.42**	**14.7**
PG&E	DI Ltg	121	111,665	0.43	4.8	19.02	0.39	6.3
PG&E	SBD	3	69,838	0.57	0.0	16.06	0.57	0.0
PG&E	Other Retro	37	176,845	0.44	3.6	17.60	0.42	4.1
PG&E Total		**161**	**358,349**	**0.46**	**2.1**	**52.68**	**0.44**	**2.4**
SCE	SBD	5	9,024	0.41	6.3	4.52	0.43	6.4
SCE	Other Retro	15	90,280	0.52	8.0	5.23	0.51	12.9
SCE Total		**20**	**99,304**	**0.51**	**7.2**	**9.75**	**0.47**	**7.2**
SDG&E	SBD	4	14,824	0.53	24.2	3.62	0.52	24.7
SDG&E	Other Retro	17	10,042	0.44	5.2	1.18	0.37	2.9
SDG&E Total		**21**	**24,866**	**0.49**	**14.5**	**4.80**	**0.47**	**18.7**
Statewide		**220**	**484,224**	**0.47**	**2.3**	**67.59**	**0.45**	**2.5**

* Relative precision at the 90% confidence level.

Table 18 shows our findings for net first-year MWh and MW savings. SCE had the highest first-year NTGR for MWh savings projects.

Table 18: First-Year Net Electric Savings and NTGR, by Domain

Sample Domain		Sampled Projects	First-Year Net Electric Savings and NTGR					
			Evaluated MWh			Evaluated MW		
PA	Project Type		Net	NTGR	RP (%)	Net	NTGR	RP (%)*
MCE	Other Retro	18	342	0.40	14.7	0.08	0.42	15.7
MCE Total		**18**	**342**	**0.40**	**15.6**	**0.08**	**0.42**	**14.7**
PG&E	DI Ltg	121	12,470	0.43	6.3	1.73	0.39	4.8
PG&E	SBD	3	4,178	0.57	0.0	0.79	0.57	0.0
PG&E	Other Retro	37	17,443	0.44	4.1	2.29	0.42	3.6
PG&E Total		**161**	**34,091**	**0.45**	**2.3**	**4.81**	**0.43**	**2.7**
SCE	SBD	5	693	0.41	6.4	0.20	0.43	6.3
SCE	Other Retro	15	13,543	0.52	12.9	1.00	0.51	8.0
SCE Total		**20**	**14,237**	**0.52**	**7.5**	**1.20**	**0.49**	**10.7**
SDG&E	SBD	4	998	0.53	24.7	0.19	0.52	24.2
SDG&E	Other Retro	17	2,212	0.44	2.9	0.12	0.37	5.2
SDG&E Total		**21**	**3,211**	**0.46**	**7.9**	**0.31**	**0.45**	**14.9**
Statewide		**220**	**51,880**	**0.47**	**2.6**	**6.39**	**0.44**	**2.9**

* Relative precision at the 90% confidence level.

Figure 12 shows the distribution of site-specific NTGRs for each PA. Overall, the NTGRs vary between 0 and about 0.82, but both the lower and upper limits of this range vary by PA, with PG&E showing both the highest and the lowest NTGRs.

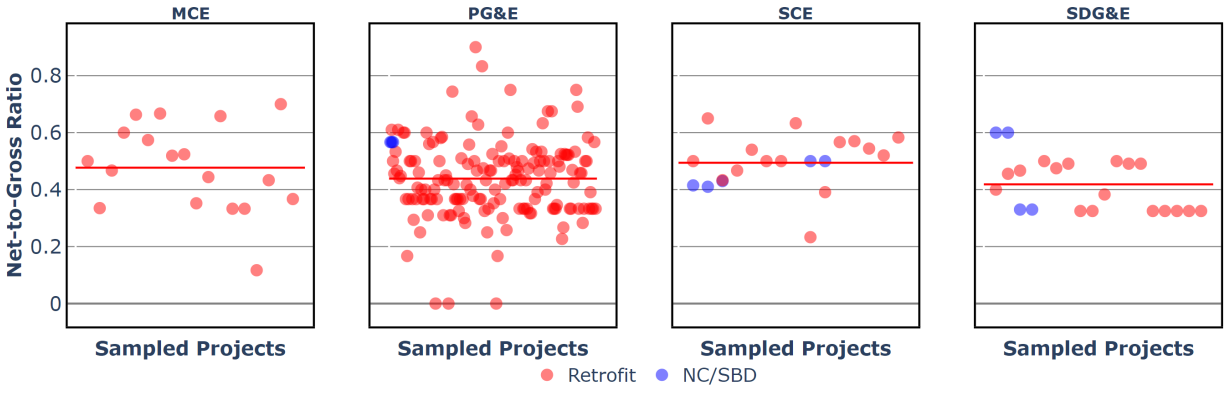

Figure 12: Distribution of kWh NTGR (Life-Cycle Gross Savings), by PA

In Figure 13, the black lines shows where all the project net savings would be in the plot, if the GRR were 1.0. For all PAs, very few projects fall on that line, indicating considerable difference between forecast and evaluated net savings. Many projects show zero net evaluated savings,

mostly because projects were classified as ineligible based on their completion dates per CPUC rules; therefore, gross savings were zero. We did not conduct a net survey to establish NTGRs for projects that were determined as ineligible.

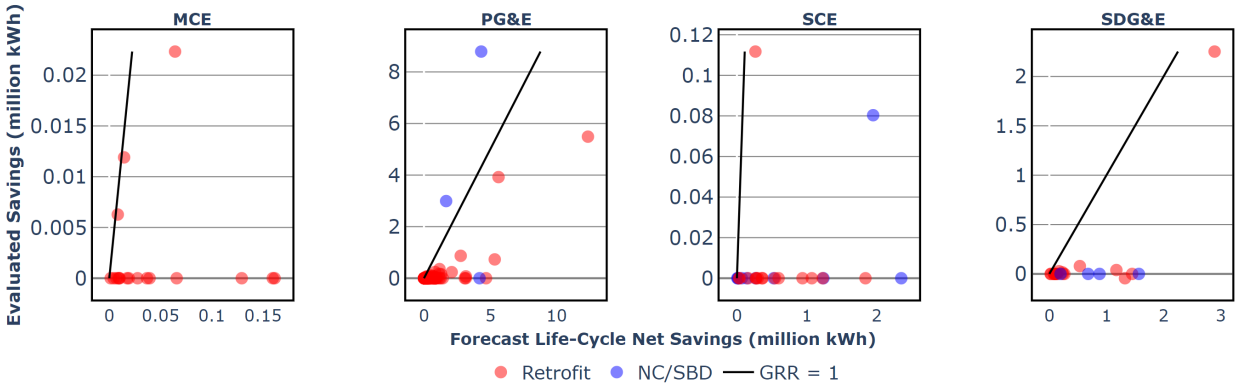

Figure 13: Evaluated vs. Claim Life-Cycle Net kWh Savings, by PA

The distribution of NTGRs by PA shown in Figure 14 cluster around 0.5 for PG&E, with quite a few project NTGRs being considerably higher and lower. Other PAs show less clustering. As with the lifecycle NTGRs, the NC/SBD projects show no discernable pattern.

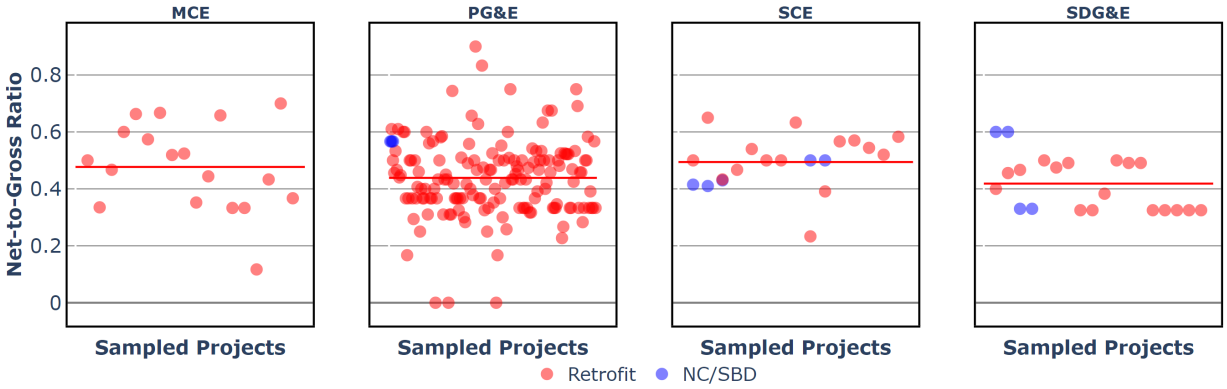

Figure 14: Distribution of kWh NTGR (First-Year Gross Savings), by PA

The markers in Figure 15 for first-year net savings show a similar pattern to the lifecycle net savings plots. Specifically, most projects had lower evaluated savings than forecast savings. There is no discernable difference between the NC/SBD projects and others in the pattern of deviation from the GRR=1 line.

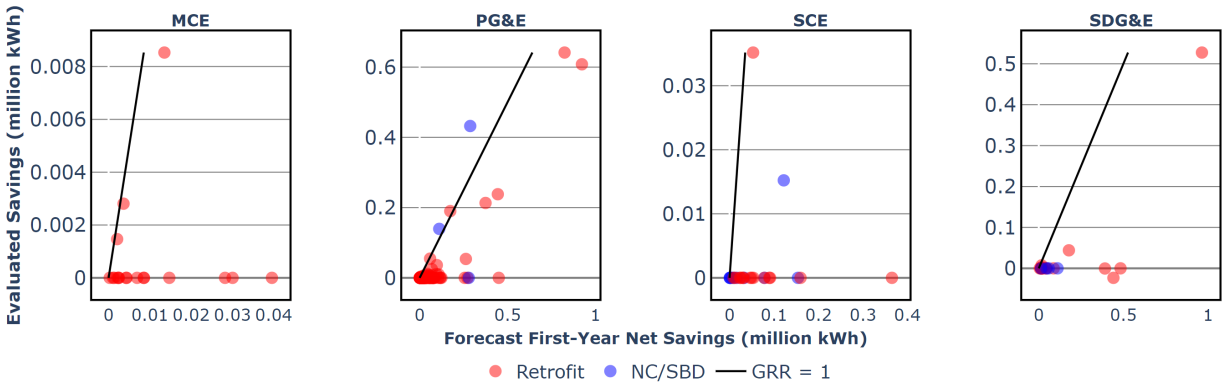

Figure 15: Evaluated vs. Claim First-Year Net kWh Savings, by PA

3.4.2 Gas Savings

Table 19 shows that most of the net gas savings for both PG&E and SCG came from their new-construction programs, and they are the source of each PA's NTGR value. Note that in Table 19, the NTGRs for SCG Other Retrofit programs were not available due to a lack of net interviews (and very few projects) for that program. In this situation, we apply the PA-level NTGR to the projects where no NTGR was possible. For SCG, this amounts to applying the NTGR for SBD to the other program type.

Table 19: Life-Cycle Net Gas Savings and NTGR, by Domain

Sample Domain		Sampled Projects	Life-Cycle Net Gas Savings and NTGR		
			Evaluated Therm		
PA	Project Type		Net	NTGR	RP (%)*
PG&E	SBD	1	2,209,818	0.57	0.0
PG&E	Other Retro	10	5,597,227	0.45	8.9
PG&E Total		**11**	**7,807,045**	**0.48**	**6.4**
SCG	SBD	6	279,478	0.44	12.8
SCG	Other Retro	0	242,325	0.44	NA
SCG Total		**6**	**521,803**	**0.44**	**6.9**
SDG&E	SBD	3	508,794	0.54	25.5
SDG&E	Other Retro	5	226,442	0.45	4.8
SDG&E Total		**8**	**735,236**	**0.51**	**17.7**
Statewide		**25**	**9,064,084**	**0.48**	**5.7**

* Relative precision at the 90% confidence level.

Table 20 shows that the savings-weighted NTGRs are relatively low for first-year net gas projects in the Other Retrofit program types. Again, most of the higher program-influence scores came from their new-construction programs.

Table 20: First-Year Net Gas Savings and NTGR, by Domain

Sample Domain		Sampled Projects	First-Year Net Gas Savings and NTGR		
			Evaluated Therm		
PA	Project Type		Net	NTGR	RP (%)*
PG&E	SBD	1	119,441	0.57	0.0
PG&E	Other Retro	10	891,610	0.45	8.9
PG&E Total		**11**	**1,011,051**	**0.46**	**7.8**
SCG	SBD	6	16,965	0.44	12.8
SCG	Other Retro	0	45,552	0.44	NA
SCG Total		**6**	**62,517**	**0.44**	**3.5**
SDG&E	SBD	3	32,868	0.54	25.5
SDG&E	Other Retro	5	70,730	0.45	4.8
SDG&E Total		**8**	**103,598**	**0.47**	**8.5**
Statewide		**25**	**1,177,167**	**0.46**	**6.8**

* Relative precision at the 90% confidence level.

Figure 16 displays the distribution of NTGRs for gas projects by PA. The pattern that recurs is that the SBD projects supply a good proportion of the NTGR values, especially for SCG. This is the result of a combination of low participation rates in the non-SBD programs and a low response rate for the net interviews.

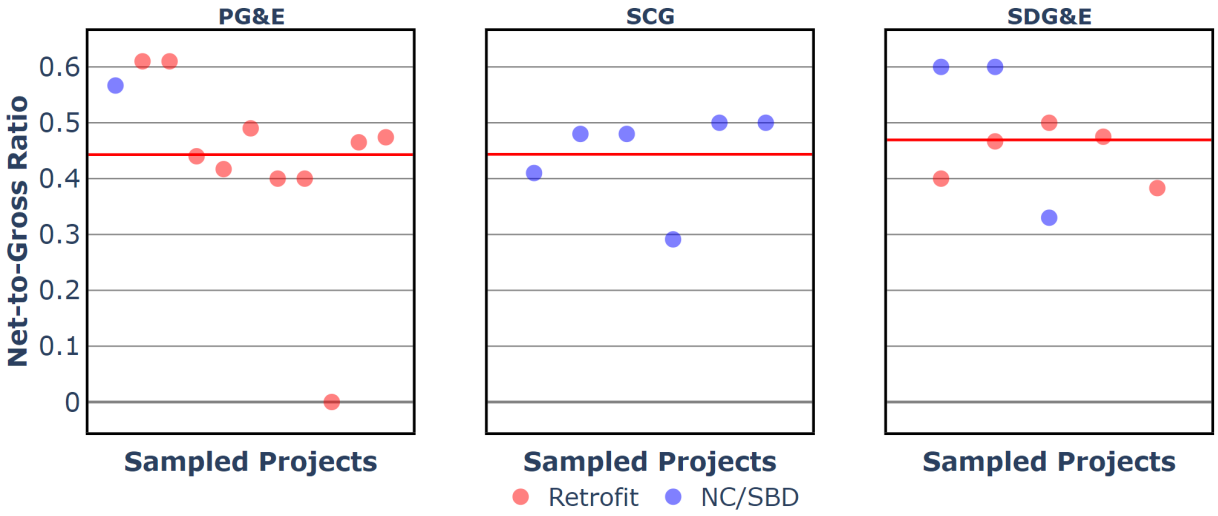

Figure 16: Distribution of Therm NTGR (Life-Cycle Gross Savings), by PA

Figure 17 shows again that few projects are on the GRR=1.0 line. Almost all evaluated savings are lower than forecast savings.

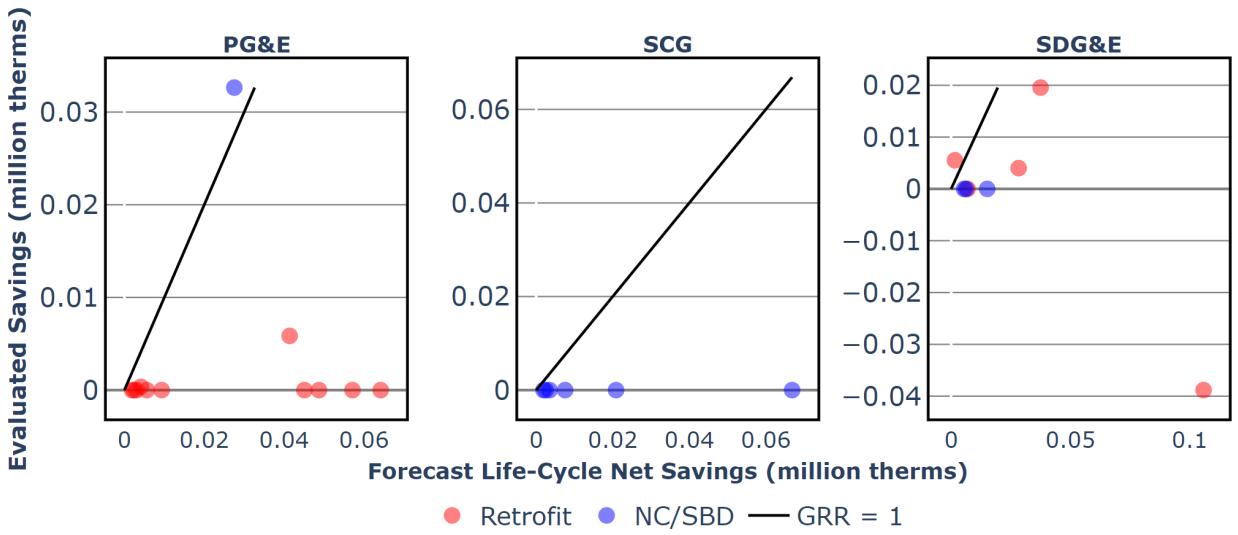

Figure 17: Evaluated vs. Claim Life-Cycle Net Therm Savings, by PA

NTGRs vary considerably by PA, as revealed in Figure 18, with the new-construction projects providing most of the "lift" to the PA NTGRs.

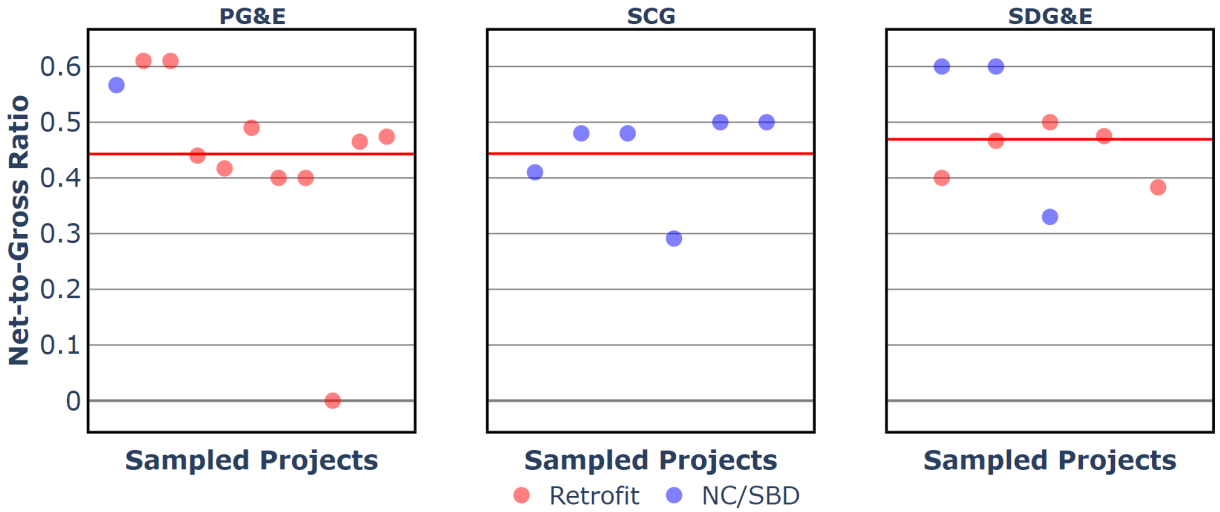

Figure 18: Distribution of Therm NTGR (First-Year Gross Savings), by PA

Figure 19 shows that, as in other areas, very few projects fall on the GRR=1 line that would indicate agreement between implementer and evaluator estimates. PG&E has two projects that are above the line and another that is very close to it. Most of the projects below the line are those that were assigned zero savings, often due to ineligible dates of completion.

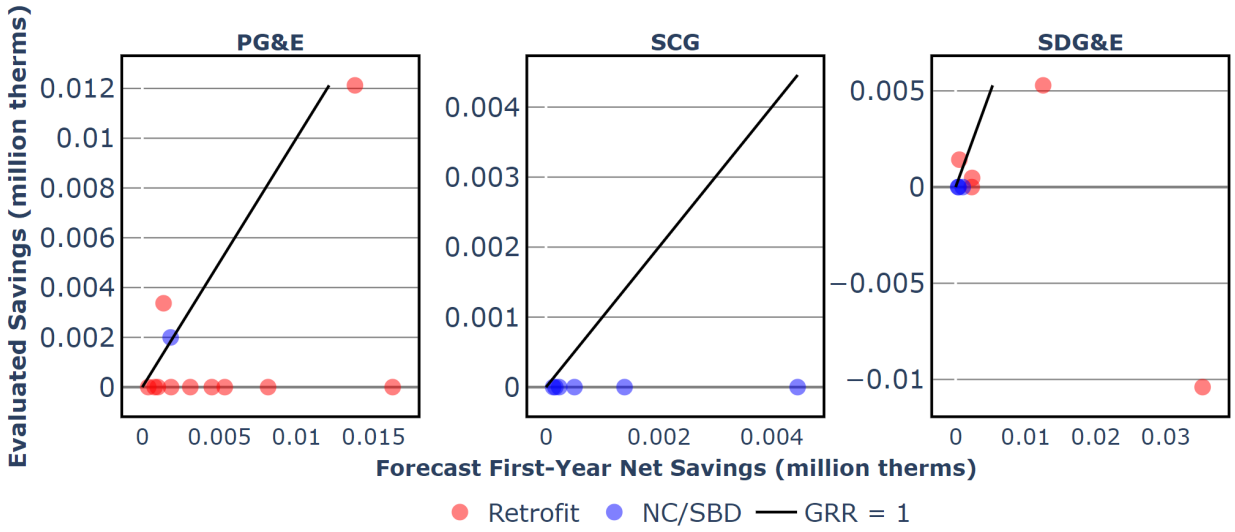

Figure 19: Evaluated vs. Claim First-Year Net Therm Savings, by PA

3.5 NTGR Reliability, Sensitivity, and Drivers

3.5.1 Reliability

One of the reasons for measuring the same concept (e.g., program influence) with multiple items is that we should assume that any individual item will produce results that are part true reflection of the concept, and part measurement error. Similarly, the multiple items should be positively correlated with each other. Sometimes an item is meant to ask a question in a negative way such that a high score means less of the concept. In this case, it would be reverse scored so that the rescored version is positively correlated with the other scale items. The degree to which all scale items are positively intercorrelated is commonly judged by Cronbach's alpha. The ideal alpha is about 0.75 to 0.85. Scores lower than that likely means that too much of the measurement error is not random. Scores higher than that reflect redundancy in the items and that the same concept could be adequately measured with fewer items.

As currently constructed, the NTGR does not show adequate consistency, at least in this program year. In fact, an alpha cannot be computed on the three items currently included in the self-reported NTGR. This is because of two negative correlations among the three items, with 2 correlations being almost zero. The largest inter-item correlation is negative (r=-0.34), which indicates that some items are measuring the opposite of what was intended. This, in spite of the inclusion of consistency checks in the interview, which were carried out by the same interviewers that have done this work over the past several years.

Table 21 shows the correlation matrix of the three items used in this evaluation of the 3 possible correlation coefficients, 2 are negative.

Table 21: NTGR Item Intercorrelations

NTGR Indicators*	PAI_1	PAI_2	PAI_3
PAI_1	1.0000		
PAI_2	-0.0103	1.0000	
PAI_3	0.0455	-0.3446	1.0000

* Sample size is 203, representing all respondents who gave answers to all relevant questions

3.5.2 Sensitivity

The current method of calculating the NTGR is to take an average of PAI_1, PAI_2, and PAI_3, inherently weighting each score equally. However, we can test the sensitivity of the overall NTGR by experimenting with different combinations of the PAI scores and by weighting them differently. Table 22 shows the results of this exercise. The NTGRs range between 0.39 and 0.47.

Table 22: Results of NTGR Sensitivity Analysis (All PAs and All Sample Points)

NTGR Weighting Scheme	NTGR Result*
1. 33.3% weights to scores PAI_2, PAI_3 and PAI_4 (current approach)	0.44
2. Remove score 2, 50% weight to scores 1 and 3	0.39
3. Remove score 1, 50% weight to scores 2 and 3	0.47
4. 50% weight to score 2, 25% to scores 1 and 3	0.43
5. 50% weight to score 3, 25% to scores 1 and 2	0.41

* Based on simple averaging

3.5.3 Drivers of the NTGR

We took two approaches —quartile and modeling—to analyzing the effects on unweighted NTGRs of different aspects of the programs, projects, and customers. The first approach was used and reported in previous years' evaluations of the Custom Program, but this report addresses only the current program year (2019) and the most recent one before this (2015).

In this analysis, we divided the NTGR scores into quartiles and compared the average characteristics or survey responses between the top and bottom quartiles. The first step in this type of analysis is to develop cut points for dividing the raw, claim-level NTGRs into four groups with equal numbers of claims.[32] It was not possible to define exactly equal groups because some scores accumulated at certain points in the distribution of scores. Table 23 shows the resulting NTGR threshold, the number of claims in the lowest and highest quartiles, and the mean NTGR within each quartile, for each of the two program years. Notably, the threshold for

[32] This analysis is based on claims, not projects; since there can be multiple claims in a project, and each claim could have a different NTGR, the claim-based observations are the best approach to what drives NTGRs and what they are sensitive to.

the highest quartile NTGR group is much lower in 2019 than in 2015, indicating the distribution of NTGRs is considerably lower in 2019. The threshold for defining the lowest quartile is very similar between the two years, so the difference in distribution is more concentrated at the top of the scale, i.e., there are fewer high NTGRs in 2019.

3.5.3.1 Quartile Approach

Table 23: Quartile Definitions

Item	Highest Quartile NTGR		Lowest Quartile NTGR	
Program year	2015	2019	2015	2019
Number of claims	52	84	52	81
NTGR Threshold value	>0.70	>0.55	<0.36	<0.40
Mean NTGR	0.80	0.62	0.18	0.28

Table 24 presents the results of this analysis for the highest and lowest quartiles, for program years 2015 and 2019, and for all five PAs (except MCE, which was not operating in 2015). These results represent only the respondents offering the strongest responses (importance scores of 8, 9, or 10). The sample sizes are also shown.

The program factors with the highest percentages in the highest quartile of NTGRs are the program factors that were most responsible for the high NTGRs. Of course, program factors should have the lowest percentage in the lowest quartile of NTGRs. In contrast, nonprogram factors that most frequently appear in the lowest quartile of NTGRs are those most responsible for the low NTGRs. To summarize, key NTGR drivers provide insight into the factors that drive high and low NTGRs, which can suggest certain program-design changes.

These analyses revealed some general themes and observations related to both program and nonprogram factors.

Program Factors

For this analysis, the four program factors asked about in the interviews were analyzed for how prevalent they are in the high and low quartiles of NTGR level. We would expect program factors to be rated much higher among high-NTGR participants than the low. This is the pattern we see in Table 24, except for one, the program incentives (the actual term used in the interview was "rebate" as that is how customers tend to think of them). Surprisingly, the program rebate was rated between 8 and 10 (on a 0-10 scale) by 74% of participants with *low* NTGRs, but the same was true for high-NTGR participants only 52% of the time. This is quite counterintuitive and is opposite in direction from the 2015 study.

Based on Table 24, it appears that program-provided technical assistance and feasibility studies are the most important part of the program in terms of influencing customers to take actions they wouldn't have taken absent the program (44% in high-quartile vs 27% in low-quartile

participants), followed by program marketing materials (25% in high-quartile and 16% in low-quartile participants). The rebate finding is quite anomalous.

Table 24: Key Program Factors Affecting NTGRs For All PAs

Key NTGR Drivers	Highest Quartile				Lowest Quartile			
	2015 Evaluation		2019 Evaluation		2015 Evaluation		2019 Evaluation	
	%	n	%	n	%	n	%	n
Program Rebate	100	52	52	84	50	52	74	81
Recommendations from program staff	16	51	13	99	41	51	0	82
Program marketing materials	16	51	25	84	14	44	16	81
Program-provided technical assistance or feasibility studies	65	52	44	84	40	52	27	81

Table 25: Key Non-Program Factors Affecting NTGRs For All PAs

Key NTGR Drivers	Highest Quartile				Lowest Quartile			
	2015 Evaluation		2019 Evaluation		2015 Evaluation		2019 Evaluation	
	%	n	%	n	%	n	%	n
Previous program experience	37	52	15	84	52	52	32	81
Made decision before discussions with Program	4	51	12	84	88	48	36	81
Industry standard practice	26	50	0	84	56	52	0	81
Corporate policy	33	52	33	84	59	52	36	81
Compliance with normal maintenance/replacement policies	15	52	20	84	38	52	19	81
Improved product quality	0	51	0	84	0	45	4	81
Regulatory compliance	0	52	29	84	0	52	21	81
Importance of age/condition of old equipment	35	51	30	84	40	52	48	81
Previous experience with energy efficiency			24	84			38	81
Vendor recommendation			14	84			58	81
Recommendation of a designer or consulting engineer			21	84			11	81
An acceptable ROI or payback			71	84			85	81
Information from a feasibility study			24	84			28	81

Nonprogram Factors

We would expect that non-program factors would be more important for low-quartile participants than high-quartile. That holds true for all factors that show a substantial difference between ratings of low- versus high-quartile participants (judging by a difference of at least ten percentage points between the two quartiles). Clearly, the strongest driver of a low NTGR in this analysis is a participant indicating the strong influence of a vendor in their decision (58% among low-quartile and 14% among high-quartile participants). Not surprisingly, participants who reported making their equipment decision before discussions with program staff are overrepresented in the low-quartile participants (36% vs 12%). Another driver appears to be how the participant rated the importance of the age and condition of the equipment being replaced; those rating it highly were much more likely to be in the low quartile. Other factors that drive participants into apparent free-ridership are previous experience with the program and/or with energy efficiency (32% vs 15%, and 38% vs 24%, respectively). Regulatory compliance was rarely, if ever mentioned by 2015 participants, but was present in substantial numbers in both the high- and low-quartile groups (29% in the high quartile, and 21% in the low) among 2019 participants.

3.5.3.2 Modeling Approach

The second approach we took to assessing the drivers of the NTGR involved multiple regression analyses to see if we could explain variation in the NTGRs as a function of customer, program, and project characteristics. Because we were interested in the raw effect of these factors on NTGR scores, we did not weight NTGR by savings or any other variable.

3.5.4 Enhanced-Rigor Analysis

Applying the enhanced-rigor methods to large and/or complex projects, we saw responses to specific questions that seemed to contradict other information, even between responses in the NTGR battery. Consistency checks within the interview revealed and resolved some inconsistencies in responses. In some cases, the respondent held to the apparently contradictory responses. Yet other inconsistencies or other measurement issues are not as obvious but may affect the results of the self-reported program influence. Following are three examples that we found evidence of in more than one case each.

Example 1: A respondent gives an importance rating of 10 to the program rebate, but in their narrative about the program, that though they definitely wanted the rebate, they would have done the project anyway because they had a sustainability policy. In other words, importance does not equate in everyone's mind, to having an important impact on the decision to install energy-efficient equipment. Similarly, participants will rate the help of their representative as being highly important, but closer examination reveals that what was helpful was the help they got in doing paperwork and keeping them informed about the progress of approval. Again, importance rating of a factor by itself does not always mean importance to the decision to install energy-efficient equipment.

Example 2: The respondent says in the open-ended responses that without the program they would have installed only 5-10% of what they did, but the NTGR from the algorithm is 0.37. Inspecting answer to the question, "If the <PA's> program had not been available, what is the likelihood that you would have installed exactly the same equipment?" shows a response of 8 on a 0-10 scale. These two pieces of information are clearly contradictory. It seems likely that the answer phrased in a natural way by the respondent reflects the reality more closely than the response, 8, which is meant to indicate they almost certainly would have installed exactly the same equipment if the program were not available. We believe this question is often misunderstood because of the way it is introduced. An alternative unvetted question was asked, but not incorporated into the NTGR, per guidance of CPUC staff: "…what action would you have taken if the program had not been available…which of the following alternatives would you have been MOST likely to do:…?" This respondent chose: "Installed fewer units" and chose "0" as the number they would have installed without the program. This answer wasn't the same as 5-10% but it was closer to that than the other response of 8 to indicate they almost certainly would have done the same thing.

Example 3: The respondent indicates in narrative responses how essential the rebates were in making the project happen even though there were other non-program factors that also had to be present to allow the project to move forward. Both were critical; neither was sufficient. In the section of the interview on balancing program and non-program factors, the respondent gives equal points to program and non-program factors. That does represent reality, but it misses the point that, without the program, according to the respondent, the project would not have happened. Thus, the implied NTGR component based on this question appears to be about 0.5, but really should have been closer to 1. (Of course, other questions would be incorporated to produce a final NTGR.) A question that asks what the respondent would have done without the program would likely be more accurate than the balancing question.

3.6 NTGR Subgroup Comparisons

The project workplan indicated that we would investigate whether some subgroups of participants or programs yielded better NTGRs than others, and the net sample design was guided by these plans. Of particular interest was whether the Custom Project Review (CPR) process helped to screen out free-riders, and whether projects associated with hard-to-reach (HTR) customers have higher NTGRs. The sample design called for larger sample sizes than it was possible to achieve, largely due to COVID-19 impacts on response rates. We attempted to over-sample projects with these characteristics, but, in the end, only six CPR sites agreed to an interview, and only 56 HTR sites did. These facts limit what we can say about these groups; we must consider the results of these analyses suggestive, certainly not definitive or conclusive. The indicator of statistical significance lets us know what patterns likely represent the population of participants, and which are less reliable. Even the results based on small samples provide suggestions about what might be pursued in future studies. For instance, it is interesting that CPR projects had somewhat higher NTGRs in this participant cohort, which conforms to

expectations. Future studies may be able to get more responses from projects subjected to CPR to give us more confidence in this pattern.

Table 26 suggests that the CPR process may have succeeded in screening out some free-riders. However, with a sample of only six such projects, conclusions are elusive. There were more HTR projects in the sample of net interviews, but their NTGRs failed to substantiate the expectation that HTR sites would be less likely to be free-riders than other types of project sites. Just in terms of the direction of the differences, HTR seems to be associated with *lower* NTGRs than non-HTR customers and, in comparison to all other project/site characteristics, it has the lowest NTGR.

Table 26: Mean NTGRs by Project and Site Characteristics

Project/Site Characteristic*	Mean		Std Dev		n	n for Present	Sig?
	Present	Absent	Present	Absent			
1. Custom Project Review	0.539	0.458	0.066	0.134	334	6	No
2. Hard-to-Reach	0.438	0.464	0.172	0.125	334	56	No
3. Direct-Install Lighting	0.449	0.473	0.143	0.120	334	185	Yes
4. Direct-Install Lighting-PG&E Only	0.449	0.483	0.143	0.119	241	185	Yes
5. New Construction	0.510	0.456	0.124	0.134	334	23	Yes

* The difference between DI Lighting and New Construction is statistically significant at the 0.1 level

As promised, we pursued these research questions in a regression model as well. We thought it advisable to look at these comparisons while controlling for other relevant factors, such as project size (measured by gross savings, annualized and lifecycle) and PA. Adding these factors into the model made all terms non-significant, but it did not change the direction of the relations we see in Table 26. This pattern gives us a bit more confidence in the relationships we see, but they are still only suggestive.

3.7 Changes in Effective Useful Life

The PAs assigned an effective useful life (EUL) to each claim by applying an approved EULs from the Database of Energy Efficiency Resources (DEER), adjusted as appropriate using project-specific conditions. We reviewed these assignments for the gross-savings sample and changed them, where needed, to better reflect the EUL of the efficiency measures. For most projects, the PAs assigned EULs that were too high. Examples of this included using the default 15-year EUL for all whole-building SBD projects or claiming some NR measures that were actually AOE measures with much lower EULs. We also found some OptC projects claimed as BRO-RCx, but which included capital NR or AOE measures with higher EULs. For these, we calculated the project EUL by estimating savings-weighted values for each measure in the claim, which increased the EUL. Table 27 and Table 28 summarize the EUL changes we made for the

gross electric sample and the gross gas sample, respectively. Statewide, the evaluation reduced EULs for kWh savings by 14.0% and for therm savings by 38.1%.

Table 27: Percent Change in Effective Useful Life, by Gross Electric Sample Domain

Gross Electric Sample Domain				Effective Useful Life		
PA	CPR	Project Type	Lighting Type	Forecast	Evaluated	Percent Change
MCE	No	Other Retro		10.9	5.6	-48.3
MCE Total				**10.9**	**5.6**	**-48.3**
PG&E	Yes	DI Ltg	Ext	12.0	5.3	-56.1
PG&E	Yes	DI Ltg	Int	9.8	7.7	-21.8
PG&E	Yes	Other Retro		8.2	3.8	-53.1
PG&E	No	DI Ltg	Ext	12.0	8.7	-27.1
PG&E	No	DI Ltg	Int	11.2	8.4	-24.3
PG&E	No	SBD		13.1	15.5	18.1
PG&E	No	Other Retro		11.5	10.8	-5.5
PG&E Total				**11.5**	**10.3**	**-10.7**
SCE	Yes	SBD		15.0	11.8	-21.3
SCE	Yes	Other Retro		7.2	5.0	-30.3
SCE	No	SBD		12.3	10.0	-18.5
SCE	No	OptC		4.7	4.4	-7.0
SCE	No	Other Retro		7.7	6.4	-16.5
SCE Total				**8.3**	**6.6**	**-19.9**
SDG&E	Yes	OptC		3.0	3.8	27.0
SDG&E	Yes	Other Retro		3.0	NA	NA
SDG&E	No	SBD		14.7	12.9	-12.4
SDG&E	No	OptC		3.3	3.6	7.8
SDG&E	No	Other Retro		13.0	10.3	-20.4
SDG&E Total				**9.1**	**7.0**	**-23.0**
Statewide				**10.6**	**9.1**	**-14.0**

Table 28: Percent Change in Effective Useful Life, by Gross Gas Sample Domain

Gross Gas Sample Domain			Effective Useful Life		
PA	CPR	Project Type	Forecast	Evaluated	Percent Change
PG&E	Yes	Other Retro	13.2	3.8	-71.5
PG&E	No	SBD	15.0	19.1	27.0

Gross Gas Sample Domain			Effective Useful Life		
PA	CPR	Project Type	Forecast	Evaluated	Percent Change
PG&E	No	Other Retro	12.9	6.6	-49.3
PG&E Total			**13.2**	**7.8**	**-41.4**
SCG	Yes	OptC	12.0	12.0	0.0
SCG	Yes	Other Retro	11.0	NA	NA
SCG	No	SBD	15.2	16.9	11.4
SCG	No	OptC	3.0	5.7	91.5
SCG	No	Other Retro	14.7	5.0	-65.9
SCG Total			**12.8**	**8.4**	**-34.1**
SDG&E	Yes	OptC	3.0	3.0	1.6
SDG&E	No	SBD	14.8	15.4	4.3
SDG&E	No	OptC	3.0	3.5	15.5
SDG&E	No	Other Retro	14.7	3.8	-74.2
SDG&E Total			**6.7**	**6.6**	**-0.8**
Statewide			**12.4**	**7.7**	**-38.1**

3.8 Comparison to 2015 Evaluation Findings

In years past, CPUC commissioned similar impact evaluations of custom projects, covering claims for 2015 and 2018 (the latter was issued only as a draft).

Table 29 compares the 2019 estimates of GRR and NTGR, by PA and statewide, with those from 2018 and 2015. The two major methodological differences between the 2019 and 2018 evaluations are that 1) 2018 included gross savings for all ineligible claims, while in 2019, such claims were set to zero, and 2) 2018 used a different net survey battery that was not fully vetted, while in 2019, we applied the same net survey battery from 2015. The 2015 evaluation values in this table were taken from Appendix A of the report *2015 Custom Impact Evaluation Industrial, Agricultural, and Large Commercial – Final Appendices*.

Overall, the GRRs and NTGRs fluctuated between the evaluated years. Some observations from the comparison of 2019 to 2015 are:

- Some GRRs are higher for 2019. For example, the PG&E therm GRR is higher, but others, such as the SCG therm GRR, are dramatically lower.
- Similarly, some NTGRs are higher for 2019. For example, the SDG&E kWh and therm NTGRs are slightly higher, but others, such as the SCG therm GRR, are very much lower. PG&E's NTGRs are slightly lower in 2019 for both kWh and therms.

- The statewide GRR for therms is considerably higher in 2019, while the GRR for kWh are significantly lower in 2019.
- Statewide, the NTGR for kWh is slightly lower in 2019, but noticeably lower for therms.

Notable differences between 2018 and 2019 results include:

- Lower 2019 GRRs generally because of the large number of ineligible claims set to zero.
- Higher 2019 GRR for MCE from improved baseline specification.
- Higher 2019 therm GRR for SDG&E from better quality Savings By Design savings claims.

Table 29: Comparison of 2019, 2018 and 2015 Life-Cycle GRR and NTGR

		2019 Evaluation		2018 Evaluation		2015 Evaluation	
PA	Ratio	kWh	Therm	kWh	Therm	kWh	Therm
MCE	GRR	0.78	NA	0.28	NA		
	NTGR	0.40	NA	0.38	NA		
PG&E	GRR	0.48	0.46	0.80	0.74	0.52	0.52
	NTGR	0.46	0.48	0.59	0.49	0.53	0.53
SCE	GRR	0.47	NA	0.69	NA	0.46	0.46
	NTGR	0.51	NA	0.55	NA	0.57	0.57
SCG	GRR	NA	0.14	NA	0.45	NA	0.56
	NTGR	NA	0.44	NA	0.45	NA	0.57
SDG&E	GRR	0.41	0.52	0.53	0.16	0.52	0.52
	NTGR	0.49	0.51	0.33	0.46	0.50	0.50
Statewide	**GRR**	**0.47**	**0.40**	**0.74**	**0.54**	**0.50**	**0.54**
	NTGR	**0.47**	**0.48**	**0.57**	**0.46**	**0.54**	**0.54**

3.9 Effect of Impact of Rule Violations on Savings

The evaluation assessed compliance with CPUC programmatic rules. When we found violations of these rules, we designated the claim or project as ineligible. All ineligible claims were assigned evaluated savings of zero. We discuss the rules for ineligibility in section 2.2.1. The forecast life-cycle savings associated with the ineligible projects are summarized by sample domain, PA, and statewide in Table 30 and Table 31, respectively, for sampled electric projects and sampled gas projects. The column labeled "Violate Rules %"shows the percent of the sampled forecast savings zeroed out because of rule violations.

That impact on electric savings for each domain ranged from zero (no violations) to 97% (nearly all the forecast savings). Effects across PAs ranged from 2.0% impact for MCE, to 33.0% of

electric savings for SCE. Rule violations statewide accounted for 22.3% of the forecast savings, significantly reducing the statewide GRR.

The effect of rule violations on gas savings was smaller than the electric impact for PG&E and much larger for SDG&E. The effect on statewide gas savings was much smaller, resulting in a reduction of about 10%.

Table 30: Forecast Savings for Electric Claims which Violate Rules

Gross Electric Sample Domain				Life-Cycle Forecast Gross Savings (MWh) for Sampled Projects		Violate Rules (%)
PA	CPR	Project Type	Lighting Type	Violate Rules	Total	
MCE	No	Other Retro		47	2,314	2.0
MCE Total				**47**	**2,314**	**2.0**
PG&E	Yes	DI Ltg	Ext	0	6,122	0.0
PG&E	Yes	DI Ltg	Int	0	2,956	0.0
PG&E	Yes	Other Retro		2,997	9,590	31.2
PG&E	No	DI Ltg	Ext	11,706	27,211	43.0
PG&E	No	DI Ltg	Int	6,547	32,998	19.8
PG&E	No	SBD		0	87,839	0.0
PG&E	No	Other Retro		41,584	243,555	17.1
PG&E Total				**62,834**	**410,273**	**15.3**
SCE	Yes	SBD		0	18,118	0.0
SCE	Yes	Other Retro		30,111	30,995	97.1
SCE	No	SBD		5,681	21,038	27.0
SCE	No	OptC		0	4,952	0.0
SCE	No	Other Retro		34,017	136,249	25.0
SCE Total				**69,809**	**211,353**	**33.0**
SDG&E	Yes	OptC		0	6,335	0.0
SDG&E	Yes	Other Retro		0	171	0.0
SDG&E	No	SBD		0	46,451	0.0
SDG&E	No	OptC		0	9,907	0.0
SDG&E	No	Other Retro		27,303	29,684	92.0

Gross Electric Sample Domain				Life-Cycle Forecast Gross Savings (MWh) for Sampled Projects		Violate Rules (%)
PA	CPR	Project Type	Lighting Type	Violate Rules	Total	
SDG&E Total				**27,303**	**92,549**	**29.5**
Statewide				**159,993**	**716,489**	**22.3**

Table 31: Forecast Savings for Gas Claims which Violate Rules

Gross Gas Sample Domain			Life-Cycle Forecast Gross Savings (Therm) for Sampled Projects		Violate Rules (%)
PA	CPR	Project Type	Violate Rules	Total	
PG&E	Yes	Other Retro	1,306,060	1,310,925	99.6
PG&E	No	SBD	0	4,902,238	0.0
PG&E	No	Other Retro	1,543,414	24,755,715	6.2
PG&E Total			**2,849,474**	**30,968,879**	**9.2**
SCG	Yes	OptC	0	42,768	0.0
SCG	Yes	Other Retro	0	711,128	0.0
SCG	No	SBD	63,315	636,056	10.0
SCG	No	OptC	0	293,001	0.0
SCG	No	Other Retro	925,243	3,622,945	25.5
SCG Total			**988,558**	**5,305,898**	**18.6**
SDG&E	Yes	OptC	0	531,837	0.0
SDG&E	No	SBD	0	1,096,815	0.0
SDG&E	No	OptC	0	333,124	0.0
SDG&E	No	Other Retro	107,750	384,564	28.0
SDG&E Total			**107,750**	**2,346,340**	**4.6**
Statewide			**3,945,782**	**38,621,117**	**10.2**

3.10 Impact of COVID-19 Pandemic

Our analysis of first-year and as-observed electric and gas savings focused on the best approach to determining life-cycle savings. It also provided insight into the impact that the pandemic had

on savings. Table 32 shows the difference between the first-year and the as-observed year of gross electric savings, both of which were based on customer reported conditions and when available trend or billing data. Only the first baseline-savings were considered in the comparisons, so that any unrelated impacts—such as an incorrect baseline specification for the second-baseline as-observed savings for AR measures—do not complicate the comparisons. The percent change indicates whether the as-observed year had greater savings (positive value) or less savings (negative value). The differences ranged widely across the domains but is relatively small across PAs and statewide. As expected, direct-install exterior lighting has no change, since those lights are automatically controlled and thus not affected by reduced building operation. SBD domains had either no change or increased savings for the as-observed year. When we identified that operating hours or production levels were increased or decreased in the ex post period, we also changed the corresponding baseline condition equally, so that the more efficient equipment operation was compared to equivalent baseline operating conditions. The PG&E Other retrofit domains have the largest decrease in savings. This is likely due to decreased operation or production, since these domains feature significant industrial production facilities. The differences between the first year and as-observed savings for OptC domains are small.

Table 32: Comparison of First-Year and As-Observed Electric Savings

Gross Electric Sample Domain				Annual Electric Savings (MWh)		
PA	CPR	Project Type	Lighting Type	First-Year	As-Observed	Percent Change
MCE	No	Other Retro		853	853	0.0
MCE Total				**853**	**853**	**0.0**
PG&E	Yes	DI Ltg	Ext	293	293	0.0
PG&E	Yes	DI Ltg	Int	81	84	3.7
PG&E	Yes	Other Retro		1,308	1,260	-3.7
PG&E	No	DI Ltg	Ext	5,194	5,194	0.0
PG&E	No	DI Ltg	Int	23,229	23,290	0.3
PG&E	No	SBD		7,373	7,986	8.3
PG&E	No	Other Retro		38,187	36,706	-3.9
PG&E Total				**75,664**	**74,813**	**-1.1**
SCE	Yes	SBD		1,332	1,332	0.0
SCE	Yes	Other Retro		75	75	0.0
SCE	No	SBD		344	630	83.3
SCE	No	OptC		1,194	1,194	0.0
SCE	No	Other Retro		24,609	24,609	0.0
SCE Total				**27,555**	**27,841**	**1.0**
SDG&E	Yes	OptC		2,646	2,665	0.7

Gross Electric Sample Domain				Annual Electric Savings (MWh)		
PA	CPR	Project Type	Lighting Type	First-Year	As-Observed	Percent Change
SDG&E	Yes	Other Retro		0	0	NA
SDG&E	No	SBD		1,888	2,175	15.2
SDG&E	No	OptC		1,857	1,833	-1.3
SDG&E	No	Other Retro		569	569	0.0
SDG&E Total				**6,960**	**7,242**	**4.1**
Statewide				**111,031**	**110,749**	**-0.3**

Table 33 shows the difference between first-year and as-observed-year gross gas savings. The range of differences across the domains is large. There is also a greater range across PAs compared to the results in Table 32. Overall, there is less gas savings in the as-observed year, except for the SCG OptC with no CPR domain and the SDG&E Other retrofit domains, which have quite small differences in gas savings. The largest single percent change is the SCG Other retrofit with CPR domain. This domain consists of a single eligible project whose production dropped significantly during the as-observed year.

Table 33: Comparison of First-Year and As-Observed Gas Savings

Gross Gas Sample Domain			Annual Gas Savings (Therm)		
PA	CPR	Project Type	First-Year	As-Observed	Percent Change
PG&E	Yes	Other Retro	5,523	0	-100.0
PG&E	No	SBD	210,778	204,410	-3.0
PG&E	No	Other Retro	1,981,835	1,860,882	-6.1
PG&E Total			**2,198,136**	**2,065,292**	**-6.0**
SCG	Yes	OptC	1,460	1,045	-28.4
SCG	Yes	Other Retro	0	0	NA
SCG	No	SBD	38,774	37,720	-2.7
SCG	No	OptC	30,609	36,394	18.9
SCG	No	Other Retro	72,042	67,979	-5.6
SCG Total			**142,886**	**143,138**	**0.2**
SDG&E	Yes	OptC	114,879	114,879	0.0
SDG&E	No	SBD	61,241	61,031	-0.3
SDG&E	No	OptC	30,445	25,578	-16.0
SDG&E	No	Other Retro	12,521	13,632	8.9

Gross Gas Sample Domain			Annual Gas Savings (Therm)		
PA	CPR	Project Type	First-Year	As-Observed	Percent Change
SDG&E Total			**219,086**	**215,121**	**-1.8**
Statewide			**2,560,108**	**2,423,551**	**-5.3**

3.11 Integrated Demand-Side Management

During the evaluation, we surveyed participants about integrated demand-side management (IDSM) at the customer's facilities to provide more information about this to the CPUC and the PAs. The survey assessed various installed equipment at customer sites, as well as customer interest in learning more about these technological possibilities for their facility. The figures below indicate the percentages of affirmative responses of the total count of responses received for each question. The vertical-axis label indicates the response count for electric and gas sampled projects. The title of each figure shows the question asked in the survey. Some responses are duplicated for projects included in both the electric and gas samples.

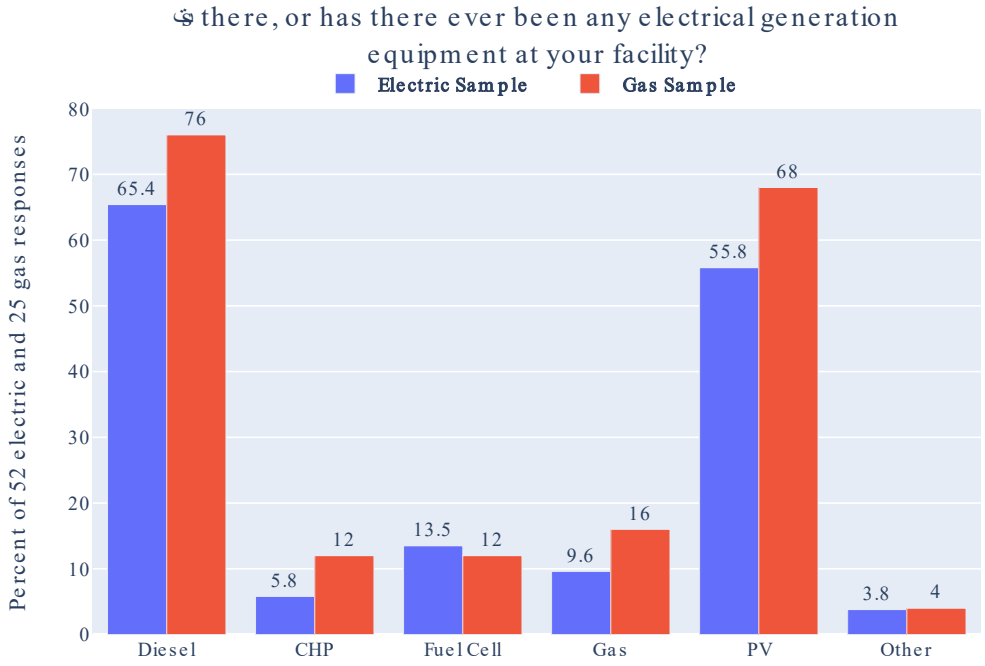

Figure 20: Electrical Generation Equipment

Figure 20 shows the responses to the question about existing or prior electrical generation equipment at the facility. There were 52 and 25 responses from customers in the electric and gas samples, respectively. A significant number of respondents had diesel and/or photovoltaic (PV) generation.

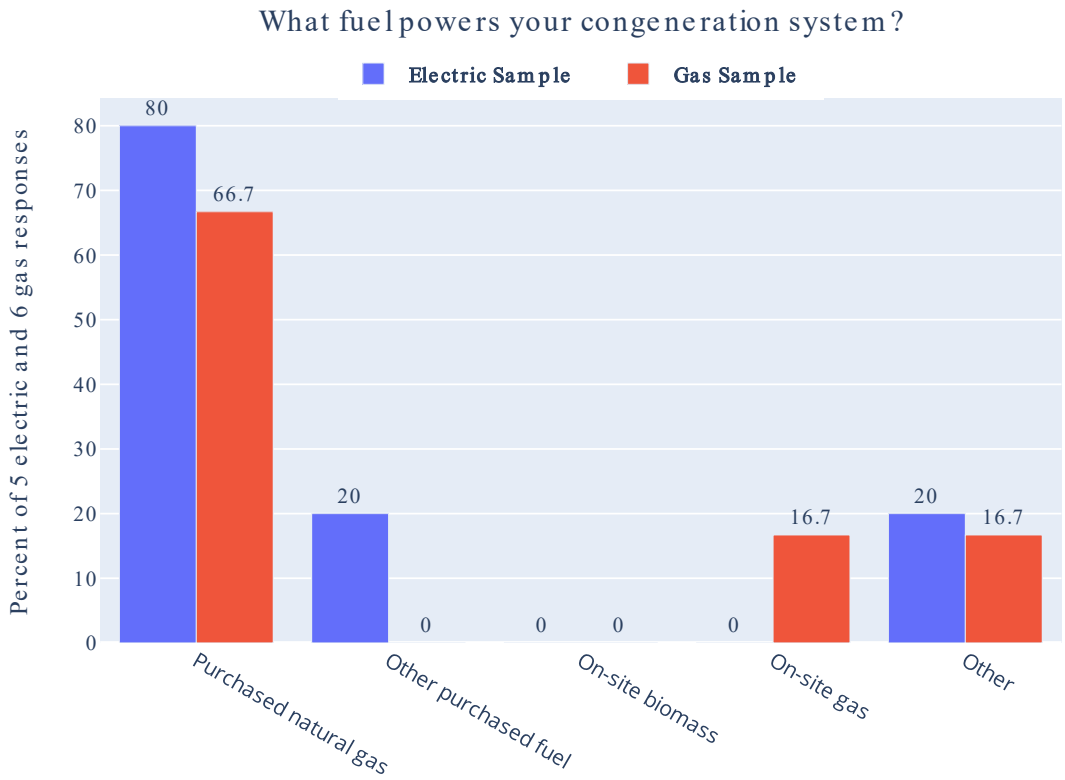

Figure 21: Fuels Powering Electrical Generation Equipment

Figure 21 shows the responses to the question about which fuel powers their cogeneration system, if present. There were five and six responses from customers in the electric and gas samples, respectively, that stated they have cogeneration systems. Purchased natural gas powers most cogeneration systems.

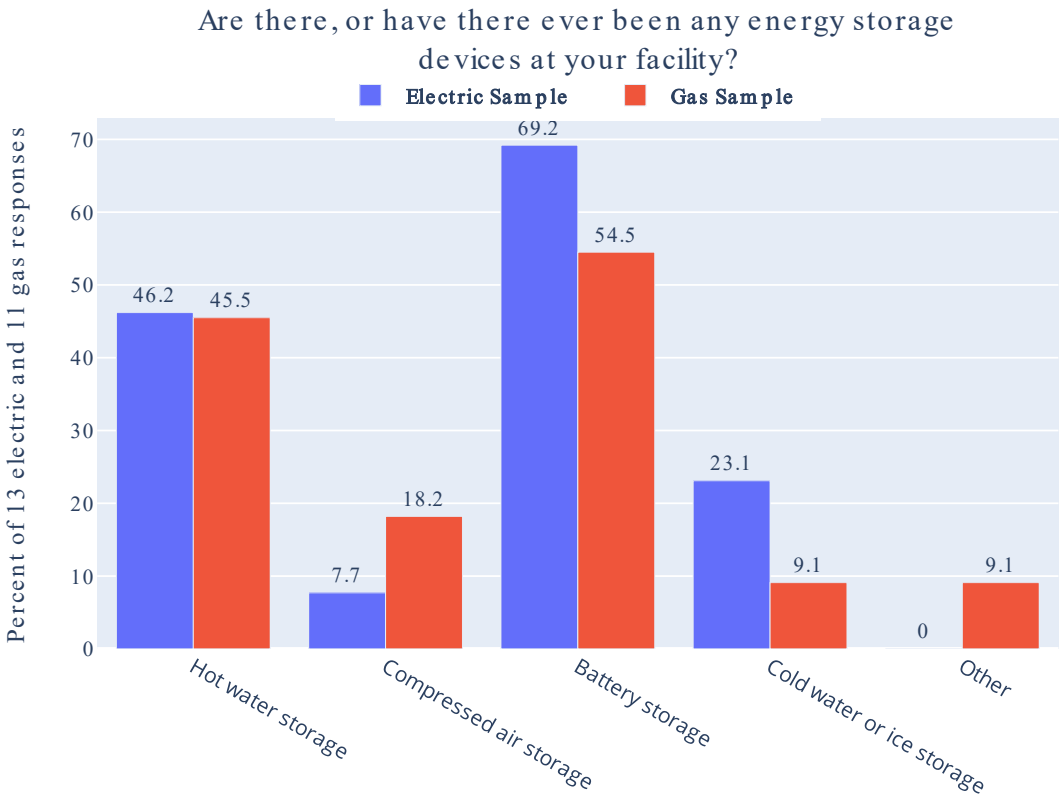

Figure 22: Energy Storage Devices

Figure 22 shows the responses to the question about existing or prior on-site energy storage. There were 13 and 11 responses from customers in the electric and gas samples, respectively, that stated they have or had energy storage systems. The first and second most common storage systems are batteries and hot water.

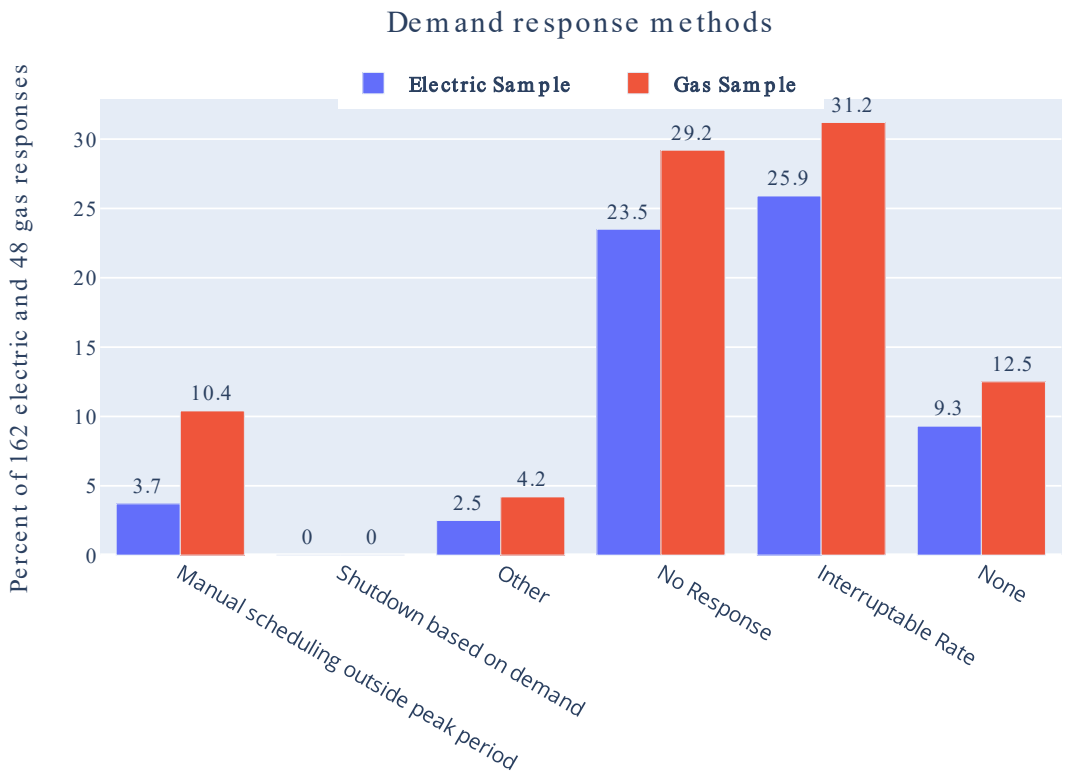

Figure 23: Demand response methods

Figure 23 shows the responses to the question about existing demand response methods used. There were 162 and 48 responses from customers to this question in the electric and gas samples, respectively. The most common response was that customers have an interruptible utility rate, closely followed by no demand response.

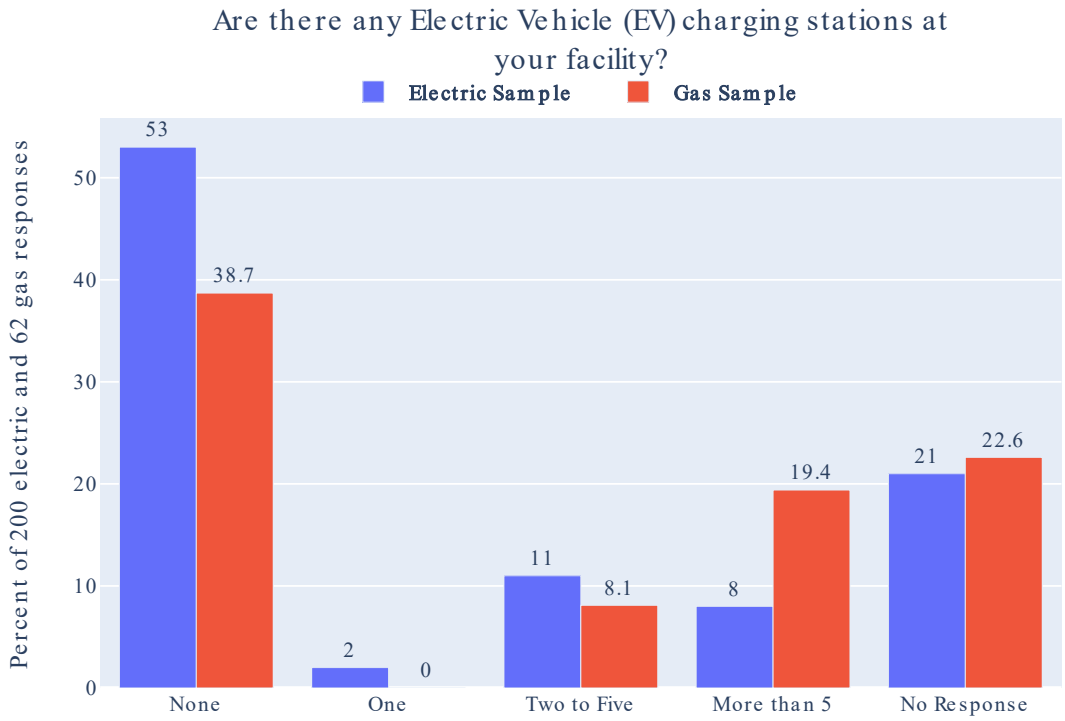

Figure 24: Electric Vehicle Charging Stations

Figure 24 shows the responses to the question about existing electric vehicle (EV) charging stations at their facility. There were 200 and 62 responses from customers in the electric and gas samples, respectively. Most do not have EV charging available, but several customers have one or more charging stations; most of those have more than five charging stations.

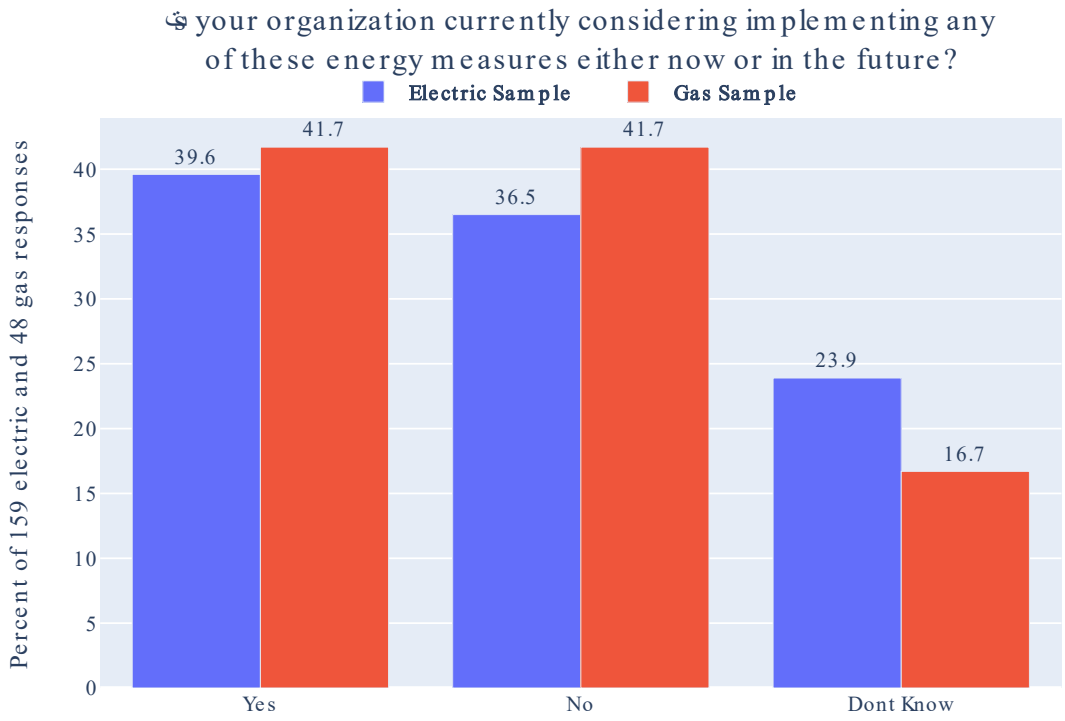

Figure 25: Considering Implementing IDSM

Figure 25 shows the responses to the question about whether the customer is currently considering implementing any of the IDSM measures mentioned in this survey. There were 159 and 48 responses from customers in the electric and gas samples, respectively. Of the customers that were aware of their organization's plans, slightly more stated that they are considering implementing some measure than those that are not.

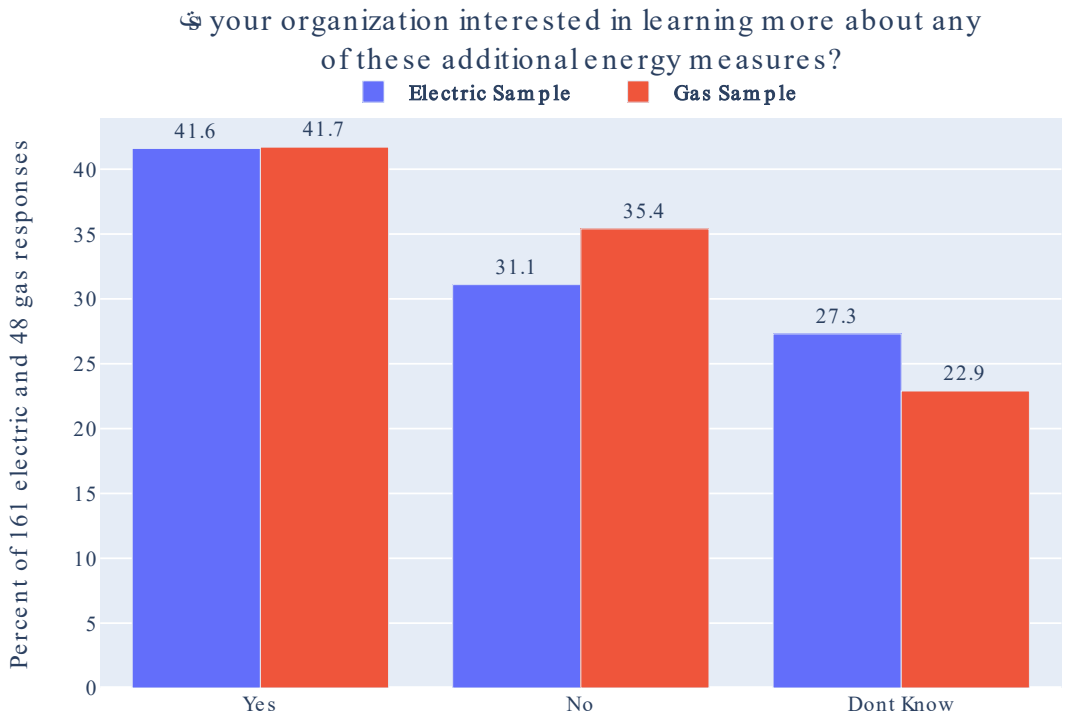

Figure 26: Interested in Learning More About IDSM

Figure 26 shows responses to the question of interest in learning more about any of the measures mentioned in the survey. There were 161 and 48 responses from customers in the electric and gas samples, respectively. Of the customers that had an opinion of their organization might consider, more are interested in learning more than are not.

4 Recommendations

In this section, we present the recommendations that have emerged from this evaluation. They are based on data-quality and analysis issues that we observed while carrying out this study. Implementing these recommendations will not only improve the accuracy of program-savings claims, but also enhance future evaluators' ability to verify those claims expeditiously.

This section has two parts. One provides recommendations that apply statewide, while the second lists recommendations specific to each PA. While this section lists all recommendations, section A.13 of Appendix A contains more granular recommendations, and also indicates the category of each recommendation—data collection, documentation, gross-savings estimation, adherence to rules, evaluation methods, or program design.

4.1 Applicable Statewide

This section presents recommendations that apply to all PAs statewide. They fall into four categories. The first set of recommendations apply generally to all types of projects, the second set to retrofit, the third set to NMEC/HOPPs, and the fourth set to new-construction programs and projects.

4.1.1 General

1. **Ensure that claim documentation is complete, consistent, and accurate.** Claims submitted to statewide claims database (CEDARS) that do not contain the names of the business and accurate contact information should be rejected until the PA provides this information. Claims should also include complete descriptions of the measures and how they save energy.
2. **PA Support of evaluation recruitment.** Recruiting customers to participate in this evaluation was unusually difficult. PAs should remind participants that, as part of their program-participation agreement, they are obligated to participate in multiple research efforts to estimate project savings.
3. **Use correct estimates of measure life.** PAs should ensure that EULs, particularly for Add-On Equipment (AOE) and Behavioral, Retrocommissioning and Operational (BRO) measures, are assigned appropriately.
4. **Improve documentation of program influence.** PAs should develop ways to motivate program staff to gather and share documents that adequately facilitate showing the program influence (or lack thereof) on the decision to incur extra cost to install high-efficiency equipment.
5. **Ensure program guidelines for comply with CPUC policy.** Programs should comply with CPUC policies. When approval to deviate from CPUC policy is granted, documentation supporting the approval should be provided.

6. **Avoid submitting custom projects that include only deemed measures.** Per DEER Resolution E-5152, deemed measures may sometimes be processed through custom programs to simplify the application process for a customer's convenience and to avoid multiple applications. Custom projects that include deemed measures, however, are required to use deemed values for energy savings and where appropriate retain deemed incentive amounts. In all cases where there is not an available deemed incentive amount, it must be documented and supported by evidence the rationale for using the customized program incentive rate in the project documentation files. Whole building and whole system projects (such as NMEC-approved building programs) are excepted from using deemed savings values when processed through custom or calculated platforms.
7. **Submit documentation that matches savings claim.** Final savings calculations and supporting documentation need to be clearly marked so that it is easy to identify documentation, calculation, and sequence of the project development, implementation, and completion. Some of the evaluated projects included savings documentation that did not match the savings claim. Other projects included multiple workbooks with no clear indication of which documentation was used to support the final savings claim. Post-installation adjustments were not documented. PAs should describe how the project documentation was used to form the final savings claim.
8. **Clearly identify project-approval and installation date.** Project-approval and installation dates are key pieces of information needed to establish project eligibility, but were missing from many project-documentation packages had missing project application approval, approval to install, or installation dates. Invoices should also clearly reference the application ID.
9. **Reduce time between project completion and post installation review.** Some projects had more than a year delay from the installation report and the PA post-installation technical review and final incentive payment. These delays were not substantiated with documentation. Review timelines should not significantly delay project claims.
10. **Analyze non-IOU fuel for projects with on-site generation.** Many projects with non-IOU energy sources did not analyze the non-IOU fuel as part of the savings calculations. Projects need to follow the CPUC guidance on non-IOU fuel analysis and include this analysis in the documentation.
11. **Inform CPUC staff promptly when a project selected for evaluation is withdrawn.** In one instance, during a request for supplemental evaluation data, the PA informed CPUC staff that the project had been withdrawn, wasting significant evaluation time. PAs should the claim and inform CPUC staff promptly when a selected project is withdrawn.
12. **Calculate savings-weighted EUL for projects with multiple measures.** Projects with multiple measures within a single claim must provide a measure-savings-weighted EUL for the single claim. PAs should calculate the savings-weighted EULs based on post-installation (claimed) savings. The savings-weighted EUL calculator provided on the CPUC website was used by many projects, but does not support BRO or AR measure application types (MAT).

4.1.2 Retrofit Projects

1. **Prohibit projects installed in other years.** Allow claims installed in prior years only if measurements had to continue into the current program year for which saving claims are being filed. File savings claims according to the rules and guidance prevailing at the time savings claims are due.
2. **Improve project documentation.** PAs should thoroughly document baselines and characteristics of installed equipment and operating parameters. These include operating hours, control methods and sequences, efficiencies, interaction with other systems, presence of on-site generation, and the age and condition of existing equipment. Provide clearly labeled, functioning calculation models (with algorithm descriptions) that match claimed savings. Include any collected pre- and post-installation data associated with savings calculations. Also provide descriptions of how this data was collected, and any normalizing information, such as weather or production levels.
3. **Do not claim ineligible projects**. Project applications that do not comply with statewide custom program participation rules should be rejected. Also, projects rejected during CPUC staff's custom project review must not be claimed, and savings claims for fuel types not provided by the PA should not be included.

4.1.3 Option C Projects

1. **Provide measure-type information**. PA documentation should clearly identify the MATs of the sub-measures within the project to assess whether IPMVP methods are appropriate for the project.
2. **Claim incremental savings** for projects with multiple reporting periods. For projects that featured multiple M&V submissions over multiple years, savings claims from one year to the next should be incremental to avoid double-counting savings over the EUL of the project.
3. **Identify and adjust for non-routine events** in Option C projects. Project implementers and developers should identify non-routine events as part of the model development and make non-routine adjustments as needed.

4.1.4 New-Construction Projects

1. **Provide standardized project documentation packages.** Savings By Design projects submittal packages should be standardized. They should include as-built plans and other component submittals sufficient to verify inputs to the simulation models. Document measure descriptions, calculations for deriving model inputs from equipment specifications, and relevant building model input and output files.
2. **Validate and update modeling software.** To reduce errors, implement a rigorous simulation model validation and vetting process before approving software for the Savings By Design

program. Also, update software to follow Savings By Design baseline guidance and build-in methods for calculating savings weighted EUL.

3. **Improve training and quality control.** Eliminate significant errors through improved procedures, focusing on proper building model inputs, such as window specifications. Training and QC should focus on building inputs for properly defining window (glazing) properties, and completely defining the model when running in noncompliance mode.
4. **Document system sizing calculations.** Provide documentation of simulation software calculations involving peak load determination and HVAC equipment sizing. This should include calculation inputs derived from the building description and the routines used to calculate peak loads and size HVAC equipment. Any projects using design-day simulations should provide input and output files for the sizing runs.
5. **Avoid filing savings claims based on software with known errors**. Base claims on the best available version of modeling software, avoiding or mitigating previously identified errors.
6. **Introduce methods for estimating savings for variable refrigerant flow systems,** by working with software developers to accurately model their performance.
7. **Require submetering for projects not separately metered.** PAs should require submetering of whole building electricity and gas consumption for new buildings receiving Savings By Design whole building incentives and submittal of the submetered data as part of the project documentation package**,** such as for buildings on large campuses.
8. **Improve software training for those using Integrated Environmental Solutions Energy Modeling Software (IESVE) for Saving by Design projects.** Review of projects using the IESVE software revealed modeling errors related to application of SBD baseline model guidance. These errors indicate a lack of knowledge about SBD modeling rules within the IESVE user community. PAs should provide additional training and guidance for developing and reviewing IESVE models.

4.1.5 Recommendations to CPUC

1. **CPUC support of evaluation recruitment.** Consider enforcing the authority granted in D.10.04.029 and developing stronger rules to ensure that customers meet their obligation to participate in EM&V studies. Dropping sampled customers from the study and selecting alternate projects often widens the error bound of savings estimates.
2. **Clarify unclear topics in guidance documents.** For all option C project analyses, the CPUC should clarify instructions regarding baseline model goodness-of-fit statistics and uncertainty of fractional savings, as well as provide guidance on peak demand savings methods.
3. **Resolve EUL inconsistencies**. Interior LED fixture measure life values, which are not clearly defined in DEER and/or may conflict with related workpapers, should be resolved.

4.2 Applicable to Specific PAs

Table 34 presents recommendations specific to each PA.

Table 34: Recommendations Specific to Each Program Administrator

Recommendation	Applicable PA				
	MCE	PG&E	SCE	SCG	SDG&E
All Project Types					
Ensure that claims are complete, consistent, and accurate	☑	☑	☑	☑	☑
PA support of evaluation recruitment	☑	☑	☑	☑	☑
Use correct estimates of measure life	☑	☑	☑	☑	☑
Improve documentation of program influence.	☑	☑	☑	☑	☑
Check Program guidelines for compliance with CPUC policy.	☐	☑	☑	☑	☑
Do not submit custom projects comprised entirely of deemed measures	☑	☑	☑	☑	☑
Submit documentation that matches savings claim	☑	☑	☑	☑	☑
Clearly identify project approval and installation date	☑	☑	☑	☑	☑
Reduce time between project completion and post installation review.	☑	☑	☑	☑	☑
Conduct non-IOU fuel analysis for projects with on-site generation	☑	☑	☑	☑	☑
Inform CPUC staff promptly when a selected project is withdrawn.	☐	☐	☐	☐	☑
Calculate savings weighted EUL for projects with multiple measures	☑	☑	☑	☑	☑
Retrofit					
Prohibit projects installed in other years.	☑	☑	☑	☑	☑
Improve project documentation.	☑	☑	☑	☑	☑
Do not claim ineligible projects.	☑	☑	☑	☑	☑
Option C					
Provide measure type and project life information	☐	☑	☑	☑	☑
Provide incremental savings claims for projects with multiple reporting periods	☐	☐	☐	☐	☑
Identify and adjust for non-routine events	☐	☑	☑	☑	☑
Clarify unclear topics in guidance documents	☐	☑	☑	☐	☑
New Construction / Savings By Design					
Validate and update modeling software	☐	☑	☑	☑	☑
Improve training and quality-control	☐	☑	☑	☑	☑

Recommendation	Applicable PA				
	MCE	PG&E	SCE	SCG	SDG&E
Document system-sizing calculations	☐	☑	☑	☑	☑
Provide standardized project documentation packages	☐	☑	☑	☑	☑
Avoid filing claims based on software with known errors	☐	☑	☑	☑	☑
Introduce methods for estimating savings for variable refrigerant flow systems	☐	☑	☑	☑	☑
Require submetering for projects not separately metered	☐	☑	☑	☑	☑
Improve software training for users of IESVE software in SBD projects	☐	☑	☑	☑	☑

5 Data Products

In this section, we describe the data products that substantiate the findings of this report.

5.1 Public

We provide an Excel workbook as a companion to this report. It does not contain any information that identifies individual customers served by the PAs. The workbook contains:

- **Primary Data**. Primary data from CEDARS, DEER, telephone surveys (decision makers and their vendors and operations staff), project documentation provided by the PAs, and site inspections and in-person interviews.
- **Products of Data Analysis**. Documentation of our sample selection, analysis of gross savings, analysis of NTGR, analysis of EUL, and estimates of gross and net savings for sampled claims aggregated for projects, domains, PAs, and the state.
- **Report Tables and Plots**. Source tables and plots that appear in the body and appendices of the report.

The sheet named "Caption" lists the contents of the workbook. Each row corresponds to one of the other sheets in the workbook. The column headed "Caption" describes what is contained in each sheet. The captions are hyperlinks to the sheets and each sheet has a hyperlink in cell A1 that returns to the captions sheet. The column headed "Destination" indicates where the contents can be found:

- **Report Workbook**. The contents are only provided in this workbook. This includes the listings of primary data and products of data analysis that are too voluminous to be reproduced in the report, e.g., the responses to each of the NTGR questions.
- **Body**. The contents appear in the body of the report and can be found in this report by searching on the caption.
- **Appendix**. The contents appear in the appendices of this report and can be found in the report by searching on the caption.

5.2 PA-Specific

Other of our data products contain information that identifies individual electric or gas customers and are only available to the PA(s) that serve these customers. Folders containing all of our work products are available for PA-specific review in the Evaluation, Measurement, and Verification (EM&V) platform on the website www.deeresources.info.

Appendices

This section contains the following appendices:

A. Detailed Findings and Recommendations

B. Statistical Estimation Procedures

C. List of Claims with Zero or Negative Savings

D. List of Claims That Violate Rules

E. Sample Frame and Strata

F. Responses to Stakeholder Comments

G. Claim Level Evaluation Results

A. Detailed Findings and Recommendations

A.1 Gross Life-Cycle Savings (MWh)

Table 35: Gross Life-Cycle Savings (MWh)

Gross Electric Sample Domain				Life-Cycle Gross Savings (MWh)			Forecast Passed Through (%)	Evaluated	
PA	CPR	Project Type	Lighting Type	Forecast	Evaluated	GRR		GRR	RP (%)*
MCE	No	Other Retro		5,467	4,274	0.78	0	0.78	22.8
MCE Total				**5,467**	**4,274**	**0.78**	**0**	**0.78**	**22.8**
PG&E	Yes	DI Ltg	Ext	6,122	1,644	0.27	0	0.27	0.0
PG&E	Yes	DI Ltg	Int	2,956	620	0.21	0	0.21	0.0
PG&E	Yes	Other Retro		15,457	4,970	0.32	0	0.32	5.3
PG&E	No	DI Ltg	Ext	187,246	46,609	0.25	0	0.25	77.8
PG&E	No	DI Ltg	Int	623,346	209,372	0.34	0	0.34	32.6
PG&E	No	SBD		133,193	123,244	0.93	0	0.93	26.0
PG&E	No	Other Retro		678,636	396,243	0.58	0	0.58	23.1
PG&E Total				**1,646,957**	**782,703**	**0.48**	**0**	**0.48**	**15.8**
SCE	Yes	SBD		18,118	15,723	0.87	0	0.87	0.0
SCE	Yes	Other Retro		30,995	377	0.01	0	0.01	0.0
SCE	No	SBD		71,961	6,095	0.08	0	0.08	70.5
SCE	No	OptC		4,952	5,219	1.05	0	1.05	0.0
SCE	No	Other Retro		284,538	166,909	0.59	0	0.59	25.1
SCE Total				**410,565**	**194,323**	**0.47**	**0**	**0.47**	**21.7**
SDG&E	Yes	OptC		6,589	10,105	1.53	0	1.53	1.1
SDG&E	Yes	Other Retro		171	0	0.00	0	0.00	NA
SDG&E	No	SBD		64,205	28,031	0.44	0	0.44	18.2
SDG&E	No	OptC		12,936	6,508	0.50	0	0.50	33.2
SDG&E	No	Other Retro		40,496	6,410	0.16	0	0.16	86.6

Gross Electric Sample Domain				Life-Cycle Gross Savings (MWh)			Forecast Passed Through (%)	Evaluated	
PA	CPR	Project Type	Lighting Type	Forecast	Evaluated	GRR		GRR	RP (%)*
SDG&E Total				**124,397**	**51,053**	**0.41**	**0**	**0.41**	**15.4**
Statewide				**2,187,387**	**1,032,354**	**0.47**	**0**	**0.47**	**12.7**

* Relative precision at the 90% confidence level.

A.2 Gross Life-Cycle Savings (MW)

Table 36: Gross Life-Cycle Savings (MW)

Gross Electric Sample Domain				Life-Cycle Gross Savings (MW)			Forecast Passed Through (%)	Evaluated	
PA	CPR	Project Type	Lighting Type	Forecast	Evaluated	GRR		GRR	RP (%)*
MCE	No	Other Retro		1.14	0.89	0.78	0	0.78	28.51
MCE Total				**1.14**	**0.89**	**0.78**	**0**	**0.78**	**28.51**
PG&E	Yes	DI Ltg	Ext	0.00	NA	NA	0	NA	NA
PG&E	Yes	DI Ltg	Int	0.62	0.12	0.19	0	0.19	0.00
PG&E	Yes	Other Retro		1.24	0.45	0.36	0	0.36	0.00
PG&E	No	DI Ltg	Ext	0.99	0.00	0.00	0	0.00	NA
PG&E	No	DI Ltg	Int	116.34	49.16	0.42	0	0.42	63.53
PG&E	No	SBD		25.72	28.34	1.10	0	1.10	31.09
PG&E	No	Other Retro		90.50	41.14	0.45	0	0.45	55.60
PG&E Total				**235.41**	**119.21**	**0.51**	**0**	**0.51**	**33.30**
SCE	Yes	SBD		5.42	3.92	0.72	0	0.72	0.00
SCE	Yes	Other Retro		5.50	0.05	0.01	0	0.01	0.00
SCE	No	SBD		16.56	6.70	0.40	0	0.40	49.43
SCE	No	OptC		0.35	0.43	1.21	0	1.21	0.00
SCE	No	Other Retro		17.41	9.75	0.56	0	0.56	58.89
SCE Total				**45.24**	**20.85**	**0.46**	**0**	**0.46**	**31.79**
SDG&E	Yes	OptC		0.33	0.73	2.19	0	2.19	0.00

Gross Electric Sample Domain				Life-Cycle Gross Savings (MW)			Forecast Passed Through (%)	Evaluated	
PA	CPR	Project Type	Lighting Type	Forecast	Evaluated	GRR		GRR	RP (%)*
SDG&E	Yes	Other Retro		0.00	NA	NA	0	NA	NA
SDG&E	No	SBD		12.09	6.98	0.58	0	0.58	41.22
SDG&E	No	OptC		1.45	1.31	0.90	0	0.90	22.42
SDG&E	No	Other Retro		1.99	1.16	0.58	0	0.58	26.61
SDG&E Total				**15.85**	**10.18**	**0.64**	**0**	**0.64**	**28.58**
Statewide				**297.65**	**151.13**	**0.51**	**0**	**0.51**	**26.70**

* Relative precision at the 90% confidence level.

A.3 Gross Life-Cycle Savings (Therm)

Table 37: Gross Life-Cycle Savings (Therm)

Gross Gas Sample Domain			Life-Cycle Gross Savings (Therm)			Forecast Passed Through (%)	Evaluated	
PA	CPR	Project Type	Forecast	Evaluated	GRR		GRR	RP (%)*
PG&E	Yes	Other Retro	1,310,925	5,415	0.00	0	0.00	0.0
PG&E	No	SBD	5,971,570	3,899,678	0.65	0	0.65	1.1
PG&E	No	Other Retro	28,562,017	12,474,151	0.44	0	0.44	7.7
PG&E Total			**35,844,513**	**16,379,244**	**0.46**	**0**	**0.46**	**5.9**
SCG	Yes	OptC	42,768	12,955	0.30	0	0.30	0.0
SCG	Yes	Other Retro	711,128	0	0.00	0	0.00	NA
SCG	No	SBD	2,602,788	638,756	0.25	0	0.25	50.5
SCG	No	OptC	293,001	198,040	0.68	0	0.68	0.0
SCG	No	Other Retro	4,995,882	342,848	0.07	0	0.07	53.7
SCG Total			**8,645,567**	**1,192,599**	**0.14**	**0**	**0.14**	**31.2**
SDG&E	Yes	OptC	531,837	350,040	0.66	0	0.66	0.0
SDG&E	No	SBD	1,490,517	948,003	0.64	0	0.64	35.1
SDG&E	No	OptC	333,124	93,192	0.28	0	0.28	0.0

Gross Gas Sample Domain			Life-Cycle Gross Savings (Therm)			Forecast Passed Through (%)	Evaluated	
PA	CPR	Project Type	Forecast	Evaluated	GRR		GRR	RP (%)*
SDG&E	No	Other Retro	436,929	62,106	0.14	0	0.14	47.1
SDG&E Total			**2,792,407**	**1,453,342**	**0.52**	**0**	**0.52**	**23.0**
Statewide			**47,282,487**	**19,025,185**	**0.40**	**0**	**0.40**	**5.7**

* Relative precision at the 90% confidence level.

A.4 Net Life-Cycle Savings (MWh)

Table 38: Net Life-Cycle Savings (MWh)

Sample Domain		Life-Cycle Net Savings (MWh)			NTGR		Forecast Passed Through (%)	Evaluated		
PA	Project Type	Forecast	Evaluated	NRR	Forecast	Evaluated		Forecast NTGR	NTGR	NTGR RP (%)*
MCE	Other Retro	4,411	1,705	0.39	0.90	0.40	0.00	0.90	0.40	15.7
MCE Total		**4,411**	**1,705**	**0.39**	**0.90**	**0.40**	**0.00**	**0.90**	**0.40**	**15.5**
PG&E	DI Ltg	623,427	111,665	0.18	0.84	0.43	0.00	0.84	0.43	4.8
PG&E	SBD	59,937	69,838	1.17	0.50	0.57	0.00	0.50	0.57	0.0
PG&E	Other Retro	404,454	176,845	0.44	0.65	0.44	0.00	0.65	0.44	3.6
PG&E Total		**1,087,818**	**358,349**	**0.33**	**0.73**	**0.46**	**0.00**	**0.73**	**0.46**	**2.1**
SCE	SBD	39,138	9,024	0.23	0.48	0.41	0.00	0.48	0.41	6.3
SCE	Other Retro	180,931	90,280	0.50	0.63	0.52	0.00	0.63	0.52	8.0
SCE Total		**220,069**	**99,304**	**0.45**	**0.59**	**0.51**	**0.00**	**0.59**	**0.51**	**7.2**
SDG&E	SBD	34,670	14,824	0.43	0.60	0.53	0.00	0.60	0.53	24.2
SDG&E	Other Retro	47,402	10,042	0.21	0.87	0.44	0.00	0.87	0.44	5.2
SDG&E Total		**82,072**	**24,866**	**0.30**	**0.73**	**0.49**	**0.00**	**0.73**	**0.49**	**14.5**
Statewide		**1,394,370**	**484,224**	**0.35**	**0.71**	**0.47**	**0.00**	**0.71**	**0.47**	**2.3**

* Relative precision at the 90% confidence level.

A.5 Net Life-Cycle Savings (MW)

Table 39: Net Life-Cycle Savings (MW)

Sample Domain		Life-Cycle Net Savings (MW)			NTGR		Forecast Passed Through (%)	Evaluated		
PA	Project Type	Forecast	Evaluated	NRR	Forecast	Evaluated		Forecast NTGR	NTGR	NTGR RP (%)*
MCE	Other Retro	0.92	0.37	0.40	0.90	0.42	0	0.90	0.42	14.7
MCE Total		**0.92**	**0.37**	**0.40**	**0.90**	**0.42**	**0**	**0.90**	**0.42**	**14.7**
PG&E	DI Ltg	93.59	19.02	0.20	0.88	0.39	0	0.88	0.39	6.3
PG&E	SBD	11.57	16.06	1.39	0.50	0.57	0	0.50	0.57	0.0
PG&E	Other Retro	51.63	17.60	0.34	0.63	0.42	0	0.63	0.42	4.1
PG&E Total		**156.79**	**52.68**	**0.34**	**0.74**	**0.44**	**0**	**0.74**	**0.44**	**2.4**
SCE	SBD	9.55	4.52	0.47	0.48	0.43	0	0.48	0.43	6.4
SCE	Other Retro	12.61	5.23	0.41	0.60	0.51	0	0.60	0.51	12.9
SCE Total		**22.16**	**9.75**	**0.44**	**0.54**	**0.47**	**0**	**0.54**	**0.47**	**7.2**
SDG&E	SBD	6.53	3.62	0.56	0.60	0.52	0	0.60	0.52	24.7
SDG&E	Other Retro	2.26	1.18	0.52	0.67	0.37	0	0.67	0.37	2.9
SDG&E Total		**8.79**	**4.80**	**0.55**	**0.62**	**0.47**	**0**	**0.62**	**0.47**	**18.7**
Statewide		**188.65**	**67.59**	**0.36**	**0.70**	**0.45**	**0**	**0.70**	**0.45**	**2.5**

* Relative precision at the 90% confidence level.

A.6 Net Life-Cycle Savings (Therm)

Table 40: Net Life-Cycle Savings (Therm)

Sample Domain		Life-Cycle Net Savings (Therm)			NTGR		Forecast Passed Through (%)	Evaluated		
PA	Project Type	Forecast	Evaluated	NRR	Forecast	Evaluated		Forecast NTGR	NTGR	NTGR RP (%)*
PG&E	SBD	2,687,207	2,209,818	0.82	0.50	0.57	0	0.50	0.57	6.4
PG&E	Other Retro	16,143,689	5,597,227	0.35	0.60	0.45	0	0.60	0.45	6.4

Sample Domain		Life-Cycle Net Savings (Therm)			NTGR		Forecast Passed Through (%)	Evaluated		
PA	Project Type	Forecast	Evaluated	NRR	Forecast	Evaluated		Forecast NTGR	NTGR	NTGR RP (%)*
PG&E Total		**18,830,896**	**7,807,045**	**0.41**	**0.58**	**0.48**	**0**	**0.58**	**0.48**	**6.4**
SCG	SBD	1,171,255	279,478	0.24	0.50	0.44	0	0.50	0.44	6.9
SCG	Other Retro	3,519,919	242,325	0.07	0.65	0.44	0	0.65	0.44	6.9
SCG Total		**4,691,173**	**521,803**	**0.11**	**0.60**	**0.44**	**0**	**0.60**	**0.44**	**6.9**
SDG&E	SBD	668,486	508,794	0.76	0.50	0.54	0	0.50	0.54	17.7
SDG&E	Other Retro	1,080,079	226,442	0.21	0.92	0.45	0	0.92	0.45	17.7
SDG&E Total		**1,748,565**	**735,236**	**0.42**	**0.70**	**0.51**	**0**	**0.70**	**0.51**	**17.7**
Statewide		**25,270,635**	**9,064,084**	**0.36**	**0.59**	**0.48**	**0**	**0.59**	**0.48**	**5.7**

* Relative precision at the 90% confidence level.

A.7 Accelerated Replacement, EUL, and Gross Savings (MWh)

Table 41: Accelerated Replacement, EUL, and Gross Savings (MWh)

Gross Electric Sample Domain				Passed Through Savings	% AR		Evaluated Average EUL (yr)	Evaluated Gross Savings (MWh)		
PA	CPR	Project Type	Lighting Type		Forecast	Evaluated		Life-Cycle	First-Year	Annualized
MCE	No	Other Retro		0	100.00	65.53	5.6	4,274	853	758
MCE Total				**0**	**100.00**	**65.53**	**5.6**	**4,274**	**853**	**758**
PG&E	Yes	DI Ltg	Ext	0	0.00	93.09	5.3	1,644	293	312
PG&E	Yes	DI Ltg	Int	0	15.96	11.93	7.7	620	81	81
PG&E	Yes	Other Retro		0	0.00	0.00	3.8	4,970	1,308	1,294
PG&E	No	DI Ltg	Ext	0	0.00	35.78	8.7	46,609	5,194	5,329
PG&E	No	DI Ltg	Int	0	1.10	2.36	8.4	209,372	23,229	24,781
PG&E	No	SBD		0	0.00	0.00	15.5	123,244	7,373	7,944

Gross Electric Sample Domain				Passed Through Savings	% AR		Evaluated Average EUL (yr)	Evaluated Gross Savings (MWh)		
PA	CPR	Project Type	Lighting Type		Forecast	Evaluated		Life-Cycle	First-Year	Annualized
PG&E	No	Other Retro		0	0.00	4.06	10.8	396,243	38,187	36,528
PG&E Total				**0**	**0.20**	**4.08**	**10.3**	**782,703**	**75,664**	**76,270**
SCE	Yes	SBD		0	0.00	0.00	11.8	15,723	1,332	1,332
SCE	Yes	Other Retro		0	34.41	0.00	5.0	377	75	75
SCE	No	SBD		0	0.00	0.00	10.0	6,095	344	608
SCE	No	OptC		0	0.00	0.00	4.4	5,219	1,194	1,194
SCE	No	Other Retro		0	10.65	12.82	6.4	166,909	24,609	26,040
SCE Total				**0**	**11.91**	**9.95**	**6.6**	**194,323**	**27,555**	**29,249**
SDG&E	Yes	OptC		0	0.00	0.00	3.8	10,105	2,646	2,659
SDG&E	Yes	Other Retro		0	0.00	NA		0	0	0
SDG&E	No	SBD		0	0.00	0.00	12.9	28,031	1,888	2,174
SDG&E	No	OptC		0	0.00	0.00	3.6	6,508	1,857	1,819
SDG&E	No	Other Retro		0	0.00	0.00	10.3	6,410	569	621
SDG&E Total				**0**	**0.00**	**0.00**	**7.0**	**51,053**	**6,960**	**7,273**
Statewide				**0**	**3.95**	**5.49**	**9.1**	**1,032,354**	**111,031**	**113,550**

A.8 Accelerated Replacement, EUL, and Net Savings (MWh)

Table 42: Accelerated Replacement, EUL, and Net Savings (MWh)

Sample Domain		Passed Through Savings	% AR		Evaluated Average EUL (yr)	Evaluated Net Savings (MWh)		
PA	Project Type		Forecast	Evaluated		Life-Cycle	First-Year	Annualized
MCE	Other Retro	0	100.00	57.80	5.3	1,705	342	319
MCE Total		**0**	**100.00**	**57.80**	**5.3**	**1,705**	**342**	**319**
PG&E	DI Ltg	0	9.95	82.96	6.7	111,665	12,470	16,698
PG&E	SBD	0	0.00	0.00	13.1	69,838	4,178	5,342
PG&E	Other Retro	0	0.11	0.12	13.7	176,845	17,443	12,949
PG&E Total		**0**	**1.61**	**5.00**	**10.2**	**358,349**	**34,091**	**34,989**
SCE	SBD	0	0.00	0.00	5.5	9,024	693	1,637
SCE	Other Retro	0	15.30	0.00	15.5	90,280	13,543	5,812
SCE Total		**0**	**8.39**	**0.00**	**13.3**	**99,304**	**14,237**	**7,449**
SDG&E	SBD	0	0.00	0.00	10.3	14,824	998	1,441
SDG&E	Other Retro	0	0.00	0.00	2.5	10,042	2,212	4,023
SDG&E Total		**0**	**0.00**	**0.00**	**4.6**	**24,866**	**3,211**	**5,465**
Statewide		**0**	**2.94**	**2.94**	**10.0**	**484,224**	**51,880**	**48,223**

A.9 Accelerated Replacement, EUL, and Gross Savings (MW)

Table 43: Accelerated Replacement, EUL, and Gross Savings (MW)

Gross Electric Sample Domain				Passed Through Savings	% AR		Evaluated Average EUL (yr)	Evaluated Gross Savings (MW)		
PA	CPR	Project Type	Lighting Type		Forecast	Evaluated		Life-Cycle	First-Year	Annualized
MCE	No	Other Retro		0	100.00	69.64	5.1	0.89	0.19	0.18
MCE Total				**0**	**100.00**	**69.64**	**5.1**	**0.89**	**0.19**	**0.18**

Gross Electric Sample Domain				Passed Through Savings	% AR		Evaluated Average EUL (yr)	Evaluated Gross Savings (MW)		
PA	CPR	Project Type	Lighting Type		Forecast	Evaluated		Life-Cycle	First-Year	Annualized
PG&E	Yes	DI Ltg	Ext	0	NA	NA	NA	NA	NA	NA
PG&E	Yes	DI Ltg	Int	0	5.15	15.99	7.1	0.12	0.02	0.02
PG&E	Yes	Other Retro		0	0.00	0.00	4.5	0.45	0.14	0.10
PG&E	No	DI Ltg	Ext	0	0.00	NA		0.00	0.00	0.00
PG&E	No	DI Ltg	Int	0	1.96	4.08	11.5	49.16	4.11	4.28
PG&E	No	SBD		0	0.00	0.00	15.9	28.34	1.76	1.79
PG&E	No	Other Retro		0	0.00	3.64	10.6	41.14	3.99	3.90
PG&E Total				**0**	**0.23**	**1.79**	**11.8**	**119.21**	**10.02**	**10.08**
SCE	Yes	SBD		0	0.00	0.00	11.8	3.92	0.33	0.33
SCE	Yes	Other Retro		0	31.25	0.00	5.0	0.05	0.01	0.01
SCE	No	SBD		0	0.00	0.00	10.4	6.70	0.40	0.64
SCE	No	OptC		0	0.00	0.00	4.4	0.43	0.10	0.10
SCE	No	Other Retro		0	0.00	0.00	12.8	9.75	0.77	0.76
SCE Total				**0**	**9.15**	**0.00**	**11.3**	**20.85**	**1.62**	**1.84**
SDG&E	Yes	OptC		0	0.00	0.00	4.9	0.73	0.15	0.15
SDG&E	Yes	Other Retro		0	NA	NA	NA	NA	NA	NA
SDG&E	No	SBD		0	0.00	0.00	13.5	6.98	0.48	0.52
SDG&E	No	OptC		0	0.00	0.00	4.1	1.31	0.35	0.32
SDG&E	No	Other Retro		0	0.00	0.00	9.6	1.16	0.07	0.12
SDG&E Total				**0**	**0.00**	**0.00**	**9.2**	**10.18**	**1.05**	**1.11**
Statewide				**0**	**2.94**	**2.94**	**11.4**	**151.13**	**12.87**	**13.21**

A.10 Accelerated Replacement, EUL, and Net Savings (MW)

Table 44: Accelerated Replacement, EUL, and Net Savings (MW)

Sample Domain		Passed Through Savings	% AR		Evaluated Average EUL (yr)	Evaluated Net Savings (MW)		
PA	Project Type		Forecast	Evaluated		Life-Cycle	First-Year	Annualized
MCE	Other Retro	0	100.00	72.38	5.1	0	0	0
MCE Total		**0**	**100.00**	**72.38**	**5.1**	**0**	**0**	**0**
PG&E	DI Ltg	0	28.43	3.24	11.3	19	2	2
PG&E	SBD	0	0.00	0.00	15.9	16	1	1
PG&E	Other Retro	0	0.29	0.30	10.4	18	2	2
PG&E Total		**0**	**28.43**	**3.24**	**11.2**	**19**	**2**	**2**
SCE	SBD	0	0.00	0.00	10.9	5	0	0
SCE	Other Retro	0	52.34	0.00	11.8	5	1	0
SCE Total		**0**	**52.34**	**0.00**	**11.8**	**5**	**1**	**0**
SDG&E	SBD	0	0.00	0.00	13.5	4	0	0
SDG&E	Other Retro	0	0.00	0.00	5.4	1	0	0
SDG&E Total		**0**	**0.00**	**0.00**	**9.9**	**5**	**0**	**0**
Statewide		**0**	**4.56**	**4.56**	**11.6**	**68**	**6**	**6**

A.11 Accelerated Replacement, EUL, and Gross Savings (Therms)

Table 45: Accelerated Replacement, EUL, and Gross Savings (Therm)

Gross Gas Sample Domain			Passed Through Savings	% AR		Evaluated Average EUL (yr)	Evaluated Gross Savings (Therm)		
PA	CPR	Project Type		Forecast	Evaluated		Life-Cycle	First-Year	Annualized
PG&E	Yes	Other Retro	0	0.00	0.00	3.8	5,415	5,523	1,440
PG&E	No	SBD	0	0.00	0.00	7.8	16,379,244	2,198,136	2,108,873

Gross Gas Sample Domain			Passed Through Savings	% AR		Evaluated Average EUL (yr)	Evaluated Gross Savings (Therm)		
PA	CPR	Project Type		Forecast	Evaluated		Life-Cycle	First-Year	Annualized
PG&E	No	Other Retro	0	0.00	0.00	6.6	12,474,151	1,981,835	1,902,751
PG&E Total			**0**	**0.00**	**0.00**	**6.6**	**12,474,151**	**1,981,835**	**1,902,751**
SCG	Yes	OptC	0	0.00	0.00	12.0	12,955	1,460	1,080
SCG	Yes	Other Retro	0	0.00	NA		0	0	0
SCG	No	SBD	0	0.00	0.00	16.9	638,756	38,774	37,760
SCG	No	OptC	0	0.00	0.00	5.7	198,040	30,609	34,466
SCG	No	Other Retro	0	0.00	0.00	5.0	342,848	72,042	68,494
SCG Total			**0**	**0.00**	**0.00**	**8.4**	**1,192,599**	**142,886**	**141,800**
SDG&E	Yes	OptC	0	0.00	0.00	3.0	350,040	114,879	114,879
SDG&E	No	SBD	0	0.00	0.00	15.4	948,003	61,241	61,437
SDG&E	No	OptC	0	0.00	0.00	3.5	93,192	30,445	26,905
SDG&E	No	Other Retro	0	0.00	0.00	3.8	62,106	12,521	16,382
SDG&E Total			0	**0.00**	**0.00**	**6.6**	**1,453,342**	**219,086**	**219,604**
Statewide			0	**0.00**	**0.00**	**7.7**	**19,025,185**	**2,560,108**	**2,470,276**

A.12 Accelerated Replacement, EUL, and Net Savings (Therms)

Table 46: Accelerated Replacement, EUL, and Net Savings (Therm)

Sample Domain		Passed Through Savings	% AR		Evaluated Average EUL (yr)	Evaluated Net Savings (Therm)		
PA	Project Type		Forecast	Evaluated		Life-Cycle	First-Year	Annualized
PG&E	SBD	0	0.00	0.00	19.1	2,209,818	119,441	115,986
PG&E	Other Retro	0	0.00	0.00	6.6	5,597,227	891,610	854,051
PG&E Total		**0**	**0.00**	**0.00**	**8.0**	**7,807,045**	**1,011,051**	**970,038**
SCG	SBD	0	0.00	0.00	16.9	279,478	16,965	16,521
SCG	Other Retro	0	NA	NA	3.3	242,325	45,552	73,807

Sample Domain		Passed Through Savings	% AR		Evaluated Average EUL (yr)	Evaluated Net Savings (Therm)		
PA	Project Type		Forecast	Evaluated		Life-Cycle	First-Year	Annualized
SCG Total		**0**	**0.00**	**0.00**	**5.8**	**521,803**	**62,517**	**90,328**
SDG&E	SBD	0	0.00	0.00	15.4	508,794	32,868	32,973
SDG&E	Other Retro	0	0.00	0.00	3.2	226,442	70,730	70,874
SDG&E Total		**0**	**0.00**	**0.00**	**7.1**	**735,236**	**103,598**	**103,848**
Statewide		**0**	**0.00**	**0.00**	**7.8**	**9,064,084**	**1,177,167**	**1,164,213**

A.13 Recommendations

Table 47: Recommendations

RecID	Sample Domains			Summary of Findings	Additional Supporting Information	Best Practice / Recommendations / Recipient	Category
	PA	Program Type	Sector				
1	PGE	Retrofit	COM	Insufficient M&V coverage	Projects in the MBCx program often did not have sufficient coverage in the post M&V period's model.	Post M&V data period should have enough coverage as compared to the normalized weather or operating conditions.	Data collection
2	PGE	Retrofit	AG	Project claimed with rejection disposition from CPR	Project went through CPR review. CS gave a rejection disposition, but the PA still claimed the project.	PAs should follow CPR dispositions for rejections	Adherence to Rules
3	PGE	All	AG	Program guidelines not in compliance with CPUC policy	Specifically, the APEP program allowed for installation prior to approval and application up to two years after installation.	Programs should be designed to comply with CPUC policies	Adherence to Rules
4	SCE	Retrofit	All	Savings were claimed for two fuels by an IOU that only sells one of those fuels.	The IOU claimed both gas and electric savings even though the IOU only sells electricity.	IOU should only claim savings for the fuel they sell.	Adherence to Rules

RecID	Sample Domains			Summary of Findings	Additional Supporting Information	Best Practice / Recommendations / Recipient	Category
	PA	Program Type	Sector				
5	SDGE	Retrofit	COM	CS not informed of dropped project	During a supplemental data request, the PA informed CS that they have withdrawn the project.	PAs should inform CS when a selected project is withdrawn.	Documentation
6	SDGE	Retrofit	COM	Incremental claims treated incorrectly	A claim with a MAT of BRO, had multiple year claims, but used full savings for each claimed year. The EUL of the claim was the full 3 years for typical BRO measures. The documentation did not include the prior year's claim.	Multi-year claims should be treated incrementally over the previous year's claim. If a project is multi-year, include prior year's documentation.	Gross Savings Estimation
7	Statewide	SBD/NC	COM	Incorrect baseline HVAC system type	Many SBD whole building projects use the incorrect baseline HVAC system type in the simulation model. SBD rules call for the baseline system type to match the proposed system type, which in many cases results in a difference between the SBD baseline system and the Title 24 base system. This problem occurs less often with later versions of EnergyPro.	Carefully review SBD whole-building new construction baseline models to check that the correct baseline HVAC system type is used.	Adherence to Rules
8	Statewide	SBD/NC	COM	Building plans not provided	Documentation for some whole-building Savings By Design projects does not include plans that are needed to verify simulation models. Often either no plans or a small subset of plans are available. Documentation will ideally include architectural, mechanical, electrical, and plumbing plans. See RecID 17.	Require (or enforce the requirement for) submittal of architectural, mechanical, electrical and plumbing plans for Savings By Design whole building projects.	Documentation

RecID	Sample Domains			Summary of Findings	Additional Supporting Information	Best Practice / Recommendations / Recipient	Category
	PA	Program Type	Sector				
9	Statewide	SBD/NC	COM	Incomplete claim information	Many claims did not include fundamental information required to perform evaluation tasks. See RecID 17.	Require a complete documentation package before accepting projects.	Documentation
10	Statewide	SBD/NC	COM	SBD modeling software (EnergyPro) issues	Version 7.2.7 VAV system DCV issue. For a VAV system, if one or more zones on a system has the Demand Control Ventilation input checked, then all the zones on that system are given the same MIN-CFM-SCH schedule that varies the minimum airflow setpoint hourly, even for zones that do not have DCV control. That same schedule is used to vary system level minimum outdoor air fraction hourly. It seems that this approach can overestimate the impact of DCV control, especially when a minority of zones actually have DCV controls.	Evaluate the method used by EnergyPro to model demand control ventilation in DOE2.1E.	Evaluation Methods
11	Statewide	SBD/NC	COM	SBD modeling software (EnergyPro) issues	Incorrect ventilation rate calculation in standard design (EnergyPro v6805) = When a zone contains more than one space, then the ventilation rate in the standard model appears to be calculated incorrectly, at least when run in NR performance mode. The space ventilation inputs include sf/person, cfm/person and an occupancy fraction multiplier. If the space ventilation input includes an occupancy fraction of less than 1, such as 0.5, and the zone contains more than one space,	As a best practice work-around, the fractions are changed from 0.5 to 1.0 and the input for cfm per person was reduced by 50%. The result is the correct ventilation rate in both the baseline and proposed model.	Evaluation Methods

RecID	Sample Domains			Summary of Findings	Additional Supporting Information	Best Practice / Recommendations / Recipient	Category
	PA	Program Type	Sector				
					then EnergyPro applies that multiplier multiple times to the ventilation rate in the standard design. The result is that ventilation rates in the standard model are 2, 4, or 8 times lower than in the proposed model depending on how many spaces are in the zone.		
12	Statewide	SBD/NC	COM	SBD modeling software (EnergyPro) issues	Error in baseline model when user input includes floor multipliers EnergyPro V7.2.7 When a proposed model uses floor multipliers, which allow multiple identical floors to be represented by one set of zones, EnergyPro incorrectly multiplies the zone airflow by the floor multiplier. For example, if a zone is assigned to a floor with a multiplier of 5, and EnergyPro calculates airflow to be 300cfm, then it will write 1500 cfm as the "assigned-cfm" in the DOE2.1E input file. EnergyPro also appears to apply the same multiplier when determining outdoor airflow for each zone. When the simulation is run, DOE2.1E applies the floor multiplier to the results, effectively double-counting the airflow multiplier. The result for one project was very high baseline energy and inflated savings.	For the standard model, EnergyPro should not apply the Floor Multiplier when writing assigned cfm or calculating outdoor air flow for zones that are on floors with multipliers.	Evaluation Methods

RecID	Sample Domains			Summary of Findings	Additional Supporting Information	Best Practice / Recommendations / Recipient	Category
	PA	Program Type	Sector				
13	Statewide	SBD/NC	COM	EnergyPro does not provide correct modeling of variable refrigerant flow (VRF) systems	Due to lack of an appropriate tool, Savings By Design Baseline Guidance requires modeling of projects with VRF systems using a minimally code compliant air source heat pump for both the proposed and standard buildings. This leaves savings from VRF systems on the table that could be captured if the simulation tool has the correct capabilities. Utilize a simulation model with correct VRF modeling capabilities to capture these savings.	Use simulation tool with correct VRF modeling capability	Gross Savings Estimation
14	Statewide	SBD/NC	COM	EnergyPro does not calculate outside ventilation air properly	Examination of DOE-2 input files from EnergyPro revealed a bug in the specification of outside air quantities.	Develop a robust and ongoing method to quality control simulation models derived from EnergyPro and implement a rapid and effective method to implement bug fixes as they are discovered.	Gross Savings Estimation
15	Statewide	SBD/NC	COM	Buildings not separately metered	Many SBD new construction projects are buildings on campuses that are not separately metered for electricity and/or gas consumption. Monthly and interval data is very valuable for savings evaluation. Consider making building metering a prerequisite for participation in Savings By Design for whole building new construction projects.	Require that new buildings receiving Savings By Design whole building incentives be metered for electricity and gas.	Program Design

RecID	Sample Domains			Summary of Findings	Additional Supporting Information	Best Practice / Recommendations / Recipient	Category
	PA	Program Type	Sector				
16	Statewide	SBD/NC	All	SBD modeling software (EnergyPro) issues - sizing	A previous CPUC disposition identified issues regarding how EnergyPro sizes the standard building. The 2018 portfolio contains projects utilizing EnergyPro versions 5, 6, and 7. While the sizing issues had been addressed in versions 6 and 7, the evaluation team was obligated to resize all version 5 project. The evaluation team executed the ASHRAE Design Day method, as detailed in ASHRAE Handbook of Fundamentals and the DOE2.1E documentation. However, the evaluation team did not receive details of how Energy Pro conducts this fundamental step and hence could not confirm EnergyPro values.	SBD software (EnergyPro and other) should provide a detailed description of the methods used to size the systems and plant in the Standard performance model.	Documentation
17	Statewide	SBD/NC	All	Insufficient documentation for whole building claims	Whole building claims require reviewing the entire energy model to ensure that savings claims are valid. This requires complete design and as-built information to be successful. Many projects submit only documentation relating to the claimed measures. Unfortunately, this does not supply sufficient information to verify savings claims. For instance, commonly exhaust fans and fan powers are left out or entered incorrectly. This results in generation of	Provide complete as-built documentation for the whole building.	Documentation

RecID	Sample Domains			Summary of Findings	Additional Supporting Information	Best Practice / Recommendations / Recipient	Category
	PA	Program Type	Sector				
					significant artificial savings that may not be directly related to the claimed measures (See RecID 8 and 9).		
18	Statewide	SBD/NC	All	SBD project documentation not standardized across IOUs	SBD projects require a range of supporting data, focused on two main areas: (1) data on the actual completed project (as-built documentation and actual usage profiles) and (2) properly constructed models of the SBD compliant "standard" building used to calculate savings. Neither of these two types of data were standardized. Model outputs (EnergyPro and IESVE) were generally not provided, making it difficult to verify savings calculations.	All parties should agree on a standard data format for both (1) building characteristics (as-built constructions and schedules) and (2) modeling parameters.	Documentation
19	Statewide	SBD/NC	All	Technical expertise lacking for SBD projects modeled with IESVE	Some SBD projects modeled with IESVE had significant errors including use of incorrect baseline system and incorrect system schedules. Reviewers often did not identify these errors during the tech review process.	Provide additional training and guidance for developing and reviewing IESVE models.	Gross Savings Estimation
20	Statewide	Retrofit	COM	Incorrect savings weighted EUL	Many claims used incorrect calculations for the savings weighted EUL. This is specifically for multiple measure claims. These projects typically used the pre-installation savings weight EUL, which after installation was not the same. The EUL needs to be updated, or if not initially calculated, calculated.	Claims which are multiple measures should have savings weighted EULs calculated based on post installation (claimed) savings.	Documentation

RecID	Sample Domains			Summary of Findings	Additional Supporting Information	Best Practice / Recommendations / Recipient	Category
	PA	Program Type	Sector				
21	Statewide	Retrofit	All	For HOPP/NMEC projects the measure application type (MAT) of the sub-measures and the savings-weighted EUL were not always provided	Where multiple submeasures with multiple MATs are rolled into one claimed measure, the MATs of the sub-measures and the savings-weighted EUL of the single claimed measure were sometimes not provided.	For HOPP/NMEC projects, PA documentation should clearly identify the MATs of the sub-measures and provide a savings-weighted EUL for the overall project.	Adherence to Rules
22	Statewide	Retrofit	All	AR measures in HOPP/NMEC projects are not always supported with POE documentation	For HOPP/NMEC projects the POE documentation for AR measures is often insufficient, particularly for lighting measures. The NMEC Rulebook states that NMEC projects "should consist primarily of measures suitable to an existing conditions baseline", so it is important to know whether measures claimed as AR meet POE requirements.	Provide POE documentation at the required level of rigor for all AR measures being claimed under HOPP/NMEC programs	Adherence to Rules
23	Statewide	Retrofit	All	Savings are being double-counted in HOPP/NMEC projects that feature multiple M&V submissions over multiple years	We saw projects where the previous year's savings claim was the full amount calculated using non-NMEC methods and then the 2019 savings claim was the full amount calculated using NMEC methods.	Savings claims from one year to the next should be incremental to avoid double-counting savings over the EUL of the project.	Documentation
24	Statewide	Retrofit	All	Savings-weighted EUL calculator does not provide for BRO or AR measure application type (MAT)	CPUC savings-weighted EUL calculator works with NR, ROB, NC, and AOE measures but not BRO or AR measures.	Update the Savings-weighted EUL calculator to allow for BRO and AR MATs	Evaluation Methods
25	Statewide	Retrofit	All	Non-routine events not addressed in NMEC models	Non routine events clearly evident in an examination of the time series interval data were	Screen all projects for NREs as part of NMEC model development and make NRAs as needed	Gross Savings Estimation

RecID	Sample Domains			Summary of Findings	Additional Supporting Information	Best Practice / Recommendations / Recipient	Category
	PA	Program Type	Sector				
					not identified and adjusted in the NMEC model.		
26	Statewide	Retrofit	All	Effective Useful Life of interior LED fixtures is not clearly defined in DEER.	The EUL table in READI v2.5.1 includes two EUL IDs for interior LED fixtures: ILtg-Com-LED-50000hr and ILtg-Com-LED-50000hr+16yr. The former is capped at 12 years and adjusts the EUL based on building hours of use while the latter provides an EUL of 16 years regardless of building hours of use. Both EUL IDs have the description "LED Fixture - Indoor - Commercial" but the former is in the "Ltg_Lamp" TechGroup while the latter is in the "Ltg_Fixture" TechGroup. Published lighting fixture measures in the eTRM use ILtg-Com-LED-50000hr, suggesting that it is the correct EUL ID for interior lighting fixtures.	Clearly define appropriate EULs for interior LED lighting fixtures.	Gross Savings Estimation
27	Statewide	Retrofit	All	For HOPP/NMEC projects where multiple submeasures with multiple measure application types (MAT) are rolled into a single measure, the MAT for that single measure is undefined.	NMEC/HOPP projects often include multiple submeasures with multiple MATs rolled into one claimed measure, making it difficult to know what MAT to assign to the claim. For these projects we assessed the MAT to be the one which best reflected the majority of the rolled-up savings and has an existing conditions baseline (i.e. BRO, AR, or AOE).	Define a new MAT for NMEC projects comprised of multiple sub-measures with multiple MATs.	Program Design
28	Statewide	Retrofit	All	Neither the NMEC Rulebook nor the	At the program level, the "NMEC Rulebook" states that	NMEC programs should clarify precisely the role of	Program Design

RecID	Sample Domains			Summary of Findings	Additional Supporting Information	Best Practice / Recommendations / Recipient	Category
	PA	Program Type	Sector				
				LBNL NMEC Technical Guidance nor Program rules clearly outline the conditions upon which an NMEC Option C approach CANNOT be used at the site level.	fractional savings uncertainty should be no more than 50% at 90% confidence level. The Rulebook makes no mention of the role of uncertainty at the site level. LBNL's "Site Level NMEC Technical Guidance" provides guidance on how goodness-of-fit statistics from the site-level models be used to assess the feasibility of using the NMEC approach for a POPULATION of sites. The PAs can only infer from that guidance how to assess the feasibility of the NMEC approach at the site-level. Meanwhile, program-specific rules always defer to the NMEC Rulebook and the LBNL Guidance. In other words, nowhere is it stipulated precisely what statistical criteria MUST be met in order to use the NMEC approach at the site level. For HOPP/NMEC projects we switched to bottom-up engineering calculations when our NMEC approach resulted in FSU > 50% at 90% CL.	statistical goodness-of-fit AND savings uncertainty in determining when the NMEC approach can be used at the site level and when alternative approaches MUST be used instead.	
29	Statewide	Retrofit	All	The NMEC Rulebook does not provide guidance on how to calculate peak demand savings using NMEC methods.	There are no rules or guidelines in place on how to assess peak demand using NMEC methods. For HOPP/NMEC projects we evaluated peak demand savings following the approach outlined in CPUC's response to PG&E's EO request titled, "DEER Peak	Update the NMEC Rulebook to provide for peak demand savings using NMEC methods.	Program Design

RecID	Sample Domains			Summary of Findings	Additional Supporting Information	Best Practice / Recommendations / Recipient	Category
	PA	Program Type	Sector				
					Demand Savings for SEM and NMEC program projects"		
30	Statewide	All	All	Projects used incorrect measure application type (MAT)	Add-On Equipment and Behavioral, Retrocommissioning, and Operational MATs were the most overturned MATs, followed by Normal Replacement and Accelerated Replacement.	PAs should clearly discuss how the MAT was determined for each measure. The MAT directly impacts selection of the baseline, measure costs, measure EUL, and energy savings calculations. Additionally, in accordance with CPUC policy, IOUs need to ensure that all program activities and installations resulting in performance that does not exceed the nominal efficiency (i.e., rated, intended, or original efficiency) of the pre-existing condition are offered through a behavioral, retrocommissioning or operational program framework, with an effective useful life not to exceed three years.	Adherence to Rules
31	Statewide	All	All	Deemed savings used without M&V	Some projects were not eligible through the deemed program. These projects were put the custom program but used deemed savings. The post installation did not include any M&V. Custom projects should include M&V.	Projects submitted through the custom program need M&V	Data collection
32	Statewide	All	All	Documentation not matching claim	Some projects included savings documentation that did not match the claim. Other projects included multiple workbooks with no indication of which was the final.	Documentation should match claim	Documentation

RecID	Sample Domains			Summary of Findings	Additional Supporting Information	Best Practice / Recommendations / Recipient	Category
	PA	Program Type	Sector				
33	Statewide	All	All	Unclear when PA made adjustment to claim	Multiple projects had adjustments to savings during tech review. These projects did not include documentation of why these changes were made.	Documentation should match claim	Documentation
34	Statewide	All	All	Installation date unclear	Many projects had installation dates that were unclear from documentation.	Installation date should be clearly identified	Documentation
35	Statewide	All	All	Project approval unclear	Many projects had missing approval dates from documentation.	Project approval date should be clearly identified	Documentation
36	Statewide	All	All	Long delay between PA tech review and installation	Multiple projects had almost a year delay from the installation report and the PA tech review. These delays were not substantiated with documentation.	Review timelines should not significantly delay project claims.	Evaluation Methods
37	Statewide	All	All	Recruitment challenges in light of the COVID Pandemic	The COVID pandemic introduced additional logistical and practical challenges into the recruitment process related to staff turnover, shuttered sites, etc. In many cases, it was difficult to contact, let alone recruit, sampled sites in the evaluation which introduced inefficiencies into the broader evaluation process (e.g., completion schedule, replacement sites, etc.).		Evaluation Methods
38	Statewide	All	All	Challenges verifying project performance and evaluation metrics in light of the COVID pandemic.	Much like the recruitment challenges introduced by the COVID pandemic, the subsequent verification of project performance attributes (e.g., hours of operation, installation rate, RUL, EUL,		Evaluation Methods

RecID	Sample Domains			Summary of Findings	Additional Supporting Information	Best Practice / Recommendations / Recipient	Category
	PA	Program Type	Sector				
					etc.) many months post-project completion were difficult to accept / confirm without a visual inspection.		
39	Statewide	All	All	Non-IOU analysis not completed	Many projects with non-IOU sources on site did not have a non-IOU analysis with the savings claim. Projects need to follow the CPUC guidance on non-IOU analysis and include this analysis in the documentation.	Projects with non-IOU sources need to complete non-IOU savings analysis	Gross Savings Estimation

B. Statistical Estimation Procedures

B.1 Methods for Rolling Up Claim-Level Parameters to the Project Level

In this section, we describe the methods used for projects with multiple claims to combine parameters such as gross savings, EULs, incentive costs, incremental costs, and net-to-gross ratios (NTGRs) to the project level. As noted in section 2.1, the evaluated gross sample of projects did not completely overlap with the net sample of projects. For those that overlap, we had the evaluated estimates of gross savings, EULs, costs, and NTGRs for claims that were evaluated. For the gross sample that did not overlap, we relied on the gross savings to weight NTGRs and EULs.

B.1.1 Methods for Calculating Gross Savings, Costs, and EULs for Projects with Multiple Claims

To extrapolate the project-level ex post results to the population of projects in their respective domains, each sampled project must have one estimate of gross savings, one EUL, one value for incentive costs, one value for incremental costs for the first baseline, and one value for the incremental costs for the second baseline. For projects with more than one claim, the gross savings, EULs, incentive costs and incremental costs for each claim must be aggregated to the project level.[33] For the 2019 program year, most projects have three or fewer claims. However, some projects contain more than three claims and required that we take a stratified random sample of three claims from the population of claims for the project.

B.1.1.1 Accelerated Replacement

Accelerated replacement (AR) claims are unique in that they have two baselines: the existing conditions and industry standard practice (ISP). As a result, such claims have two separate estimates of ex post gross savings covering the RUL and post-RUL periods. The current CPUC guidelines do not address how to combine or aggregate the savings for these two periods for a given *claim*. Below we describe our methods for addressing such claims.

What we needed was a single, blended estimate of gross savings that represents the annualized ex post gross savings that can be multiplied by an EUL to yield the correct life-cycle gross savings for an AR claim.

[33] In these calculations, we followed the CPUC guidelines for calculating ex ante savings-weighted NTGRs and EUL for projects with multiple claims (see Combining_Measures_Claims.DRAFT.xlsm workbook to calculate the savings weighted EUL. The calculator can be found in the Rolling Portfolio Guidance section of the CPUC website http://www.cpuc.ca.gov/general.aspx?id=6442456320 under Technical Guidance: Weighted Average Expected Useful Life/Net to Gross Method

First, we calculated life-cycle gross savings using Equation 1.

$$Life\ Cycle\ Ex\ Post\ Gross\ kWh_i = \sum_{i=1}^{n}(First\ Baseline\ Ex\ Post\ Gross\ kWh_i \times RUL_i) +$$

$$(Second\ Baseline\ Ex\ Post\ Gross\ kWh_i \times Post\ RUL_i) \quad \textbf{(1)}$$

To estimate the claim-level annualized gross savings, we used Equation 2.

$$Annualized\ Ex\ Post\ Gross\ kWh_i = \frac{Life\ Cycle\ Ex\ Post\ Gross\ kWh_i}{Ex\ Post\ EUL_i} \quad \textbf{(2)}$$

We could then process the AR claims along with all other normal-replacement (NR) claims using the methods described next to aggregate claims to the project level.

B.1.1.2 Annualized Gross Savings

For projects with three or fewer claims, we first calculated a realization rate (the ex post savings divided by the ex ante savings) using Equation 3.

$$RR_P = \frac{\sum_{i=1}^{2} Ex\ Post\ Annualized\ Gross\ kWh_i}{\sum_{i=1}^{2} Ex\ Ante\ Annualized\ Gross\ kWh_i} \quad \textbf{(3)}$$

where:

i = the ith claim

To be consistent with AR claims, we refer to the *ex post first-baseline kWh gross savings* for normal-replacement claims as the *ex post annualized gross kWh*.

We multiplied the ex ante annualized gross kWh for each claim by this realization rate to produce the ex post annualized gross savings for each claim and summed them to arrive at the ex post annualized gross savings for the project.

There were 12 projects in the frame that included more than three claims, which was the limit of what the gross estimation procedures could cover. For these projects, we randomly selected three claims for producing estimates. We then applied the realization rate from the sampled claims to all claims in the project to produce project-level ex post gross savings.

B.1.1.3 Effective Useful Life

To estimate the EUL realization rate, we used the evaluated EUL as y_i and the claimed EUL as the x_i in Equation 4, weighted by the annualized gross savings from each claim. We then applied this realization rate to the ex ante EULs for all claims to produce project-level EULs.

$$RR_p = \frac{\sum w_i y_i}{\sum w_i x_i} \quad \textbf{(4)}$$

This operation produced project-level EULs, which we extrapolated to higher levels of aggregation using population weights.

B.1.1.4 Costs

When a project consisted of two to three claims, they could be a mix of NR and AR claims and of program types—SBD and non-SBD. We calculated these values for each claim and then for the total project, thus:

- To calculate the incentive costs for **non-SBD projects** with two to three claims, we simply added the *evaluation incentives from the project documentation* across all claims.
- To calculate the incentive costs for **SBD projects** with two to three claims, we first added the *incentive paid to owner of company* and the *incentive paid to the design team* for each claim and then added the resulting sum across all claims for the SBD project.
- Within non-SBD projects, the claims could be a mix of NR (which will have one incremental measure cost (IMC) for the first baseline) and AR claims (which will have two IMCs, one for the first baseline and one for the second baseline). That is, every claim within a non-SBD project will have a first baseline value, but only AR claims will have a second baseline value. At the project level, we first summed the *evaluation first-baseline measure cost as found in the project documentation* across all non-SBD claims, regardless of whether they were NR or AR. Next, we summed the *second baseline incremental cost for accelerated replacement measures as found in the project documentation* IMCs across all non-SBD claims. (For NR claims the second-baseline IMC will be blank.)

To estimate the cost realization rates for projects with more than three claims, we used the evaluated costs as y_i and the claimed costs as the x_i in Equation 6 below. Now, each claim has eight relevant costs, including:

A. Total incentive paid from the claim database. This may include payments to the customer, or some value associated with equipment that was installed under a direct-install program. May also include incentives to the design team for SBD projects.

B. Evaluation incentives from the project documentation.

C. For SBD projects, incentive paid to the owner or company

D. For SBD projects, incentive paid to the design team

E. First-baseline measure cost as reported in the claim database

F. Second-baseline incremental cost for accelerated-replacement measures as reported in the claim database

G. Evaluation first-baseline measure cost as found in the project documentation

H. Evaluation second-baseline incremental cost for accelerated replacement measures as found in the project documentation

We calculated the cost realization rates as follows:

- For non-SBD projects, the incentive realization rate = B÷A.

- For SBD projects, the incentive realization rate = (C+D)÷A.
- For all projects, the IMC realization rate for the first baseline = G÷E
- For non-SBD accelerated-replacement projects, the IMC realization rate for the second baseline = H÷F

For each cost, we then applied these stratified-cost realization rates to their corresponding ex ante costs for all claims within a given project, including:

- claims that were sampled in strata 2 and 3
- claims that were not sampled in stratum 2
- claims that were excluded from the sample frame due to the size of their savings

Each claim then had an ex post estimated incentive cost, the first-baseline IMC, and the second-baseline IMC. We could then sum each to the project level across all claims in a project. We did not address *incentives paid to others*, d*irect-install projects total material cost* and d*irect-install projects total labor cost* due to inconsistent inputs from the PAs.

B.1.2 Methods for Calculating NTGRs for Projects with Multiple Claims

This section describes the methods we used to calculate ex post life-cycle-savings-weighted NTGRs for projects with more than one claim for which we estimated ex post NTGRs. The net sample of projects did not completely overlap with the gross sample of projects. For the projects that did ultimately overlap, we had the claim-level ex post estimates of gross savings and EULs. For projects without claim-level ex post gross savings and EULS, we used the ex ante values. For convenience, in the equations that follow, we refer to these parameters as ex post even though some of them are ex ante.

B.1.2.1 Creating a Claim-Level NTGR for Accelerated Replacement Claims

For accelerated-replacement claims, we needed a single, blended estimate of the net-life-cycle-weighted NTGR so that we could process them along with the other claims.

First, we calculated life-cycle ex post gross savings using Equation 5.

$$Life\ Cycle\ Ex\ Post\ Gross\ kWh_i = \sum_{i=1}^{n}(First\ Baseline\ Ex\ Post\ Gross\ kWh_i \times RUL_i)$$

$$+ (Second\ Baseline\ Ex\ Post\ Gross\ kWh_i \times Post\ RUL_i) \quad \textbf{(5)}$$

We then calculated life-cycle ex post net savings using Equation 6.

$$Life\ Cycle\ Ex\ Post\ Net\ kWh_i = \sum_{i=1}^{n}(First\ Baseline\ Ex\ Post\ Gross\ kWh_i \times RUL_i \times NTGR_i)$$

$$+ (Second\ Baseline\ Ex\ Post\ Gross\ kWh_i \times Post\ RUL_i \times NTGR_i)$$

We then calculated the NTGR, weighted by net life-cycle ex post savings, for the claim using Equation 7.

$$Net\ Lifecycle\ Ex\ Post\ Savings\ Weighted\ NTGR_i = \frac{Lifecycle\ Ex\ Post\ Net\ kWh_i}{Lifecycle\ Ex\ Post\ Gross\ kWh_i} \quad (7)$$

With the claim-level life-cycle-savings-weighted NTGR calculated for AR claims, we could then process them along with the other claims.

B.1.2.2 Aggregating Claim-Level NTGRs to the Project Level

To aggregate claim-level NTGRs to the project level (which was rarely necessary as most respondents indicated that their decision-making process was the same for all claims in the project), we first derived the life-cycle ex post gross kWh savings by summing, across all claims, the product of the ex post annualized gross savings using Equation 8.

$$Lifecycle\ Ex\ Post\ Gross\ kWh_P = \sum_{i=1}^{n} EUL_i \times Ex\ Post\ Annualized\ Gross\ kWh_i \quad (8)$$

For projects without an ex post claim-level estimate of annualized gross savings or EUL, we used the ex ante values.

Using Equation 9 we estimated the net kWh for each project.

$$Lifecycle\ Ex\ Post\ Net\ kWh_P = \sum_{i=1}^{n}(Ex\ Post\ Annualized\ Gross\ kWh_i \times EUL_i \times NTGR_i) \quad (9)$$

We used the results from Equations 8 and 9 in Equation 10 to calculate a life-cycle-savings-weighted NTGR for each project.

$$NTGR_P = \frac{Lifecycle\ Ex\ Post\ Net\ kWh_p}{Lifecycle\ Ex\ Post\ Gross\ kWh_p} \quad (10)$$

We then multiplied that weighted mean NTGR by the ex post annualized gross kWh savings and EUL for every claim in the project, using Equation 12.

$$Lifecycle\ Ex\ Post\ Net\ kWh_P = (\sum_{h=1}^{2} Ex\ Post\ Gross\ kWh_i \times EUL_i \times \overline{\text{NTGR}} \quad (12)$$

We then used Equation 10 to calculate the NTGR for the project.

B.1.3 Load Shapes

For the 2019 program year, we assigned the load shape for the claim with the largest energy (kWh or therm) savings.

B.2 Methods for Rolling Up Project-Level Parameters to the Domain, PA, and State Levels

B.2.1 Gross Savings

We estimated the ex post gross savings at the domain, PA, and state levels. We first calculated the domain-level ex post gross savings[34] and the achieved precision for each fuel type using the stratified-ratio estimation method described in Levy & Lemeshow (2008) because it more accurately accounts for the correlations between ex ante and ex post estimates than some other approaches. There were some savings strata with negative correlations, and this affects the standard errors.

The method we used is the combined method for calculating ratio estimators of Levy & Lemeshow (2008, p.215).[35] This is distinct from the *separate* method, which calculates a gross realization rate (GRR) for every stratum which are then rolled into a weighted stratified GRR. The combined method is meant for calculating the stratified GRR when there aren't enough sample cases in any or all strata to support stable stratum-level estimates. Since we have multiple strata that do not qualify for the *separate* method, we used the *combined* method. While we use the Levy & Lemeshow method, they reverse the meaning of *x* and *y* compared to standard usage in our industry. Therefore, the equations shown here have been converted to industry-standard uses of those symbols. Specifically, we use *x* to refer to ex ante and *y* to symbolize ex post values.

The stratified ratio estimator is given as:

$$r_{strc} = \frac{\bar{y}_{str}}{\bar{x}_{str}} \quad (13)$$

where:

r_{strc} = the stratified ratio estimator based on the combined method, which is the ratio of weighted ex post gross savings to the weighted ex ante gross savings.

$\bar{y}_{str}$ = the stratified mean ex post gross savings in the sample, using case weights (N_h/N).

$\bar{x}_{str}$ = the stratified mean ex ante gross savings in the sample, using case weights (N_h/N).

The primary equation for estimating the stratified variance is:

$$Var(r_{strc}) = \left(\frac{1}{N^2\bar{X}^2}\right)\sum_{h=1}^{L}\frac{N_h^2(N_h - n_h)}{n_h(N_h - 1)}\sigma_{hz}^2 \quad (14)$$

[34] We calculated realization rates and NTGRs at all levels of aggregation using both annualized and life-cycle savings. For brevity, we refer to both simply as savings.

[35] Levy, Paul S. & Lemeshow, Stanley (2008). *Sampling of Populations: Methods and Applications*, 4th Edition. New Jersey: John Wiley & Sons, Inc.

where:

Var_{strc} = the stratified variance

$\sigma_{hz}^2 = \sigma_{hy}^2 + R^2\sigma_{hx}^2 - 2R\rho_{hxy}\sigma_{hy}\sigma_{hx}$

The standard error of the estimate was calculated as the square root of the stratified variance.

To estimate domain-level ex post gross savings, we multiplied the domain-level ex ante gross savings for each claim in the population by the domain-level stratified GRR. We calculated the 90% relative precision as:

$$RP_{Domain} = \frac{1.645 * \text{stratified standard error}}{Domain\ RR} \quad \textbf{(15)}$$

For all other levels, we simply summed the domain-level ex post gross savings to the PA and the statewide levels. We then calculated the PA-level and statewide GRRs by taking the ratio of the respective total ex post gross savings and total ex ante gross savings.

For estimating the RP for the realization rate at the PA level, the domain error bounds (EB Domain), were propagated to the PA level as:

$$EB_{PA} = \sqrt{(\text{EB Domain}_1)^2 + (\text{EB Domain}_2)^2 \ldots\ldots + (\text{EB Domain}_n)^2} \quad \textbf{(16)}$$

where:

$EB\ Domain = RP_{Domain} * Ex\ Post\ Gross\ Savings_{Domain}$

Based on these assumptions:

- There are no interactions between the domains.
- Each of the individual domains has been evaluated independently.
- Each evaluation has provided an unbiased estimate of the actual savings of the corresponding domain.

B.2.2 Net Savings

We calculated net savings using the self-report approach (SRA) to generate a NTGR at the claim level, which we then aggregated to the project level (see section B.1.2.1). The following subsections describe the equations that we applied to the project-level NTGR to calculate the net domain-, PA-, and state-level NTGRs. We calculated the net domain mean NTGR directly (i.e., without using a GRR), as described by Cochran (1977).[36]

Rolling up project-level NTGRs to net and gross domains, PA, and state levels was complicated by a few factors that distinguish the 2019 Custom program from most other program years. The first was the very different distribution of projects across different program types and PAs. For example, Table 5, shows that the number of projects in the Southern California IOUs is quite

[36] Cochran, William G. (1977). *Sampling techniques*. New York: John Wiley & Sons.

low. There were 146 for SCE/SCG, and 97 for SDG&E. PG&E dominated the numbers, and within PG&E, by far the most common project was a direct-install lighting project.

A second complicating factor was a request by CPUC staff to compare projects that were part of the CPR process with those that were not. The net sampling strategy was also based on comparisons of HTR projects with non-HTR, and of SBD projects with non-SBD on their mean NTGRs.

The first step is to calculate statistics for strata, which will vary depending on the level of aggregation (roll-up) being calculated. The first level is the net domain, where there were only two strata: General and Certainty, the latter being defined by projects that were included in the gross savings certainty strata. The equation for calculating the stratified mean at the net domain level, based on the project-level NTGRs is equation 5.1 from Cochran (1977):

$$\bar{y}_{st} = \frac{\sum_{h=1}^{L} N_h \bar{y}_h}{N} \quad \textbf{(17)}$$

where:

N_h = the stratum population size (number of projects)

N = the stratum total number of projects in the domain

The central equation needed to calculate standard errors, confidence intervals, and relative precision values in this analysis is equation 5.13 from Cochran (1977) and produces the stratified variance:

$$s^2(\bar{y}_{st}) = \sum_{h=1}^{L} \frac{W_h^2 s_h^2}{n_h} - \sum_{h=1}^{L} \frac{W_h s_h^2}{N} \quad \textbf{(18)}$$

We calculated the standard error of the estimate as the square root of the stratified variance.

Ideally, we would have been able to define both gross and net domains by the same criteria, and in past years, that has been possible. However, during the 2019 program year the combination of a lopsided distribution of projects across gross domains, and the fact that we had special analysis goals for the net domains, the net domains could not be fit into the original gross domains (or vice versa) and have sufficient projects to generate stable estimates of NTGRs to apply to individual gross domain projects.

Our solution to this situation was to temporarily combine some gross domains into super domains, and to estimate NTGRs that were applied to all projects in the gross super domains. We also combined net domains to produce stratified NTGRs to apply to all projects in the gross super domains. For example, there were several lighting domains in the PG&E population of projects; they were divided into interior and exterior lighting as well as those subjected to CPR and those that were not. We combined the PG&E Direct- Install Lighting domains into one gross super domain. Similarly, all PG&E Savings By Design projects were combined into one PG&E SBD gross super domain, regardless of whether a project was in the CPR sample.

Similarly, we combined net domains that fit logically into the gross super domains, e.g., regardless of HTR or CPR status. So, for example, we treated all projects that were DI Lighting in the net domains as strata within the gross super domain of DI Lighting. In addition, since there were two strata in most net domains because of the addition of the certainty strata to the net domains, we also included those strata within the gross super domains.

The result was to calculate a stratified NTGR for each gross super domain and apply that NTGR to all ex post gross savings for projects in that gross super domain, sampled or not. In practice, this is similar to how it would usually work with just one set of domains for gross and net; e.g., all NTGRs for SCE retrofit projects would be applied to all gross savings from projects in the SCE retrofit domain. We have simply created more strata that fit into the gross super domains.

This method resulted in both net and gross savings estimates from every project in the program year, sampled or not. As a result, to find net and gross savings for any original gross domain, it was only necessary so sum all savings of each kind from that original gross domain. From those summed net and gross savings, we calculated the NTGR for the original gross domain by dividing the net savings by the gross savings.

Net savings at the PA level are simply the sum of the PA's domain net savings. To calculate the PA-level NTGR, we divided the sum of the PA ex post net savings by the sum of the PA ex post gross savings. To calculate the relative precision of the PA NTGR, we multiplied the domain NTGR relative precision by the domain net ex post savings to produce an error bound for each domain. We summed these domain-level error bounds in quadrature to produce a PA-level error bound. We then divided the PA error bound by the PA net savings to produce the PA-level NTGR relative precision. This process is reflected in Equation 19.

For estimating the RP for the PA level NTGR, we estimated the error bounds (EB) as:

$$EB_{PA} = \sqrt{(\text{EB Domain}_1)^2 + (\text{EB Domain}_2)^2 \ldots\ldots + (\text{EB Domain}_n)^2} \quad \textbf{(19)}$$

where:

$$EB\ Domain = RP_{Domain\ ntgr} * Annualized\ Net\ Savings_{Domain}$$

This calculation is based on these assumptions:

- There are no interactions between the domains.
- Each of the individual domains has been evaluated independently.
- Each evaluation has provided an unbiased estimate of the actual savings of the corresponding domain.

We then divided the PA-level error bound by the PA-level NTGR. We applied the same process to calculate NTGRs and associated RPs to generate the statewide numbers.

C. List of Claims That Violate Rules

Table 48: Sampled Electric Claims that Violate Rules

Gross Electric Sample Domain	Sample ID	Claim ID	Rule Violation
MCE_noCPR_Other	6	MCE-2019-02-085-02	Ineligible because incandescent lamp are not an allowed measure per statewide rules.
PGE_CPR_Other	45	PGE-2019-Q4-11012	Ineligible due to exceeding the installation time limit without properly documented exception.
PGE_CPR_Other	45	PGE-2019-Q4-11718	Ineligible due to exceeding the installation time limit without properly documented exception.
PGE_CPR_Other	45	PGE-2019-Q4-65037	Ineligible due to exceeding the installation time limit without properly documented exception.
PGE_CPR_Other	47	PGE-2019-Q2-65047	Ineligible due to installation in 2018 with no M&V in 2019.
PGE_CPR_Other	193	PGE-2019-Q2-39209	Ineligible due to installation in 2017 with no M&V in 2019.
PGE_CPR_Other	230	PGE-2019-Q3-80360	Ineligible due to installation in 2016 with no M&V in 2019.
PGE_CPR_Other	237	PGE-2019-Q3-81435	Ineligible due to simple payback greater than measure EUL.
PGE_noCPR_DILighting_interior	156	PGE-2019-Q4-33992	Ineligible measure: NR project per CIT Policy Review documents. Deemed measure offered at the time of application.
PGE_noCPR_DILighting_interior	156	PGE-2019-Q4-55621	Ineligible measure: NR project per CIT Policy Review documents. Deemed measure offered at the time of application.
PGE_noCPR_DILighting_exterior	113	PGE-2019-Q3-51630	Ineligible due to measure offered in the deemed program at the time of application.

Gross Electric Sample Domain	Sample ID	Claim ID	Rule Violation
PGE_noCPR_DILighting_interior	121	PGE-2019-Q1-7691	Ineligible due to installation in 2018 with no M&V in 2019.
PGE_noCPR_DILighting_interior	132	PGE-2019-Q1-12955	Ineligible due to installation in 2018 with no M&V in 2019.
PGE_noCPR_DILighting_interior	132	PGE-2019-Q1-12984	Ineligible due to installation in 2018 with no M&V in 2019.
PGE_noCPR_DILighting_exterior	255	PGE-2019-Q4-60974	Ineligible due to simple payback greater than measure EUL.
PGE_noCPR_Other	31	PGE-2019-Q1-20600	Ineligible due to exceeding the installation time limit without properly documented exception.
PGE_noCPR_Other	32	PGE-2019-Q2-5608	Ineligible due to equipment ordered prior to approval without proper exception documentation and installation in 2016 with no M&V in 2019.
PGE_noCPR_Other	34	PGE-2019-Q1-39317	Ineligible due to exceeding the installation time limit without properly documented exception and installation in 2018 with no M&V in 2019.
PGE_noCPR_Other	56	PGE-2019-Q1-45922	Ineligible due to installation in 2018 with no M&V in 2019.
PGE_noCPR_Other	78	PGE-2019-Q4-41646	Ineligible due to ordering equipment prior to project approval without documented exception.
PGE_noCPR_Other	82	PGE-2019-Q2-84903	Ineligible: M&V occurred 7/16/18 per IR Tech Review.docx with no M&V in 2019.
PGE_noCPR_Other	83	PGE-2019-Q1-8748	Ineligible due to installation in 2018 with no M&V in 2019.
PGE_noCPR_Other	100	PGE-2019-Q3-45462	Ineligible due to installation prior to application and approval.

Gross Electric Sample Domain	Sample ID	Claim ID	Rule Violation
PGE_noCPR_Other	102	PGE-2019-Q4-333	Ineligible due to installation in 2018 with no M&V in 2019.
PGE_noCPR_Other	102	PGE-2019-Q4-69585	Ineligible due to installation in 2018 with no M&V in 2019.
PGE_noCPR_DILighting_exterior	104	PGE-2019-Q4-86416	Ineligible due to exceeding the allowable installation time.
PGE_noCPR_DILighting_exterior	104	PGE-2019-Q4-30150	Ineligible due to exceeding the allowable installation time.
SCE_noCPR_NC/SBD	274	SCE-2019-Q2-0041868	Ineligible due to installation in 2018 with no M&V in 2019.
SCE_CPR_Other	290	SCE-2019-Q2-0044455	Ineligible due to installation in 2018 with no M&V in 2019.
SCE_CPR_Other	290	SCE-2019-Q2-0044456	Ineligible due to installation in 2018 with no M&V in 2019.
SCE_CPR_Other	292	SCE-2019-Q4-0060027	Ineligible due to installation in 2017 with no M&V in 2019.
SCE_CPR_Other	292	SCE-2019-Q4-0060029	Ineligible due to installation in 2017 with no M&V in 2019.
SCE_CPR_Other	292	SCE-2019-Q4-0060032	Ineligible due to installation in 2017 with no M&V in 2019.
SCE_CPR_Other	293	SCE-2019-Q2-0044275	Ineligible due to installation in 2017 with no M&V in 2019.
SCE_CPR_Other	296	SCE-2019-Q2-0044462	Ineligible due to installation in 2018 with no M&V in 2019.
SCE_CPR_Other	296	SCE-2019-Q2-0044463	Ineligible due to installation in 2018 with no M&V in 2019.
SCE_CPR_Other	334	SCE-2019-Q2-0044302	Ineligible due to installation in 2017 with no M&V in 2019.
SCE_CPR_Other	334	SCE-2019-Q2-0044303	Ineligible due to installation in 2017 with no M&V in 2019.
SCE_CPR_Other	334	SCE-2019-Q2-0044305	Ineligible due to installation in 2017 with no M&V in 2019.

Gross Electric Sample Domain	Sample ID	Claim ID	Rule Violation
SCE_noCPR_NC/SBD	283	SCE-2019-Q2-0041873	Ineligible due to installation in 2018 with no M&V in 2019.
SCE_noCPR_NC/SBD	283	SCE-2019-Q2-0041874	Ineligible due to installation in 2018 with no M&V in 2019.
SCE_noCPR_NC/SBD	303	SCE-2019-Q2-0044514	Ineligible due to installation completed in 2018 with no M&V in 2019.
SCE_noCPR_Other	282	SCE-2019-Q2-0044459	Ineligible due to exceeding the installation time limit without properly documented exception and installation in 2017 with no M&V in 2019.
SCE_noCPR_Other	289	SCE-2019-Q2-0044431	Ineligible due to installation in 2018 with no M&V in 2019.
SCE_noCPR_Other	289	SCE-2019-Q2-0044432	Ineligible due to installation in 2018 with no M&V in 2019.
SCE_noCPR_Other	302	SCE-2019-Q1-0009322	Ineligible due to installation in 2017 with no M&V in 2019.
SCE_noCPR_Other	327	SCE-2019-Q4-0083709	Ineligible due to exceeding allowed installation time.
SDGE_noCPR_Other	384	SDGE-2019-3220-10770648-1774698	Ineligible due to exceeding the installation time limit without properly documented exception.
SDGE_noCPR_Other	388	SDGE-2019-3220-10788467-1811912	Ineligible due to exceeding the installation time limit without properly documented exception.
SDGE_noCPR_Other	391	SDGE-2019-3220-10794023-1838767	Ineligible due to exceeding the installation time limit without properly documented exception.
SDGE_noCPR_Other	393	SDGE-2019-3322-10795341-1813833	Ineligible due to exceeding the installation time limit without properly documented exception.
SDGE_noCPR_Other	397	SDGE-2019-3322-10812194-1845900	Ineligible due to exceeding the installation time limit

Gross Electric Sample Domain	Sample ID	Claim ID	Rule Violation
			without properly documented exception.
SDGE_noCPR_Other	402	SDGE-2019-3220-10885037-9002547	Ineligible due to exceeding the installation time limit without properly documented exception.

Table 49: Sampled Gas Claims that Violate Rules

Gross Gas Sample Domain	Sample ID	Claim ID	Rule Violation
PGE_CPR_Other	47	PGE-2019-Q2-65047	Ineligible due to installation in 2018 with no M&V in 2019.
PGE_CPR_Other	48	PGE-2019-Q2-16713	Ineligible due to installation in 2018 with no M&V in 2019.
PGE_CPR_Other	58	PGE-2019-Q1-26565	Ineligible due to installation in 2017 with no M&V in 2019.
PGE_noCPR_Other	31	PGE-2019-Q1-20561	Ineligible due to exceeding the installation time limit without properly documented exception.
PGE_noCPR_Other	32	PGE-2019-Q2-5607	Ineligible due to equipment ordered prior to approval without proper exception documentation and installation in 2016 with no M&V in 2019.
PGE_noCPR_Other	34	PGE-2019-Q1-39317	Ineligible due to exceeding the installation time limit without properly documented exception and installation in 2018 with no M&V in 2019.
PGE_noCPR_Other	83	PGE-2019-Q1-8748	Ineligible due to installation in 2018 with no M&V in 2019.
PGE_noCPR_Other	88	PGE-2019-Q1-16582	Ineligible due to installation in 2018 with no M&V in 2019.
PGE_noCPR_Other	88	PGE-2019-Q1-18590	Ineligible due to installation in 2018 with no M&V in 2019.
SCG_noCPR_NC/SBD	365	SCG-2019-3813-500767460-1	Ineligible due to installation in 2018 with no M&V in 2019.
SCG_noCPR_Other	338	SCG-2019-3757-11245269-2204351	Ineligible due to 2018 installation with no M&V in 2019.
SCG_noCPR_Other	347	SCG-2019-3715-12209696-3430379	Ineligible due to exceeding the installation time limit without properly documented exception.
SCG_noCPR_Other	347	SCG-2019-3715-12209696-3430385	Ineligible due to exceeding the installation time limit without properly documented exception.

Gross Gas Sample Domain	Sample ID	Claim ID	Rule Violation
SCG_noCPR_Other	353	SCG-2019-3715-5001259543-10	Ineligible due to 2018 installation with no M&V in 2019.
SCG_noCPR_Other	354	SCG-2019-3715-5001259620-10	Ineligible due to installation in 2018 with no M&V in 2019.
SDGE_noCPR_Other	397	SDGE-2019-3322-10812194-1853982	Ineligible due to exceeding the installation time limit without properly documented exception.

D. List of Claims with Zero or Negative Savings

Table 50: Sampled Electric Claims with Zero or Negative Savings

Gross Electric Sample Domain	Sample ID	Claim ID	Evaluated First-Year kWh Savings	Description
MCE_noCPR_Other	7	MCE-2019-02-086-02	0	During the phone verification, evaluator found that the site was closed and is no longer operational. Hence ex post savings for this site are 0.
MCE_noCPR_Other	23	MCE-2019-02-119-01	0	MAT is changed from AR (as claimed in tracking data) to NR since during phone verification, the site contact mentioned that old fixtures were probably installed during 78-79 time frame. Actual Savings are 0 since, for NR savings there is no savings beyond ISP for Basic Linear LED T8 replacement measure.
PGE_CPR_DILighting_interior	258	PGE-2019-Q4-83690	0	Site has shut its operations hence 0 ex post savings for this project.
PGE_CPR_DILighting_interior	247	PGE-2019-Q4-104944	0	Based on phone verification, we changed the MAT from AR to NR as the old fixtures were probably very old and beyond their EUL. No savings beyond ISP. Savings are zeroed
PGE_CPR_DILighting_interior	267	PGE-2019-Q4-97299	0	NR measure should have ISP as baseline, not existing equipment. There were no savings beyond ISP for this claim.
PGE_noCPR_DILighting_interior	197	PGE-2019-Q3-50088	0	Business shuttered due to COVID
PGE_noCPR_DILighting_interior	272	PGE-2019-Q4-1612	0	Zero saver due to ISP baseline the same as the installed measure instead of existing condition baseline.
PGE_noCPR_DILighting_interior	183	PGE-2019-Q2-57735	0	Business closed and shuttered
PGE_noCPR_DILighting_interior	241	PGE-2019-Q4-29832	0	No savings beyond ISP for this measure. Savings are zeroed.
PGE_noCPR_DILighting_interior	241	PGE-2019-Q4-43212	0	No savings beyond ISP for this measure. Savings are zeroed.
PGE_noCPR_DILighting_interior	242	PGE-2019-Q4-43284	0	NR project with no savings beyond ISP. Savings are zeroed.
PGE_noCPR_DILighting_interior	242	PGE-2019-Q4-93589	0	NR project with no savings beyond ISP. Savings are zeroed.
PGE_noCPR_DILighting_interior	248	PGE-2019-Q4-9775	0	Zero saver due to ISP baseline the same as the installed measure instead of existing condition baseline.
SCE_noCPR_NC/SBD	280	SCE-2019-Q4-0084165	0	Unevaluable: Plans not provided to verify savings claims. PA failed to produce necessary information in response to

Gross Electric Sample Domain	Sample ID	Claim ID	Evaluated First-Year kWh Savings	Description
				Supplemental Data Request. Savings zeroed as unverifiable.
SCE_noCPR_NC/SBD	280	SCE-2019-Q4-0084166	0	Unevaluable: Plans not provided to verify savings claims. PA failed to produce necessary information in response to Supplemental Data Request. Savings zeroed as unverifiable.
SCE_noCPR_NC/SBD	285	SCE-2019-Q4-0084167	0	Unevaluable - No building plans, model outputs to determine which version was used, or cut sheets for installed measures were provided, and PA failed to provide these in response to a Supplemental Data Request.
SCE_noCPR_Other	318	SCE-2019-Q2-0044368	0	ISP for street lighting at the time of application is LED lighting. There is no savings beyond ISP for this project. Savings are zeroed
SCE_noCPR_Other	318	SCE-2019-Q2-0044369	0	ISP for street lighting at the time of application is LED lighting. There is no savings beyond ISP for this project. Savings are zeroed
SCE_noCPR_Other	318	SCE-2019-Q2-0044372	0	ISP for street lighting at the time of application is LED lighting. There is no savings beyond ISP for this project. Savings are zeroed
SDGE_noCPR_Other	409	SDGE-2019-3220-10952413-12269472	0	There is no savings beyond ISP for this claim.
SDGE_CPR_Other	412	SDGE-2019-3220-10973274-12247959	0	Eligible with zero savings: project was cancelled by the PA after post M&V analysis showed no savings
SDGE_CPR_Other	412	SDGE-2019-3220-10973274-12247960	0	Eligible with zero savings: project was cancelled by the PA after post M&V analysis showed no savings
SDGE_noCPR_NC/SBD	373	SDGE-2019-3222-10383280-1208538	-15,461	Negative saver: SBD project that included modeling of 12 buildings with EnergyPro 6.4. When the models were upgraded to the approved EnergyPro 6.8 version, some of the models resulted in negative electric savings.
SDGE_noCPR_NC/SBD	379	SDGE-2019-3222-10732247-1817164	-397,057	Negative saver: SBD project that included modeling of the building with EnergyPro 6.8.0.2. When the model wase upgraded to the approved EnergyPro 6.8.0.5 version, the model resulted in negative electric savings.

Gross Electric Sample Domain	Sample ID	Claim ID	Evaluated First-Year kWh Savings	Description
SDGE_noCPR_OptC	387	SDGE-2019-3317-10786859-1786251	-791	Project was also claimed in 2018. 2019 claim was based on full savings instead of incremental savings. Evaluated savings calculate savings as incremental over the 2018 claim which was less and resulted in negative savings.
SDGE_noCPR_OptC	398	SDGE-2019-3317-10812859-1847952	-46,418	Electric: The evaluated savings are incremental to the 2018 claimed savings, which was 366,410 kWh. The total Year-1 evaluated savings (non-incremental) are 319,992 kWh which resulted in negative incremental savings. Gas: The model used to claim savings for Reporting Period 1 (2019 claim) is statistically invalid. The model uncertainty is higher than the claimed savings, meaning that the model is not able to accurately predict the savings. The evaluator attempted to build a new energy model but was not able to achieve a statistically significant model. The evaluated therm savings are consistent with the 2018 claim which was made using bottom up calculations. Therefore the evaluated incremental savings was zero.
SDGE_noCPR_OptC	421	SDGE-2019-4061-10994773-12368421	0	While requesting meter data for this project, the PA informed us that they withdrew this project in 2020. They adjusted the 2019 claim to 0. Please see the email from the PA in the Gross folder. Therefore, the savings are zeroed out.
SDGE_noCPR_OptC	425	SDGE-2019-4061-10995233-12510971	0	Zero saver: Savings are too small to reliably calculate using Option C with lack of information by participant to confirm non-routine events and actual measure operation.

Table 51: Sampled Gas Claims with Zero or Negative Savings

Gross Gas Sample Domain	Sample ID	Claim ID	Evaluated First-Year Therm Savings	Description
PGE_noCPR_NC/SBD	69	PGE-2019-Q4-35361	-6,127	The majority of the reduction in savings is due to a change in the baseline model. An EnergyPro issue caused the original standard

Gross Gas Sample Domain	Sample ID	Claim ID	Evaluated First-Year Therm Savings	Description
				model to essentially be operating as constant volume and 100% outdoor air. The issue is an error in the way EnergyPro applies floor multipliers.
SCG_CPR_Other	336	SCG-2019-3715-11212285-2326126	0	Zero saver. In the Influence document, the customer stated that part of the reason for the project was that the new equipment was able to produce some desired products that the existing equipment was not able to. Therefore, the added functionality of the new equipment makes it the ISP for this participant.
SCG_noCPR_NC/SBD	349	SCG-2019-3813-12310764-3762934	-191	The most significant issue was that the baseline model did not comply with Savings By Design rules for baseline system types. Correcting the baseline model resulted negative gas saving for the first year due to COVID based low occupancy. Life cycle savings is positive (but very small) due to full occupancy for the as-observed savings.
SCG_noCPR_NC/SBD	352	SCG-2019-3813-500000509-1	0	Unevaluable: No models were provided to verify savings calculations and only partial building plans were provided. PA failed to provide necessary information in response to a Supplemental Data Request, so savings have been zeroed as unverifiable.
SCG_noCPR_NC/SBD	366	SCG-2019-3813-500793206-1	0	Not evaluable. Plans not provided to verify savings claims. PA failed to produce necessary information in response to Supplemental Data Request. Whole building models require a complete set of architectural, mechanical, plumbing and electrical plans to validate.
SCG_noCPR_Other	344	SCG-2019-3710-12168311-3306078	0	Based on an email from the customer, the dryer was damaged and inoperable before COVID started and the dryer is currently inoperable.
SDGE_noCPR_NC/SBD	375	SDGE-2019-3222-10384670-1688403	-269	Negative gas saver: SBD project that included modeling of six buildings with EnergyPro 6.7.0.4. When the models were upgraded to the approved EnergyPro 6.8.0.5 version, some of the models resulted in negative gas savings which summed to a negative value at the claim level.
SDGE_noCPR_NC/SBD	378	SDGE-2019-3222-10700899-1821416	-4,479	Negative saver: SBD project that included modeling of the building with EnergyPro 6.8.0.3. When the model was upgraded to the approved EnergyPro 6.8.0.5 version, the model resulted in negative gas savings.
SDGE_noCPR_OptC	387	SDGE-2019-3317-	-22,283	Project was also claimed in 2018. 2019 claim was based on full savings instead of incremental savings. Evaluated savings calculate savings as

Gross Gas Sample Domain	Sample ID	Claim ID	Evaluated First-Year Therm Savings	Description
		10786859-1786251		incremental over the 2018 claim which was less and resulted in negative savings.
SDGE_noCPR_OptC	398	SDGE-2019-3317-10812859-1847952	0	Electric: The evaluated savings are incremental to the 2018 claimed savings, which was 366,410 kWh. The total Year-1 evaluated savings (non-incremental) are 319,992 kWh which resulted in negative incremental savings. Gas: The model used to claim savings for Reporting Period 1 (2019 claim) is statistically invalid. The model uncertainty is higher than the claimed savings, meaning that the model is not able to accurately predict the savings. The evaluator attempted to build a new energy model but was not able to achieve a statistically significant model. The evaluated therm savings are consistent with the 2018 claim which was made using bottom up calculations. Therefore the evaluated incremental savings was zero.

E. Sample Frame and Strata

Table 52: Projects Dropped to Create Sample Frame, by PA

PA	Categories Dropped	Project Count	Life-Cycle Forecast Gross Savings		
			MW	MWh	MTherm
All Custom		**32,477**	**5,048**	**22,956,309**	**725,878**
BAY	Non-CIAC Sector: Codes And Standards	2	0	26	38
BAY	Non-CIAC Sector: Evaluation Measurement And Verification	1	0	0	0
BAY	Non-CIAC Sector: Residential	72	3	27,309	2,481
BAY	WhySavingsZeroed	1	0	0	0
	BAY	**76**	**3**	**27,335**	**2,519**
LCE	Non-CIAC Sector: Residential	6	0	0	0
	LCE	**6**	**0**	**0**	**0**
MCE	Non-CIAC Sector: Residential	15	0	3,015	274
	MCE	**15**	**0**	**3,015**	**274**
PGE	On Billing Finance Alternative Pathway	5	97	402,099	1,870
PGE	Non-CIAC Sector: Codes And Standards	6	1,898	7,897,586	204,858
PGE	Non-CIAC Sector: Emerging Technologies	3	0	0	0
PGE	Non-CIAC Sector: Energy Savings Assistance	1	132	1,087,452	-10,398
PGE	Non-CIAC Sector: Evaluation Measurement And Verification	1	0	0	0
PGE	Non-CIAC Sector: Finance	3	0	0	0
PGE	Non-CIAC Sector: On Billing Finance	1	0	0	0
PGE	Non-CIAC Sector: Other	2	0	0	0
PGE	Non-CIAC Sector: Public - Residential (Res)	518	16	147,153	-438

PA	Categories Dropped	Project Count	Life-Cycle Forecast Gross Savings		
			MW	MWh	MTherm
PGE	Non-CIAC Sector: Residential	27,115	69	244,661	17,586
PGE	Non-CIAC Sector: Workforce Education And Training	3	0	0	0
PGE	Non Resource	17	0	0	0
PGE	Strategic Energy Management (SEM)	3	0	41,232	1,253
PGE	WhySavingsZeroed	263	1	23,734	963
	PGE	**27,941**	**2,213**	**9,843,917**	**215,694**
SCE	Non-CIAC Sector: Codes And Standards	4	0	0	0
SCE	Non-CIAC Sector: Emerging Technologies	3	0	0	0
SCE	Non-CIAC Sector: Evaluation Measurement And Verification	2	0	0	0
SCE	Non-CIAC Sector: Finance	2	0	0	0
SCE	Non-CIAC Sector: Other	2	0	0	0
SCE	Non-CIAC Sector: Residential	241	2,102	9,085,193	1,738
SCE	Non-CIAC Sector: Workforce Education And Training	2	0	0	0
SCE	Strategic Energy Management (SEM)	7	0	39,521	1,127
	SCE	263	2,102	9,124,714	2,865
SCE	WhySavingsZeroed	**79**	**0**	**2,134**	**-4**
SCG	Non-CIAC Sector: Codes And Standards	16	0	0	416,859
SCG	Non-CIAC Sector: Residential	1,015	2	2,172	17,908
SCG	Strategic Energy Management (SEM)	6	0	0	1,048
	SCG	**1,116**	**2**	**4,307**	**435,811**

PA	Categories Dropped	Project Count	Life-Cycle Forecast Gross Savings		
			MW	MWh	MTherm
SCR	Non-CIAC Sector: Finance	2	0	0	0
SCR	Non-CIAC Sector: Residential	2	5	83,611	5,655
SCR	Non-CIAC Sector: Workforce Education And Training	1	0	0	0
SCR	WhySavingsZeroed	3	0	0	0
	SCR	**8**	**5**	**83,611**	**5,655**
SDGE	Non-CIAC Sector: Codes And Standards	8	444	1,846,675	23,194
SDGE	Non-CIAC Sector: Energy Savings Assistance	12	2	17,423	-67
SDGE	Non-CIAC Sector: Residential	117	8	33,771	1,255
SDGE	Strategic Energy Management (SEM)	6	0	2,699	29
SDGE	WhySavingsZeroed	2	0	321	0
	SDGE	**145**	**454**	**1,900,888**	**24,411**
TCR	Non-CIAC Sector: Residential	16	0	0	0
	TCR	**16**	**0**	**0**	**0**
All Dropped		**29,586**	**4,780**	**20,987,786**	**687,230**
CIAC Frame		**2,891**	**268**	**1,968,523**	**38,648**

Table 53: Gross Electric - Sampled and Completed Projects and Stratum Bounds

Gross Electric Sample Strata					Projects			Stratum Bounds (kWh)	
PA	CPR	Project Type	Lighting Type	Stratum	Total	Sampled	Completed	Lower	Upper
MCE	No	Other Retro		1	32	5	5	9,110	19,099
MCE	No	Other Retro		2	15	5	5	70,579	142,125
MCE	No	Other Retro		3	13	8	6	154,264	302,960
MCE	No	Other Retro		Excluded	5	NA	NA	NA	NA
MCE	No	Other Retro		Certainty	1	1	1	376,908	376,908
PG&E	Yes	DI Ltg	Ext	Certainty	4	4	4	324,474	3,468,010
PG&E	Yes	DI Ltg	Int	Certainty	7	7	7	129,583	911,996
PG&E	Yes	Other Retro		1	6	4	4	82,767	940,899
PG&E	Yes	Other Retro		2	5	3	3	964,622	2,318,087
PG&E	Yes	Other Retro		Certainty	1	1	1	3,259,300	3,259,300
PG&E	No	DI Ltg	Ext	1	149	2	2	80,294	101,500
PG&E	No	DI Ltg	Ext	2	91	2	2	340,612	533,672
PG&E	No	DI Ltg	Ext	3	48	2	2	1,361,659	1,375,878
PG&E	No	DI Ltg	Ext	4	18	4	4	1,967,508	5,865,181
PG&E	No	DI Ltg	Ext	Excluded	14	NA	NA	NA	NA
PG&E	No	DI Ltg	Ext	Certainty	1	1	1	6,188,912	6,188,912
PG&E	No	DI Ltg	Int	1	1,172	14	14	7,673	244,814
PG&E	No	DI Ltg	Int	2	492	12	12	294,739	857,261
PG&E	No	DI Ltg	Int	3	188	12	12	908,466	4,131,827
PG&E	No	DI Ltg	Int	Certainty	2	2	2	4,212,317	4,339,345
PG&E	No	SBD		1	18	9	6	405,975	3,344,501
PG&E	No	SBD		2	8	5	5	4,355,391	20,187,260
PG&E	No	SBD		Certainty	1	1	1	22,768,530	22,768,530
PG&E	No	Other Retro		1	186	14	14	173,487	1,682,665
PG&E	No	Other Retro		2	63	11	10	1,961,135	6,592,108
PG&E	No	Other Retro		3	23	10	10	8,515,600	22,024,103
PG&E	No	Other Retro		Excluded	1	NA	NA	NA	NA
PG&E	No	Other Retro		Certainty	2	2	2	22,955,372	25,390,308
SCE	Yes	SBD		Certainty	1	1	1	18,118,410	18,118,410
SCE	Yes	Other Retro		Certainty	6	6	6	378,085	12,785,713
SCE	No	SBD		1	18	5	4	666,992	2,200,448
SCE	No	SBD		2	10	5	4	3,575,363	13,631,756
SCE	No	OptC		Certainty	1	1	1	4,952,335	4,952,335
SCE	No	Other Retro		1	71	4	3	38,622	1,023,744
SCE	No	Other Retro		2	26	4	3	2,045,700	4,523,051
SCE	No	Other Retro		3	9	6	6	5,519,893	14,509,539
SCE	No	Other Retro		Excluded	2	NA	NA	NA	NA

Gross Electric Sample Strata					Projects			Stratum Bounds (kWh)	
PA	CPR	Project Type	Lighting Type	Stratum	Total	Sampled	Completed	Lower	Upper
SCE	No	Other Retro		Certainty	2	2	2	29,727,853	42,289,368
SDG&E	Yes	OptC		1	9	3	3	5,629	44,049
SDG&E	Yes	OptC		Certainty	2	2	2	2,892,920	3,383,619
SDG&E	Yes	Other Retro		Certainty	1	1	1	171,264	171,264
SDG&E	No	SBD		1	15	4	4	191,112	1,354,260
SDG&E	No	SBD		2	8	5	5	1,767,150	5,658,570
SDG&E	No	SBD		Certainty	2	2	2	8,492,856	17,176,065
SDG&E	No	OptC		1	30	3	3	22,744	282,100
SDG&E	No	OptC		2	5	4	4	534,249	3,013,131
SDG&E	No	OptC		Excluded	4	NA	NA	NA	NA
SDG&E	No	OptC		Certainty	1	1	1	3,504,736	3,504,736
SDG&E	No	Other Retro		1	18	9	8	24,084	2,282,128
SDG&E	No	Other Retro		Certainty	2	2	2	11,883,630	14,409,320

Table 54: Gross Gas - Sampled and Completed Projects and Stratum Bounds

Gross Gas Sample Strata				Projects			Stratum Bounds (Therm)	
PA	CPR	Project Type	Stratum	Total	Sampled	Completed	Lower	Upper
PG&E	Yes	Other Retro	Certainty	4	4	4	4,866	1,266,523
PG&E	No	SBD	1	11	7	4	4,575	170,265
PG&E	No	SBD	Certainty	2	2	2	2,400,616	2,426,655
PG&E	No	Other Retro	1	36	7	6	3,620	151,762
PG&E	No	Other Retro	2	7	7	6	250,272	2,136,540
PG&E	No	Other Retro	Certainty	1	1	1	21,199,584	21,199,584
SCG	Yes	OptC	Certainty	1	1	1	42,768	42,768
SCG	Yes	Other Retro	Certainty	1	1	1	711,128	711,128
SCG	No	SBD	1	25	5	4	7,740	33,165
SCG	No	SBD	2	13	7	6	58,665	739,815
SCG	No	SBD	Excluded	2	NA	NA	NA	NA
SCG	No	OptC	Certainty	1	1	1	293,001	293,001
SCG	No	Other Retro	1	12	5	5	142,790	305,550
SCG	No	Other Retro	Excluded	1	NA	NA	NA	NA
SCG	No	Other Retro	Certainty	2	2	2	1,014,880	1,525,500
SDG&E	Yes	OptC	1	1	1	1	530,247	530,247
SDG&E	Yes	OptC	Certainty	1	1	1	1,590	1,590
SDG&E	No	SBD	1	15	5	5	7,050	32,910
SDG&E	No	SBD	2	4	3	3	53,325	260,430
SDG&E	No	SBD	Excluded	1	NA	NA	NA	NA
SDG&E	No	SBD	Certainty	1	1	1	608,265	608,265
SDG&E	No	OptC	1	5	5	5	6,894	106,404
SDG&E	No	Other Retro	1	4	3	3	47,174	229,640

Table 55: Net Electric - Sampled and Completed Projects and Stratum Bounds

Net Electric Sample Strata					Projects			Stratum Bounds (kWh)	
PA	CPR	HTR	Project Type	Stratum	Total	Sampled	Completed	Lower	Upper
MCE	No	Yes	Other Retro	1	1	1	NA	54,317	54,317

Net Electric Sample Strata					Projects			Stratum Bounds (kWh)	
PA	CPR	HTR	Project Type	Stratum	Total	Sampled	Completed	Lower	Upper
MCE	No	No	Other Retro	1	65	57	18	1,388	342,986
PG&E	Yes	Yes	DI Ltg	1	1	1	NA	117,920	117,920
PG&E	Yes	No	DI Ltg	9	10	10	2	246,004	3,155,889
PG&E	Yes	No	Other Retro	9	12	9	1	57,937	2,770,405
PG&E	No	Yes	DI Ltg	1	882	96	38	851	1,260,546
PG&E	No	Yes	Other Retro	1	6	5	NA	93,965	188,824
PG&E	No	No	DI Ltg	1	1,319	397	81	1,732	5,337,315
PG&E	No	No	SBD	1	27	27	3	118,414	11,384,265
PG&E	No	No	Other Retro	1	269	206	36	0	17,773,216
SCE	Yes	No	SBD	1	1	1	NA	9,059,205	9,059,205
SCE	Yes	No	Other Retro	1	6	1	1	264,660	264,660
SCE	No	Yes	Other Retro	1	1	1	NA	93,422	93,422
SCE	No	No	SBD	1	28	25	5	5,914	6,815,878
SCE	No	No	Other Retro	1	110	83	14	26,798	25,373,621
SDG&E	Yes	No	Other Retro	1	12	11	1	5,629	3,383,619
SDG&E	No	No	SBD	1	25	25	4	114,667	10,305,639
SDG&E	No	No	Other Retro	1	60	51	16	554	3,504,736

Table 56: Net Gas - Sampled and Completed Projects and Stratum Bounds

Net Gas Sample Strata					Projects		Stratum Bounds (Therm)	
PA	CPR	HTR	Project Type	Stratum	Sampled	Completed	Lower	Upper
PG&E	Yes	No	Other Retro	1	3	1	4,136	17,330
PG&E	No	No	SBD	1	13	1	562	1,213,328
PG&E	No	No	Other Retro	1	35	9	7	12,719,750
SCG	Yes	No	Other Retro	1	2	NA	40,630	355,564
SCG	No	No	SBD	1	28	6	142	369,908
SCG	No	No	Other Retro	1	8	NA	78,661	762,750
SDG&E	Yes	No	Other Retro	Certainty	2	1	1,590	530,247
SDG&E	No	No	SBD	1	21	3	77	304,133
SDG&E	No	No	Other Retro	1	8	4	6,894	137,784

F. Responses to Stakeholder Comments

F.1 Comments on the Public Report

ID	Source	Section	Topic	Page	Comment	SBW Response
1	PG&E	NA	Impact evaluation scope	NA	Clearly this impact evaluation draft is not estimating grid-level impacts since many projects' savings were not counted when grid impacts exist. How would you describe the impacts this evaluation is estimating?	CPUC staff response: PG&E has not provided project numbers of eligible projects for which grid-level savings were not calculated. Therefore, a specific response is not feasible to provide.
2	PG&E	Workplan Appendix E	Project Eligibility	NA	Could you explain the rationale for the ineligibility criteria of any "rule violations" and “installation time limit exceeded?” Regarding the latter, it is true that PG&E includes an installation time limit for project installation. This rule was instituted to help set customer expectations and to ensure that projects don’t sit idle for long periods of time. However, the time limit is arbitrary, not based on any Commission decision or ruling. PG&E includes it in our programs as good housekeeping, and we routinely grant time extensions. We’ve considered eliminating or extending the default time limit as it creates an administrative burden to process routine application extensions. However, we don't understand the rationale for using this program best practice as an evaluation ineligibility criterion. Similarly, other minor program rule discrepancies appear inappropriate to use as ineligibility criteria. Please explain, or advise the evaluation team to count the savings for these projects.	CPUC staff response: A criterion for determining eligibility of projects is conformity with the statewide custom program rules and requirements. This has been applied consistently in the 2019 CIAC impact evaluation.

ID	Source	Section	Topic	Page	Comment	SBW Response
3	PG&E	NA	CPR vs. Evaluation result	NA	When CPR results disagree with evaluation results, which one should be trusted as more accurate?	CPUC staff response: Ex post evaluators use the observed evidence obtained during its post-installation EM&V process whereas the CPR reviews are based on the data provided at the time of project application with forecasted savings.
4	PG&E	NA	CPR	NA	Based on ED guidance, for many years custom impact evaluations used CPR results to inform ex post results, meaning that evaluators did not re-assess the accuracy of CPR dispositions and approved project savings parameters. This evaluation does exactly that; when did that ED evaluation guidance change?	CPUC staff response: Ex post evaluators use the observed evidence obtained during its post-installation EM&V process whereas the CPR reviews are based on the data provided at the time of project application with forecasted savings. PG&E has not provided a reference to the guidance document it refers to in which ED has directed ex post evaluators to keep CPR findings unchanged.
5	PG&E	All	Terminology (General Comments on the Draft PY2019 Custom Impact Evaluation)	All	Apparently, the term "forecast" is used throughout the report as a synonym for "PA ex ante savings claims," or "ex ante savings." Is that correct? If so, it would be clearer to globally change that throughout the report. Forecasted savings do exist, but they are not included in any PA CEDARS ex ante reported savings claims.	CPUC staff direction: Stay with forecast and add it to the glossary.
6	PG&E	2.1.1 Develop Sample Frame	Terminology, usage of "sampled" (General Comments on the Draft PY2019 Custom Impact Evaluation)	24-31	Table 7, 8, 9, and 10, are helpful which show total number of projects “sampled” and “evaluated.” Apparently, the draft report uses "sampled" to mean "target sample size." If correct, this is an unconventional usage of the term sampled. Can the evaluation rename "sampled" to "target sample size" or something similar that is clear? Per research standard practice, "sampled"	We have replaced “Sampled” with “Sample Target” and did not change “Evaluated”.

ID	Source	Section	Topic	Page	Comment	SBW Response
					should be used exclusively for "achieved (evaluated) sample points."	
7	PG&E	2.1.1 Develop Sample Frame	Sample category savings (General Comments on the Draft PY2019 Custom Impact Evaluation)	24-31	Can the evaluation include in separate tables, or add columns to Tables 7, 8, 9, and 10, that show the ex ante savings for each sample category? This would be very helpful since seeing only project counts isn't very meaningful when individual project savings can vary by a factor of 1000 or more.	The forecast and evaluated savings are shown in Appendix A. We added references to the Appendix tables.
8	PG&E	2.2.1	2.2.1 Project Eligibility, and 3.9 Rule Violations (General Comments on the Draft PY2019 Custom Impact Evaluation)	33, 66	Section 3.9 states, "The rules that defined ineligibility are discussed in Section 2.2.1." (p66). And then section 2.2.1 states, "Appendix G of the workplan defines the evaluation criteria for determining ineligible projects which resulted in setting the evaluated savings to zero." The workplan does not contain an Appendix G. Since these criteria were the single biggest driver of results, rather than referencing secondary documents, can the final report simply include the eligibility criteria? They're only two pages.	Appendix G was an incorrect reference. Corrected to Appendix E in the workplan. Section 2.2.1 only lists the differences between the workplan and the evaluation, so it remains unchanged.
9	PG&E	Multiple, including 3.8 Comparison to 2015 Evaluation Findings	References to CIAC PY2018 report (General Comments on the Draft PY2019 Custom Impact Evaluation)	Multiple, including 64-65	The PY2019 draft report makes numerous references to the draft CIAC PY2018 report. What is the purpose of comparing GRR and NRR results to a previous year's draft report, when ED announced those results are not available, and the draft was removed from the CPUC's Public Documents Area? "Oct 27, 2020: To Service Lists R.13-11-005 and A.17-01-013 This is to notify parties that Energy Division will not release a final 2018 Commercial, Industrial and Agricultural Custom (CIAC) Impact Evaluation. Due	CPUC staff response: For stakeholders who had reviewed the draft 2018 CIAC report before it was removed from the CPUC's public documents area, the results from that report have been included in the 2019 CIAC report to compare using the CPUC-vetted methodologies to methodologies included in the draft 2018 CIAC report.

ID	Source	Section	Topic	Page	Comment	SBW Response
					to methodological and analytical issues discovered since a revised draft was released on September 15, 2020, CPUC staff will not finalize this study, and will not adopt any of the draft study findings to adjust energy efficiency savings parameters in the program administrators' (PAs) energy efficiency portfolios. As 2018 gross realization rates (GRR) and net to gross (NTG) adjustments will not be available, CPUC staff will use 2017 GRR and NTG adjustments to adjust 2018 PAs Commercial, Industrial and Agricultural Custom electrical and gas savings claims."	
10	PG&E	Methodology	Billing data (General Comments on the Draft PY2019 Custom Impact Evaluation)	Multiple	Did the evaluation make use of utility billing data to aid ex post savings estimates? If so, how was this done?	We used billing data as a reality check in a few cases and billing-data regressions in a few cases.
11	PG&E	Methodology	Reconciling Gross and Net Surveys (General Comments on the Draft PY2019 Custom Impact Evaluation)	Multiple	In cases where customers were sampled for both gross and net savings, were the survey responses reconciled? For example, if one survey found no maintenance was needed, and the other survey found maintenance was needed, how were these contradictory responses reconciled?	The net sample was independent of the gross sample. Only a small number of net surveys were also done for gross sample points. The gross team assessed the claimed baseline, not the net team; therefore, reconciliation was not necessary.
12	PG&E	A.13 Recommendations	Recommendations (General Comments on the Draft PY2019 Custom Impact Evaluation)	95-106	Recommendations #37 and #38 are blank. Are there recommendations?	These relate to COVID, but we made recommendations since COVID is a non-routine event.
13	PG&E	A.13 Recommendations	Recommendations (General Comments on the Draft PY2019 Custom Impact Evaluation)	95-106	One of the findings of the evaluation was that projects that go through CPR do not tend to evaluate any better than other projects. Are there any	The report does not make any statement as characterized by PG&E. Sample sizes were not sufficient to support recommendations on the CPR process.

ID	Source	Section	Topic	Page	Comment	SBW Response
					recommendations the evaluation team could offer on the CPR process?	
14	PG&E	A.13 Recommendations	Recommendations (General Comments on the Draft PY2019 Custom Impact Evaluation)	95-106	We don't see any recommendations for the Commission or for future custom evaluations. Are there any recommendations the evaluation team could suggest for the Commission or for future evaluations to improve the speed, accuracy, collaboration, reporting, etc. of this important work?	We have separated out two existing recommendations for CPUC into a separate section in the ES and recommendations section. We have also added a recommendation that CPUC consider enforcing the authority granted to staff in D. 10.04.029 and develop stronger rules.
15	SCG	Discussion	Program Year Violations	2	Zeroing out of projects due to timing violations or not acquiring specific extension paperwork is an issue that is becoming increasingly frequent. This is important as continued application may create disincentives for larger, more complex projects that are longer in time frame and may require metering for savings validation – which is important to all parties. This creates additional (possibly unnecessary) bureaucratic paperwork requirements that impact the CPUC and the IOUs portfolio and program savings offerings. Indeed, this also extends to customers (participants and non-participants). Project # 347 is an example of this program year violation. One solution is to consider allowing projects to be claimed when completed. SoCalGas agrees that in general project claims should be made only in one year except for those specific projects where the incentive is split according to program rules. The effects are to realize the claims as valid and the real savings as real, and to evaluate the projects fully and properly per the evaluator's	The evaluation enforced the statewide custom program requirements.

ID	Source	Section	Topic	Page	Comment	SBW Response
					responsibility, for those projects that are selected for the evaluation sample.	
16	SCG	Discussion	Consider Default Gross Realization Rates (GRRs), for "Unevaluable Projects"	2	Unevaluable projects are zeroed out in this evaluation. The issue is important as they can have an outsized effect on GRRs. An unevaluable project still happened, still exists, and likely produces savings (exemptions do exist such as when facilities shut down or remove projects). SoCalGas suggests that a default GRR for each project type developed in recent years, might be applied in this case in the final draft CIAC evaluation report.	PAs should be collecting and providing all information and documentation support claimed savings. Unsupported savings claims will remain zeroed out as a basis to apply a default GRR does not exist. No change.
17	SCG	Discussion	Misinterpretation of customer comment and nature of installed equipment in "ISP" Zero saver project:	3	The equipment selected for the project (#336) allowed different steps in a recipe for producing the same product. That change resulted in more saved energy rather than increased product or new product. The technology improvement allowed the customer to change some steps in the process and therefore save energy. The measure is not ISP, and the new processes or steps were misinterpreted with "added functionality" rather than interpreted correctly as EE improvements. SoCalGas is willing to work with the evaluation team to explain its prospective of the issue at length if required.	The new equipment added new capability that the existing equipment did not have in order to produce new products that had not previously been produced at this site, driving equipment selection. The new capability becomes the new baseline and equates to NR since the new equipment is needed to produce the new product which could not have been produced with the old equipment.
18	SCG	Discussion	Individual Investor-Owned-Utility (IOU) Recommendations:	3	While SoCalGas has access to some site report information, SoCalGas requests specific recommendations related to the 10 of 18 "Zero saver" projects. Such recommendations are provided in Table 47 of the CIAC Impact Evaluation report for PG&E, SDG&E and SCE. Detailed recommendations will assist	Please refer to Table 34: Recommendations Specific to Each Program Administrator. This table specific recommendations for all PAs individually. All recommendations related to ensuring eligibility and evaluability are applicable to zero savings evaluation results.

ID	Source	Section	Topic	Page	Comment	SBW Response
					SoCalGas in the implementation of process improvements.	
19	SCG	Discussion	The Validity and Treatment of the Evaluation Sample in Covid Restricted Periods	3	Covid restrictions are only briefly acknowledged and may have greater implications for this and other impact evaluations. This issue is important as it is critical to understand the extent to which Covid may have impacted the evaluation, especially if it made projects unevaluable and thus zero savers (see above) but also if it resulted in temporary closures, reduced hours, or use. SoCalGas understands the challenge of evaluating Covid impacts on the "missing data" aspects of the "unevaluable" conclusion, but believes such review is warranted as significant saving were zeroed out in this process. SoCalGas believes that two projects # 352 and # 366 that were among the Zero saver list, happened in one site and our understanding is that Covid may have been a cause of the lack of response to evaluators activities.	SCG did not provide needed documentation to evaluate the covid impacts of these two projects. Complete documentation packages should be compiled for each project to facilitate evaluation. No change.
20	SDG&E	Overarching	Draft Report	N/A	The 2019 draft report references GRR and NTGR results from the 2018 Evaluation. However, the CPUC published a notice on October 27, 2020 stating that "Energy Division will not release a final 2018 Commercial, Industrial and Agricultural Custom (CIAC) Impact Evaluation." Additionally, the draft 2018 Impact Evaluation Results are not available on the Public Document Area (PDA). Recommend that the 2018 Evaluation results be made available.	CPUC staff response: For stakeholders who had reviewed the draft 2018 CIAC report before it was removed from the CPUC's public documents area, the results from that report have been included in the 2019 CIAC report to compare using the CPUC-vetted methodologies to methodologies included in the draft 2018 CIAC report. Because of methodological issues, the 2018 CIAC report will not be released.
21	SDG&E	Overarching	Draft Report	N/A	Recommendations are more valued when programs are able to implement	Noted. We have recommended that projects should be claimed in the year

ID	Source	Section	Topic	Page	Comment	SBW Response
					them sooner if they are in agreement with the SDG&E and/or are still relevant/applicable rather than later. Having a 2019 impact evaluation finalize in 2022 leaves a gap in prior years. Recommend CPUC to evaluate closer to current year.	installation occurs so the evaluators can provide feedback with a relatively short time lag.
22	SDG&E	Section 2.2.2	Draft Report	N/A	The report states that "If a customer refused to participate in both the 2018 and 2019 CIAC evaluations, then savings were zeroed, instead of being dropped for refusing only the 2019 evaluations." Could you clarify the rationale behind this decision?	SBW identified one project that fell in this category, however upon further review of the single case, we realized that the project was dropped and not zeroed. The bullet description has been removed from the referenced report text.
23	SDG&E	Section 2.2.5	Draft Report	N/A	The report states that deemed claims were zeroed out as ineligible. As mentioned in Recommendation #6, per DEER Resolution E-5152, deemed measures may sometimes be processed through custom programs. Custom projects that include deemed measures are required to use deemed values for energy savings and where appropriate retain deemed incentives amounts. Given the guidance from DEER Resolution E-5152, shouldn't the evaluated savings consider the deemed savings?	Clarified text in report about how deemed measures were handled in the evaluation. DEER Resolution E-5152 applies as of the date of resolution and is not retroactively applicable to the 2019 evaluation.
24	SDG&E	N/A	Draft Report	40	Typo to "Figure 2 is similar to Figure 2". Recommend "Figure 3 is similar to Figure 2..."	Corrected.
25	SDG&E	Overarching	Draft Report	N/A	The submittal of the draft report was released towards the end of the year. The review time for stakeholders to provide responses for could not be extended. This is unfortunate as there were key stakeholders off during this time period. Recommendation: Please push up the	Noted.

ID	Source	Section	Topic	Page	Comment	SBW Response
					project schedule to account for major holidays towards the end of the year to have more quality responses.	

F.2 Comments on Confidential PA-Specific Work Products

ID	Source	Project	Topic	Comment	SBW Response
1	PG&E	58	CPR review driven claim timing (Comments on Limited FSR Sample Review)	**Summary:** The evaluation incorrectly determined that this project is ineligible due to installation in 2017 without M&V requirements in 2019. **Details:** While the installation completed on 8/16/2017, this project was in extended CPR review and only approved by Commission staff on 7/16/2019. Per Commission policy, PG&E cannot make final savings claims until CPR approval is received. **Request:** Since PG&E appropriately waited to claim this project's savings in the year Commission staff approved it, PG&E requests that the savings for this project be restored and the final evaluation report be appropriately updated.	The final CPR uploaded to the DEER Resources website on December 24, 2018 makes a one-time exception to allow the project to proceed after the initial review had set savings to zero. The project was already installed when the final disposition was issued. PG&E's installation approval date is December 31, 2018; therefore, it is still a 2018 installation with no M&V in 2019. The project remains a zero saver.
2	PG&E	75	Deemed measures inclusion (Comments on Limited FSR Sample Review)	**Summary:** The evaluation incorrectly determined that the deemed measures portion of this project were ineligible. Claim one was zeroed as ineligible and claim two was modified to include only custom measures, however, the inclusion of deemed measures in this custom project was appropriate and followed program rules. **Details:** The use of deemed measures in custom projects is expressly permitted by the PG&E program rulebook under certain conditions (2019 Statewide Custom Policies and Procedures Manual, Section 1.5.6, page 9, January 1, 2019) and the evaluation eligibility criteria allow these measures per exception: "Deemed measures that are typically not eligible but are included with the custom project will be allowed and savings will be passed through." (SBW workplan, Appendix E, p137). **Request:** PG&E requests that this project be classified as eligible, the savings adjusted appropriately, and the final report revised accordingly.	Claim includes two measures—one is deemed, and the other is a combination of deemed and custom. Both deemed measures use deemed savings and custom incentives, which is not allowed in the custom program. Deemed measures can only be passed through if they use deemed savings and deemed incentives. The project workbook has been updated to include savings for the custom measure.
3	PG&E	193 & 231	Not applying program-specific rules to determine project	**Summary:** The evaluation incorrectly determined that multiple APEP project were ineligible due to violation of program rules around the sequence and timing of the application submittal, pump tests, and savings claim date. PG&E determined these projects are eligible under the program-specific Policies and Procedures Manual for APEP; however, PA-specific program rules were ignored by the evaluation team.	The statewide custom program manual is the overarching requirements document that overrides conflicting subprogram-specific requirements. The

ID	Source	Project	Topic	Comment	SBW Response
			eligibility (Comments on Limited FSR Sample Review)	**Details:** According to an email provided with the Final Savings Report (FSR) for APEP project SBW Sample ID 0193, PRJ - 01989533, "This evaluation does not use program-specific rules so all APEP rules do not apply; only the custom program requirements apply except one, i.e., participants may submit the incentive application after the work is completed." This appears to be in contradiction to the PY2019 Evaluation Workplan which states on page 5 "When designing and implementing our evaluation, we considered the following CPUC policies and guidance. Our evaluations will consider the policy and guidance documents, as well as any codes and regulations that were in effect at the time of project approval." This is followed by a list of sources that includes "PA-specific policy and procedures manuals." These program details were known to the evaluation team as stated in the Workplan for 2019 Custom Impact Evaluation, Appendix E: Project Ineligibility Criteria, Installed Prior to Approval - Exceptions/discussion: "Some programs such as PG&E's advanced pumping efficiency program (APEP) allows application for incentive after the project is completed and requires submission of pre and post test results, savings calculations, and paid invoices." The program rules stipulate 3 years between pre and post tests and 2 years between post test and savings claim. This novel program design incorporates M&V directly into the delivery program services and the longer period to complete the tests acknowledges the shortage of industry pump-testing companies. **Sources:** Workplan for 2019 Custom Impact Evaluation, Appendix E: Project Ineligibility Criteria, Installed Prior to Approval - Exceptions/discussion: Some programs such as PG&E's advanced pumping efficiency program (APEP) allows application for incentive after the project is completed and requires submission of pre and post test results, savings calculations, and paid invoices. **Request:** PG&E requests that the evaluation follow PA-specific program policies and procedures manuals and that the savings for all APEP and other affected projects that were disqualified to be restored and the final report revised to include savings for these projects.	exception made to the eligibility requirement for APEP projects is the overarching requirement of the statewide custom programs that the proposed equipment should not be ordered prior to application approval. A reversal of ineligible APEP projects is not needed as those projects were ineligible on grounds other than the allowed exception. Project 193 was installed in 2017 without M&V in 2019 and remains ineligible. Project 231 workbook included first-year savings. Erroneously, the as-observed savings were not entered in the project workbook. This has been corrected.
4	PG&E	183	Evaluation methodology, sample (Comments on Limited FSR Sample Review)	**Summary:** This project was determined to be a zero saver in the evaluation, but we don't understand why. Although the tenant that occupied the space did indeed close in 2020 because of Covid, zero savings are not consistent with the evaluation methodology of first- year savings="as was" and lifecycle savings="as found" (section 2.2.4). **Details:** The 2019 first-year savings were fully realized; why aren't those savings counted? When the evaluation team conducted field work in 2021, did they recognize the change in tenant from the billing data for this address and attempt to contact the new tenant to assess "as found" conditions? We took a moment to do so. The new tenant informed us they are fully operational and did not change any	When we collected data, the business was closed and shutdown. The original participant was not available to interview for first-year operation.

ID	Source	Project	Topic	Comment	SBW Response
				of the lighting measures that were installed. Why did the evaluation deviate from the evaluation policy (Section 2.2.4) and set both first-year and lifecycle savings to zero when the measures were installed, fully achieved first-year savings, and continue to accrue savings to this day? **Request:** PG&E requests the savings for this project be restored and the savings reflected in the final evaluation report	
5	PG&E	0102	Program rules – timing of claims (Comments on Limited FSR Sample Review)	**Summary:** The evaluation incorrectly determined that the project is ineligible due to installation in 2018 with no M&V in 2019. **Details:** Project was paid on 12/24/18 but that payment was to the customer and was cancelled then re-issued. This project shows up as a 2019 claim because the check was re-issued to the implementer on 1/16/2019. It is unreasonable to disqualify this project due to a timing issue when PG&E is required to ensure that incentive payments are correct. This is a normal part of the verification of project claims which is an integral part of the Measurement and Verification process. **Request:** PG&E requests that the eligibility of this project be restored because valid reasons caused the delay into 2019 and to revise the final report to include appropriate savings for this project.	This evaluation uses the date of installation as a qualifying criterion, not the date of incentive payment. No change.
6	PG&E	46	Incomplete Data Request (Comments on Limited FSR Sample Review)	**Summary:** The evaluator disqualified this project based upon the incorrect conclusion that the customer is no longer a PG&E customer. This customer has been a PG&E customer at this location continuously since 10/14/2017. **Details:** In the ex-post evaluation final site report (FSR "Savings Results" tab) states, "Zero Saver: Participant switched to purchased renewable electric energy less than a month after building completion." And the SBW provided "Zero Saver Tracker" worksheet states, "It appears that the building stopped purchasing electric power from PG&E less than a month after the project was completed. Billing data only goes through 11/26/2019 with construction complete on 11/7/2019." The FSR shows that information was only gathered for one of two primary accounts, and the data gathered is incomplete. A new service account ID was assigned on 11/26/2019 for a new rate tariff (HB19S) associated with one of the primary accounts as required to be compliant with new tariffs approved by the CPUC. The evaluation could have easily determined the correct account status with a supplemental data request, or a phone call to PG&E, to make an accurate assessment of this project. **Request:** PG&E requests that the evaluation results be revised to include the savings impacts for this project which already account for the non-IOU fuel sources, as claimed, with adjustments for ex-post observed adjustments for model inputs, occupancy, and HOU.	Press releases from the company indicated that only renewable energy was sourced for the facility, and we were unaware of the new service account ID as it was not identified in the billing database. The billing data has now been identified and the project has now been evaluated.

ID	Source	Project	Topic	Comment	SBW Response
7	PG&E	113	PG&E Rules and project reports, Eligible Projects Deemed Ineligible (Comments on Limited FSR Sample Review)	**Summary:** The evaluation team disqualified projects that do not follow the "deemed must go deemed" rule without considering the seven (7) exceptions to this rule. **CPUC/SBW Source:** The Workplan for the 2019 Custom Impact Evaluation, Appendix E: Project Ineligibility Criteria, Rulebook Violations - Exceptions/discussion: "Deemed measures that are typically not eligible but are included with the custom project will be allowed and savings will be passed through." **PG&E Source:** PG&E Customized Energy Efficiency Policy and Programs Rulebook, Version 1.5| August 21, 2018. Section 5.8. Deemed must go deemed **Details:** The PG&E Policy and Programs Rulebook, v1.5 states: "All measures that have calculation methodologies approved in workpapers or DEER must adopt those methodologies." Exception1: Early Retirement measures with supporting Preponderance of Evidence. Note: There are few if any deemed Early Retirement measures, therefore this is not an exception, but listed here as such for clarity. Exception 2: Interior parking garage lighting measures are allowed in custom though technically eligible in deemed as exterior lighting. Exception 3: LEDA measures that incentivize the top end of available products (e.g. Tier I and Tier II LED) may be processed as custom. Exception 4: 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 go deemed. Exception 5: If a measure qualifies for deemed but is part of a greater EE system that is being installed(e.g. deemed measure being an efficient motor without controls, proposed EE measure being an efficient motor plus controls), the project may be processed through the custom program. Exception 6: If the workpaper for a deemed measure does not have an applicable building type for a project(including the COM and OTR building types), the measure must go through custom. Exception 7: Deemed measures can be calculated and incentivized through Statewide Government Partnerships programs (SGP). All projects with measures in the deemed catalog must have savings calculated according to deemed methodologies on a measure-by- measure basis. However, since the SGP program offers specific enhanced incentives, the incentive may be calculated at the enhanced rate on a measure-by-measure basis. Projects that are deemed measures only or a combination of deemed/customized measures are eligible.	We determined ineligibility based on statewide custom program policies, not PG&E's program policies. Per the statewide custom program procedures manual, deemed measures are ineligible for custom savings and incentives. Project 113 claimed savings and incentives through custom calculations so the measure remains ineligible.

ID	Source	Project	Topic	Comment	SBW Response
				Request: PG&E requests that the evaluation revise the interpretation of the deemed-must-go-deemed rule to include the numerous exceptions and adjust the savings for projects incorrectly disqualified by the current interpretation.	
8	PG&E	0267	Eligible project (Comments on Sample of DI Lighting Projects)	**Summary:** The evaluation incorrectly classified the measure application type (MAT) for this lighting project as normal replacement (NR), but it should have been accelerated replacement (AR). **Details:** PG&E provided a customer-signed enhanced accelerated replacement questionnaire (ARQ) where the result was AR. Additional AR evidence was provided consisting of over 20 photos showing that existing equipment was operational, with no lamp burnouts (so no maintenance needed), and modern instant-start electronic ballasts are visible which don't look very old (manufacturer label is not discolored, the vintage of the ballast is Gen 3 or 4). The evaluator's MAT worksheet is factually incorrect: it states that there is not a signed ARQ, when there is, and states there is not additional compelling documentation, when there is. **Request:** PG&E requests that this project's MAT be corrected to AR, and the evaluated savings be appropriately adjusted.	The signed ARQ is not recognized by the CPUC as meeting the preponderance-of-evidence criteria. The participant didn't know the exact age of the existing fixtures but said they were very old. We concluded that they were likely older than their EUL, therefore the measure MAT remains NR.
9	PG&E	247	Eligible project (Comments on Sample of DI Lighting Projects)	**Summary:** The evaluation incorrectly classified the measure application type (MAT) for this lighting project as normal replacement (NR), but it was correctly claimed as AR. CPR review confirmed approval of the AR MAT. **Details:** PG&E provided a customer-signed enhanced accelerated replacement questionnaire (ARQ). Additional AR evidence was provided consisting of photos showing that existing equipment was operational with no lamp burnouts (so no maintenance needed) . The evaluator's MAT worksheet is factually incorrect: it states that there is not a signed ARQ, when there is, and states there is not additional compelling documentation, when there is. Additionally this project went through Ex-Ante review and was approved with conditions as shown in PRJ - 02113963 PGE_19_P_C_292_Prop 39_Disposition_r1_20200730.xlsx the conditions require a Non-IOU fuels analysis as done in PRJ - 02113963 MLC Non-IOU Analysis_CONF.xlsx. **Request:** PGE requests that this project's MAT be corrected to AR, and the evaluated savings appropriately adjusted to match the EAR conditions.	We overrode the ARQ after surveying the participant.
10	PG&E	248	Eligible project (Comments on Sample of DI Lighting Projects)	**Summary:** The evaluation incorrectly determined that this entire project is ineligible due one of the measures did not have second baseline savings. **Details:** This project has multiple measures and the one evaluated measure (CLA43) has negative second baseline savings. The lower savings is due to using the newer, version 11.3 of the MLC calculator that correctly assigns the ISP baseline to measures classified as NR to determine savings. However, the MAT	An SBW survey determined that the existing equipment was more than 15 years old, which is greater than the EUL, so the MAT remains NR. The entire project was not considered ineligible.

ID	Source	Project	Topic	Comment	SBW Response
				should be AR and not NR, and there are still 3 measures with approximately 50,000kWh in savings and positive second baseline savings, so why is the whole project being zeroed out? **Request:** PGE requests that this project's eligible measures be restored, the MAT corrected to AR for the first measure, and the evaluated savings for the measures corrected, and the final report updated accordingly.	Only one of the three claims was zeroed—claims one and two are still showing evaluated savings above ISP, and claim three has zero savings because normal replacement savings do not exceed the standard practice baseline savings.
11	PG&E	104	Eligible project (Comments on Sample of DI Lighting Projects)	**Summary:** The evaluation incorrectly classified the measure application type (MAT) for this lighting project as normal replacement (NR), but it should have been accelerated replacement (AR). **Details:** PG&E provided a customer-signed enhanced accelerated replacement questionnaire (ARQ) and AR scoring matrix where the result was AR. Additional AR evidence was provided consisting of photos showing that existing equipment was operational, with no lamp burnouts (so no maintenance needed). The evaluator's MAT worksheet is factually incorrect: it states that there is not a signed ARQ, when there is, and states there is not additional compelling documentation, when there is. **Request:** PGE requests that this project's MAT be corrected to AR, the evaluated savings appropriately adjusted, and the final report revised accordingly.	After reviewing the project documentation, we determined that this project is ineligible. The program dates section of customer work order agreement states project must be installed and completed before 12/14/18 to be eligible for incentives. Project was not completed until 9/30/19. Additionally, customer approval was signed 9/28/18 and completed over a year later, on 9/30/19.
12	PG&E	241	Eligible project (Comments on Sample of DI Lighting Projects)	**Summary:** The evaluation incorrectly classified the measure application type (MAT) for this lighting project as normal replacement (NR), but it should have been accelerated replacement (AR). **Details:** PG&E provided a customer-signed enhanced accelerated replacement questionnaire (ARQ) and AR scoring matrix where the result was AR. Additional AR evidence was provided consisting of photos showing that existing equipment was operational, with no lamp burnouts (so no maintenance needed) . The evaluator's MAT worksheet is factually incorrect: it states that there is not a signed ARQ, when there is, and states there is not additional compelling documentation, when there is. **Request:** PGE requests that this project's MAT be corrected to AR, the evaluated savings appropriately adjusted, and the final report revised accordingly.	An SBW survey determined that the existing equipment was more than 15 years old, which is greater than the EUL. MAT remains as NR.
13	PG&E	242	Eligible project (Comments on Sample of DI Lighting Projects)	**Summary:** The evaluation incorrectly classified the measure application type (MAT) for this lighting project as normal replacement (NR), but it should have been accelerated replacement (AR). **Details:** PG&E provided a customer-signed enhanced accelerated replacement questionnaire (ARQ) and AR scoring matrix where the result was AR. Additional AR evidence was provided consisting of photos showing that existing equipment	An SBW survey says the participant stated the existing lighting was 15 years old and at end of life. MAT remains as NR.

ID	Source	Project	Topic	Comment	SBW Response
				was operational, with no lamp burnouts (so no maintenance needed), and modern electronic ballasts are visible. The evaluator's MAT worksheet is factually incorrect: it states that there is not a signed ARQ, when there is, and states there is not additional compelling documentation, when there is. **Request:** PGE requests that this project's MAT be corrected to AR, the evaluated savings appropriately adjusted, and the final report revised accordingly.	
14	PG&E	105	Eligible project, ignoring project documentation (Comments on Sample of DI Lighting Projects)	**Summary:** The evaluator incorrectly disqualified this project due to lack of evidence of equipment viability to support AR and due to an unsigned application. **Details:** The evaluation team's Measures Worksheet shows that the claimed measure application type is NR. The evaluation team did not assess the actual RUL. The RUL was not provided because no 2nd baseline savings was claimed. Evaluator revised the MAT to NR using unchanged MLC calculations (the 2nd baseline savings calculations in submitted MLC were correct) even though the documentation package includes evidence to confirm lack of equipment viability. **Evidence:** PG&E provided a customer- signed enhanced accelerated replacement questionnaire (ARQ) and AR scoring matrix where the result was AR. Additional AR evidence was provided consisting of photos showing that existing equipment was operational, with no lamp burnouts (so no maintenance needed). The evaluator's MAT worksheet is factually incorrect: it states that there is not a signed ARQ, when there is, and states there is not additional compelling documentation, when there is. The claimed MAT should be AR (not NR) as can be seen by the night-time photos showing the pole-mounted and wall pack HPS lighting fixtures in operation. Furthermore, the customer application package includes the AR Questionnaire that is signed by the customer. Further evidence in support of equipment viability is the customer statement that the pre-existing exterior lighting was meeting the customer's needs, and that their outdoor lighting needs will not be changing in the near future. Although the application form is not signed, the vendor proposal, customer approval, ARQ, site access agreement, and post-completion forms are signed, clearly showing that the customer was duly enrolled. Also, the AR Scoring Matrix was completed by implementer that illustrated viability for ER (AR) claim appears to be completed at the top decision-making level, and that the site-level decision-maker may not have provided or had the opportunity to provide additional input to that might have indicated "evidence of less program influence". Nonetheless, the Net interview conducted by the evaluator clearly corroborates that the top-level corporate DM would not have replaced their lighting fixtures for 5 years, making an AR MAT the proper basis for existing conditions baseline claim. PG&E is concerned that this appears to suggest that the findings from Net and Gross customer interviews were not reconciled.	The evaluation survey did not find enough evidence to support the claimed NR MAT nor was the preponderance evidence adequate to overturn the AR MAT assignment. Savings are adjusted based on the AR MAT.

ID	Source	Project	Topic	Comment	SBW Response
				Request: PG&E requests that the MAT for this project be corrected to AR, the savings for this project restored, and the evaluation results revised accordingly.	
15	PG&E	178 & 179	Reduced savings, Inappropriate source of data (Comments on Sample of DI Lighting Projects)	**Summary:** These are two projects encompassing phases 3 and 4 of the lighting retrofit project. The evaluation team revised the MAT from NR to AR based upon an interview with the wrong customer; the new owner of facility stated he was not aware of the project. The revised MAT resulted in a baseline change from existing conditions to ISP and a corresponding reduction in savings. **Details:** The Customer survey was completed by the new owner of the facility who did not understand the nature of the project and therefore provided answers that adversely affected the determination of the baseline. Evidence of the lack of knowledge of the survey respondent is found in the evaluator's MAT Worksheet that says: "The facility changed ownership and hence new point of contact did not know a lot about the background behind project installation." The customer said "No" to the question "Was the old, replaced equipment fully functioning, able to adequately provide the desired service, and would have continued for an additional (RUL) years?" The evaluation team should have understood that there is no way for the new owner to know the correct answers and should have dropped the site from the sample. There is evidence in the documentation package supporting the AR MAT. **Request:** PG&E requests that the project be revised to include savings based on the AR measure application type. PG&E accepts the evaluators findings of a reduction in HOU that affected savings, therefore we request that the savings be adjusted for the baseline change only and the final report should be revised accordingly.	PG&E's project documentation lacks photos of the baseline fixtures and information on the age of the equipment. MAT remains NR.
16	PG&E	89	Incorrect Understanding of ISP (Comments on Sample of DI Lighting Projects)	**Summary:** The evaluation incorrectly revised savings calculations to match the claimed NR baseline claim, but the claim should have been revised to AR and the savings calculations left unchanged. **Details:** Evidence of eligibility for AR was included in the documentation package and shows 10.4 years of remaining useful life, as noted in the evaluation final site report, MAT Worksheet, cell L9. The measure application type should be Accelerated Replacement (AR), matching the calculations that use the existing conditions baseline, in which case the savings would remain unchanged. The reason AR is the appropriate baseline is that this project is a State of California prison facility that is not subject to Title 24 baseline. The industry standard practice is not the same as typical commercial lighting because fixtures must meet prison security requirements. Calcs use the Easy Lighting Calculator (eLC) that is designed for NC projects because it does not have existing conditions baseline, but it still gives the correct savings value if the existing baseline values are specified appropriately. The evaluated measures not exceeding the Title-24 baseline is not an appropriate metric for disqualifying measures at a prison facility that is only	An SBW survey states that lighting fixtures are very old. The Technical Review report submitted by PGE also confirms the NR MAT. MAT to remain NR with baseline for prisons adjusted to ISP rather than Title24 code.

ID	Source	Project	Topic	Comment	SBW Response
				required to meet ASHRAE 90.1 federal efficiency standards. "Prison" is in the customer's name. The scope of Title 24 can be found in Section 100 of the CEC regulations and it is common knowledge that it does not include prisons. **Request:** PG&E requests that this project's measures are revised to be eligible and the savings revised to reflect existing conditions savings with any HOU adjustments based upon as-observed conditions.	
17	SCE	274	Zero saver	**Reason for Status:** Unevaluable: No models or plans were provided, and PA failed to provide these in response to a Supplemental Data Request, so savings have been zeroed as unverifiable. **SCE's Comments:** Evaluate: The requested documents were provided in the original data request response. A list of documents is provided on Tab #274. Copies of the documents can be provided upon request.	We discovered that the project models and plan files are available and that the project is evaluable. However, the project is ineligible because it was installed in 2018 with no M&V in 2019 and therefore remains a zero saver.
18	SCE	280	Zero Saver	**Reason for Status:** Unevaluable: No building plans or cut sheets for installed measures were provided, and PA failed to provide these in response to a Supplemental Data Request, so savings have been zeroed as unverifiable. **SCE's Comments:** "Evaluate: The file provided in the response to the data request, 01_Confidential 280 500626404 As-built memo to file v2.pdf contained all the screen shots of documents provided on Tab 280: • Architectural Drawings; and • Product specification cut sheets. Additional files not provided with the original response have been provided (tab 280 Documents)."	The measures can be verified with the supplied submittals. But the architectural plans were not included to verify the model, so the project remains unevaluable.
19	SCE	282	Ineligible	**Reason for Status:** "The project is ineligible due to exceeding the installation time limit without documented exception and due to installation in 2017 with no M&V in 2019. The installation date of April 1, 2017 is greater than 1 year after the approval date of March 23, 2016. The project installation was in April 2017 with M&V requirements extending to April 2018. The installation review was then not completed until almost 1-year later, 3/22/19, with no M&V data used in 2019." **SCE's Comments:** "Evaluate: Project approved in Feb. 2016; Equipment installed in Apr. 2017; M&V data collected from May 2017 to April 2018. Installation Report submitted in Nov. 2018; Installation report technical review completed in 03/22/19.	No M&V occurred in 2019, only internal review and approval. No change.

ID	Source	Project	Topic	Comment	SBW Response
				Project application approved and installation completed within SCE's 3yr Customer Agreement allowed time frame. Project should be eligible for savings if based on SCE's 3yr Customer Agreement allowed time frame of installation completion. Please review documentation provided on Tab 282."	
20	SCE	283	Ineligible	**Reason for Status:** Ineligible because the project was completed in January 2018 and there was no M&V in 2019. **SCE's Comments:** Ineligible	No response needed.
21	SCE	285	Zero Saver	**Reason for Status:** Unevaluable: No building plans, model outputs to determine which model version was used, or cut sheets for installed measures were provided, and PA failed to provide these in response to a Supplemental Data Request, so savings have been zeroed as unverifiable. **SCE's Comments:** Tab 285 identifies the PDF file provided in the original request. Additional files not provided with the original response have been provided (tab 285 Documents).	Not all architectural plans were included to verify the model, so it remains unevaluable.
22	SCE	289	Ineligible	**Reason for Status:** Ineligible due to installation in 2018 with no M&V in 2019. **SCE's Comments:** Eligible: Per IR Technical Review Form 500831254.xlsx, see Tab 289. Project was installed as of 12/2018 and inspected/M & V performed 04/02/2019.	Project-closeout activities conducted in 2019 are not defined as M&V. M&V was completed in 2018 and the project should have been claimed in 2018. No change.
23	SCE	290	Ineligible	**Reason for Status:** "Ineligible due to installation in 2018 with no M&V in 2019. Project was approved by SCE on 2/19/2016. The equipment was installed on 1/4/2018 and the final project savings (based on 15-second metered data from 4/7/2018 to 5/5/2018) was approved on 12/21/2018. M&V did not extend into 2019." **SCE's Comments:** "Project approved on 10/03/2017; Equipment installed on 01/24/2018: M&V data collected from 04/07/2017 to 5/5/2018. Installation Report submitted in 07/16/2018; Installation report technical review completed in 12/21/2018. Project was released of IR CPUC review on 04/12/19. (Reference CMPA site - https://deeresources.info/cmpa/projects/13375) Project application approved and installation completed within SCE's 3yr Customer Agreement allowed time frame. Project should be eligible for savings if based on SCE's 3yr Customer Agreement allowed time frame of installation completion. Please review documentation provided on Tab 290."	Project-closeout activities conducted in 2019 are not defined as M&V. M&V was completed in 2018 and the project should have been claimed in 2018. No change.

ID	Source	Project	Topic	Comment	SBW Response
24	SCE	292	Ineligible	**Reason for Status:** Ineligible due to installation in 2017 with no M&V in 2019. The savings calculations were based on pre and post trend data from 2017. **SCE's Comments:** "Project approved on 10/03/2016; Equipment installed on 09/28/2017: M&V data collected from 06/1/2017 to 10/01/2017. Installation Report submitted in 10/03/2017; Installation report technical review completed in 10/04/2018. Project was released of IR CPUC review on 10/01/19. (Reference CMPA site - https://deeresources.info/cmpa/projects/13324). Project application approved and installation completed within SCE's 1yr Customer Agreement allowed time frame. Project should be eligible for savings if based on SCE's 1yr Customer Agreement allowed time frame of installation completion. Please refer to Tab 292 for referenced documentation."	Project-closeout activities conducted in 2019 are not defined as M&V. M&V was completed in 2017 and the project should have been claimed in 2017. No change.
25	SCE	293	Ineligible	**Reason for Status:** Ineligible due to installation in 2017 with no M&V in 2019. Installation appears to have occurred around September 2017 with post M&V data used from 10/31/2017 to 11/20/2017. **SCE's Comments:** Eligible: Per IR Technical Review Form 500837390.xlsx, see Tab 293. Project was installed as of 01/2018 and inspected/M & V performed 04/01/2019.	Project-closeout activities conducted in 2019 are not defined as M&V. M&V was completed in 2017 and the project should have been claimed in 2017. No change.
26	SCE	296	Ineligible	**Reason for Status:** Ineligible due to installation in 2018 with no M&V in 2019. The post-installation logging period ended 8/9/2018. **SCE's Comments:** "Project approved on 03/8/2017; Equipment installed on 3/01/2018: M&V data collected from 03/15/2018 to 04/17/2018. Installation Report submitted in 06/08/2018; Installation report technical review completed in 09/27/2018. Project application approved and installation completed within SCE's 3yr Customer Agreement allowed time frame. Project should be eligible for savings if based on SCE's 3yr Customer Agreement allowed time frame of installation completion. Please refer to Tab 296 for referenced documentation."	The project was completed, including the IR technical review, on 9/27/2018. The CPUC requires savings claims to be filed in the year of installation. SCE's agreement with the customer to allow project installation within three years after agreement execution does not alter the CPUC policy. No change.
27	SCE	302	Ineligible	**Reason for Status:** Ineligible due to installation in 2017 with no M&V in 2019. **SCE's Comments:** Eligible: Per IR Technical Review Form 500956939.xlsx, Tab 302, Project was installed as of 12/2017and inspected/M & V performed 1/30/2019.	The application agreement was signed on 6/15/2017. The Project Details document states the installation date as 7/7/2017. There is no documentation of an inspection date, but the Technical Review Form states the

ID	Source	Project	Topic	Comment	SBW Response
					application date as 1/19/2019, estimated installation date as "Installed", and Review Completion Date as 2/1/2019. It appears that the project closeout slipped by nearly a year and a half, and the closeout activities do not count as M&V. No change.
28	SCE	303	Ineligible	**Reason for Status:** Ineligible due to installation in 2018 with no M&V in 2019. Project "Verification Report" is dated 9/27/2018. Claimed savings are consistent with the whole building summary report, "WBA Summary Report", that is dated 6/8/2017. Therefore, savings were not revised (no M&V) in 2019. **SCE's Comments:** Ineligible.	No response needed.
29	SCE	318	Zero saver	**Reason for Status:** ISP for street lighting at the time of application, 4/24/2018, is LED lighting. There is no savings beyond ISP for this project. Savings are zeroed. **SCE's Comments:** Ineligible	No response needed.
30	SCE	327	Ineligible	**Reason for Status:** Ineligible due to application after PA discontinued incentives for installed measure. The application date was 8/27/2018 which was after 5/1/2018 when SCE discontinued incentives for exterior lighting measures. **SCE's Comments:** Eligible. The 08/27/2018 was the date the project was approved for participation in the program. However, as identified on the CRM Screen Shot, see Tab 327, the project was officially received as of April 27, 2018 at 12:48 pm which is prior to the date the measure was discontinued. This data field (Application Received Date) is the date which the Custom, 3P and Partnership programs use to determine project eligibility.	CPUC staff has reconsidered this application and has grandfathered it as an exception and will allow savings to be claimed. Savings are updated for claim 1 using the NR baseline and ISP using the MLC calculator. Claim 2 is ineligible because the installation did not occur within the one-year agreement period and an extension was not granted. There are two claims associated with this measure, both of which should have been "completely installed and operational" within one year of the PA Approval, Claim 1 appears eligible, Claim 2 was not completely installed within one year and is ineligible. The statewide custom procedures manual for 2018 requires NR projects to use code or ISP for the

ID	Source	Project	Topic	Comment	SBW Response
					baseline. We recalculated Claim 1 savings with ISP baseline.
31	SCE	334	Ineligible	**Reason for Status:** Ineligible due to installation in 2017 with no M&V in 2019. Final report is dated 12/18/2018 which used post installation data from 8/1/2018 to 9/12/2018. **SCE's Comments:** "See tab 334 for associated screen shot of the following: 1) Project approved August 10, 2016 2) Project installed March 24, 2017 3) Customer agreement stipulates project must be installed within three years of project approval 4) Initial Installation Report submitted 10/4/2017 5) IR Review completed 2/2/2019 6) SCE approved incentives 6/26/2019 Project application approved and installation completed within SCE's 3yr Customer Agreement allowed time frame. Project should be eligible for savings if based on SCE's 3yr Customer Agreement allowed time frame of installation completion."	IR review and other internal processing does not count as M&V having occurred in 2019. No change.
32	SDG&E	373	Negative electric saver	**Reason for Status:** Negative saver: SBD project that included modeling of 12 buildings with EnergyPro 6.4. When the models were upgraded to the approved EnergyPro 6.8 version, some of the models resulted in negative electric savings which summed to a negative value at the claim level. **SDG&E's Comments:** As the project calculations were completed prior to March 1, 2018 and customers had already reviewed the calculations of their project savings and estimated incentive amounts, Commission Staff found it reasonable to allow this project to be included in the grandfathering of Savings By Design projects that were eligible to use the version of EnergyPro in place at time of submittal (i.e., original model prior to ED Disposition). Please refer to the files labeled "Grandfathering of SDGE SBD Pending Contracts.msg", "SDGE_SBD_Grandfathered Project List 09-18.xlsx", and "CPUC Staff SBD Response Memo_08132018.pdf".	On August 13, 2018, CPUC staff issued a memo titled CPUC staff response to Program Administrators' statewide proposal on grandfathering of the Saving by Design Projects impact by the Energy Pro software tool and user input issues. This memo states: "The utilities shall only claim energy efficiency savings based on the corrected Savings by Design software tool. CPUC staff may revisit these projects' savings claims as part of the Efficiency Savings Performance Incentive payment calculations." Therefore, it is appropriate to evaluate savings using the best calculation tools available.

ID	Source	Project	Topic	Comment	SBW Response
33	SDG&E	375	Negative gas saver	**Reason for Status:** Negative gas saver: SBD project that included modeling of six buildings with EnergyPro 6.7.0.4. When the models were upgraded to the approved EnergyPro 6.8.0.5 version, some of the models resulted in negative gas savings which summed to a negative value at the claim level. **SDG&E's Comments:** As the project calculations were completed prior to March 1, 2018 and customers had already reviewed the calculations of their project savings and estimated incentive amounts, Commission Staff found it reasonable to allow this project to be included in the grandfathering of Savings By Design projects that were eligible to use the version of EnergyPro in place at time of submittal (i.e., original model prior to ED Disposition). Please refer to the files labeled "Grandfathering of SDGE SBD Pending Contracts.msg", "SDGE_SBD_Grandfathered Project List 09-18.xlsx", and "CPUC Staff SBD Response Memo_08132018.pdf".	On August 13, 2018, CPUC staff issued a memo titled CPUC staff response to Program Administrators' statewide proposal on grandfathering of the Saving by Design Projects impact by the Energy Pro software tool and user input issues. This memo states: "The utilities shall only claim energy efficiency savings based on the corrected Savings by Design software tool. CPUC staff may revisit these projects' savings claims as part of the Efficiency Savings Performance Incentive payment calculations." Therefore, it is appropriate for the evaluation to calculate ex post savings using the best calculation tools available.
34	SDG&E	378	Negative gas saver	**Reason for Status:** Negative saver: SBD project that included modeling of the building with EnergyPro 6.8.0.3. When the model was upgraded to the approved EnergyPro 6.8.0.5 version, the model resulted in negative gas savings. **SDG&E's Comments:** As the project calculations were completed prior to March 1, 2018 and customers had already reviewed the calculations of their project savings and estimated incentive amounts, Commission Staff found it reasonable to allow this project to be included in the grandfathering of Savings By Design projects that were eligible to use the version of EnergyPro in place at time of submittal (i.e., original model prior to ED Disposition). Please refer to the files labeled "Grandfathering of SDGE SBD Pending Contracts.msg", "SDGE_SBD_Grandfathered Project List 09-18.xlsx", and "CPUC Staff SBD Response Memo_08132018.pdf".	On August 13, 2018, CPUC staff issued a memo titled CPUC staff response to Program Administrators' statewide proposal on grandfathering of the Saving by Design Projects impact by the Energy Pro software tool and user input issues. This memo states: "The utilities shall only claim energy efficiency savings based on the corrected Savings by Design software tool. CPUC staff may revisit these projects' savings claims as part of the Efficiency Savings Performance Incentive payment calculations."

ID	Source	Project	Topic	Comment	SBW Response
					Therefore, it is appropriate to evaluate savings using the best calculation tools available.
35	SDG&E	379	Negative electric saver	**Reason for Status:** Negative saver: SBD project that included modeling of the building with EnergyPro 6.8.0.2. When the model was upgraded to the approved EnergyPro 6.8.0.5 version, the model resulted in negative electric savings. **SDG&E's Comments:** As the project calculations were completed prior to March 1, 2018 and customers had already reviewed the calculations of their project savings and estimated incentive amounts, Commission Staff found it reasonable to allow this project to be included in the grandfathering of Savings By Design projects that were eligible to use the version of EnergyPro in place at time of submittal (i.e., original model prior to ED Disposition). Please refer to the files labeled "Grandfathering of SDGE SBD Pending Contracts.msg", "SDGE_SBD_Grandfathered Project List 09-18.xlsx", and "CPUC Staff SBD Response Memo_08132018.pdf".	On August 13, 2018, CPUC staff issued a memo titled CPUC staff response to Program Administrators' statewide proposal on grandfathering of the Saving by Design Projects impact by the Energy Pro software tool and user input issues. This memo states: "The utilities shall only claim energy efficiency savings based on the corrected Savings by Design software tool. CPUC staff may revisit these projects' savings claims as part of the Efficiency Savings Performance Incentive payment calculations." Therefore, it is appropriate to evaluate savings using the best calculation tools available.
36	SDG&E	384	Ineligible	**Reason for Status:** Ineligible due to exceeding the allowable installation time period. The executed 2013-2016 Program Project Agreement is dated 10/2/2017 which states that the project must be installed within one year of this approval (which would be 10/2/2018) and in no event later than 2/10/2017. The wrong agreement was used. There is no specific documented time extension, but an email thread titled "extensions email ...." was included and starts on 1/17/2019 through 4/25/2019 with inquiries of project status. Installation was completed on 11/1/2019. **SDG&E's Comments:** SDG&E, in consultation with its legal counsel, decided that EEBI contracts could be granted an optional 12-month extension, for a total of 24 months to get projects installed. The installation deadline was extended to 11/30/2019 by SDG&E. Please refer to the documents labeled "10770648 - EECP Note Documenting Project Extension.docx" and "10770648 - ECD Status.msg"	Documentation of the time extension submitted after the draft report is not being accepted. No change.

ID	Source	Project	Topic	Comment	SBW Response
37	SDG&E	387	Negative saver	**Reason for Status:** Project was also claimed in 2018. 2019 claim was based on full savings instead of incremental savings. Evaluated savings calculate savings as incremental over the 2018 claim which was less and resulted in negative savings. **SDG&E's Comments:** SDG&E acknowledges the findings.	No response needed.
38	SDG&E	388	Ineligible	**Reason for Status:** "Ineligible due to installation after install deadline date. Installed 4/8/19, as stated in the installation report, after approved extension deadline 3/31/19 stated in the email document ""Extensions email ...."" . " **SDG&E's Comments:** Installation deadline was extended to 4/8/2019 by SDG&E. Please refer to the email labeled "EEBI Project 10788467 - SDGE Project Status Update.msg"	Documentation of the time extension submitted after the draft report is not being accepted. No change.
39	SDG&E	391	Ineligible	**Reason for Status:** "Ineligible due to exceeding the specified installation time limit with no time extension documentation. Project approval agreement was completed on 1/10/18 which stated installation must be completed within 1 year of the approval date, but no later than 2/10/2018. Installation was completed 12/16/2019. No time extension documentation was found. " **SDG&E's Comments:** Installation deadline was extended to 12/16/2019 by SDG&E. Please refer to the documents labeled "10794023 - EECP Note Documenting Project Extension.docx" and "EEBI Project 10794023 - SDGE Project Status Update.msg"	Documentation of the time extension submitted after the draft report is not being accepted. No change.
40	SDG&E	393	Ineligible	**Reason for Status:** "Ineligible due to exceeding the installation time limit specified in the signed incentive agreement. Per Incentive agreement, installation must be complete no later than 2/10/2019. Provided documentation did not include a post installation inspection report to clearly state the installation date, but the invoice for installed measures was dated 9/2/19" **SDG&E's Comments:** SDG&E acknowledges the findings.	No response needed.
41	SDG&E	397	Ineligible	**Reason for Status:** "Ineligible due to installation after the specified installation deadline date. Installation completed for these two claims on 5/3/2019 and 7/22/2019, respectively, which was after the final acceptable installation date of 2/10/19 listed in the countersigned incentive agreement, with no documentation of an extension." **SDG&E's Comments:** SDG&E acknowledges the findings.	No response needed.
42	SDG&E	398	Zero/negative saver	**Reason for Status:** This claim is a second-year claim that was also claimed in 2018. The 2018 claim included estimated savings based on engineering built up calculations without including any post install M&V, and was assigned the full	No response needed.

ID	Source	Project	Topic	Comment	SBW Response
				three-year EUL. Therefore the 2019 claim should have been incremental energy savings over the 2018 values. Our evaluation recalculated savings as the incremental savings over the first-year estimate. This resulted in negative electric savings and zero gas savings. **SDG&E's Comments:** SDG&E acknowledges the findings.	
43	SDG&E	402	Ineligible	**Reason for Status:** "Ineligible due exceeding the allowable installation time period. The fully executed contract states that installation must be completed by 12/2/2018, but the equipment was not fully installed until 10/21/2019. There was no documentation of an install date extension." **SDG&E's Comments:** The original "Notice to Proceed" that SDG&E issued listed an installation completion date of 5/31/2019. That date was extended to 6/30/2019 and later extended to 10/1/2019 by SDG&E. On 10/17/2019, SDG&E sent an email to the customer notifying them that they had 10 days to finish installation and submit documentation or the project would be cancelled. Please refer to the documents labeled "REVISED | SDG&E Energy Efficiency Business Incentive Program - Notice To Proceed with Installation.msg", "10885037 - EECP Note Documenting Project Extension.docx", and "EEBI IR Follow-Up.msg"	Documentation of the time extension submitted after the draft report is not being accepted. No change.
44	SDG&E	409	Ineligible	**Reason for Status:** Ineligible because these measures were offered in deemed catalog. **SDG&E's Comments:** The EEBI application was signed on 5/8/2019. An active deemed workpaper was not found at the time of application for either measure. Therefore, a modified DEER approach was used to calculate the energy savings for the case retrofit, with Energy Impact ID DO3-206 as the basis for the energy savings, and an SDG&E emerging technology study was used to calculate the savings for replacing Permanent Magnet Synchronous Fan Motor. Furthermore, as noted in Resolution E-5152, deemed measures may sometimes be processed through custom programs. Thus, deemed measures should not be automatically disqualified or labeled ineligible.	Evaluated measure 1 has zero savings due to being classified as normal replacement (RUL < 1) and is equal to the ISP baseline. Evaluated measure 2 is eligible and was offered in SDG&E's deemed catalog. Since deemed savings and incentive were claimed, the savings have now been passed through.
45	SDG&E	412	Zero saver	**Reason for Status:** Project was cancelled by the PA after post M&V analysis showed no savings. **SDG&E's Comments:** SDG&E agrees that this is a zero saver, as the project was cancelled.	No response needed.
46	SDG&E	421	Zero saver	**Reason for Status:** Project was cancelled by PA after post M&V showed zero savings and they did not intend to claim savings. **SDG&E's Comments:** SDG&E agrees that this is a zero saver, as the project was cancelled. The original claim ID was trued-up in 2020 to reflect zero savings.	No response needed.

ID	Source	Project	Topic	Comment	SBW Response
47	SDG&E	425	Zero saver	**Reason for Status:** The normalized savings over the 1st full year is 9,325 kWh with a Fractional Savings Uncertainty of 89% at 90% confidence level using Option C analysis. The modeled savings is barely larger than the uncertainty in the savings. This is certainly due to the multitude of random and unexplained large step changes in the usage profile (i.e., non-routine events, NREs) over both the baseline and reporting year. Since nobody we spoke with can explain these NREs we can't justifiably make any adjustments to improve the FSU. Moreover, since nobody we spoke with can confirm whether the measure remains in effect, we can't justify bottom-up calculations either. We are assigning zero savings to this project. **SDG&E's Comments:** SDG&E acknowledges the findings.	No response needed.

G. Claim Level Evaluation Results

Table 57: Claim Level Gross Life-Cycle Evaluation Results

Claim ID*	SBW Sample ID	Forecast EUL	Evaluated EUL	Life-Cycle Savings (kWh)						Evaluated NTGR		
				Forecast			Evaluated					
				kW	kWh	therm	kW	kWh	therm	kW	kWh	therm
MCE-2019-02-02-068-01	2	5.0		2.1	7,565	-45.8				0.50	0.50	
MCE-2019-02-066-01B	710	16.0		34.1	118,716	-698.9				0.12	0.12	
MCE-2019-02-066-02B	710	16.0		0.0	58,690	0.0				0.12	0.12	
MCE-2019-02-069-01	434	5.0	12.0	91.8	285,628	-1,765.2	58.7	182,802	-1,129.76			
MCE-2019-02-071-01	435	12.0	10.3	53.4	238,937	-3,477.9	58.3	261,078	-3,799.74			
MCE-2019-02-075-02	436	12.0		0.0	28,902	0.0				0.35	0.35	
MCE-2019-02-075-03	436	12.0		0.0	14,352	0.0				0.35	0.35	
MCE-2019-02-084-01	5	5.0		0.4	1,525	-9.2				0.34	0.34	
MCE-2019-02-085-01	6	12.0	12.0	22.3	86,499	-516.2	26.3	101,663	-606.73			
MCE-2019-02-085-02	6	12.0		10.7	47,320	-282.1	0.0	0	0.00			
MCE-2019-02-085-03	6	12.0	12.0	0.0	29,816	0.0	0.0	36,495	0.00			
MCE-2019-02-086-02	7	12.0		25.4	133,503	-1,280.8	0.0	0	0.00			
MCE-2019-02-088-01	8	12.0	12.0	36.5	133,196	-752.7	68.1	248,184	-1,402.36			
MCE-2019-02-090-01	9	12.0	12.0	84.1	376,908	-5,486.8	48.7	220,381	-3,210.36			
MCE-2019-02-093-01	723	12.0		50.1	155,897	-963.5				0.43	0.43	
MCE-2019-02-093-02	723	12.0		0.0	7,295	0.0				0.43	0.43	
MCE-2019-02-093-03	723	12.0		0.0	12,202	0.0				0.43	0.43	
MCE-2019-02-094-01	11	12.0	12.0	55.0	171,135	-1,057.6	68.7	213,919	-1,322.05			
MCE-2019-02-094-03	11	12.0	12.0	0.0	15,711	0.0	0.0	492	0.00			
MCE-2019-02-094-04	11	12.0	10.2	0.5	1,665	-10.5	0.6	2,008	-12.60			
MCE-2019-02-095-01	12	12.0	12.0	78.3	243,809	-1,506.8	62.6	195,047	-1,205.44			
MCE-2019-02-096-01	13	12.0	12.0	29.2	103,397	-626.2	5.9	20,912	-126.60			
MCE-2019-02-097-01	14	12.0		0.0	40,435	0.0				0.60	0.60	

Claim ID*	SBW Sample ID	Forecast EUL	Evaluated EUL	Life-Cycle Savings (kWh)						Evaluated NTGR		
				Forecast			Evaluated					
				kW	kWh	therm	kW	kWh	therm	kW	kWh	therm
MCE-2019-02-098-01	15	12.0		5.4	19,134	-115.9				0.66	0.66	
MCE-2019-02-099-01	16	12.0	12.0	30.4	107,486	-651.0	20.5	72,553	-439.42			
MCE-2019-02-099-02	16	12.0	9.4	12.1	38,853	-235.3	9.2	29,734	-180.09			
MCE-2019-02-099-04	16	12.0	12.0	0.0	16,723	0.0	0.0	16,994	0.00			
MCE-2019-02-100-01-BESS	445	12.0		2.2	9,721	0.0				0.44	0.44	
MCE-2019-02-108-01	450	12.0		3.0	13,393	-194.9				0.66	0.66	
MCE-2019-02-108-02	450	12.0		1.7	7,504	-109.2				0.66	0.66	
MCE-2019-02-110-01	18	12.0	12.0	19.2	70,579	-421.4	15.1	55,764	-332.98	0.57	0.57	
MCE-2019-02-112-01	724	12.0		8.4	29,741	-180.1				0.70	0.70	
MCE-2019-02-112-02	724	12.0		0.2	639	-3.9				0.70	0.70	
MCE-2019-02-113-01	19	12.0		3.9	10,746	-42.1				0.67	0.67	
MCE-2019-02-117-01	22	12.0	12.0	14.9	52,697	-319.2	10.1	35,570	-213.30			
MCE-2019-02-117-02	22	12.0	12.0	0.0	18,186	0.0	0.0	21,331	0.00			
MCE-2019-02-119-01	23	12.0		6.0	16,410	-64.2	0.0	0	0.00			
MCE-2019-02-121-01	24	12.0	12.0	5.1	18,608	-111.1	1.1	3,516	-23.28			
MCE-2019-02-123-01	726	12.0		2.9	10,858	-64.8				0.37	0.37	
MCE-2019-02-125-01	25	12.0	12.0	2.1	9,110	-54.3	2.1	11,297	-67.20	0.52	0.52	
MCE-2019-02-126-01	26	12.0	12.0	3.6	15,924	-94.9	4.9	21,433	-127.78	0.52	0.52	
MCE-2019-02-128-01	454	12.0		1.1	4,677	-27.9				0.33	0.33	
MCE-2019-02-132-01	456	12.0		1.4	4,775	-28.9				0.33	0.33	
MCE-2019-02-132-02	456	12.0		0.0	15,357	0.0				0.33	0.33	
MCE-2019-02-132-03	456	12.0		0.0	52,178	0.0				0.33	0.33	
MCE-2019-02-133-01	29	12.0	12.0	5.4	19,099	-115.7	3.0	10,505	-63.62			
PGE-2019-Q1-10051	136	5.0	10.3	22.7	115,652	-2,605.4	22.7	115,652	-2,605.40			
PGE-2019-Q1-11826	140	12.0	12.0	0.0	1,967,508	0.0	0.0	80,570	0.00			
PGE-2019-Q1-12340	144	12.0	16.0	36.8	147,744	-1,251.0	36.4	205,980	-1,379.00			

Claim ID*	SBW Sample ID	Forecast EUL	Evaluated EUL	Life-Cycle Savings (kWh)						Evaluated NTGR		
				Forecast			Evaluated					
				kW	kWh	therm	kW	kWh	therm	kW	kWh	therm
PGE-2019-Q1-12725	144	12.0	16.0	1.8	7,032	-59.5	2.3	24,416	-86.50			
PGE-2019-Q1-12769	144	12.0	16.0	96.6	296,945	-2,522.6	87.2	495,728	-4,203.30			
PGE-2019-Q1-12955	132	12.0		0.0	254,315	0.0	0.0	0	0.00			
PGE-2019-Q1-12978	146	12.0	12.0	0.0	1,375,878	0.0	0.0	137,772	0.00			
PGE-2019-Q1-12984	132	10.4		218.0	1,134,979	-5,868.1	0.0	0	0.00			
PGE-2019-Q1-14337	108	10.4	8.5	30.0	147,531	-1,006.0	2.5	17,246	-119.00			
PGE-2019-Q1-15960	927	12.0		0.0	15,842	0.0				0.50	0.50	
PGE-2019-Q1-16032	927	12.0		0.0	14,170	0.0				0.50	0.50	
PGE-2019-Q1-16044	927	5.0		20.7	81,744	-1,776.3				0.50	0.50	
PGE-2019-Q1-16582	88	7.0		0.0	0	5,971.0	0.0	0	0.00			
PGE-2019-Q1-16637	891	12.0		0.0	158,621	0.0				0.53	0.53	
PGE-2019-Q1-16741	891	12.0		0.0	138,350	0.0				0.53	0.53	
PGE-2019-Q1-17111	502	5.0		1.2	4,072	-2.5				0.47	0.47	0.47
PGE-2019-Q1-17293	502	12.0		0.0	16,728	0.0				0.47	0.47	0.47
PGE-2019-Q1-17759	498	12.0		0.0	328,115	0.0				0.38	0.38	
PGE-2019-Q1-17823	498	12.0		0.0	548,137	0.0				0.38	0.38	
PGE-2019-Q1-18590	88	7.0		0.0	0	35,252.0	0.0	0	0.00			
PGE-2019-Q1-20467	130	10.4		33.7	159,391	-1,934.4				0.37	0.37	0.37
PGE-2019-Q1-20468	130	10.4		182.0	821,835	-10,543.0				0.37	0.37	0.37
PGE-2019-Q1-20470	849	5.0		0.0	0	0.0				0.54	0.54	
PGE-2019-Q1-20480	849	12.0		0.0	10,086	0.0				0.54	0.54	
PGE-2019-Q1-20482	849	10.4		11.9	46,598	-538.4				0.54	0.54	
PGE-2019-Q1-20561	31	15.0		0.0	0	831,015.0	0.0	0	0.00			
PGE-2019-Q1-20600	31	15.0		702.1	983,745	0.0	0.0	0	0.00			
PGE-2019-Q1-22069	35	15.0	14.0	0.0	3,013,785	1,004,490.0	0.0	513,422	994,221.94			
PGE-2019-Q1-22747	150	12.0	10.0	155.9	1,104,253	-5,695.1	29.0	206,276	-1,064.06			
PGE-2019-Q1-23643	126	12.0	12.0	0.0	45,166	0.0	0.0	22,553	0.00			

Claim ID*	SBW Sample ID	Forecast EUL	Evaluated EUL	Life-Cycle Savings (kWh)						Evaluated NTGR		
				Forecast			Evaluated					
				kW	kWh	therm	kW	kWh	therm	kW	kWh	therm
PGE-2019-Q1-23701	126	12.0	12.0	0.0	196,554	0.0	0.0	93,379	0.00			
PGE-2019-Q1-23708	126	12.0	12.0	0.0	98,892	0.0	0.0	45,338	0.00			
PGE-2019-Q1-26565	58	15.0		0.0	0	1,266,522.8	0.0	0	0.00			
PGE-2019-Q1-27022	913	12.0		0.0	142,582	0.0				0.63	0.63	
PGE-2019-Q1-27072	889	5.0		10.2	40,509	-880.3				0.50	0.50	
PGE-2019-Q1-27223	913	12.0		14.4	71,376	-474.5				0.63	0.63	
PGE-2019-Q1-27303	464	15.0	6.7	0.0	0	289,950.0	0.0	0	122,429.10			
PGE-2019-Q1-27392	103	14.0	3.7	-117.5	-334,253	250,272.4	-26.3	-74,809	56,014.60			
PGE-2019-Q1-27691	954	20.0		0.0	420,067	0.0				0.42	0.42	
PGE-2019-Q1-28796	135	12.0	12.0	0.0	350,550	0.0	0.0	32,096	0.00		0.29	
PGE-2019-Q1-28880	135	12.0	6.1	0.2	824	-4.1	0.0	323	-5.10		0.29	
PGE-2019-Q1-30535	749	3.0		84.6	304,040	4,009.2				0.47	0.47	0.47
PGE-2019-Q1-335	117	12.0		0.0	165,312	0.0				0.17	0.17	
PGE-2019-Q1-3374	960	12.0		16.0	43,521	-170.4				0.68	0.68	
PGE-2019-Q1-34198	486	7.0		0.0	0	114,276.6						0.40
PGE-2019-Q1-34819	794	12.0		0.0	261,085	0.0				0.43	0.43	
PGE-2019-Q1-39317	34	12.0		61.8	541,164	107,004.0	0.0	0	0.00			
PGE-2019-Q1-39361	740	15.0		21.1	202,947	0.0				0.45	0.45	
PGE-2019-Q1-45922	56	15.0		99.6	952,640	0.0	0.0	0	0.00			
PGE-2019-Q1-46456	500	10.4		51.1	151,360	-1,765.8				0.90	0.90	
PGE-2019-Q1-48	117	5.0		10.0	37,025	-187.9				0.17	0.17	
PGE-2019-Q1-5247	489	10.0		0.0	0	90,170.0						0.40
PGE-2019-Q1-5446	137	5.0		9.6	31,785	-394.9				0.50	0.50	
PGE-2019-Q1-5619	510	5.0		1.7	8,444	-60.0				0.63	0.63	
PGE-2019-Q1-5662	510	12.0		0.0	165,312	0.0				0.63	0.63	
PGE-2019-Q1-5696	510	12.0		5.1	24,740	-175.9				0.63	0.63	
PGE-2019-Q1-5773	928	5.0		5.0	13,412	-85.3				0.40	0.40	

Claim ID*	SBW Sample ID	Forecast EUL	Evaluated EUL	Life-Cycle Savings (kWh)						Evaluated NTGR		
				Forecast			Evaluated					
				kW	kWh	therm	kW	kWh	therm	kW	kWh	therm
PGE-2019-Q1-63	117	12.0		0.0	199,162	0.0				0.17	0.17	
PGE-2019-Q1-6692	887	12.0		0.0	11,611	0.0				0.47	0.47	
PGE-2019-Q1-6695	887	0.0		0.0	6,408	0.0				0.47	0.47	
PGE-2019-Q1-7476	960	12.0		1.8	5,075	-19.6				0.68	0.68	
PGE-2019-Q1-7691	121	10.4		144.7	1,095,532	-7,350.1	0.0	0	0.00			
PGE-2019-Q1-8748	83	15.0		3,798.3	18,559,527	151,762.5	0.0	0	0.00			
PGE-2019-Q1-9510	864	5.0		14.5	46,101	-266.5				0.53	0.53	
PGE-2019-Q1-9529	864	0.0		3.5	30,874	0.0				0.53	0.53	
PGE-2019-Q2-105594	163	5.0	16.0	3.3	12,258	-248.0	3.3	19,152	-387.45	0.40	0.40	
PGE-2019-Q2-105638	990	12.0		0.0	719,796	0.0				0.46	0.46	
PGE-2019-Q2-105641	497	12.0		0.0	65,239	0.0				0.66	0.66	
PGE-2019-Q2-105650	145	12.0	16.0	0.0	70,159	0.0	0.0	93,546	0.00			
PGE-2019-Q2-16612	165	12.0	12.0	395.3	1,353,031	-7,823.0	96.0	298,630	-3,289.20			
PGE-2019-Q2-16623	180	12.0	8.4	276.8	1,289,122	-17,372.2	160.6	981,857	-13,217.32	0.31	0.31	0.31
PGE-2019-Q2-16640	518	5.0		24.7	92,860	-415.7				0.83	0.83	
PGE-2019-Q2-16713	48	3.0		0.0	0	20,388.0	0.0	0	0.00			
PGE-2019-Q2-23360	1,024	12.0		0.5	1,909	-20.0				0.33	0.33	
PGE-2019-Q2-23376	532	5.0		10.8	29,747	-84.4				0.43	0.43	
PGE-2019-Q2-23384	122	10.4	7.5	113.5	508,870	-7,404.8	23.2	146,475	-2,137.50	0.37	0.37	0.37
PGE-2019-Q2-23409	513	12.0		0.0	8,659	0.0				0.37	0.37	
PGE-2019-Q2-23482	70	10.4		219.5	969,608	-10,095.3				0.53	0.53	
PGE-2019-Q2-23483	92	15.0	5.0	436.9	3,567,690	0.0	77.3	1,074,877	0.00			
PGE-2019-Q2-30296	145	12.0	16.0	0.9	9,326	0.0	0.6	1,970	0.00			
PGE-2019-Q2-30300	167	12.0	6.4	122.1	577,066	-7,003.8	28.6	198,411	-2,408.06	0.37	0.37	0.37
PGE-2019-Q2-30397	60	3.0		0.0	59,400	0.0				0.50	0.50	
PGE-2019-Q2-30398	51	3.0	3.6	367.8	3,259,300	0.0	439.0	3,551,649	0.00	0.61	0.61	
PGE-2019-Q2-39209	193	20.0		0.0	82,767	0.0	0.0	0	0.00			

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				Forecast			Evaluated					
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PGE-2019-Q2-44008	981	5.0		30.8	121,802	-2,646.8				0.50	0.50	
PGE-2019-Q2-44029	185	12.0	6.4	163.4	727,236	-12,676.6	19.7	128,598	-2,239.04	0.37	0.37	0.37
PGE-2019-Q2-44034	166	12.0		120.8	537,616	-9,371.3				0.37	0.37	0.37
PGE-2019-Q2-50956	178	12.0	12.0	420.0	4,131,827	0.0	60.8	406,380	0.00			
PGE-2019-Q2-50986	998	12.0		41.1	111,936	-438.2				0.68	0.68	
PGE-2019-Q2-50994	177	12.0		0.0	61,697	0.0				0.60	0.60	
PGE-2019-Q2-51059	775	10.4		251.9	532,182	0.0				0.33	0.33	
PGE-2019-Q2-51060	75	10.4	10.3	121.0	482,639	-4,426.8	107.0	129,002	-655.08			
PGE-2019-Q2-51061	36	15.0	15.0	190.2	5,779,818	0.0	194.7	5,779,815	0.00			
PGE-2019-Q2-5377	538	5.0		4.5	41,944	0.0				0.25	0.25	
PGE-2019-Q2-5401	530	12.0		26.3	90,852	-455.9				0.33	0.33	
PGE-2019-Q2-5442	142	12.0	7.5	41.4	184,030	-3,208.0	9.8	63,667	-1,108.50	0.37	0.37	0.37
PGE-2019-Q2-5464	491	12.0		0.0	702,970	0.0				0.56	0.56	
PGE-2019-Q2-5471	532	12.0		0.0	46,051	0.0				0.43	0.43	
PGE-2019-Q2-5477	177	12.0		0.0	14,219	0.0				0.60	0.60	
PGE-2019-Q2-5607	32	15.0		0.0	0	412,410.0	0.0	0	0.00			
PGE-2019-Q2-5608	32	15.0		688.9	841,560	0.0	0.0	0	0.00			
PGE-2019-Q2-5610	781	10.4		26.5	117,129	-1.9				0.43	0.43	
PGE-2019-Q2-5611	36	15.0	10.0	0.0	16,244,284	0.0	0.0	10,829,520	0.00			
PGE-2019-Q2-57706	526	5.0		6.5	21,417	-266.1				0.47	0.47	
PGE-2019-Q2-57723	164	12.0	10.0	151.0	1,069,506	-5,514.1	27.9	197,308	-1,017.20			
PGE-2019-Q2-57727	517	12.0		106.7	474,775	-8,275.8				0.37	0.37	0.37
PGE-2019-Q2-57735	183	5.0		32.9	116,292	-704.3	0.0	0	0.00			
PGE-2019-Q2-57818	57	15.0	15.0	165.0	16,497,127	0.0	165.4	16,497,127	0.00			
PGE-2019-Q2-59076	181	20.0		0.0	1,229,728	0.0				0.56	0.56	0.56
PGE-2019-Q2-64575	177	12.0		0.4	1,533	-17.8				0.60	0.60	
PGE-2019-Q2-64578	118	12.0	12.0	0.0	9,250	0.0	0.0	787	0.00			

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PGE-2019-Q2-64643	75	10.4		26.9	118,770	-1,242.8	0.0	0	0.00			
PGE-2019-Q2-64645	85	15.0	12.1	121.5	1,055,010	-9,585.0	53.1	84,463	-410.19			
PGE-2019-Q2-65047	47	3.0		510.0	503,028	19,149.0	0.0	0	0.00			
PGE-2019-Q2-71250	497	5.0		33.2	110,489	-551.4				0.66	0.66	
PGE-2019-Q2-71268	158	12.0		0.0	19,975	0.0				0.46	0.46	
PGE-2019-Q2-71277	118	12.0	12.0	0.0	92,250	0.0	0.0	8,876	0.00			
PGE-2019-Q2-71356	51	3.0	3.8	0.0	0	4,865.7	0.0	0	5,415.00			0.61
PGE-2019-Q2-73843	195	20.0	3.0	0.0	940,899	0.0	0.0	141,135	0.00			
PGE-2019-Q2-77965	157	12.0		73.5	246,095	-1,518.7				0.41	0.41	
PGE-2019-Q2-77990	1,024	5.0		2.9	11,304	-118.5				0.33	0.33	
PGE-2019-Q2-78095	783	10.4		59.2	262,518	0.0				0.50	0.50	
PGE-2019-Q2-84838	513	12.0		4.0	17,819	-310.6				0.37	0.37	
PGE-2019-Q2-84903	82	10.4		735.8	6,592,108	0.0	0.0	0	0.00			
PGE-2019-Q2-91867	96	10.4	10.2	354.6	1,313,312	0.0	321.3	1,211,944	0.00			
PGE-2019-Q2-98641	179	12.0	12.0	428.2	4,212,317	0.0	62.0	414,301	0.00			
PGE-2019-Q2-98657	158	5.0		2.9	10,184	-51.1				0.46	0.46	
PGE-2019-Q2-98662	162	5.0		3.0	10,659	-60.3				0.25	0.25	
PGE-2019-Q2-98663	190	5.0		17.0	54,035	-276.4				0.40	0.40	
PGE-2019-Q3-40500	209	5.0		22.2	157,367	-810.4				0.58	0.58	
PGE-2019-Q3-45462	100	10.0		3.6	197,645	0.0	0.0	0	0.00			
PGE-2019-Q3-49827	175	5.0	12.0	2.4	8,439	-105.3	2.4	8,439	-105.27	0.40	0.40	
PGE-2019-Q3-49844	194	5.0		2.1	5,573	-35.4				0.00	0.00	
PGE-2019-Q3-49847	201	5.0	12.0	12.7	42,073	-522.7	12.7	42,073	-522.67			
PGE-2019-Q3-49859	203	5.0	12.0	3.0	7,973	-50.7	3.0	7,973	-50.66			
PGE-2019-Q3-49862	1,083	5.0		35.4	170,543	-3,838.5				0.53	0.53	
PGE-2019-Q3-49880	1,107	5.0		2.1	10,083	-226.9				0.53	0.53	
PGE-2019-Q3-49887	554	5.0		0.6	2,382	-48.2				0.40	0.40	

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PGE-2019-Q3-49891	555	5.0		0.9	2,842	-35.3				0.00	0.00	
PGE-2019-Q3-49894	556	5.0		8.4	22,584	-143.6				0.17	0.17	
PGE-2019-Q3-49896	1,108	5.0		1.7	6,229	-126.0				0.52	0.52	
PGE-2019-Q3-49899	1,109	5.0		5.2	13,919	-88.5				0.52	0.52	
PGE-2019-Q3-49901	1,110	5.0		9.7	33,576	-418.8				0.52	0.52	
PGE-2019-Q3-49915	557	5.0		2.1	7,348	-91.7				0.50	0.50	
PGE-2019-Q3-49924	226	5.0	12.0	11.9	39,364	-489.0	11.9	39,364	-489.00	0.45	0.45	
PGE-2019-Q3-49937	225	5.0	12.0	4.8	12,852	-81.7	4.8	12,850	-81.50	0.43	0.43	
PGE-2019-Q3-50020	186	12.0	16.0	75.1	354,583	-3,888.0	6.9	46,814	-510.45	0.37	0.37	0.37
PGE-2019-Q3-50028	182	12.0	12.0	53.0	170,928	-1,709.3	21.3	68,577	-685.80			
PGE-2019-Q3-50088	197	12.0		57.2	244,814	-1,238.1	0.0	0	0.00			
PGE-2019-Q3-50141	552	12.0		32.6	113,562	-483.7				0.35	0.35	
PGE-2019-Q3-50176	564	12.0		14.9	76,261	-647.5				0.50	0.50	
PGE-2019-Q3-50211	236	12.0		5.3	18,402	-108.3				0.74	0.74	
PGE-2019-Q3-50228	182	12.0	12.0	0.8	81,514	-822.9	0.5	55,903	-561.57			
PGE-2019-Q3-50254	1,089	12.0		67.6	236,895	-1,338.6				0.27	0.27	
PGE-2019-Q3-50257	1,088	12.0		108.2	422,644	-2,383.4				0.27	0.27	
PGE-2019-Q3-50258	204	12.0		51.7	188,310	-1,064.3				0.43	0.43	
PGE-2019-Q3-50368	561	12.0		208.1	925,841	-16,138.6				0.37	0.37	0.37
PGE-2019-Q3-50379	1,089	12.0		2.0	7,672	-45.6				0.27	0.27	
PGE-2019-Q3-50381	1,088	12.0		4.8	18,784	-95.2				0.27	0.27	
PGE-2019-Q3-50396	220	12.0	12.0	2.3	12,217	-73.0	3.1	11,983	-71.56			
PGE-2019-Q3-50445	541	5.0		2.3	6,302	-17.9				0.47	0.47	
PGE-2019-Q3-50484	1,115	5.0		4.1	15,998	-167.7				0.33	0.33	
PGE-2019-Q3-50485	574	5.0		15.2	73,313	0.0				0.42	0.42	
PGE-2019-Q3-50490	1,161	5.0		2.2	8,550	-89.7				0.42	0.42	

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PGE-2019-Q3-50492	1,137	5.0		12.8	34,915	-136.7				0.47	0.47	
PGE-2019-Q3-50493	228	5.0	16.0	2.1	7,673	-45.8	2.1	8,743	-52.20			
PGE-2019-Q3-50551	161	12.0	12.0	29.8	210,778	-1,087.0	6.0	64,825	-334.80			
PGE-2019-Q3-50584	174	12.0	7.4	93.6	318,042	-2,118.2	52.9	426,982	-2,897.06			
PGE-2019-Q3-50589	220	12.0	12.0	0.9	4,439	-36.2	1.4	4,439	-36.24			
PGE-2019-Q3-50596	863	12.0		173.4	605,303	-228.2				0.37	0.37	
PGE-2019-Q3-50612	234	12.0	8.4	97.5	498,308	-5,410.9	29.1	189,081	-2,033.47	0.31	0.31	0.31
PGE-2019-Q3-50622	221	12.0		271.5	1,387,154	-15,060.2				0.31	0.31	0.31
PGE-2019-Q3-50640	186	12.0	8.4	113.5	535,905	-5,875.9	25.4	169,493	-1,858.40	0.37	0.37	0.37
PGE-2019-Q3-50694	1,089	12.0		0.0	289,739	0.0				0.27	0.27	
PGE-2019-Q3-50696	1,088	12.0		0.0	76,260	0.0				0.27	0.27	
PGE-2019-Q3-50728	212	12.0		0.0	165,312	0.0				0.58	0.58	
PGE-2019-Q3-50739	540	12.0		0.0	371,952	0.0				0.47	0.47	
PGE-2019-Q3-50775	204	12.0		0.0	13,284	0.0				0.43	0.43	
PGE-2019-Q3-50807	220	12.0	12.0	0.0	216,382	0.0	68.7	281,818	0.00			
PGE-2019-Q3-50819	863	12.0		0.0	246,590	0.0				0.37	0.37	
PGE-2019-Q3-50832	1,041	12.0		0.0	114,144	0.0				0.35	0.35	
PGE-2019-Q3-50835	1,069	12.0		0.0	228,288	0.0				0.50	0.50	
PGE-2019-Q3-50842	212	12.0		0.0	128,707	0.0				0.58	0.58	
PGE-2019-Q3-50909	204	12.0		0.0	43,985	0.0				0.43	0.43	
PGE-2019-Q3-51022	539	12.0		0.0	492,492	0.0				0.33	0.33	
PGE-2019-Q3-51052	110	3.0	3.0	0.0	0	18,972.6	0.0	0	19,692.20			
PGE-2019-Q3-51581	54	12.0	12.0	194.9	8,156,014	0.0	195.1	8,156,014	0.00			
PGE-2019-Q3-51588	61	15.0	15.0	1,099.2	9,628,935	0.0	465.3	4,026,989	0.00			
PGE-2019-Q3-51589	37	10.4	12.0	783.0	4,355,391	0.0	903.5	3,163,772	0.00			
PGE-2019-Q3-51592	74	15.0	14.0	2,613.0	3,133,740	388,485.0	-58.8	3,580,612	517,482.00			
PGE-2019-Q3-51594	788	10.4		119.6	481,268	0.0				0.33	0.33	

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PGE-2019-Q3-51595	789	10.4		72.8	276,561	0.0				0.33	0.33	
PGE-2019-Q3-51598	49	10.4	12.2	3,580.1	20,187,260	-69,403.9	4,204.1	17,504,648	-53,741.96			
PGE-2019-Q3-51599	89	12.0	12.0	0.0	11,366,783	0.0	0.0	2,315,604	0.00			
PGE-2019-Q3-51607	483	3.0		0.0	40,217	5,016.0				0.49	0.49	0.49
PGE-2019-Q3-51609	483	15.0		-6.9	295,822	0.0				0.49	0.49	0.49
PGE-2019-Q3-51613	65	10.0	6.7	162.2	387,942	-1,169.0	84.5	86,361	-7,295.85	0.46	0.46	
PGE-2019-Q3-51619	89	10.4	6.8	1,212.5	7,908,188	0.0	205.0	2,379,608	0.00			
PGE-2019-Q3-51620	90	15.0	15.0	0.0	14,012,340	0.0	0.0	14,012,340	0.00			
PGE-2019-Q3-51623	838	10.4		141.6	451,716	-2,502.1				0.32	0.32	
PGE-2019-Q3-51626	842	15.0		123.0	421,797	0.0				0.32	0.32	
PGE-2019-Q3-51627	854	10.4		52.3	203,292	-99.8				0.49	0.49	
PGE-2019-Q3-51628	854	12.0		0.0	22,676	0.0				0.49	0.49	
PGE-2019-Q3-51629	842	15.0		0.0	836,190	0.0				0.32	0.32	
PGE-2019-Q3-51630	113	12.0		688.3	6,030,010	0.0	0.0	0	0.00			
PGE-2019-Q3-51632	131	15.0	10.0	543.2	1,154,700	0.0	360.2	769,800	0.00			
PGE-2019-Q3-51831	536	15.0	15.0	0.0	2,205,481	0.0	0.0	883,425	0.00			
PGE-2019-Q3-51832	536	15.0	15.0	273.2	936,502	0.0	273.1	936,495	0.00			
PGE-2019-Q3-63972	207	20.0	3.0	0.0	173,487	0.0	0.0	26,023	0.00			
PGE-2019-Q3-80360	230	20.0		0.0	964,622	0.0	0.0	0	0.00			
PGE-2019-Q3-80362	231	20.0	3.0	0.0	2,318,087	0.0	0.0	347,712	0.00			
PGE-2019-Q3-81435	237	20.0		0.0	1,233,500	0.0	0.0	0	0.00			
PGE-2019-Q4-100766	1,212	12.0		0.0	34,243	0.0				0.50	0.50	
PGE-2019-Q4-102237	1,080	12.0		7.1	38,006	0.0				0.50	0.50	
PGE-2019-Q4-102598	1,167	20.0		0.0	150,228	0.0				0.75	0.75	
PGE-2019-Q4-102710	1,212	12.0		145.9	506,154	-313.9				0.50	0.50	
PGE-2019-Q4-103270	1,080	12.0		6.0	32,100	0.0				0.50	0.50	
PGE-2019-Q4-103992	109	15.0	15.0	1,095.6	7,687,545	0.0	1,095.6	7,687,545	0.00	0.37	0.37	

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PGE-2019-Q4-104463	262	12.0		70.3	256,299	-1,448.2				0.37	0.37	
PGE-2019-Q4-104712	97	15.0	20.0	150.0	380,250	0.0	606.0	1,438,820	0.00			
PGE-2019-Q4-104944	247	5.0		0.0	347,466	-4,302.0	0.0	0	0.00			
PGE-2019-Q4-105158	594	12.0		0.0	30,898	0.0				0.50	0.50	
PGE-2019-Q4-11012	45	15.0		12.2	64,227	0.0	0.0	0	0.00			
PGE-2019-Q4-11183	119	12.0	12.0	5,696.6	25,390,308	0.0	5,700.0	25,390,308	0.00			
PGE-2019-Q4-11718	45	15.0		13.5	69,558	0.0	0.0	0	0.00			
PGE-2019-Q4-12263	1,080	12.0		6.7	35,792	0.0				0.50	0.50	
PGE-2019-Q4-12746	44	15.0	13.9	15.0	405,975	4,575.0	90.1	167,870	6,160.93			
PGE-2019-Q4-13395	208	12.0		0.0	8,266	0.0				0.50	0.50	
PGE-2019-Q4-1349	239	12.0		0.0	52,841	0.0				0.42	0.42	
PGE-2019-Q4-13969	263	12.0	12.0	0.0	285,754	0.0	0.0	2,624	0.00			
PGE-2019-Q4-14407	268	12.0	12.0	0.0	604,471	0.0	0.0	56,091	0.00			
PGE-2019-Q4-14769	124	3.0	3.0	0.0	559,371	7,313.4	0.0	572,301	8,233.55			
PGE-2019-Q4-14831	585	12.0		21.3	83,167	-960.8				0.75	0.75	
PGE-2019-Q4-14875	269	12.0	12.0	0.0	24,108	0.0	0.0	1,181	0.00			
PGE-2019-Q4-15089	1,207	12.0		0.0	12,251	0.0				0.33	0.33	
PGE-2019-Q4-1612	272	12.0		93.5	294,739	-1,476.4	0.0	0	0.00			
PGE-2019-Q4-16254	589	12.0		44.9	142,367	-610.3				0.43	0.43	
PGE-2019-Q4-16735	87	3.0	3.0	0.0	209,235	48,705.0	0.0	89,619	19,873.67		0.61	0.61
PGE-2019-Q4-17314	224	12.0	12.0	0.0	18,942	0.0	0.0	16,581	0.00			
PGE-2019-Q4-17489	1,222	5.0		4.3	15,103	-85.3				0.39	0.39	
PGE-2019-Q4-17952	232	5.0		3.7	13,529	-68.6				0.00	0.00	
PGE-2019-Q4-18829	590	12.0		0.0	168,756	0.0				0.43	0.43	
PGE-2019-Q4-18916	580	12.0		289.8	1,117,071	-5,575.2				0.60	0.60	0.60
PGE-2019-Q4-18993	248	12.0	12.0	0.0	200,736	0.0	0.0	15,929	0.00			
PGE-2019-Q4-19616	885	12.0		22.5	61,317	-208.5				0.39	0.39	

Claim ID*	SBW Sample ID	Forecast EUL	Evaluated EUL	Life-Cycle Savings (kWh)						Evaluated NTGR		
				Forecast			Evaluated					
				kW	kWh	therm	kW	kWh	therm	kW	kWh	therm
PGE-2019-Q4-21210	112	5.0	15.0	0.0	116,060	0.0	0.0	140,530	0.00			
PGE-2019-Q4-21483	1,174	5.0		2.8	11,069	-116.1				0.33	0.33	
PGE-2019-Q4-21538	563	12.0		44.0	144,760	-1,648.6				0.30	0.30	
PGE-2019-Q4-21724	1,186	5.0		2.7	9,869	-55.7				0.28	0.28	
PGE-2019-Q4-21789	208	12.0		0.0	209,149	0.0				0.50	0.50	
PGE-2019-Q4-22346	214	12.0	12.0	0.0	80,294	0.0	0.0	34,374	0.00			
PGE-2019-Q4-22807	807	3.0		0.0	301,876	0.0				0.47	0.47	0.47
PGE-2019-Q4-22808	1,231	12.0		0.0	24,895	0.0				0.33	0.33	
PGE-2019-Q4-23150	1,212	12.0		0.0	123,295	0.0				0.50	0.50	
PGE-2019-Q4-2325	482	15.0		2,591.7	8,382,999	-88,033.5				0.57	0.57	0.57
PGE-2019-Q4-23941	1,183	12.0		0.0	147,452	0.0				0.46	0.46	
PGE-2019-Q4-2413	1,012	15.0		-21.6	499,810	0.0				0.33	0.33	
PGE-2019-Q4-2421	1,022	12.0		1.5	261,258	-3,366.2				0.33	0.33	
PGE-2019-Q4-25244	807	3.0		0.0	317,432	15,564.9				0.47	0.47	0.47
PGE-2019-Q4-25369	583	12.0		0.0	60,811	0.0				0.51	0.51	
PGE-2019-Q4-25700	1,214	12.0		6.4	374,223	-4,822.1				0.50	0.50	
PGE-2019-Q4-25787	1,166	20.0		0.0	781,434	0.0				0.53	0.53	
PGE-2019-Q4-25982	1,230	12.0		1.9	200,254	-1,927.7				0.57	0.57	
PGE-2019-Q4-26807	76	15.0	13.0	1,776.3	7,164,694	0.0	1,192.0	6,173,394	0.00			
PGE-2019-Q4-28233	263	12.0	12.0	0.0	120,048	0.0	0.0	21,388	0.00			
PGE-2019-Q4-29068	1,022	12.0		0.0	104,255	0.0				0.33	0.33	
PGE-2019-Q4-29341	1,168	12.0		22.7	162,291	-550.9				0.69	0.69	
PGE-2019-Q4-29832	241	12.0		28.6	127,379	-2,220.4	0.0	0	0.00			
PGE-2019-Q4-30028	261	12.0	12.0	0.0	361,620	0.0	0.0	361,620	0.00			
PGE-2019-Q4-30150	104	12.0		0.0	5,520,240	0.0	0.0	0	0.00			
PGE-2019-Q4-30372	94	3.0		120.7	363,305	-0.3				0.44	0.44	0.44
PGE-2019-Q4-30552	247	12.0	12.0	0.0	95,108	-1,188.9	27.1	59,106	-732.14			

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				Forecast			Evaluated					
				kW	kWh	therm	kW	kWh	therm	kW	kWh	therm
PGE-2019-Q4-31144	246	12.0	12.0	38.2	270,334	-1,394.3	7.9	55,932	-288.48			
PGE-2019-Q4-32180	253	12.0	9.6	156.8	542,992	-2,479.0	33.1	158,048	-887.50			
PGE-2019-Q4-33077	214	12.0	12.0	99.0	272,446	-723.1	44.6	122,595	0.00			
PGE-2019-Q4-333	102	10.4		199.2	1,210,733	0.0	0.0	0	0.00			
PGE-2019-Q4-33992	156	12.0		0.0	4,050,144	0.0	0.0	0	0.00			
PGE-2019-Q4-34385	266	12.0		51.2	139,230	-473.5				0.30	0.30	
PGE-2019-Q4-35361	69	15.0	14.8	3,490.5	16,065,345	2,426,655.0	254.2	2,420,729	-30,936.33			
PGE-2019-Q4-35789	99	15.0	12.0	416.7	3,576,864	0.0	333.4	2,861,496	0.00			
PGE-2019-Q4-36482	95	15.0	17.8	894.4	3,344,500	55,062.0	1,568.9	5,341,669	45,657.71	0.57	0.57	0.57
PGE-2019-Q4-36821	198	12.0		89.4	397,460	-6,928.1				0.37	0.37	0.37
PGE-2019-Q4-36932	268	12.0	12.0	0.0	757,188	0.0	0.0	61,329	0.00			
PGE-2019-Q4-39681	1,022	12.0		45.4	140,553	-1,811.0				0.33	0.33	
PGE-2019-Q4-4038	239	12.0		0.0	101,352	0.0				0.42	0.42	
PGE-2019-Q4-40579	885	5.0		0.3	906	-3.1				0.39	0.39	
PGE-2019-Q4-40607	227	5.0		2.0	5,333	-33.9				0.43	0.43	
PGE-2019-Q4-40804	79	15.0	15.0	2,046.6	16,246,224	0.0	2,040.4	16,246,230	0.00	0.47	0.47	
PGE-2019-Q4-41646	78	15.0		482.4	4,281,662	0.0	0.0	0	0.00			
PGE-2019-Q4-42160	594	12.0		8.2	25,760	-129.0				0.50	0.50	
PGE-2019-Q4-43212	241	12.0		25.1	107,781	-1,948.3	0.0	0	0.00			
PGE-2019-Q4-43284	242	12.0		119.8	558,100	-7,520.8	0.0	0	0.00			
PGE-2019-Q4-43320	224	12.0	12.0	0.0	218,645	0.0	0.0	62,767	0.00			
PGE-2019-Q4-43818	590	12.0		0.0	84,624	0.0				0.43	0.43	
PGE-2019-Q4-45537	224	12.0	12.0	0.0	69,667	0.0	0.0	49,060	0.00			
PGE-2019-Q4-46241	1,125	5.0		0.7	2,804	-23.8				0.33	0.33	
PGE-2019-Q4-47905	1,228	12.0		0.0	640	0.0				0.33	0.33	
PGE-2019-Q4-48142	109	15.0	15.0	157.6	1,035,060	0.0	157.6	1,035,060	0.00	0.37	0.37	
PGE-2019-Q4-48144	208	12.0		0.6	2,676	-21.2				0.50	0.50	

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				Forecast			Evaluated					
				kW	kWh	therm	kW	kWh	therm	kW	kWh	therm
PGE-2019-Q4-49432	496	10.0		0.0	700,700	0.0				0.40	0.40	0.40
PGE-2019-Q4-50345	249	12.0	9.4	196.5	1,088,451	-5,881.6	50.4	281,186	-1,519.42			
PGE-2019-Q4-5037	499	12.0		0.0	3,270,964	0.0				0.50	0.50	0.50
PGE-2019-Q4-50380	563	12.0		0.0	23,518	0.0				0.30	0.30	
PGE-2019-Q4-50654	269	12.0	12.0	0.0	65,239	0.0	0.0	6,770	0.00			
PGE-2019-Q4-51710	1,220	12.0		4.5	20,535	-225.2				0.33	0.33	
PGE-2019-Q4-52655	124	3.0	3.0	0.0	8,344	3,616.2	0.0	8,346	3,615.00			
PGE-2019-Q4-5405	1,228	12.0		0.0	34,292	0.0				0.33	0.33	
PGE-2019-Q4-54770	1,220	12.0		0.0	8,561	0.0				0.33	0.33	
PGE-2019-Q4-55511	79	15.0	15.0	511.6	4,372,614	0.0	510.1	4,372,620	0.00			
PGE-2019-Q4-55621	156	12.0		0.0	11,759	0.0	0.0	0	0.00			
PGE-2019-Q4-55839	499	12.0		0.0	64,649	0.0				0.50	0.50	0.50
PGE-2019-Q4-55926	81	14.0	6.3	0.0	0	21,199,584.0	0.0	0	9,585,239.62			
PGE-2019-Q4-57442	260	12.0		0.0	208,362	0.0				0.51	0.51	0.51
PGE-2019-Q4-57508	251	12.0	12.0	129.1	420,246	-1,684.9	3.6	16,117	-64.56	0.33	0.33	
PGE-2019-Q4-57888	124	3.0	3.0	11.9	87,605	912.0	11.8	92,950	1,030.32			
PGE-2019-Q4-58010	267	12.0	12.0	53.0	181,693	-1,153.6	12.2	42,673	-270.49			
PGE-2019-Q4-59830	1,220	12.0		0.0	60,073	0.0				0.33	0.33	
PGE-2019-Q4-60142	1,229	12.0		0.0	24,649	0.0				0.33	0.33	
PGE-2019-Q4-60848	94	3.0		10.2	44,833	9,326.1				0.44	0.44	0.44
PGE-2019-Q4-60974	255	12.0		0.0	80,294	0.0	0.0	0	0.00			
PGE-2019-Q4-61259	114	15.0	15.0	2,091.0	9,290,820	0.0	2,892.0	13,606,860	0.00			
PGE-2019-Q4-622	239	12.0		2.6	275,337	-2,650.4				0.42	0.42	
PGE-2019-Q4-62657	1,229	12.0		0.0	16,236	0.0				0.33	0.33	
PGE-2019-Q4-62991	473	3.0		0.0	51,999	0.0				0.42	0.42	0.42
PGE-2019-Q4-63235	241	12.0	7.5	242.1	1,077,228	-18,777.2	57.3	358,898	-6,248.85	0.37	0.37	0.37
PGE-2019-Q4-65037	45	15.0		13.5	79,088	0.0	0.0	0	0.00			

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				Forecast			Evaluated					
				kW	kWh	therm	kW	kWh	therm	kW	kWh	therm
PGE-2019-Q4-65194	1,168	12.0		57.3	409,583	-1,390.3				0.69	0.69	
PGE-2019-Q4-66245	198	12.0		20.6	91,391	-1,593.1				0.37	0.37	0.37
PGE-2019-Q4-66496	594	12.0		1.2	4,157	-20.9				0.50	0.50	
PGE-2019-Q4-67093	245	12.0		213.2	1,008,016	-12,234.2				0.37	0.37	0.37
PGE-2019-Q4-67883	99	15.0	12.0	213.9	1,836,262	0.0	171.1	1,469,010	0.00			
PGE-2019-Q4-68199	111	12.0	12.0	834.0	3,848,076	0.0	834.0	3,848,076	0.00			
PGE-2019-Q4-69585	102	10.4		1,201.4	7,304,867	0.0	0.0	0	0.00			
PGE-2019-Q4-6977	200	12.0	12.0	0.0	533,672	0.0	0.0	43,223	0.00			
PGE-2019-Q4-70574	242	12.0	7.5	200.7	934,984	-12,599.8	47.5	324,645	-4,370.10	0.37	0.37	0.37
PGE-2019-Q4-70659	235	12.0	8.4	184.5	914,653	-16,129.4	108.9	668,009	-11,776.80	0.31	0.31	0.31
PGE-2019-Q4-7079	248	12.0	12.0	123.6	382,143	-4,923.8	32.0	108,210	-1,394.28			
PGE-2019-Q4-70986	562	5.0		4.5	14,932	-185.5				0.55	0.55	
PGE-2019-Q4-73674	112	15.0	5.0	16.1	1,566,606	0.0	5.4	522,202	0.00			
PGE-2019-Q4-75652	53	15.0	14.6	417.0	699,750	4,800.0	130.4	548,490	9,544.02			
PGE-2019-Q4-77175	1,168	12.0		0.0	358,668	0.0				0.69	0.69	
PGE-2019-Q4-78307	46	15.0	20.0	2,817.3	8,634,032	-80,098.5	5,447.0	17,553,594	1,090,827.29	0.57	0.57	0.57
PGE-2019-Q4-79088	1,186	12.0		12.1	44,103	-249.2				0.28	0.28	
PGE-2019-Q4-79170	261	12.0	12.0	0.0	1,627,536	0.0	0.0	1,627,536	0.00			
PGE-2019-Q4-79261	251	12.0	12.0	30.6	108,555	-436.2	5.0	17,791	-71.52	0.33	0.33	
PGE-2019-Q4-7992	73	15.0	14.8	649.5	854,370	10,530.0	609.7	851,981	2,860.75			
PGE-2019-Q4-81967	125	10.4	9.4	611.2	3,382,743	-19,642.0	150.3	834,633	-4,510.12			
PGE-2019-Q4-82269	806	10.4		41.7	136,734	0.0				0.33	0.33	
PGE-2019-Q4-82309	76	15.0	13.0	1,031.1	15,790,677	0.0	1,241.8	10,771,887	0.00			
PGE-2019-Q4-82660	742	15.0		0.0	380,140	0.0				0.48	0.48	
PGE-2019-Q4-83467	128	12.0	12.0	0.0	5,714,334	0.0	0.0	5,714,334	0.00		0.50	
PGE-2019-Q4-83690	258	12.0		37.0	129,583	-732.3	0.0	0	0.00			
PGE-2019-Q4-85187	233	12.0	12.0	0.0	1,923,966	0.0	0.0	851,265	0.00			

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				kW	kWh	therm	kW	kWh	therm	kW	kWh	therm
PGE-2019-Q4-8555	579	5.0		16.2	56,136	-700.2				0.26	0.26	
PGE-2019-Q4-86021	473	3.0		0.0	248,958	28,317.0				0.42	0.42	0.42
PGE-2019-Q4-86416	104	12.0		0.0	75,276	0.0	0.0	0	0.00			
PGE-2019-Q4-86831	550	12.0		0.0	151,536	0.0				0.53	0.53	
PGE-2019-Q4-86931	1,012	15.0		47.1	114,016	0.0				0.33	0.33	
PGE-2019-Q4-87463	189	12.0		0.9	94,827	-912.8				0.57	0.57	
PGE-2019-Q4-87981	269	12.0	12.0	0.0	239,702	0.0	0.0	24,098	0.00			
PGE-2019-Q4-88088	1,186	12.0		28.2	102,657	-580.1				0.28	0.28	
PGE-2019-Q4-89877	1,207	12.0		3.0	13,177	-229.7				0.33	0.33	
PGE-2019-Q4-90622	1,182	12.0		0.0	131,069	0.0				0.46	0.46	
PGE-2019-Q4-91543	129	12.0	12.0	0.0	3,468,010	0.0	0.0	633,597	0.00		0.50	
PGE-2019-Q4-91905	260	12.0		300.7	1,347,130	-19,602.7				0.51	0.51	0.51
PGE-2019-Q4-91914	590	12.0		7.8	30,436	-257.7				0.43	0.43	
PGE-2019-Q4-92619	583	12.0		60.6	211,180	-899.5				0.51	0.51	
PGE-2019-Q4-93589	242	12.0		40.8	185,790	-2,659.9	0.0	0	0.00			
PGE-2019-Q4-93812	473	3.0		-32.7	85,176	52,914.0				0.42	0.42	0.42
PGE-2019-Q4-94901	62	15.0	19.1	3,093.4	22,768,530	2,400,616.5	4,743.2	24,647,097	3,141,356.98			
PGE-2019-Q4-95525	1,218	20.0		0.0	166,639	0.0				0.58	0.58	
PGE-2019-Q4-96389	105	12.0	12.0	0.0	3,712,435	0.0	0.0	1,639,700	0.00		0.60	
PGE-2019-Q4-97299	267	5.0		31.9	124,417	-788.8	0.0	0	0.00			
PGE-2019-Q4-97579	254	12.0	7.2	203.5	911,996	-13,270.9	21.6	147,355	-2,145.60	0.37	0.37	0.37
PGE-2019-Q4-9775	248	12.0		1.3	238,220	-3,023.5	0.0	0	0.00			
PGE-2019-Q4-99920	105	12.0	12.0	0.0	87,822	0.0	0.0	40,684	0.00		0.60	
SCE-2019-Q1-0009322	302	12.0		0.0	38,622	0.0	0.0	0	0.00			
SCE-2019-Q2-0041860	273	16.0	13.1	99.2	743,712	6,752.0	298.3	363,160	28,039.85			
SCE-2019-Q2-0041868	274	16.0		632.0	1,438,272	3,792.0	0.0	0	0.00			
SCE-2019-Q2-0041869	276	12.0		16.6	118,624	-625.2				0.41	0.41	

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				kW	kWh	therm	kW	kWh	therm	kW	kWh	therm
SCE-2019-Q2-0041870	276	16.0		371.2	2,357,184	63,552.0				0.41	0.41	
SCE-2019-Q2-0041873	283	15.0		0.0	130,467	0.0	0.0	0	0.00			
SCE-2019-Q2-0041874	283	16.0		720.0	3,444,896	67,536.0	0.0	0	0.00			
SCE-2019-Q2-0041875	284	15.0	11.8	5,419.7	18,118,410	0.0	3,922.3	15,722,993	0.00			
SCE-2019-Q2-0041877	610	16.0		227.2	1,053,936	4,080.0				0.50	0.50	
SCE-2019-Q2-0041879	611	16.0		84.8	533,456	5,280.0				0.50	0.50	
SCE-2019-Q2-0041883	309	12.0	12.0	0.0	11,013,568	0.0	0.0	11,013,568	0.00			
SCE-2019-Q2-0041892	316	12.0	12.0	0.0	6,317	0.0	0.0	6,316	0.00			
SCE-2019-Q2-0041893	316	12.0	12.0	87.4	2,039,383	0.0	141.1	1,924,568	0.00			
SCE-2019-Q2-0041902	653	12.0		48.7	189,019	-1,198.8				0.52	0.52	0.52
SCE-2019-Q2-0041903	653	12.0		0.0	44,575	0.0				0.52	0.52	0.52
SCE-2019-Q2-0041904	653	12.0		0.0	761,616	0.0				0.52	0.52	0.52
SCE-2019-Q2-0044275	293	15.0		739.5	4,941,436	0.0	0.0	0	0.00			
SCE-2019-Q2-0044284	313	12.0	12.0	0.0	593,942	0.0	0.0	256,129	0.00			
SCE-2019-Q2-0044285	313	12.0	12.0	0.0	2,366,520	0.0	0.0	1,047,088	0.00			
SCE-2019-Q2-0044286	633	12.0		0.0	608,555	0.0				0.39	0.39	
SCE-2019-Q2-0044302	334	3.0		48.0	270,580	0.0	0.0	0	0.00			
SCE-2019-Q2-0044303	334	3.0		37.1	255,596	0.0	0.0	0	0.00			
SCE-2019-Q2-0044305	334	15.0		373.9	1,913,977	0.0	0.0	0	0.00			
SCE-2019-Q2-0044368	318	12.0		0.0	105,540	0.0	0.0	0	0.00			
SCE-2019-Q2-0044369	318	12.0		0.0	31,980	0.0	0.0	0	0.00			
SCE-2019-Q2-0044372	318	12.0		0.0	166,296	0.0	0.0	0	0.00			
SCE-2019-Q2-0044431	289	12.0		436.1	2,253,468	0.0	0.0	0	0.00			
SCE-2019-Q2-0044432	289	12.0		0.0	84,329	0.0	0.0	0	0.00			
SCE-2019-Q2-0044443	305	12.0		0.0	12,216	0.0				0.65	0.65	0.65
SCE-2019-Q2-0044445	305	12.0		0.0	286,872	0.0				0.65	0.65	0.65
SCE-2019-Q2-0044448	305	12.0		72.4	225,043	0.0				0.65	0.65	0.65

Claim ID*	SBW Sample ID	Forecast EUL	Evaluated EUL	Life-Cycle Savings (kWh)						Evaluated NTGR		
				Forecast			Evaluated					
				kW	kWh	therm	kW	kWh	therm	kW	kWh	therm
SCE-2019-Q2-0044455	290	4.3		2.5	186,824	0.0	0.0	0	0.00			
SCE-2019-Q2-0044456	290	15.0		1,345.4	8,751,079	0.0	0.0	0	0.00			
SCE-2019-Q2-0044457	322	12.0	12.0	0.0	14,509,539	0.0	0.0	14,509,539	0.00			
SCE-2019-Q2-0044459	282	5.0		3,831.9	29,727,852	0.0	0.0	0	0.00			
SCE-2019-Q2-0044462	296	5.0		1,695.9	1,710,134	0.0	0.0	0	0.00			
SCE-2019-Q2-0044463	296	5.0		1,202.1	11,075,578	0.0	0.0	0	0.00			
SCE-2019-Q2-0044514	303	16.0		46.4	666,992	22,448.0	0.0	0	0.00			
SCE-2019-Q3-0078433	291	16.0	13.2	19.2	2,200,448	35,232.0	145.4	245,648	2,513.01			
SCE-2019-Q3-0078435	630	12.0		0.2	1,100	-4.7				0.23	0.23	
SCE-2019-Q3-0078437	630	12.0		0.0	174,660	0.0				0.23	0.23	
SCE-2019-Q3-0078438	630	12.0		0.0	277,980	0.0				0.23	0.23	
SCE-2019-Q3-0078445	315	3.3	3.3	0.0	70,343	0.0	0.0	76,124	0.00			
SCE-2019-Q3-0078446	315	3.3	3.3	29.4	289,080	0.0	32.0	313,170	0.00			
SCE-2019-Q3-0078453	651	12.0		0.0	251,171	0.0				0.57	0.57	0.57
SCE-2019-Q3-0078454	651	12.0		0.0	1,010,465	0.0				0.57	0.57	0.57
SCE-2019-Q3-0080412	308	12.0	12.0	0.0	7,875,739	0.0	0.0	7,866,552	0.00			
SCE-2019-Q3-0080430	660	3.0		79.2	455,849	0.0				0.58	0.58	
SCE-2019-Q3-0081248	324	12.0		68.6	600,982	0.0				0.43	0.43	
SCE-2019-Q3-0081266	628	12.0		0.0	463,070	0.0				0.63	0.63	0.63
SCE-2019-Q3-0081273	286	12.0	5.7	807.4	7,072,054	0.0	44.5	443,099	-696.35			
SCE-2019-Q3-0081277	621	5.0		304.1	2,046,120	0.0				0.54	0.54	0.54
SCE-2019-Q4-0056522	307	12.0	12.0	0.0	42,289,368	0.0	0.0	42,289,368	0.00			
SCE-2019-Q4-0056536	652	12.0		0.0	11,959	0.0				0.54	0.54	
SCE-2019-Q4-0056539	652	12.0		0.0	15,941	0.0				0.54	0.54	
SCE-2019-Q4-0056550	652	12.0		0.0	15,744	0.0				0.54	0.54	
SCE-2019-Q4-0060027	292	3.0		0.0	101,749	0.0	0.0	0	0.00			
SCE-2019-Q4-0060029	292	3.0		0.0	617,885	0.0	0.0	0	0.00			

Claim ID*	SBW Sample ID	Forecast EUL	Evaluated EUL	Life-Cycle Savings (kWh)						Evaluated NTGR		
				Forecast			Evaluated					
				kW	kWh	therm	kW	kWh	therm	kW	kWh	therm
SCE-2019-Q4-0060032	292	5.0		0.0	286,575	1,085.0	0.0	0	0.00			
SCE-2019-Q4-0060162	638	12.0		0.0	1,739,328	0.0				0.57	0.57	0.57
SCE-2019-Q4-0060164	638	12.0		0.0	195,084	0.0				0.57	0.57	0.57
SCE-2019-Q4-0060166	638	12.0		0.0	627,864	0.0				0.57	0.57	0.57
SCE-2019-Q4-0083706	281	16.0	12.7	289.6	3,901,232	27,456.0	347.2	1,028,355	-36.08	0.43	0.43	0.43
SCE-2019-Q4-0083709	327	12.0		0.0	1,912,457	0.0	0.0	0	0.00			
SCE-2019-Q4-0083710	327	12.0	12.0	0.0	6,873,166	0.0	0.0	123,976	0.00			
SCE-2019-Q4-0084090	331	5.0	5.0	51.8	378,085	0.0	51.8	376,585	0.00	0.47	0.47	
SCE-2019-Q4-0084165	280	12.0		186.0	641,890	0.0	0.0	0	0.00			
SCE-2019-Q4-0084166	280	16.0		0.0	4,064,960	16,144.0	0.0	0	0.00			
SCE-2019-Q4-0084167	285	16.0		203.2	3,805,392	72,592.0	0.0	0	0.00			
SCE-2019-Q4-0084175	328	12.0	12.0	15.1	63,463	0.0	320.4	981,000	0.00			
SCE-2019-Q4-0084176	328	12.0	12.0	0.0	4,853,186	0.0	0.0	9,465,120	0.00			
SCE-2019-Q4-0084177	304	3.0		-12.9	64,150	2,306.4				0.50	0.50	
SCE-2019-Q4-0084178	625	3.0		2.9	44,663	0.0				0.50	0.50	
SCE-2019-Q4-0084184	626	3.0		-3.8	236,102	20,236.5				0.50	0.50	
SCE-2019-Q4-0084185	626	3.0		0.0	32,240	0.0				0.50	0.50	
SCE-2019-Q4-0084770	333	4.7	4.4	353.3	4,952,335	286,509.7	427.5	5,219,413	0.00			
SCG-2019-3710-12168311-3306078	344	20.0		0.0	0	1,014,880.0	0.0	0	0.00			
SCG-2019-3715-11212285-2326126	336	11.0		0.0	0	711,128.0	0.0	0	0.00			
SCG-2019-3715-12117735-3190977	339	11.0	3.7	0.0	0	157,322.0	0.0	37,372	52,183.34			
SCG-2019-3715-12209696-3430379	347	20.0		0.0	0	92,600.0	0.0	0	0.00			
SCG-2019-3715-12209696-3430385	347	15.0		0.0	0	50,190.0	0.0	0	0.00			
SCG-2019-3715-5001259543-10	353	15.0		0.0	0	305,550.0	0.0	0	0.00			
SCG-2019-3715-5001259620-10	354	15.0		0.0	0	298,620.0	0.0	0	0.00			
SCG-2019-3757-11110493-3347949	335	20.0	6.7	0.0	0	1,525,500.0	0.0	0	227,397.96			
SCG-2019-3757-11245269-2204351	338	7.0		0.0	0	178,283.0	0.0	0	0.00			

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				Forecast			Evaluated					
				kW	kWh	therm	kW	kWh	therm	kW	kWh	therm
SCG-2019-3807-11237890-2019	337	12.0	12.0	0.0	0	42,768.0	0.0	0	12,955.00			
SCG-2019-3813-12310764-3762934	349	16.5	15.0	0.0	0	227,914.5	537.0	1,182,371	1,629.00			
SCG-2019-3813-12311258-3763124	350	16.5	19.0	0.0	0	84,018.0	372.2	568,032	8,573.45			
SCG-2019-3813-500000422-1	664	15.0		0.0	0	133,740.0				0.48	0.48	0.48
SCG-2019-3813-500000423-1	665	15.0		0.0	0	6,990.0				0.48	0.48	0.48
SCG-2019-3813-500000509-1	352	15.0		0.0	0	58,665.0	0.0	0	0.00			
SCG-2019-3813-500429536-1	356	15.0	20.0	0.0	0	64,110.0	0.0	4,070,280	86,020.00			
SCG-2019-3813-500550449-1	358	15.0	15.4	0.0	0	12,780.0	-46.0	300,214	4,974.65			
SCG-2019-3813-500553542-1	673	15.0		0.0	0	41,745.0						0.29
SCG-2019-3813-500574779-1	360	15.0	15.0	0.0	0	7,740.0	0.0	1,211,100	10,410.00			
SCG-2019-3813-500622639-2	361	15.0	15.0	0.0	0	15,691.5	76.5	84,390	15,690.00			
SCG-2019-3813-500626404-1	362	15.0		0.0	0	15,135.0				0.41	0.41	0.41
SCG-2019-3813-500645444-1	363	15.0	20.0	0.0	0	33,165.0	-42.0	161,340	300.00			
SCG-2019-3813-500767460-1	365	15.0		0.0	0	63,315.0	0.0	0	0.00			
SCG-2019-3813-500793206-1	366	15.0		0.0	0	68,055.0	0.0	0	0.00			
SCG-2019-3813-500793573-1	676	15.0		0.0	0	3,825.0						0.50
SCG-2019-3813-500793574-1	677	15.0		0.0	0	4,950.0						0.50
SCG-2019-3815-12202558-3425640	345	3.0	3.0	0.0	0	40,455.0	0.0	0	26,482.50			
SCG-2019-3815-12202558-3425858	345	3.0	5.0	0.0	0	39,093.0	0.0	0	42,650.10			
SCG-2019-3815-12202558-3425863	345	3.0	3.0	0.0	0	119,787.0	0.0	0	65,598.13			
SDGE-2019-3220-10770648-1774698	384	15.0		0.0	603,765	0.0	0.0	0	0.00			
SDGE-2019-3220-10788467-1811912	388	15.0		0.0	11,883,630	0.0	0.0	0	0.00			
SDGE-2019-3220-10794023-1838767	391	10.0		26.5	237,560	0.0	0.0	0	0.00			
SDGE-2019-3220-10885037-9002547	402	20.0		80.0	14,409,320	0.0	0.0	0	0.00			

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				Forecast			Evaluated					
				kW	kWh	therm	kW	kWh	therm	kW	kWh	therm
SDGE-2019-3220-10951681-12201641	686	5.0		25.0	141,410	0.0				0.33	0.33	
SDGE-2019-3220-10951694-12201930	687	5.0		25.0	165,294	0.0				0.33	0.33	
SDGE-2019-3220-10951704-12204687	406	5.0		25.0	138,435	0.0				0.33	0.33	
SDGE-2019-3220-10951776-12205860	407	10.0	10.0	40.0	282,100	0.0	36.8	134,486	0.00	0.33	0.33	
SDGE-2019-3220-10951778-12205708	688	9.0		45.0	186,111	0.0				0.33	0.33	
SDGE-2019-3220-10951780-12205832	689	10.0		50.0	393,340	0.0				0.33	0.33	
SDGE-2019-3220-10951785-12201212	690	5.0		25.0	145,850	0.0				0.33	0.33	
SDGE-2019-3220-10951992-12199763	408	20.0	3.7	0.0	-463,900	229,640.0	0.0	-61,801	38,939.14			
SDGE-2019-3220-10952413-12269315	409	12.0	4.0	184.8	269,568	47,174.4	60.0	89,856	15,724.00	0.38	0.38	0.38
SDGE-2019-3220-10952413-12269472	409	12.0		4.8	111,326	0.0	0.0	0	0.00			
SDGE-2019-3220-10973274-12247959	412	3.0		0.0	95,184	0.0	0.0	0	0.00			
SDGE-2019-3220-10973274-12247960	412	3.0		0.0	76,080	0.0	0.0	0	0.00			
SDGE-2019-3220-10994696-12408462	419	4.0	4.0	0.0	24,208	0.0	0.0	23,840	0.00			
SDGE-2019-3220-10994750-12408390	420	4.0	4.0	0.0	24,084	0.0	0.0	24,976	0.00			
SDGE-2019-3222-10378842-1794901	368	15.0	12.0	760.5	3,472,845	-11,535.0	608.4	2,778,276	0.00			

Claim ID*	SBW Sample ID	Forecast EUL	Evaluated EUL	Life-Cycle Savings (kWh)						Evaluated NTGR		
				Forecast			Evaluated					
				kW	kWh	therm	kW	kWh	therm	kW	kWh	therm
SDGE-2019-3222-10379053-1320927	370	15.0	16.0	52.5	741,570	7,050.0	140.8	279,869	2,011.00			
SDGE-2019-3222-10379053-1634717	370	15.0	12.0	544.5	1,968,675	0.0	432.0	1,574,940	0.00			
SDGE-2019-3222-10379223-12123864	372	15.0	14.0	0.0	594,630	0.0	214.2	319,928	12,950.00			
SDGE-2019-3222-10379223-1469179	372	12.0	12.0	210.0	736,572	0.0	210.0	736,572	0.00			
SDGE-2019-3222-10383280-1208537	373	12.0	12.0	0.0	108,984	0.0	0.0	108,984	0.00			
SDGE-2019-3222-10383280-1208538	373	15.0	14.9	132.0	325,830	75,450.0	-68.3	-229,693	2,169.02			
SDGE-2019-3222-10384255-1212086	374	15.0	16.3	1,239.0	5,658,570	32,910.0	-40.2	4,551,477	20,232.19			
SDGE-2019-3222-10384670-1688403	375	15.0	15.0	409.5	3,740,160	17,490.0	673.5	1,557,829	-4,791.00			
SDGE-2019-3222-10384670-1710584	375	12.0	12.0	0.0	121,992	0.0	0.0	121,992	0.00			
SDGE-2019-3222-10437105-1887895	376	12.0	12.0	0.0	191,112	0.0	0.0	191,112	0.00			
SDGE-2019-3222-10437105-1887896	376	15.0	15.0	0.0	0	260,430.0	121.5	367,101	253,560.00			
SDGE-2019-3222-10700899-1821415	378	15.0	12.0	0.0	813,630	0.0	0.0	650,904	0.00			
SDGE-2019-3222-10700899-1821416	378	15.0	12.8	184.5	540,630	21,960.0	-23.0	11,423	-57,286.70			
SDGE-2019-3222-10732247-1817164	379	15.0	18.8	3,172.5	17,176,065	53,325.0	0.0	-7,462,982	22,085.00			
SDGE-2019-3222-10736650-1838749	380	12.0	12.0	540.0	1,490,916	0.0	540.0	1,490,916	0.00			

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				Forecast			Evaluated					
				kW	kWh	therm	kW	kWh	therm	kW	kWh	therm
SDGE-2019-3222-10736650-1838750	380	15.0	15.0	138.0	7,001,940	608,265.0	1,351.0	7,044,010	595,740.00			
SDGE-2019-3222-10789569-12014200	680	15.0		997.5	1,969,620	30,255.0				0.60	0.60	0.60
SDGE-2019-3222-10789569-12014201	680	12.0		286.8	642,504	0.0				0.60	0.60	0.60
SDGE-2019-3222-10789628-12014225	389	15.0		400.5	1,464,945	10,890.0				0.60	0.60	0.60
SDGE-2019-3222-10797011-9107892	394	15.0	15.0	166.5	1,175,205	15.0	166.5	1,175,205	15.00			
SDGE-2019-3222-10797011-9107893	394	15.0	12.0	57.0	591,945	-15.0	24.7	256,510	-6.50			
SDGE-2019-3222-10797011-9107894	394	15.0	15.0	0.0	0	19,935.0	0.0	0	19,935.00			
SDGE-2019-3222-10952109-12247226	691	15.0		0.0	0	13,500.0				0.33	0.33	0.33
SDGE-2019-3222-10952109-12247227	691	15.0		114.0	325,965	-900.0				0.33	0.33	0.33
SDGE-2019-3222-10952112-12247384	692	15.0		268.5	198,045	0.0				0.33	0.33	0.33
SDGE-2019-3222-10952112-12247385	692	15.0		337.5	934,635	0.0				0.33	0.33	0.33
SDGE-2019-3231-10872180-8943439	401	15.0	15.0	135.0	1,951,530	0.0	166.0	2,247,865	0.00			
SDGE-2019-3237-10949973-12110452	684	3.0		0.0	439,265	0.0				0.49	0.49	0.49
SDGE-2019-3237-10951085-12132277	405	3.0		0.4	198,950	0.0				0.49	0.49	0.49
SDGE-2019-3237-10951678-12132338	685	3.0		4.0	230,984	0.0				0.49	0.49	0.49

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				Forecast			Evaluated					
				kW	kWh	therm	kW	kWh	therm	kW	kWh	therm
SDGE-2019-3317-10737532-12483725	381	3.0	3.0	0.0	534,249	37,515.0	0.0	315,610	39,268.29		0.40	0.40
SDGE-2019-3317-10739477-11500606	382	3.0	3.0	0.0	3,383,619	530,247.0	0.0	4,224,348	335,635.23			
SDGE-2019-3317-10739649-1722534	383	3.0		0.0	1,449,588	0.0				0.46	0.46	0.46
SDGE-2019-3317-10786858-12277999	386	3.0	3.0	240.5	3,013,131	106,404.0	503.7	3,070,475	54,777.00			
SDGE-2019-3317-10786859-1786251	387	3.0	3.0	0.0	1,173,684	105,855.0	0.0	133,676	-66,849.25		0.47	0.47
SDGE-2019-3317-10793127-12278001	390	3.0	3.7	628.6	3,504,736	76,455.9	204.9	1,790,613	65,995.73			
SDGE-2019-3317-10812859-1847952	398	3.0	3.0	0.0	1,323,960	6,894.0	0.0	-139,254	0.00		0.50	
SDGE-2019-3317-10945041-12353600	403	3.0	4.8	311.2	2,892,920	1,590.0	681.6	5,330,117	14,404.80	0.47	0.47	0.47
SDGE-2019-3322-10795341-1813833	393	5.0		0.0	48,765	0.0	0.0	0	0.00			
SDGE-2019-3322-10812194-1845900	397	15.0		0.0	120,240	0.0	0.0	0	0.00			
SDGE-2019-3322-10812194-1853982	397	10.0		0.0	0	107,750.0	0.0	0	0.00			
SDGE-2019-4061-10988455-12309267	416	2.0	3.0	0.0	44,049	0.0	0.0	89,364	0.00			
SDGE-2019-4061-10994773-12368421	421	2.0		0.0	52,266	0.0	0.0	0	0.00			
SDGE-2019-4061-10995233-12510971	425	2.0		0.0	22,744	0.0	0.0	0	0.00			
SDGE-2019-4061-11006461-12517946	432	2.0	3.0	0.0	8,927	0.0	0.0	6,054	0.00			

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				Forecast			Evaluated					
				kW	kWh	therm	kW	kWh	therm	kW	kWh	therm
SDGE-2019-4061-11015387-12663812	433	2.0	3.0	0.0	5,629	0.0	0.0	18,043	0.00			

* When evaluated energy gross savings or NTGR has not been reported, this indicates the sample ID was not evaluated.

Table 58: Claim Level Gross First-Year Evaluation Results

Claim ID[1]	SBW Sample ID	First-Year Savings (kWh)						Evaluated NTGR		
		Forecast[2]			Evaluated					
		kW	kWh	therm	kW	kWh	therm	kW	kWh	therm
MCE-2019-02-02-068-01	2	0.4	1,513	-9.2				0.50	0.50	
MCE-2019-02-066-01B	710	5.9	20,447	-120.4				0.12	0.12	
MCE-2019-02-066-02B	710	0.0	10,562	0.0				0.12	0.12	
MCE-2019-02-069-01	434	18.4	57,126	-353.1	18.3	57,126	-353			
MCE-2019-02-071-01	435	9.8	43,737	-636.4	9.8	43,737	-636			
MCE-2019-02-075-02	436	0.0	6,281	0.0				0.35	0.35	
MCE-2019-02-075-03	436	0.0	3,136	0.0				0.35	0.35	
MCE-2019-02-084-01	5	0.1	305	-1.8				0.34	0.34	
MCE-2019-02-085-01	6	4.5	17,308	-103.3	4.5	17,308	-103			
MCE-2019-02-085-02	6	2.6	11,394	-67.9	0.0	0				

Claim ID[1]	SBW Sample ID	First-Year Savings (kWh)						Evaluated NTGR		
		Forecast[2]			Evaluated					
		kW	kWh	therm	kW	kWh	therm	kW	kWh	therm
MCE-2019-02-085-03	6	0.0	6,937	0.0	0.0	6,937	0			
MCE-2019-02-086-02	7	5.9	30,866	-296.1	0.0	0	0			
MCE-2019-02-088-01	8	5.7	20,682	-116.9	5.7	20,682	-117			
MCE-2019-02-090-01	9	12.9	57,959	-843.4	4.1	18,365	-268			
MCE-2019-02-093-01	723	12.5	38,974	-240.9				0.43	0.43	
MCE-2019-02-093-02	723	0.0	1,697	0.0				0.43	0.43	
MCE-2019-02-093-03	723	0.0	2,821	0.0				0.43	0.43	
MCE-2019-02-094-01	11	13.7	42,784	-264.4	13.7	42,784	-264			
MCE-2019-02-094-03	11	0.0	3,846	0.0	0.0	41	0			
MCE-2019-02-094-04	11	0.1	386	-2.4	0.1	386	-2			
MCE-2019-02-095-01	12	19.6	60,952	-376.7	19.6	60,952	-377			
MCE-2019-02-096-01	13	6.3	22,364	-135.4	0.5	1,743	-11			
MCE-2019-02-097-01	14	0.0	9,356	0.0				0.60	0.60	
MCE-2019-02-098-01	15	1.4	4,784	-29.0				0.66	0.66	
MCE-2019-02-099-01	16	7.6	26,872	-162.7	7.6	26,872	-163			
MCE-2019-02-099-02	16	1.3	4,316	-26.1	1.3	4,316	-26			
MCE-2019-02-099-04	16	0.0	3,399	0.0	0.0	3,399	0			
MCE-2019-02-100-01-BESS	445	0.6	2,430	0.0				0.44	0.44	
MCE-2019-02-108-01	450	0.7	3,348	-48.7				0.66	0.66	
MCE-2019-02-108-02	450	0.3	1,334	-19.4				0.66	0.66	
MCE-2019-02-110-01	18	4.0	14,860	-88.7	4.0	14,860	-89	0.57	0.57	
MCE-2019-02-112-01	724	2.1	7,435	-45.0				0.70	0.70	
MCE-2019-02-112-02	724	0.0	148	-0.9				0.70	0.70	
MCE-2019-02-113-01	19	1.0	2,686	-10.5				0.67	0.67	
MCE-2019-02-117-01	22	3.7	13,174	-79.8	3.7	13,174	-79			
MCE-2019-02-117-02	22	0.0	3,612	0.0	0.0	3,612	0			
MCE-2019-02-119-01	23	1.5	4,102	-16.1	0.0	0	0			

Claim ID[1]	SBW Sample ID	First-Year Savings (kWh)						Evaluated NTGR		
		Forecast[2]			Evaluated					
		kW	kWh	therm	kW	kWh	therm	kW	kWh	therm
MCE-2019-02-121-01	24	1.1	4,000	-23.9	0.1	293	-2			
MCE-2019-02-123-01	726	0.7	2,714	-16.2				0.37	0.37	
MCE-2019-02-125-01	25	0.5	2,278	-13.6	0.5	2,824	-17	0.52	0.52	
MCE-2019-02-126-01	26	0.9	3,981	-23.7	1.2	5,358	-32	0.52	0.52	
MCE-2019-02-128-01	454	0.3	1,169	-7.0				0.33	0.33	
MCE-2019-02-132-01	456	0.3	1,194	-7.2				0.33	0.33	
MCE-2019-02-132-02	456	0.0	3,157	0.0				0.33	0.33	
MCE-2019-02-132-03	456	0.0	11,824	0.0				0.33	0.33	
MCE-2019-02-133-01	29	1.4	4,775	-28.9	1.4	4,775	-29			
PGE-2019-Q1-10051	136	4.5	23,130	-521.1	4.5	23,130	-521			
PGE-2019-Q1-11826	140	0.0	163,959	0.0	0.0	6,714	0			
PGE-2019-Q1-12340	144	3.1	12,312	-104.2	5.6	31,521	-211			
PGE-2019-Q1-12725	144	0.1	586	-5.0	0.1	1,526	-13			
PGE-2019-Q1-12769	144	8.1	24,745	-210.2	8.1	45,144	-384			
PGE-2019-Q1-12955	132	0.0	21,193	0.0	0.0	0				
PGE-2019-Q1-12978	146	0.0	114,656	0.0	0.0	11,481	0			
PGE-2019-Q1-12984	132	21.0	109,133	-564.2	0.0	0				
PGE-2019-Q1-14337	108	2.9	14,186	-96.7	0.3	2,029	-14			
PGE-2019-Q1-15960	927	0.0	1,320	0.0				0.50	0.50	
PGE-2019-Q1-16032	927	0.0	1,181	0.0				0.50	0.50	
PGE-2019-Q1-16044	927	4.1	16,349	-355.3				0.50	0.50	
PGE-2019-Q1-16582	88	0.0	0	853.0			0			
PGE-2019-Q1-16637	891	0.0	13,218	0.0				0.53	0.53	
PGE-2019-Q1-16741	891	0.0	11,529	0.0				0.53	0.53	
PGE-2019-Q1-17111	502	0.2	814	-0.5				0.47	0.47	0.47
PGE-2019-Q1-17293	502	0.0	1,394	0.0				0.47	0.47	0.47
PGE-2019-Q1-17759	498	0.0	27,343	0.0				0.38	0.38	

Claim ID[1]	SBW Sample ID	First-Year Savings (kWh)						Evaluated NTGR		
		Forecast[2]			Evaluated					
		kW	kWh	therm	kW	kWh	therm	kW	kWh	therm
PGE-2019-Q1-17823	498	0.0	45,678	0.0				0.38	0.38	
PGE-2019-Q1-18590	88	0.0	0	5,036.0			0			
PGE-2019-Q1-20467	130	3.2	15,326	-186.0				0.37	0.37	0.37
PGE-2019-Q1-20468	130	17.5	79,023	-1,013.8				0.37	0.37	0.37
PGE-2019-Q1-20470	849	0.0	0	0.0				0.54	0.54	
PGE-2019-Q1-20480	849	0.0	840	0.0				0.54	0.54	
PGE-2019-Q1-20482	849	1.1	4,481	-51.8				0.54	0.54	
PGE-2019-Q1-20561	31	0.0	0	55,401.0	0.0	0	0			
PGE-2019-Q1-20600	31	46.8	65,583	0.0	0.0	0	0			
PGE-2019-Q1-22069	35	0.0	200,919	66,966.0	0.0	36,673	71,016			
PGE-2019-Q1-22747	150	13.0	92,021	-474.6	2.9	20,607	-106			
PGE-2019-Q1-23643	126	0.0	3,764	0.0	0.0	3,764	0			
PGE-2019-Q1-23701	126	0.0	16,379	0.0	0.0	16,380	0			
PGE-2019-Q1-23708	126	0.0	8,241	0.0	0.0	8,241	0			
PGE-2019-Q1-26565	58	0.0	0	84,434.9	0.0	0	0			
PGE-2019-Q1-27022	913	0.0	11,882	0.0				0.63	0.63	
PGE-2019-Q1-27072	889	2.0	8,102	-176.1				0.50	0.50	
PGE-2019-Q1-27223	913	1.2	5,948	-39.5				0.63	0.63	
PGE-2019-Q1-27303	464	0.0	0	19,330.0	0.0	0	18,273			
PGE-2019-Q1-27392	103	-8.4	-23,875	17,876.6	-7.2	-20,402	15,277			
PGE-2019-Q1-27691	954	0.0	21,003	0.0				0.42	0.42	
PGE-2019-Q1-28796	135	0.0	29,212	0.0	0.0	2,675	0		0.29	
PGE-2019-Q1-28880	135	0.0	69	-0.3	0.0	53	-1		0.29	
PGE-2019-Q1-30535	749	28.2	101,347	1,336.4				0.47	0.47	0.47
PGE-2019-Q1-335	117	0.0	13,776	0.0				0.17	0.17	
PGE-2019-Q1-3374	960	1.3	3,627	-14.2				0.68	0.68	
PGE-2019-Q1-34198	486	0.0	0	16,325.2						0.40

Claim ID[1]	SBW Sample ID	First-Year Savings (kWh)						Evaluated NTGR		
		Forecast[2]			Evaluated					
		kW	kWh	therm	kW	kWh	therm	kW	kWh	therm
PGE-2019-Q1-34819	794	0.0	21,757	0.0				0.43	0.43	
PGE-2019-Q1-39317	34	5.1	45,097	8,917.0	0.0	0	0			
PGE-2019-Q1-39361	740	1.4	13,530	0.0				0.45	0.45	
PGE-2019-Q1-45922	56	6.6	63,509	0.0	0.0	0	0			
PGE-2019-Q1-46456	500	4.9	14,554	-169.8				0.90	0.90	
PGE-2019-Q1-48	117	2.0	7,405	-37.6				0.17	0.17	
PGE-2019-Q1-5247	489	0.0	0	9,017.0						0.40
PGE-2019-Q1-5446	137	1.9	6,357	-79.0				0.50	0.50	
PGE-2019-Q1-5619	510	0.3	1,689	-12.0				0.63	0.63	
PGE-2019-Q1-5662	510	0.0	13,776	0.0				0.63	0.63	
PGE-2019-Q1-5696	510	0.4	2,062	-14.7				0.63	0.63	
PGE-2019-Q1-5773	928	1.0	2,682	-17.1				0.40	0.40	
PGE-2019-Q1-63	117	0.0	16,597	0.0				0.17	0.17	
PGE-2019-Q1-6692	887	0.0	968	0.0				0.47	0.47	
PGE-2019-Q1-6695	887	0.0	534	0.0				0.47	0.47	
PGE-2019-Q1-7476	960	0.1	423	-1.6				0.68	0.68	
PGE-2019-Q1-7691	121	13.9	105,340	-706.7	0.0	0				
PGE-2019-Q1-8748	83	253.2	1,237,302	10,117.5	0.0	0	0			
PGE-2019-Q1-9510	864	2.9	9,220	-53.3				0.53	0.53	
PGE-2019-Q1-9529	864	0.2	2,058	0.0				0.53	0.53	
PGE-2019-Q2-105594	163	0.7	2,452	-49.6	0.7	3,830	-77	0.40	0.40	
PGE-2019-Q2-105638	990	0.0	59,983	0.0				0.46	0.46	
PGE-2019-Q2-105641	497	0.0	5,437	0.0				0.66	0.66	
PGE-2019-Q2-105650	145	0.0	5,847	0.0	0.0	5,847	0			
PGE-2019-Q2-16612	165	32.9	112,753	-651.9	8.0	24,886	-274			
PGE-2019-Q2-16623	180	23.1	107,427	-1,447.7	19.1	116,888	-1,573	0.31	0.31	0.31
PGE-2019-Q2-16640	518	4.9	18,572	-83.1				0.83	0.83	

Claim ID[1]	SBW Sample ID	First-Year Savings (kWh)						Evaluated NTGR		
		Forecast[2]			Evaluated					
		kW	kWh	therm	kW	kWh	therm	kW	kWh	therm
PGE-2019-Q2-16713	48	0.0	0	6,796.0	0.0	0	0			
PGE-2019-Q2-23360	1,024	0.0	159	-1.7				0.33	0.33	
PGE-2019-Q2-23376	532	2.2	5,949	-16.9				0.43	0.43	
PGE-2019-Q2-23384	122	10.9	48,930	-712.0	3.1	19,530	-285	0.37	0.37	0.37
PGE-2019-Q2-23409	513	0.0	722	0.0				0.37	0.37	
PGE-2019-Q2-23482	70	21.1	93,232	-970.7				0.53	0.53	
PGE-2019-Q2-23483	92	29.1	237,846	0.0	15.5	214,975	0			
PGE-2019-Q2-30296	145	0.1	777	0.0	0.1	261	0			
PGE-2019-Q2-30300	167	10.2	48,089	-583.7	4.5	31,002	-376	0.37	0.37	0.37
PGE-2019-Q2-30397	60	0.0	19,800	0.0				0.50	0.50	
PGE-2019-Q2-30398	51	122.6	1,086,433	0.0	121.6	983,836	0	0.61	0.61	
PGE-2019-Q2-39209	193	0.0	4,138	0.0	0.0	0	0			
PGE-2019-Q2-44008	981	6.2	24,360	-529.4				0.50	0.50	
PGE-2019-Q2-44029	185	13.6	60,603	-1,056.4	3.1	20,093	-350	0.37	0.37	0.37
PGE-2019-Q2-44034	166	10.1	44,801	-780.9				0.37	0.37	0.37
PGE-2019-Q2-50956	178	35.0	344,319	0.0	5.1	33,865	0			
PGE-2019-Q2-50986	998	3.4	9,328	-36.5				0.68	0.68	
PGE-2019-Q2-50994	177	0.0	5,141	0.0				0.60	0.60	
PGE-2019-Q2-51059	775	24.2	51,171	0.0				0.33	0.33	
PGE-2019-Q2-51060	75	11.6	46,408	-425.6	10.4	12,524	-64			
PGE-2019-Q2-51061	36	12.7	385,321	0.0	13.0	385,321	0			
PGE-2019-Q2-5377	538	0.9	8,389	0.0				0.25	0.25	
PGE-2019-Q2-5401	530	2.2	7,571	-38.0				0.33	0.33	
PGE-2019-Q2-5442	142	3.4	15,336	-267.3	1.3	8,489	-148	0.37	0.37	0.37
PGE-2019-Q2-5464	491	0.0	58,581	0.0				0.56	0.56	
PGE-2019-Q2-5471	532	0.0	3,838	0.0				0.43	0.43	
PGE-2019-Q2-5477	177	0.0	1,185	0.0				0.60	0.60	

Claim ID[1]	SBW Sample ID	First-Year Savings (kWh)						Evaluated NTGR		
		Forecast[2]			Evaluated					
		kW	kWh	therm	kW	kWh	therm	kW	kWh	therm
PGE-2019-Q2-5607	32	0.0	0	27,494.0	0.0	0	0			
PGE-2019-Q2-5608	32	45.9	56,104	0.0	0.0	0	0			
PGE-2019-Q2-5610	781	2.5	11,262	-0.2				0.43	0.43	
PGE-2019-Q2-5611	36	0.0	1,082,952	0.0	0.0	1,082,952	0			
PGE-2019-Q2-57706	526	1.3	4,283	-53.2				0.47	0.47	
PGE-2019-Q2-57723	164	12.6	89,126	-459.5	2.8	19,731	-102			
PGE-2019-Q2-57727	517	8.9	39,565	-689.7				0.37	0.37	0.37
PGE-2019-Q2-57735	183	6.6	23,258	-140.9	0.0	0				
PGE-2019-Q2-57818	57	11.0	1,099,808	0.0	11.0	1,099,808	0			
PGE-2019-Q2-59076	181	0.0	61,486	0.0				0.56	0.56	0.56
PGE-2019-Q2-64575	177	0.0	128	-1.5				0.60	0.60	
PGE-2019-Q2-64578	118	0.0	771	0.0	0.0	66	0			
PGE-2019-Q2-64643	75	2.6	11,420	-119.5	0.0	0				
PGE-2019-Q2-64645	85	8.1	70,334	-639.0	4.4	7,001	-34			
PGE-2019-Q2-65047	47	170.0	167,676	6,383.0	0.0	0	0			
PGE-2019-Q2-71250	497	6.6	22,098	-110.3				0.66	0.66	
PGE-2019-Q2-71268	158	0.0	1,665	0.0				0.46	0.46	
PGE-2019-Q2-71277	118	0.0	7,688	0.0	0.0	740	0			
PGE-2019-Q2-71356	51	0.0	0	1,621.9	0.0	0	1,440			0.61
PGE-2019-Q2-73843	195	0.0	47,045	0.0	0.0	47,045	0			
PGE-2019-Q2-77965	157	6.1	20,508	-126.6				0.41	0.41	
PGE-2019-Q2-77990	1,024	0.6	2,261	-23.7				0.33	0.33	
PGE-2019-Q2-78095	783	5.7	25,242	0.0				0.50	0.50	
PGE-2019-Q2-84838	513	0.3	1,485	-25.9				0.37	0.37	
PGE-2019-Q2-84903	82	70.7	633,856	0.0	0.0	0				
PGE-2019-Q2-91867	96	34.1	126,280	0.0	31.5	118,818	0			
PGE-2019-Q2-98641	179	35.7	351,026	0.0	5.2	34,525	0			

Claim ID[1]	SBW Sample ID	First-Year Savings (kWh)						Evaluated NTGR		
		Forecast[2]			Evaluated					
		kW	kWh	therm	kW	kWh	therm	kW	kWh	therm
PGE-2019-Q2-98657	158	0.6	2,037	-10.2				0.46	0.46	
PGE-2019-Q2-98662	162	0.6	2,132	-12.1				0.25	0.25	
PGE-2019-Q2-98663	190	3.4	10,807	-55.3				0.40	0.40	
PGE-2019-Q3-40500	209	4.4	31,473	-162.1				0.58	0.58	
PGE-2019-Q3-45462	100	0.4	19,764	0.0	0.0	0	0			
PGE-2019-Q3-49827	175	0.5	1,688	-21.1	0.5	1,688	-21	0.40	0.40	
PGE-2019-Q3-49844	194	0.4	1,115	-7.1				0.00	0.00	
PGE-2019-Q3-49847	201	2.5	8,415	-104.5	2.5	8,415	-105			
PGE-2019-Q3-49859	203	0.6	1,595	-10.1	0.6	1,595	-10			
PGE-2019-Q3-49862	1,083	7.1	34,109	-767.7				0.53	0.53	
PGE-2019-Q3-49880	1,107	0.4	2,017	-45.4				0.53	0.53	
PGE-2019-Q3-49887	554	0.1	476	-9.6				0.40	0.40	
PGE-2019-Q3-49891	555	0.2	568	-7.1				0.00	0.00	
PGE-2019-Q3-49894	556	1.7	4,517	-28.7				0.17	0.17	
PGE-2019-Q3-49896	1,108	0.3	1,246	-25.2				0.52	0.52	
PGE-2019-Q3-49899	1,109	1.0	2,784	-17.7				0.52	0.52	
PGE-2019-Q3-49901	1,110	1.9	6,715	-83.8				0.52	0.52	
PGE-2019-Q3-49915	557	0.4	1,470	-18.3				0.50	0.50	
PGE-2019-Q3-49924	226	2.4	7,873	-97.8	2.4	7,873	-98	0.45	0.45	
PGE-2019-Q3-49937	225	1.0	2,570	-16.3	0.9	2,570	-16	0.43	0.43	
PGE-2019-Q3-50020	186	6.3	29,549	-324.0	0.4	2,926	-32	0.37	0.37	0.37
PGE-2019-Q3-50028	182	4.4	14,244	-142.4	4.4	14,021	-140			
PGE-2019-Q3-50088	197	4.8	20,401	-103.2	0.0	0				
PGE-2019-Q3-50141	552	2.7	9,464	-40.3				0.35	0.35	
PGE-2019-Q3-50176	564	1.2	6,355	-54.0				0.50	0.50	
PGE-2019-Q3-50211	236	0.4	1,534	-9.0				0.74	0.74	

Claim ID[1]	SBW Sample ID	First-Year Savings (kWh)						Evaluated NTGR		
		Forecast[2]			Evaluated					
		kW	kWh	therm	kW	kWh	therm	kW	kWh	therm
PGE-2019-Q3-50228	182	0.1	6,793	-68.6	0.1	6,687	-68			
PGE-2019-Q3-50254	1,089	5.6	19,741	-111.5				0.27	0.27	
PGE-2019-Q3-50257	1,088	9.0	35,220	-198.6				0.27	0.27	
PGE-2019-Q3-50258	204	4.3	15,692	-88.7				0.43	0.43	
PGE-2019-Q3-50368	561	17.3	77,153	-1,344.9				0.37	0.37	0.37
PGE-2019-Q3-50379	1,089	0.2	639	-3.8				0.27	0.27	
PGE-2019-Q3-50381	1,088	0.4	1,565	-7.9				0.27	0.27	
PGE-2019-Q3-50396	220	0.2	1,018	-6.1	0.3	999	-6			
PGE-2019-Q3-50445	541	0.5	1,260	-3.6				0.47	0.47	
PGE-2019-Q3-50484	1,115	0.8	3,200	-33.5				0.33	0.33	
PGE-2019-Q3-50485	574	3.0	14,663	0.0				0.42	0.42	
PGE-2019-Q3-50490	1,161	0.4	1,710	-17.9				0.42	0.42	
PGE-2019-Q3-50492	1,137	2.6	6,983	-27.3				0.47	0.47	
PGE-2019-Q3-50493	228	0.4	1,535	-9.2	0.4	1,749	-10			
PGE-2019-Q3-50551	161	2.5	17,565	-90.6	0.5	5,402	-28			
PGE-2019-Q3-50584	174	7.8	26,503	-176.5	7.2	58,070	-394			
PGE-2019-Q3-50589	220	0.1	370	-3.0	0.1	370	-3			
PGE-2019-Q3-50596	863	14.4	50,442	-19.0				0.37	0.37	
PGE-2019-Q3-50612	234	8.1	41,526	-450.9	3.5	22,510	-242	0.31	0.31	0.31
PGE-2019-Q3-50622	221	22.6	115,596	-1,255.0				0.31	0.31	0.31
PGE-2019-Q3-50640	186	9.5	44,659	-489.7	3.0	20,163	-221	0.37	0.37	0.37
PGE-2019-Q3-50694	1,089	0.0	24,145	0.0				0.27	0.27	
PGE-2019-Q3-50696	1,088	0.0	6,355	0.0				0.27	0.27	
PGE-2019-Q3-50728	212	0.0	13,776	0.0				0.58	0.58	
PGE-2019-Q3-50739	540	0.0	30,996	0.0				0.47	0.47	
PGE-2019-Q3-50775	204	0.0	1,107	0.0				0.43	0.43	

Claim ID[1]	SBW Sample ID	First-Year Savings (kWh)						Evaluated NTGR		
		Forecast[2]			Evaluated					
		kW	kWh	therm	kW	kWh	therm	kW	kWh	therm
PGE-2019-Q3-50807	220	0.0	18,032	0.0	5.7	23,485	0			
PGE-2019-Q3-50819	863	0.0	20,549	0.0				0.37	0.37	
PGE-2019-Q3-50832	1,041	0.0	9,512	0.0				0.35	0.35	
PGE-2019-Q3-50835	1,069	0.0	19,024	0.0				0.50	0.50	
PGE-2019-Q3-50842	212	0.0	10,726	0.0				0.58	0.58	
PGE-2019-Q3-50909	204	0.0	3,665	0.0				0.43	0.43	
PGE-2019-Q3-51022	539	0.0	41,041	0.0				0.33	0.33	
PGE-2019-Q3-51052	110	0.0	0	6,324.2	0.0	0	6,564			
PGE-2019-Q3-51581	54	16.2	679,668	0.0	16.3	679,668	0			
PGE-2019-Q3-51588	61	73.3	641,929	0.0	73.3	641,929	0			
PGE-2019-Q3-51589	37	75.3	418,788	0.0	75.3	263,648	0			
PGE-2019-Q3-51592	74	174.2	208,916	25,899.0	-4.2	255,758	36,963			
PGE-2019-Q3-51594	788	11.5	46,276	0.0				0.33	0.33	
PGE-2019-Q3-51595	789	7.0	26,592	0.0				0.33	0.33	
PGE-2019-Q3-51598	49	344.2	1,941,083	-6,673.5	344.2	1,433,281	-4,400			
PGE-2019-Q3-51599	89	0.0	947,232	0.0	0.0	192,967	0			
PGE-2019-Q3-51607	483	0.0	13,406	1,672.0				0.49	0.49	0.49
PGE-2019-Q3-51609	483	-0.5	19,722	0.0				0.49	0.49	0.49
PGE-2019-Q3-51613	65	16.2	38,794	-116.9	12.7	12,948	-1,094	0.46	0.46	
PGE-2019-Q3-51619	89	116.6	760,403	0.0	30.1	349,374	0			
PGE-2019-Q3-51620	90	0.0	934,156	0.0	0.0	934,156	0			
PGE-2019-Q3-51623	838	13.6	43,434	-240.6				0.32	0.32	
PGE-2019-Q3-51626	842	8.2	28,120	0.0				0.32	0.32	
PGE-2019-Q3-51627	854	5.0	19,547	-9.6				0.49	0.49	
PGE-2019-Q3-51628	854	0.0	1,890	0.0				0.49	0.49	
PGE-2019-Q3-51629	842	0.0	55,746	0.0				0.32	0.32	
PGE-2019-Q3-51630	113	57.4	502,501	0.0	0.0	0	0			

Claim ID[1]	SBW Sample ID	First-Year Savings (kWh)						Evaluated NTGR		
		Forecast[2]			Evaluated					
		kW	kWh	therm	kW	kWh	therm	kW	kWh	therm
PGE-2019-Q3-51632	131	36.2	76,980	0.0	36.0	76,980	0			
PGE-2019-Q3-51831	536	0.0	147,032	0.0	0.0	58,895	0			
PGE-2019-Q3-51832	536	18.2	62,433	0.0	18.2	62,433	0			
PGE-2019-Q3-63972	207	0.0	8,674	0.0	0.0	8,674	0			
PGE-2019-Q3-80360	230	0.0	48,231	0.0	0.0	0	0			
PGE-2019-Q3-80362	231	0.0	115,904	0.0	0.0	115,904	0			
PGE-2019-Q3-81435	237	0.0	61,675	0.0	0.0	0	0			
PGE-2019-Q4-100766	1,212	0.0	2,854	0.0				0.50	0.50	
PGE-2019-Q4-102237	1,080	0.6	3,167	0.0				0.50	0.50	
PGE-2019-Q4-102598	1,167	0.0	7,511	0.0				0.75	0.75	
PGE-2019-Q4-102710	1,212	12.2	42,179	-26.2				0.50	0.50	
PGE-2019-Q4-103270	1,080	0.5	2,675	0.0				0.50	0.50	
PGE-2019-Q4-103992	109	73.0	512,503	0.0	73.0	512,503	0	0.37	0.37	
PGE-2019-Q4-104463	262	5.9	21,358	-120.7				0.37	0.37	
PGE-2019-Q4-104712	97	10.0	25,350	0.0	30.3	71,941	0			
PGE-2019-Q4-104944	247	0.0	69,493	-860.4	0.0	0	0			
PGE-2019-Q4-105158	594	0.0	2,575	0.0				0.50	0.50	
PGE-2019-Q4-11012	45	0.8	4,282	0.0	0.0	0	0			
PGE-2019-Q4-11183	119	474.7	2,115,859	0.0	475.0	2,115,859	0			
PGE-2019-Q4-11718	45	0.9	4,637	0.0	0.0	0	0			
PGE-2019-Q4-12263	1,080	0.6	2,983	0.0				0.50	0.50	
PGE-2019-Q4-12746	44	1.0	27,065	305.0	6.5	12,077	443			
PGE-2019-Q4-13395	208	0.0	689	0.0				0.50	0.50	
PGE-2019-Q4-1349	239	0.0	4,403	0.0				0.42	0.42	
PGE-2019-Q4-13969	263	0.0	23,813	0.0	0.0	219	0			
PGE-2019-Q4-14407	268	0.0	50,373	0.0	0.0	4,674	0			
PGE-2019-Q4-14769	124	0.0	186,457	2,437.8	0.0	190,767	2,745			

Claim ID[1]	SBW Sample ID	First-Year Savings (kWh)						Evaluated NTGR		
		Forecast[2]			Evaluated					
		kW	kWh	therm	kW	kWh	therm	kW	kWh	therm
PGE-2019-Q4-14831	585	1.8	6,931	-80.1				0.75	0.75	
PGE-2019-Q4-14875	269	0.0	2,009	0.0	0.0	98	0			
PGE-2019-Q4-15089	1,207	0.0	1,021	0.0				0.33	0.33	
PGE-2019-Q4-1612	272	7.8	24,562	-123.0	0.0	0	0			
PGE-2019-Q4-16254	589	3.7	11,864	-50.9				0.43	0.43	
PGE-2019-Q4-16735	87	0.0	69,745	16,235.0	0.0	29,873	6,625		0.61	0.61
PGE-2019-Q4-17314	224	0.0	1,578	0.0	0.0	2,505	0			
PGE-2019-Q4-17489	1,222	0.9	3,021	-17.1				0.39	0.39	
PGE-2019-Q4-17952	232	0.7	2,706	-13.7				0.00	0.00	
PGE-2019-Q4-18829	590	0.0	14,063	0.0				0.43	0.43	
PGE-2019-Q4-18916	580	24.2	93,089	-464.6				0.60	0.60	0.60
PGE-2019-Q4-18993	248	0.0	16,728	0.0	0.0	1,327	0			
PGE-2019-Q4-19616	885	1.9	5,110	-17.4				0.39	0.39	
PGE-2019-Q4-21210	112	0.0	23,212	0.0	0.0	9,369	0			
PGE-2019-Q4-21483	1,174	0.6	2,214	-23.2				0.33	0.33	
PGE-2019-Q4-21538	563	3.7	12,063	-137.4				0.30	0.30	
PGE-2019-Q4-21724	1,186	0.5	1,974	-11.1				0.28	0.28	
PGE-2019-Q4-21789	208	0.0	17,429	0.0				0.50	0.50	
PGE-2019-Q4-22346	214	0.0	6,691	0.0	0.0	6,691	0			
PGE-2019-Q4-22807	807	0.0	100,626	0.0				0.47	0.47	0.47
PGE-2019-Q4-22808	1,231	0.0	2,075	0.0				0.33	0.33	
PGE-2019-Q4-23150	1,212	0.0	10,275	0.0				0.50	0.50	
PGE-2019-Q4-2325	482	172.8	558,867	-5,868.9				0.57	0.57	0.57
PGE-2019-Q4-23941	1,183	0.0	12,288	0.0				0.46	0.46	
PGE-2019-Q4-2413	1,012	-1.4	33,321	0.0				0.33	0.33	
PGE-2019-Q4-2421	1,022	0.1	21,771	-280.5				0.33	0.33	
PGE-2019-Q4-25244	807	0.0	105,811	5,188.3				0.47	0.47	0.47

Claim ID[1]	SBW Sample ID	First-Year Savings (kWh)						Evaluated NTGR		
		Forecast[2]			Evaluated					
		kW	kWh	therm	kW	kWh	therm	kW	kWh	therm
PGE-2019-Q4-25369	583	0.0	5,068	0.0				0.51	0.51	
PGE-2019-Q4-25700	1,214	0.5	31,185	-401.8				0.50	0.50	
PGE-2019-Q4-25787	1,166	0.0	39,072	0.0				0.53	0.53	
PGE-2019-Q4-25982	1,230	0.2	16,688	-160.6				0.57	0.57	
PGE-2019-Q4-26807	76	118.4	477,646	0.0	91.7	474,876	0			
PGE-2019-Q4-28233	263	0.0	10,004	0.0	0.0	1,782	0			
PGE-2019-Q4-29068	1,022	0.0	8,688	0.0				0.33	0.33	
PGE-2019-Q4-29341	1,168	1.9	13,524	-45.9				0.69	0.69	
PGE-2019-Q4-29832	241	2.4	10,615	-185.0	0.0	0	0			
PGE-2019-Q4-30028	261	0.0	30,135	0.0	0.0	30,135	0			
PGE-2019-Q4-30150	104	0.0	460,020	0.0	0.0	0	0			
PGE-2019-Q4-30372	94	40.2	121,102	-0.1				0.44	0.44	0.44
PGE-2019-Q4-30552	247	0.0	7,926	-99.1	2.3	4,925	-61			
PGE-2019-Q4-31144	246	3.2	22,528	-116.2	0.7	4,661	-24			
PGE-2019-Q4-32180	253	13.1	45,249	-206.6	3.4	16,437	-92			
PGE-2019-Q4-33077	214	8.3	22,704	-60.3	8.3	22,704	0			
PGE-2019-Q4-333	102	19.1	116,417	0.0	0.0	0				
PGE-2019-Q4-33992	156	0.0	337,512	0.0	0.0	0	0			
PGE-2019-Q4-34385	266	4.3	11,603	-39.5				0.30	0.30	
PGE-2019-Q4-35361	69	232.7	1,071,023	161,777.0	17.2	164,091	-2,097			
PGE-2019-Q4-35789	99	27.8	238,458	0.0	27.8	238,458	0			
PGE-2019-Q4-36482	95	59.6	222,967	3,670.8	88.0	299,514	2,560	0.57	0.57	0.57
PGE-2019-Q4-36821	198	7.4	33,122	-577.3				0.37	0.37	0.37
PGE-2019-Q4-36932	268	0.0	63,099	0.0	0.0	5,111	0			
PGE-2019-Q4-39681	1,022	3.8	11,713	-150.9				0.33	0.33	
PGE-2019-Q4-4038	239	0.0	8,446	0.0				0.42	0.42	
PGE-2019-Q4-40579	885	0.1	181	-0.6				0.39	0.39	

Claim ID[1]	SBW Sample ID	First-Year Savings (kWh)						Evaluated NTGR		
		Forecast[2]			Evaluated					
		kW	kWh	therm	kW	kWh	therm	kW	kWh	therm
PGE-2019-Q4-40607	227	0.4	1,067	-6.8				0.43	0.43	
PGE-2019-Q4-40804	79	136.4	1,083,082	0.0	136.0	1,083,082	0	0.47	0.47	
PGE-2019-Q4-41646	78	32.2	285,444	0.0	0.0	0	0			
PGE-2019-Q4-42160	594	0.7	2,147	-10.8				0.50	0.50	
PGE-2019-Q4-43212	241	2.1	8,982	-162.4	0.0	0	0			
PGE-2019-Q4-43284	242	10.0	46,508	-626.7	0.0	0	0			
PGE-2019-Q4-43320	224	0.0	18,220	0.0	0.0	11,537	0			
PGE-2019-Q4-43818	590	0.0	7,052	0.0				0.43	0.43	
PGE-2019-Q4-45537	224	0.0	5,806	0.0	0.0	8,819	0			
PGE-2019-Q4-46241	1,125	0.1	561	-4.8				0.33	0.33	
PGE-2019-Q4-47905	1,228	0.0	53	0.0				0.33	0.33	
PGE-2019-Q4-48142	109	10.5	69,004	0.0	10.5	69,004	0	0.37	0.37	
PGE-2019-Q4-48144	208	0.0	223	-1.8				0.50	0.50	
PGE-2019-Q4-49432	496	0.0	70,070	0.0				0.40	0.40	0.40
PGE-2019-Q4-50345	249	16.4	90,704	-490.1	5.4	29,913	-162			
PGE-2019-Q4-5037	499	0.0	272,580	0.0				0.50	0.50	0.50
PGE-2019-Q4-50380	563	0.0	1,960	0.0				0.30	0.30	
PGE-2019-Q4-50654	269	0.0	5,437	0.0	0.0	564	0			
PGE-2019-Q4-51710	1,220	0.4	1,711	-18.8				0.33	0.33	
PGE-2019-Q4-52655	124	0.0	2,782	1,205.4	0.0	2,782	1,205			
PGE-2019-Q4-5405	1,228	0.0	2,858	0.0				0.33	0.33	
PGE-2019-Q4-54770	1,220	0.0	713	0.0				0.33	0.33	
PGE-2019-Q4-55511	79	34.1	291,508	0.0	34.0	291,508	0			
PGE-2019-Q4-55621	156	0.0	980	0.0	0.0	0	0			
PGE-2019-Q4-55839	499	0.0	5,387	0.0				0.50	0.50	0.50
PGE-2019-Q4-55926	81	0.0	0	1,514,256.0	0.0	0	1,514,256			
PGE-2019-Q4-57442	260	0.0	17,364	0.0				0.51	0.51	0.51

Claim ID[1]	SBW Sample ID	First-Year Savings (kWh)						Evaluated NTGR		
		Forecast[2]			Evaluated					
		kW	kWh	therm	kW	kWh	therm	kW	kWh	therm
PGE-2019-Q4-57508	251	10.8	35,021	-140.4	0.3	1,343	-5	0.33	0.33	
PGE-2019-Q4-57888	124	4.0	29,202	304.0	4.0	30,983	343			
PGE-2019-Q4-58010	267	4.4	15,141	-96.1	1.0	3,556	-23			
PGE-2019-Q4-59830	1,220	0.0	5,006	0.0				0.33	0.33	
PGE-2019-Q4-60142	1,229	0.0	2,054	0.0				0.33	0.33	
PGE-2019-Q4-60848	94	3.4	14,944	3,108.7				0.44	0.44	0.44
PGE-2019-Q4-60974	255	0.0	6,691	0.0	0.0	0				
PGE-2019-Q4-61259	114	139.4	619,388	0.0	192.8	907,124	0			
PGE-2019-Q4-622	239	0.2	22,945	-220.9				0.42	0.42	
PGE-2019-Q4-62657	1,229	0.0	1,353	0.0				0.33	0.33	
PGE-2019-Q4-62991	473	0.0	17,333	0.0				0.42	0.42	0.42
PGE-2019-Q4-63235	241	20.2	89,769	-1,564.8	7.6	47,853	-833	0.37	0.37	0.37
PGE-2019-Q4-65037	45	0.9	5,272	0.0	0.0	0	0			
PGE-2019-Q4-65194	1,168	4.8	34,132	-115.9				0.69	0.69	
PGE-2019-Q4-66245	198	1.7	7,616	-132.8				0.37	0.37	0.37
PGE-2019-Q4-66496	594	0.1	346	-1.7				0.50	0.50	
PGE-2019-Q4-67093	245	17.8	84,001	-1,019.5				0.37	0.37	0.37
PGE-2019-Q4-67883	99	14.3	122,418	0.0	14.3	122,418	0			
PGE-2019-Q4-68199	111	69.5	320,673	0.0	69.5	320,673	0			
PGE-2019-Q4-69585	102	115.5	702,391	0.0	0.0	0				
PGE-2019-Q4-6977	200	0.0	44,473	0.0	0.0	3,602	0			
PGE-2019-Q4-70574	242	16.7	77,915	-1,050.0	6.3	43,109	-580	0.37	0.37	0.37
PGE-2019-Q4-70659	235	15.4	76,221	-1,344.1	13.0	79,525	-1,402	0.31	0.31	0.31
PGE-2019-Q4-7079	248	10.3	31,845	-410.3	2.7	9,017	-116			
PGE-2019-Q4-70986	562	0.9	2,986	-37.1				0.55	0.55	
PGE-2019-Q4-73674	112	1.1	104,440	0.0	1.1	104,440	0			
PGE-2019-Q4-75652	53	27.8	46,650	320.0	8.9	37,444	652			

Claim ID[1]	SBW Sample ID	First-Year Savings (kWh)						Evaluated NTGR		
		Forecast[2]			Evaluated					
		kW	kWh	therm	kW	kWh	therm	kW	kWh	therm
PGE-2019-Q4-77175	1,168	0.0	29,889	0.0				0.69	0.69	
PGE-2019-Q4-78307	46	187.8	575,602	-5,339.9	273.0	879,820	54,674	0.57	0.57	0.57
PGE-2019-Q4-79088	1,186	1.0	3,675	-20.8				0.28	0.28	
PGE-2019-Q4-79170	261	0.0	135,628	0.0	0.0	135,628	0			
PGE-2019-Q4-79261	251	2.6	9,046	-36.3	0.4	1,483	-6	0.33	0.33	
PGE-2019-Q4-7992	73	43.3	56,958	702.0	41.2	57,567	193			
PGE-2019-Q4-81967	125	58.8	325,264	-1,888.7	16.0	88,791	-480			
PGE-2019-Q4-82269	806	4.0	13,148	0.0				0.33	0.33	
PGE-2019-Q4-82309	76	68.7	1,052,712	0.0	95.5	828,607	0			
PGE-2019-Q4-82660	742	0.0	25,343	0.0				0.48	0.48	
PGE-2019-Q4-83467	128	0.0	476,194	0.0	0.0	476,194	0		0.50	
PGE-2019-Q4-83690	258	3.1	10,799	-61.0	0.0	0				
PGE-2019-Q4-85187	233	0.0	160,330	0.0	0.0	160,330	0			
PGE-2019-Q4-8555	579	3.2	11,227	-140.0				0.26	0.26	
PGE-2019-Q4-86021	473	0.0	82,986	9,439.0				0.42	0.42	0.42
PGE-2019-Q4-86416	104	0.0	6,273	0.0	0.0	0	0			
PGE-2019-Q4-86831	550	0.0	12,628	0.0				0.53	0.53	
PGE-2019-Q4-86931	1,012	3.1	7,601	0.0				0.33	0.33	
PGE-2019-Q4-87463	189	0.1	7,902	-76.1				0.57	0.57	
PGE-2019-Q4-87981	269	0.0	19,975	0.0	0.0	2,008	0			
PGE-2019-Q4-88088	1,186	2.3	8,555	-48.3				0.28	0.28	
PGE-2019-Q4-89877	1,207	0.2	1,098	-19.1				0.33	0.33	
PGE-2019-Q4-90622	1,182	0.0	10,922	0.0				0.46	0.46	
PGE-2019-Q4-91543	129	0.0	289,001	0.0	0.0	107,537	0		0.50	
PGE-2019-Q4-91905	260	25.1	112,261	-1,633.6				0.51	0.51	0.51
PGE-2019-Q4-91914	590	0.6	2,536	-21.5				0.43	0.43	
PGE-2019-Q4-92619	583	5.1	17,598	-75.0				0.51	0.51	

Claim ID[1]	SBW Sample ID	First-Year Savings (kWh)						Evaluated NTGR		
		Forecast[2]			Evaluated					
		kW	kWh	therm	kW	kWh	therm	kW	kWh	therm
PGE-2019-Q4-93589	242	3.4	15,483	-221.7	0.0	0	0			
PGE-2019-Q4-93812	473	-10.9	28,392	17,638.0				0.42	0.42	0.42
PGE-2019-Q4-94901	62	206.2	1,517,902	160,041.1	247.7	1,287,061	164,040			
PGE-2019-Q4-95525	1,218	0.0	8,332	0.0				0.58	0.58	
PGE-2019-Q4-96389	105	0.0	309,370	0.0	0.0	309,370	0		0.60	
PGE-2019-Q4-97299	267	6.4	24,883	-157.8	0.0	0	0			
PGE-2019-Q4-97579	254	17.0	76,000	-1,105.9	3.0	20,466	-298	0.37	0.37	0.37
PGE-2019-Q4-9775	248	0.1	19,852	-252.0	0.0	0	0			
PGE-2019-Q4-99920	105	0.0	7,318	0.0	0.0	7,318	0		0.60	
SCE-2019-Q1-0009322	302	0.0	3,218	0.0	0.0	0	0			
SCE-2019-Q2-0041860	273	6.2	46,482	422.0	22.8	27,704	2,139			
SCE-2019-Q2-0041868	274	39.5	89,892	237.0	0.0	0				
SCE-2019-Q2-0041869	276	1.4	9,885	-52.1				0.41	0.41	
SCE-2019-Q2-0041870	276	23.2	147,324	3,972.0				0.41	0.41	
SCE-2019-Q2-0041873	283	0.0	8,698	0.0	0.0	0				
SCE-2019-Q2-0041874	283	45.0	215,306	4,221.0	0.0	0				
SCE-2019-Q2-0041875	284	361.3	1,207,894	0.0	332.4	1,332,457	0			
SCE-2019-Q2-0041877	610	14.2	65,871	255.0				0.50	0.50	
SCE-2019-Q2-0041879	611	5.3	33,341	330.0				0.50	0.50	
SCE-2019-Q2-0041883	309	0.0	917,797	0.0	0.0	917,797	0			
SCE-2019-Q2-0041892	316	0.0	526	0.0	0.0	526	0			
SCE-2019-Q2-0041893	316	7.3	169,949	0.0	11.8	160,381	0			
SCE-2019-Q2-0041902	653	4.1	15,752	-99.9				0.52	0.52	0.52
SCE-2019-Q2-0041903	653	0.0	3,715	0.0				0.52	0.52	0.52
SCE-2019-Q2-0041904	653	0.0	63,468	0.0				0.52	0.52	0.52
SCE-2019-Q2-0044275	293	49.3	329,429	0.0	0.0	0				
SCE-2019-Q2-0044284	313	0.0	49,495	0.0	0.0	45,182	0			

Claim ID[1]	SBW Sample ID	First-Year Savings (kWh)						Evaluated NTGR		
		Forecast[2]			Evaluated					
		kW	kWh	therm	kW	kWh	therm	kW	kWh	therm
SCE-2019-Q2-0044285	313	0.0	197,210	0.0	0.0	196,308	0			
SCE-2019-Q2-0044286	633	0.0	50,713	0.0				0.39	0.39	
SCE-2019-Q2-0044302	334	16.0	90,193	0.0	0.0	0				
SCE-2019-Q2-0044303	334	12.4	85,199	0.0	0.0	0				
SCE-2019-Q2-0044305	334	34.0	173,996	0.0	0.0	0				
SCE-2019-Q2-0044368	318	0.0	8,795	0.0	0.0	0				
SCE-2019-Q2-0044369	318	0.0	2,665	0.0	0.0	0				
SCE-2019-Q2-0044372	318	0.0	13,858	0.0	0.0	0				
SCE-2019-Q2-0044431	289	36.3	187,789	0.0	0.0	0				
SCE-2019-Q2-0044432	289	0.0	7,027	0.0	0.0	0	0			
SCE-2019-Q2-0044443	305	0.0	1,018	0.0				0.65	0.65	0.65
SCE-2019-Q2-0044445	305	0.0	23,906	0.0				0.65	0.65	0.65
SCE-2019-Q2-0044448	305	6.0	18,754	0.0				0.65	0.65	0.65
SCE-2019-Q2-0044455	290	0.6	43,447	0.0	0.0	0				
SCE-2019-Q2-0044456	290	41.8	330,548	0.0	0.0	0				
SCE-2019-Q2-0044457	322	0.0	3,167,381	0.0	0.0	3,167,381	0			
SCE-2019-Q2-0044459	282	766.4	5,945,570	0.0	0.0	0				
SCE-2019-Q2-0044462	296	339.2	342,027	0.0	0.0	0				
SCE-2019-Q2-0044463	296	240.4	2,215,116	0.0	0.0	0				
SCE-2019-Q2-0044514	303	2.9	41,687	1,403.0	0.0	0				
SCE-2019-Q3-0078433	291	1.2	137,528	2,202.0	11.0	18,586	190			
SCE-2019-Q3-0078435	630	0.0	92	-0.4				0.23	0.23	
SCE-2019-Q3-0078437	630	0.0	14,555	0.0				0.23	0.23	
SCE-2019-Q3-0078438	630	0.0	23,165	0.0				0.23	0.23	
SCE-2019-Q3-0078445	315	0.0	21,316	0.0	0.0	23,068	0			
SCE-2019-Q3-0078446	315	8.9	87,600	0.0	9.7	94,900	0			
SCE-2019-Q3-0078453	651	0.0	20,931	0.0				0.57	0.57	0.57

Claim ID[1]	SBW Sample ID	First-Year Savings (kWh)						Evaluated NTGR		
		Forecast[2]			Evaluated					
		kW	kWh	therm	kW	kWh	therm	kW	kWh	therm
SCE-2019-Q3-0078454	651	0.0	84,205	0.0				0.57	0.57	0.57
SCE-2019-Q3-0080412	308	0.0	656,312	0.0	0.0	655,546	0			
SCE-2019-Q3-0080430	660	26.4	151,950	0.0				0.58	0.58	
SCE-2019-Q3-0081248	324	5.7	50,082	0.0				0.43	0.43	
SCE-2019-Q3-0081266	628	0.0	38,589	0.0				0.63	0.63	0.63
SCE-2019-Q3-0081273	286	67.3	589,338	0.0	7.8	77,631	-122			
SCE-2019-Q3-0081277	621	90.5	608,667	0.0				0.54	0.54	0.54
SCE-2019-Q4-0056522	307	0.0	3,524,114	0.0	0.0	3,524,114	0			
SCE-2019-Q4-0056536	652	0.0	997	0.0				0.54	0.54	
SCE-2019-Q4-0056539	652	0.0	1,328	0.0				0.54	0.54	
SCE-2019-Q4-0056550	652	0.0	1,312	0.0				0.54	0.54	
SCE-2019-Q4-0060027	292	0.0	33,916	0.0	0.0	0				
SCE-2019-Q4-0060029	292	0.0	205,962	0.0	0.0	0				
SCE-2019-Q4-0060032	292	0.0	57,315	217.0	0.0	0				
SCE-2019-Q4-0060162	638	0.0	144,944	0.0				0.57	0.57	0.57
SCE-2019-Q4-0060164	638	0.0	16,257	0.0				0.57	0.57	0.57
SCE-2019-Q4-0060166	638	0.0	52,322	0.0				0.57	0.57	0.57
SCE-2019-Q4-0083706	281	18.1	243,827	1,716.0	27.3	81,008	-3	0.43	0.43	0.43
SCE-2019-Q4-0083709	327	0.0	159,371	0.0	0.0	0	0			
SCE-2019-Q4-0083710	327	0.0	572,764	0.0	0.0	10,331	0			
SCE-2019-Q4-0084090	331	10.4	75,617	0.0	10.4	75,317	0	0.47	0.47	
SCE-2019-Q4-0084165	280	15.5	53,491	0.0	0.0	0				0.41
SCE-2019-Q4-0084166	280	0.0	254,060	1,009.0	0.0	0				0.41
SCE-2019-Q4-0084167	285	12.7	237,837	4,537.0	0.0	0				
SCE-2019-Q4-0084175	328	1.3	5,289	0.0	26.7	81,750	0			
SCE-2019-Q4-0084176	328	0.0	404,432	0.0	0.0	788,760	0			
SCE-2019-Q4-0084177	304	-4.3	21,384	768.8				0.50	0.50	

Claim ID[1]	SBW Sample ID	First-Year Savings (kWh)						Evaluated NTGR		
		Forecast[2]			Evaluated					
		kW	kWh	therm	kW	kWh	therm	kW	kWh	therm
SCE-2019-Q4-0084178	625	1.0	14,888	0.0				0.50	0.50	
SCE-2019-Q4-0084184	626	-1.3	78,701	6,745.5				0.50	0.50	
SCE-2019-Q4-0084185	626	0.0	10,746	0.0				0.50	0.50	
SCE-2019-Q4-0084770	333	75.2	1,053,688	60,959.5	97.8	1,194,374	0			
SCG-2019-3710-12168311-3306078	344	0.0	0	50,744.0	0.0	0	0			
SCG-2019-3715-11212285-2326126	336	0.0	0	64,648.0	0.0	0	0			
SCG-2019-3715-12117735-3190977	339	0.0	0	14,302.0	0.0	10,183	14,219			
SCG-2019-3715-12209696-3430379	347	0.0	0	4,630.0			0			
SCG-2019-3715-12209696-3430385	347	0.0	0	3,346.0			0			
SCG-2019-3715-5001259543-10	353	0.0	0	20,370.0			0			
SCG-2019-3715-5001259620-10	354	0.0	0	19,908.0	0.0	0	0			
SCG-2019-3757-11110493-3347949	335	0.0	0	76,275.0	0.0	0	33,940			
SCG-2019-3757-11245269-2204351	338	0.0	0	25,469.0			0			
SCG-2019-3807-11237890-2019	337	0.0	0	3,564.0	0.0	0	1,080			
SCG-2019-3813-12310764-3762934	349	0.0	0	13,813.0	35.8	78,825	109			
SCG-2019-3813-12311258-3763124	350	0.0	0	5,092.0	19.6	29,868	451			
SCG-2019-3813-500000422-1	664	0.0	0	8,916.0				0.48	0.48	0.48
SCG-2019-3813-500000423-1	665	0.0	0	466.0				0.48	0.48	0.48
SCG-2019-3813-500000509-1	352	0.0	0	3,911.0			0			
SCG-2019-3813-500429536-1	356	0.0	0	4,274.0	0.0	203,514	4,301			
SCG-2019-3813-500550449-1	358	0.0	0	852.0	-3.0	19,553	324			
SCG-2019-3813-500553542-1	673	0.0	0	2,783.0						0.29
SCG-2019-3813-500574779-1	360	0.0	0	516.0	0.0	80,740	694			
SCG-2019-3813-500622639-2	361	0.0	0	1,046.1	5.1	5,626	1,046			
SCG-2019-3813-500626404-1	362	0.0	0	1,009.0				0.41	0.41	0.41
SCG-2019-3813-500645444-1	363	0.0	0	2,211.0	-2.1	8,067	15			
SCG-2019-3813-500767460-1	365	0.0	0	4,221.0			0			

Claim ID[1]	SBW Sample ID	First-Year Savings (kWh)						Evaluated NTGR		
		Forecast[2]			Evaluated					
		kW	kWh	therm	kW	kWh	therm	kW	kWh	therm
SCG-2019-3813-500793206-1	366	0.0	0	4,537.0			0			
SCG-2019-3813-500793573-1	676	0.0	0	255.0						0.50
SCG-2019-3813-500793574-1	677	0.0	0	330.0						0.50
SCG-2019-3815-12202558-3425640	345	0.0	0	13,485.0	0.0	0	8,828			
SCG-2019-3815-12202558-3425858	345	0.0	0	13,031.0	0.0	0	8,530			
SCG-2019-3815-12202558-3425863	345	0.0	0	39,929.0	0.0	0	21,866			
SDGE-2019-3220-10770648-1774698	384	0.0	40,251	0.0	0.0	0				
SDGE-2019-3220-10788467-1811912	388	0.0	792,242	0.0	0.0	0				
SDGE-2019-3220-10794023-1838767	391	2.6	23,756	0.0	0.0	0				
SDGE-2019-3220-10885037-9002547	402	4.0	720,466	0.0	0.0	0				
SDGE-2019-3220-10951681-12201641	686	5.0	28,282	0.0				0.33	0.33	
SDGE-2019-3220-10951694-12201930	687	5.0	33,059	0.0				0.33	0.33	
SDGE-2019-3220-10951704-12204687	406	5.0	27,687	0.0				0.33	0.33	
SDGE-2019-3220-10951776-12205860	407	4.0	28,210	0.0	3.7	13,449	0	0.33	0.33	
SDGE-2019-3220-10951778-12205708	688	5.0	20,679	0.0				0.33	0.33	
SDGE-2019-3220-10951780-12205832	689	5.0	39,334	0.0				0.33	0.33	
SDGE-2019-3220-10951785-12201212	690	5.0	29,170	0.0				0.33	0.33	
SDGE-2019-3220-10951992-12199763	408	0.0	-23,195	11,482.0	0.0	-16,703	10,524			
SDGE-2019-3220-10952413-12269315	409	15.4	22,464	3,931.2	15.0	22,464	3,931	0.38	0.38	0.38
SDGE-2019-3220-10952413-12269472	409	0.4	9,277	0.0	0.0	0	0			
SDGE-2019-3220-10973274-12247959	412	0.0	31,728	0.0	0.0	0				
SDGE-2019-3220-10973274-12247960	412	0.0	25,360	0.0	0.0	0				
SDGE-2019-3220-10994696-12408462	419	0.0	6,052	0.0	0.0	5,960	0			
SDGE-2019-3220-10994750-12408390	420	0.0	6,021	0.0	0.0	6,244	0			
SDGE-2019-3222-10378842-1794901	368	50.7	231,523	-769.0	50.7	231,523	0			
SDGE-2019-3222-10379053-1320927	370	3.5	49,438	470.0	8.8	17,492	126			
SDGE-2019-3222-10379053-1634717	370	36.3	131,245	0.0	36.0	131,245	0			

Claim ID[1]	SBW Sample ID	First-Year Savings (kWh)						Evaluated NTGR		
		Forecast[2]			Evaluated					
		kW	kWh	therm	kW	kWh	therm	kW	kWh	therm
SDGE-2019-3222-10379223-12123864	372	0.0	39,642	0.0	15.3	22,852	925			
SDGE-2019-3222-10379223-1469179	372	17.5	61,381	0.0	17.5	61,381	0			
SDGE-2019-3222-10383280-1208537	373	0.0	9,082	0.0	0.0	9,082	0			
SDGE-2019-3222-10383280-1208538	373	8.8	21,722	5,030.0	-4.6	-15,461	146			
SDGE-2019-3222-10384255-1212086	374	82.6	377,238	2,194.0	-2.5	279,403	1,242			
SDGE-2019-3222-10384670-1688403	375	27.3	249,344	1,166.0	44.9	103,855	-319			
SDGE-2019-3222-10384670-1710584	375	0.0	10,166	0.0	0.0	10,166	0			
SDGE-2019-3222-10437105-1887895	376	0.0	15,926	0.0	0.0	15,926	0			
SDGE-2019-3222-10437105-1887896	376	0.0	0	17,362.0	8.1	24,473	16,904			
SDGE-2019-3222-10700899-1821415	378	0.0	54,242	0.0	0.0	54,242	0			
SDGE-2019-3222-10700899-1821416	378	12.3	36,042	1,464.0	-1.8	893	-4,479			
SDGE-2019-3222-10732247-1817164	379	211.5	1,145,071	3,555.0	0.0	-397,057	1,175			
SDGE-2019-3222-10736650-1838749	380	45.0	124,243	0.0	45.0	124,243	0			
SDGE-2019-3222-10736650-1838750	380	9.2	466,796	40,551.0	90.1	469,601	39,716			
SDGE-2019-3222-10789569-12014200	680	66.5	131,308	2,017.0				0.60	0.60	0.60
SDGE-2019-3222-10789569-12014201	680	23.9	53,542	0.0				0.60	0.60	0.60
SDGE-2019-3222-10789628-12014225	389	26.7	97,663	726.0				0.60	0.60	0.60
SDGE-2019-3222-10797011-9107892	394	11.1	78,347	1.0	11.1	78,347	1			
SDGE-2019-3222-10797011-9107893	394	3.8	39,463	-1.0	2.1	21,376	-1			
SDGE-2019-3222-10797011-9107894	394	0.0	0	1,329.0	0.0	0	1,329			
SDGE-2019-3222-10952109-12247226	691	0.0	0	900.0				0.33	0.33	0.33
SDGE-2019-3222-10952109-12247227	691	7.6	21,731	-60.0				0.33	0.33	0.33
SDGE-2019-3222-10952112-12247384	692	17.9	13,203	0.0				0.33	0.33	0.33
SDGE-2019-3222-10952112-12247385	692	22.5	62,309	0.0				0.33	0.33	0.33
SDGE-2019-3231-10872180-8943439	401	9.0	130,102	0.0	11.1	149,858	0			
SDGE-2019-3237-10949973-12110452	684	0.0	146,422	0.0				0.49	0.49	0.49
SDGE-2019-3237-10951085-12132277	405	0.1	66,316	0.0				0.49	0.49	0.49

Claim ID[1]	SBW Sample ID	First-Year Savings (kWh)						Evaluated NTGR		
		Forecast[2]			Evaluated					
		kW	kWh	therm	kW	kWh	therm	kW	kWh	therm
SDGE-2019-3237-10951678-12132338	685	1.3	76,995	0.0				0.49	0.49	0.49
SDGE-2019-3317-10737532-12483725	381	0.0	178,083	12,505.0	0.0	105,203	13,089		0.40	0.40
SDGE-2019-3317-10739477-11500606	382	0.0	1,127,873	176,749.0	0.0	1,408,116	111,878			
SDGE-2019-3317-10739649-1722534	383	0.0	483,196	0.0				0.46	0.46	0.46
SDGE-2019-3317-10786858-12277999	386	80.2	1,004,377	35,468.0	167.9	1,023,492	18,259			
SDGE-2019-3317-10786859-1786251	387	0.0	391,228	35,285.0	0.0	44,559	-22,283		0.47	0.47
SDGE-2019-3317-10793127-12278001	390	209.5	1,168,245	25,485.3	55.4	484,043	17,840			
SDGE-2019-3317-10812859-1847952	398	0.0	441,320	2,298.0	0.0	-46,418	0		0.50	
SDGE-2019-3317-10945041-12353600	403	103.8	964,307	530.0	142.0	1,110,441	3,001	0.47	0.47	0.47
SDGE-2019-3322-10795341-1813833	393	0.0	9,753	0.0	0.0	0				
SDGE-2019-3322-10812194-1845900	397	0.0	8,016	0.0	0.0	0	0			
SDGE-2019-3322-10812194-1853982	397	0.0	0	10,775.0	0.0	0	0			
SDGE-2019-4061-10988455-12309267	416	0.0	22,024	0.0	0.0	29,788	0			
SDGE-2019-4061-10994773-12368421	421	0.0	26,133	0.0	0.0	0	0			
SDGE-2019-4061-10995233-12510971	425	0.0	11,372	0.0	0.0	0	0			
SDGE-2019-4061-11006461-12517946	432	0.0	4,463	0.0	0.0	2,018	0			
SDGE-2019-4061-11015387-12663812	433	0.0	2,814	0.0	0.0	6,014	0			

1 When evaluated energy gross savings or NTGR has not been reported, this indicates the sample ID was not evaluated.

2 Forecast first-year savings are the claimed values adjusted to remove the default GRR.

Glossary of Terms

Term	Abbreviation	Explanation
Accelerated Replacement	AR	Replacement of existing equipment prior to the end of its useful life.
Add-On Equipment	AOE	Equipment installed 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 be able to fully meet the existing load 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
Advice Letter		A document submitted by an IOU to the CPUC requesting review of a change of its tariffs or to propose a new product or service. The advice letter process provides a quick and simplified review of the types of utility requests that are expected neither to be controversial nor to raise important policy questions.
Assembly Bill 802	AB802	A bill that calls on the CPUC to authorize investor owned utilities (IOUs) to implement programs that improve the efficiency of existing buildings and take into account all estimated energy usage reductions resulting from measures that bring existing buildings, at a minimum, into conformity with the requirements of Title 24, as well as operational, behavioral, and retrocommissioning activities that are reasonably expected to produce multiyear savings.
Behavior, Retrocommission-ing and Operation-al	BRO	Measures installed within the BRO installation type include measures that either restore or improve energy efficiency and can be reasonably expected to produce multi-year savings. Savings from correcting deferred maintenance, performance restoration and operational characteristics are considered within this category.
California Energy Commission	CEC	The state government agency with regulatory authority over energy planning for all energy utilities throughout California.
California Energy Data and Reporting System	CEDARS	A system that securely manages data associated with California demand-side management (DSM) programs, ensuring quality and improving communication between DSM Program Administrators (PAs), the CPUC, and the public.
California Public Utilities Commission	CPUC or Commission	The state government agency with regulatory authority over Investor Owned Utility companies and Energy Efficiency Program Administrators, and author of this contract.
Codes and Standards	C&S	An effort by a municipal, state, or federal government to drive energy savings through energy requirements for buildings or appliances.
Community Choice Aggregator	CCA	Organizations created by local governments pursuant to Assembly Bill 1178 for the purpose of procuring power and administering energy efficiency programs on behalf of local citizens*
Custom Measures		See Measures, Custom
Database of Energy Efficiency Resources	DEER	A database maintained by the California Public Utilities Commission which contains standard savings estimates for many typical energy efficiency interventions.

Term	Abbreviation	Explanation
Decision		An opinion or judgment of the PUC that decides the resolution of a proceeding, usually written in the format D.01-02-003. A proposed decision is usually written by a PUC Administrative Law Judge (ALJ), it is then reviewed and voted upon by the Commissioners.
Deemed Measures		See Measures, Deemed
Disposition		A final determination of a case or issue.
Due Diligence Review	DDR	The review and QC process used by the Program Implementers prior to the submittal of the project for ex-ante review.
Effective Useful Life	EUL	An estimate of the median number of years that a measure stays in place and is still operational
Energy Division		A division of the Commission responsible for regulating Investor Owned Utility Companies, and for overseeing energy efficiency programs funded through ratepayer funds. Energy Division will be managing this contract.
Energy Efficiency		Activities or programs that stimulate customers to reduce customer energy use by making investments in more efficient equipment or controls that reduce energy use while maintaining a comparable level of service as perceived by the customer.*
Energy Savings		See Savings, Energy
Evaluation, Impact		A study in which Evaluation, Measurement and Verification techniques are used to estimate net changes in electricity usage, electricity demand, natural gas usage, and/or behavioral impacts that are expected to produce changes in energy use and demand.*
Evaluation, Measurement and Verification	EM&V	Activities that evaluate, monitor, measure, and verify performance or other aspects of energy efficiency programs or their market environment.*
Ex Ante		Estimated savings calculated based on assumptions prior to the evaluation of the portfolio cycle. These savings reflect the IOU reported savings, which are trued up with final evaluation.*
Ex Post		Estimated savings are based on evaluation, and all incentives are held until after evaluation is complete. Custom and uncertain deemed measures are incentivized based on ex post savings estimates.
Free Rider		A program participant who would have implemented the program measure(s) or practice(s) in the absence of the program.
Forecast		See Ex Ante
Gross Energy Savings		See Savings, Gross Energy
Gross Realization Rate	GRR	Ratio of the gross savings estimated by an evaluation to the savings claimed by a PA
Impact Evaluation		See Evaluation, Impact
Incremental Cost		The cost that the customer will incur above and beyond the cost associated based on their original design of the building. These costs are associated with the implementation of program recommended energy savings technologies that enable the facility's efficiency to exceed current Title 24 standards.
Investor-Owned Utility Companies	IOU	Privately owned, publicly traded companies responsible for generation and transmission of electricity and/or natural gas to ratepayers, regulated by the California Public Utilities Commission.
Local Government Partnership	LGP	A coordinated effort of a utility and a local government to use the strengths of both parties to achieve energy savings goals.*

Term	Abbreviation	Explanation
Measure		A specific intervention addressing a specific existing condition in a specific environment, with the intended result of reducing energy use from a certain baseline. A measure may constitute a customer action or an installed product.
Measurement and Verification	M&V	A data-collection component of energy efficiency programs from which gross estimates of energy savings are calculated.
Measurement and Verification Evaluation		See Evaluation, Measurement and Verification
Measures, Custom		Measures which require site-specific analysis in order to determine energy savings estimates. Custom measures are implemented through Custom Programs, and incentives are paid only after completion of ex post analysis for the associated project year.
Measures, Deemed		A prescriptive energy efficiency intervention which, in many cases, is implemented across an IOU or the state. Includes both DEER and work paper measures, and can be paid either through the ex ante or ex post incentive mechanisms, depending on inclusion in the Uncertain Measures List for the applicable program year.
Net-to-Gross Ratio	NTGR	The ratio of program-induced savings to total savings
Net Energy Savings		See Savings, Net Energy
Program Administrator	PA	An entity which has been authorized by the California Public Utilities Commission to use Ratepayer funds to coordinate energy efficiency programs within a specified service territory. Current Program Administrators include Investor Owned Utilities, Community Choice Aggregators, and Regional Energy Networks.
Ratepayer		Those customers who pay for gas or electric service under regulated rates and conditions of service. *
Regional Energy Network	REN	A coalition of municipal organizations (i.e. cities, counties, and special districts) authorized by the California Public Utilities Commission to administer energy efficiency programs.
Remaining Useful Life	RUL	An estimate of the median number of years a technology or piece of equipment would remain in service and operational had the program intervention not caused the replacement or alteration; default Commission policy assumes that RUL is equal to one-third of the EUL
Remote Ex Ante Database Interface	READI	A utility for viewing CPUC's database of ex ante measure information including measures, support tables, and technologies.
Rolling Portfolio		The current structure of combined program implementation and evaluation used by all California Energy Efficiency Program Administrators, as defined in Commission Decision D.15-10-028.
Ruling		An interpretation of a Decision. Rulings can come from an Administrative Law Judge or an Assigned Commissioner.
Savings By Design	SBD	California's nonresidential new-construction energy-efficiency program, administered statewide and funded by Utility customers through the Public Purpose Programs surcharge applied to gas and electric services.
Savings, Energy		The amount of reduced electric energy consumption or demand, and/or natural gas consumption, associated with a given set of energy efficiency interventions.
Savings, Gross Energy		The calculated energy savings before accounting for evaluated parameters.

Term	Abbreviation	Explanation
Savings, Net Energy		The calculated energy savings after accounting for evaluated parameters.
Time Dependent Valuation of Energy	TDV	the value of energy depending on the time it is used. This means that electricity saved on a hot summer afternoon will be worth more in the compliance process than the same amount of electricity saved on a winter morning. The value assigned to energy savings through TDV more closely reflects the market for electricity, gas, propane, and other energy sources and provides incentives for measures, such as thermal storage or daylighting, that are more effective during peak periods.
Title 20		California Code of Regulations relating to appliance efficiency. It is also known as the Appliance Energy Efficiency Standards. Title 20 sets minimum efficiency requirements for appliances, such as package-units, exit signs, and other building elements in the state of California.
Title 24		California Code of Regulations relating to building design and construction. Part 6 of Title 24 is the Energy Efficiency Standards for Nonresidential Buildings. Title 24 sets minimum efficiency requirements for building construction materials and energy-consuming equipment in the state of California.
Zero Net Energy	ZNE	A building project (e.g., building, campus, community) that generates at least as much energy through on-site renewables (e.g., solar, geothermal, wind) as is consumed by operating the building.

* From *Energy Efficiency Policy Manual*, Version 5, enacted July 2013 as part of Commission Resolution 09-11-014, available at http://www.cpuc.ca.gov/uploadedFiles/CPUC_Public_Website/Content/Utilities_and_Industries/Energy__Electricity_and_Natural_Gas/EEPolicyManualV5forPDF.pdf.