GROUP D

Evaluation, Measurement, & Verification of Program Year 2022 Commercial, Industrial, and Agriculture Custom Projects Work Plan

California Public Utilities Commission

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Glossary of terms and acronyms

Authority Having Jurisdiction (AHJ) – Refers to the organization, agency, or individual responsible for ensuring that the codes, standards, and regulations are followed within their jurisdiction, and they have the authority to enforce them, issue permits, and conduct inspections. AHJs may vary depending on the location and jurisdiction, and it is important to identify the specific AHJ for a particular project or activity to ensure compliance with applicable regulations.[1]

California Database for Energy Efficiency Resources (DEER) – Refers to the Database for Energy Efficient Resources. This database contains information on energy efficient technologies and measures. DEER provides estimates of the energy-savings potential for these technologies in residential and non-residential applications. DEER is used by California Energy Efficiency (EE) Program Administrators (PAs), private sector implementers, and the EE industry across the country to develop and design energy efficiency programs.[2]

California Energy Data and Reporting System (CEDARS) – Refers to the database that securely manages California Energy Efficiency Program data reported to the California Public Utilities Commission (CPUC) by Investor-Owned Utilities (IOUs), Regional Energy Networks (RENs), and certain Community Choice Aggregators (CCAs).[3]

Custom Core Template (CCT) – DNV created an Excel-based CCT to organize and communicate evaluation information for each claimed project in the sample. This spreadsheet was used to ensure a uniform and systematic approach to determining and communicating gross savings methods, calculations, and results.

Custom Project Review (CPR) – Refers to the process of selecting custom projects, submitted biweekly by the program administrators, for review of all forecasted savings parameters and documents of selected projects.

ED Tracking Data – Refers to the officially claimed electric and gas impacts as captured in the CEDARS (defined above) data and reporting system.

Effective Useful Life (EUL) – An estimate of the median number of years that the measures installed under the program are still in place and operable.

Free-ridership – Program participants who would have installed the program measure or equipment in the absence of the program.

Gross Realization Rate (GRR) – Refers to the ratio of achieved energy savings to predicted energy savings; as a multiplier on Unit Energy Savings, the GRR considers the likelihood that not all CPUC-approved projects undertaken by IOUs will come to fruition.

Gross savings – Gross savings count the energy savings from installed energy efficiency measures (EEMs) irrespective of whether those savings are from free riders, i.e., those customers who would have installed the measure(s) even without the financial incentives offered under the program.

1 Please refer to the Energy Efficiency Policy Manual for additional terms and definitions: : https://www.cpuc.ca.gov/-/media/cpuc-website/files/legacyfiles/e/6442465683-eepolicymanualrevised-march-20-2020-b.pdf

2 Public utilities commission of California, Resolution E-5152, August 5, 2021. http://www.deeresources.com/files/DEER2023/Resolution%20E- 5152%20DEER2023%20Complete.pdf

3 California Energy Data and Reporting System (CEDARS), "Welcome to CEDARS," cedars.sound-data.com, https://cedars.sound-data.com/

International Performance Measurement and Verification Protocol (IPMVP)[4] – Refers to the protocol that facilities a common approach to measuring and verifying energy efficiency investments. IPMVP incorporates M&V best practices in a non-prescriptive framework that allows it to be applied flexibly based on a measure's application and the information available.

Industry Standard Practice (ISP) – Refers to the use of current market practice as a baseline. This is typically identified through a market research study to determine what current practice may be at the time of measure installation.

Lifecycle savings – Refers to the savings associated with the lifetime of an efficiency measure undertaken by a program participant. Equipment replaced early in its useful life might receive reduced savings for a portion of its lifetime.

Measure – Refers to the specific customer actions that reduce or otherwise modify energy end use patterns. A measure is a product whose installation and operation at a customer's premises reduces the customer's on-site energy use, compared to what would have happened otherwise.

Measure Application Type (MAT) – Refers to the installation basis for each claim. There are seven approved measure application types: Add-on Equipment, Accelerated Replacement, BRO-Behavioral, BRO-Operational, BRO-Retro- commissioning (RCx), New Construction, and Normal Replacement.

Metric Million British Thermal Unit (MMBTU) – A unit traditionally used to measure heat content or energy value. MMBTU is the common unit upon which sampling is based.

Net savings – Refers to the savings realized when free-ridership is accounted for. Savings are calculated by multiplying the gross savings by the net-to-gross ratio.

Net-to-gross ratio (NTGR) – A ratio or percentage of net program savings divided by gross or total impacts. Net-to-gross ratios are used to estimate and describe the free-ridership that may be occurring within energy efficiency programs.

Normalized Metered Energy Consumption (NMEC) – Refers to high opportunity projects or programs (HOPPs) that provide incentives based on metered energy consumption. This initiative fulfils the directive for utilities to quickly identify high energy-efficiency savings opportunities in existing buildings using a program and project approach where incentive payment and claimed savings are based on NMEC and include only approved NMEC building programs.

Outdoor Air Temperature (OAT) – Local climate zone (CZ) weather data was often used to regress equipment operation for weather dependent data to estimate annual operation.

Program Administrator (PA) – An entity tasked with the functions of portfolio management of energy efficiency programs and program choice (i.e., Marin Clean Energy (MCE),[5] Pacific Gas & Electric (PG&E), Southern California Edison (SCE), Southern California Gas (SCG), San Diego Gas & Electric (SDG&E)).

Peak Demand – Refers to the average demand impact, for installed or implemented measures, as would be applied to the electric grid. CPUC Resolution E-4952 approved the Database for Energy-Efficient Resources (DEER) for 2020. Additionally, this resolution revised the DEER Peak Period definition from 2:00 p.m. to 5:00 p.m. to 4:00 p.m. to 9:00 p.m. effective January 1, 2020. In accordance with the CPUC memo issued on 03/21/19, operationalizing the 2020 DEER Peak Period change,

4 IPMVP- Efficiency Valuation Organization (EVO), evo-world.org, https://evo-world.org/en/

5 MCE is a not-for-profit public agency that MCE provides electricity service to more than one million residents and businesses in 37 member communities across four Bay Area counties: Contra Costa, Marin, Napa, and Solano.

effective January 1, 2020, per CPUC Res E-4952 for custom projects shall follow the Statewide Custom Project Guidance Document, Version 1.4.

Relative Precision – A ratio of the error bound divided by the value of the measurement itself. This provides the error on a relative basis that is frequently used to show uncertainty as a fraction of a quantity. In this report, all relative precisions are provided at the 90% confidence interval, which means that in repeated sampling 90 times out of 100 the true value will fall within the lower and upper bounds of the estimate.

Remaining Useful Life (RUL) – An estimate of the median number of years that a measure being replaced under the program would remain in place and operable had the program intervention not caused the replacement.

Strategic Energy Management (SEM) – Allows for continuous energy performance improvement by providing the processes and systems needed to incorporate energy considerations and energy management into daily operations.

Statewide – Energy efficiency programs or activities that are essentially similar in design and available in all CPUC regulated utility service areas in California.

1 OVERVIEW

This document is a work plan for evaluating energy savings for the Commercial Industrial and Agricultural Custom (CIAC) projects for program year (PY) 2022 under CPUC's Group D evaluation contract group. The CIAC evaluation only focuses on custom projects implemented with non-residential customers and does not include residential programs.

The scope of work contained in this work plan includes deliverables related to planning, data collection, analysis, and reporting on evaluated gross and net savings estimates.

Table 1-1 provides an overview of the goals and objectives, highlights of our approach, and details on DNV's method to delivering a transparent working relationship with the CPUC and their stakeholders.

Table 1-1. Key elements of the evaluation work plan

Goals and objectives	Develop first year and lifecycle evaluated net and gross savings at a high-level of precision meeting the timelines associated with the relevant EM&V bus stops.
	Develop meaningful and actionable recommendations to improve program performance in delivering energy efficiency savings.
Highlights of our approach	We will formulate a sample frame with final Q1 through Q3 PY2022 forecasted savings estimates and provisional Q4 PY2022 data applying statistical methods to correct for any subsequent changes in vetted data. Provisional data indicates claims submitted through Q4 of 2022 that are not yet updated and called final.
	We will provide an Excel-based Custom Core Template that establishes a data collection instrument with common elements across Custom Project Review (CPR) and all evaluation activities for streamlining and supporting cross-team analytics
	The net-to-gross methods will follow well-developed California Nonresidential Self-Reported Attribution (SRA) survey instruments and algorithm used in evaluating custom programs.

1.1 Organization of work plan

The work plan is presented in the following sections:

- Section 2, Evaluation objectives – details key study objectives, aligned with the CPUC objectives.
- Section 3, Sample design and data collection – provides a sampling and detailed data collection plan.
- Section 4, Evaluation methodology – documents the approach for estimating gross and net savings for custom projects.
- Section 5, Portfolio savings approach – outlines how savings at the portfolio level are determined.
- Section 6, Reporting – summarizes key reporting deliverables and timelines.
- Section 7, Quality assurance and quality control – details DNV's approach for delivering high-quality products.
- Section 8, Project management plan – provides insights into scheduling, resource management, and ongoing communication with the CPUC, program administrator (PA), project co-ordination groups (PCGs), and stakeholders.
- Section 9, Communication and coordination plan – outlines the communication and coordination approach that the evaluation team will follow to ensure compliance with CPUC evaluation-wide requirements, contribute key information, ensure sampling and study coordination, and share study results.

2 EVALUATION OBJECTIVES

Our first task in this evaluation is to develop a work plan that describes the complete scope of work for all research areas. This work plan reflects fine-tuning of the approach based on further input and guidance we received from the CPUC staff.

DNV will update the work plan to reflect changes in programs, measure mix, number of participants, the distribution of savings, and the proposed sample plan to meet precision targets.

2.1 Key research questions

The key research questions for this impact evaluation are as follows:

- What are the first year and lifecycle gross kWh, peak kW, and therm savings by sampling domain (e.g., by PA, fuel, etc.)?
- What are the evaluated gross realization rates (GRR)? What factors are driving gross realization rates, and, as necessary, how can realization rates be improved? What is the corresponding GRR by sampling domain?
- What is the corresponding net-to-gross ratio (NTGR) by sampling domain? Determine the factors that characterize free-ridership, and as required, provide recommendations on how the NTGR might be improved.
- What factors contributed to the difference between forecasted and evaluated savings in terms of energy impacts?
- What assumptions or assumed parameter values should be adjusted based on evaluation findings and how?
- What gaps are there, if any, in the planned evaluation, measurement, and verification (EM&V) activities for custom programs? What emerging evaluation issues should be addressed going forward?
- What are the actionable recommendations to address gaps and improve programs and projects in the future?

We will consult with the CPUC staff and stakeholders to revise these research questions as needed prior to commencing research.

2.2 Overview of approach

Our proposal for meeting the 2024 bus stop (May 1, 2024) for PY 2022 (January 1, 2022- December 31, 2022) uses a combination of approaches as appropriate for each CIAC project. As necessary, the DNV team will conduct a combination of site visits, virtual visits, and telephone verification to verify measure installation and acquire evaluator-observed operating parameters. We will also conduct project file reviews, prepare site-specific M&V plans, conduct surveys, data collection, perform engineering analyses, simulate energy models, perform billing analysis, and develop site-specific gross savings results. For the 2022 CIAC evaluation, we plan to estimate the NTG ratios using the methodology in the 2015 custom industrial, agricultural, and large commercial (IALC) impact evaluation.[6]

We expect to estimate the program NTGRs based on responses to customer surveys. Table 2-1 summarizes activities for PY2022.

Table 2-1. Summary of activity for PY2022

Activity	Custom
PY2022– April 2024 Bus Stop	
Expected 2022 Program Activity[7]	408 accounts

[6] Itron, 2015 Custom Impact Evaluation Industrial, Agricultural, and Large Commercial Final Report Submitted to: California Public Utilities Commission. calmac.org, May 3, 2017. http://www.calmac.org/publications/IALC_2015_Custom_Report_Final.pdf

[7] Project counts are estimates and actual PY2022 activity is presented in Section 3.

Activity	Custom
Sampling	• 76 total projects selected for evaluated gross savings to meet target precision across of 10% for electric projects and 15% for gas projects at the 90% confidence interval • Same sample used for gross impact evaluation and net savings attribution interviews and analysis. • Stratified error ratio sample design with precision targets for PY2022
M&V Activities	• Method dependent on measure • On-site verification for a selection of highly complex or uncertain projects • Virtual verification for all projects not selected for on-site verification
Net-to-gross	• Sampling approach involves attempting to complete NTG surveys/interviews with a census of the 76 sites selected for evaluating gross savings as well as an additional sample of 74 sites that will only receive net savings analyses. In the likely event the DNV team does not complete NTG surveys/interviews with all 76 sites selected for evaluated gross savings, the team will make up the difference with additional NTG survey/interviews from the "net only" sample so that the total number of NTG surveys/interviews still adds up to 150. • Assigning projects to three different bins for net savings evaluation rigor (basic, standard, and enhanced) based on project size, project complexity, and the existence of multiple decision-makers. Two different evaluators will review the NTG interview responses for all standard or enhanced rigor projects and come to agreement on any differences in the interpretation of the interview responses before assigning the project an NTGR.
Reporting	• Evaluated gross and net savings finalized February 2024 • Recommendations of evaluation study findings

3 SAMPLE DESIGN AND DATA COLLECTION

Collection of relevant program tracking data and design of statistically significant samples is addressed in this section. The section starts with transfer of program tracking data to the DNV team and then details the sampling plan. Subsequent sections describe data collection methods. The sample design provided here has been previously shared with the CPUC and PAs for assessment and approval. These designs show detail on strata, sample selection by domains and confidence and precision by domain.

3.1 Data transfer

The team obtained data from the Energy Division's California Energy Data and Reporting System (CEDARS) database for programs with non-deemed project savings claims. The initial data obtained included the final data for the first three quarters of 2022. Subsequent data obtained will be full-year final 2022 data, when available, after the 2022 Annual Claims True-up Reports[8] have been submitted. The final sample design will be adjusted once final PY2022 data is available. The sample design presented in this work plan targets precision across the two waves of final data receipt by estimating activity in Q4 2022. Once the samples are selected, another data collection step involves the request and transmittal of relevant project documentation for all sampled projects. Since much of the project documentation may contain sensitive customer information, the DNV team will use the Non-California Database for Energy Efficiency Resources (DEER) Resources website[9] to post the data requests to the PAs and to securely transfer data uploaded by the PAs.

Consistent with past CPUC rulings and evaluation practice, program savings cannot be counted for projects installed in a year prior to the claim year. The exception is that projects installed in the last quarter prior to the claim year can be counted in the claim year if the reason for claiming in the latter year was that M&V was not able to be completed within the installation year. Prior to finalizing the sample design, the DNV team requested data from the PAs to identify which PY2022 savings claims from installations in the prior year's last quarter did and did not have M&V delays as the reason for the late claim. However, making this identification comprehensively turned out to be too complicated to complete within the timeframe for this effort. Accordingly, projects from the last quarter of a prior year are retained in the sample frame unless they were definitively identified as ineligible by the PAs. If sampled projects are found to have been installed in Q4 of the prior program year and did not require M&V to continue into the program claim year (PY2022), such projects will be considered ineligible claim and no gross savings will be assigned. Excluding ineligible projects from the final savings totals will be managed as described in Section 4.5.2.

3.2 Sample design

Savings claims classified as non-deemed for PY 2022 Q1 through Q3 are provided in Table 3-1. There are 222 claims present in this period of activity representing 220 projects (project IDs) due to two projects having more than one claim. More than 98% of lifecycle MWh savings and more than 97% of lifecycle therm savings are from the Custom Programs.

[8] 2021 Annual Claims True-up Deadline extended per ALJ Fitch on 3/25/2022: May 17, 2022 - Regional Energy Networks and Community Choice Aggregators and June 1, 2022 - Investor-Owned Utilities

[9] California Public Utilities Commission, "Energy Division Non-DEER Resources. Deeresources.info, https://deeresources.info/

Table 3-1. PY2022 Q1-Q3 activity and forecasted lifecycle savings by Program Type, (non-deemed)[10]

Program type	# Projects	Lifecycle MWh	Positive saving lifecycle therms (thousand)
Custom	200	120,125	1,213
SBD	4	2,012	45
ALL	**204**	**122,136**	**1,258**

For the PY2022 CIAC sample, we are planning to target better than 90/10 precision overall around MMBTU with sample allocation by Program Administrator (PA) to optimize precisions for potentially more granular results application. We will report impacts separately for each PA, fuel, and overall (statewide).

For this study the DNV team will collect and analyze data for impact estimation for 76 projects for PY2022 (38 in wave 1 and 38 in wave 2). All projects included in the gross impact sample will have net-to-gross surveys attempted as well. However, based on our experience, it is not always possible to reach decision makers for all projects that cooperate with gross data collection and some of the gross sample may not have completed NTGR surveys. Therefore, this plan includes an additional NTGR-only sample. In addition to the 76 impact evaluation sites, DNV plans to recruit an additional 74 sites for the NTGR sample to reach a total of 150 sites. These additional NTG surveys may provide some insights as to how the programs are influencing Hard-to-Reach (HTR) customers vs. non HTR customers in non-residential program areas. If the sample size of HTR projects proves too small for a useful analysis, we may do an alternative analysis looking at whether NTGRs for projects involving smaller participants differ significantly from those of medium-sized or large customers.

3.2.1 Two sampling waves for PY2022

The first wave sample will be drawn using Q1-Q3 2022 tracking that has been reviewed by the DNV team, though not finalized by the PAs. The second wave sample will be drawn in July, after the Q4 PY2022 tracking data are final and uploaded by the PAs and compiled by the DNV team. The two-wave sampling approach will allow us to commence field work in July and continue as the additional sample is added a few weeks later. For the final data analysis, DNV will use post-stratification techniques to expand the full (Wave 1 and Wave 2) completed sample to the final tracking data.

The two-wave sampling approach requires that a portion of the overall planned sample is reserved for the second sampling wave. The approach taken here is to specify the total sample to be allocated in the first wave and allocate these sample points for best projected precision for the overall CIAC gross savings estimate to achieve better than ±10% relative precision for electric and better than ±15% relative precision at the 90% confidence level for the full year of activity. For Wave 2, a similar sample allocation for the full, final PY2022 data will be developed. For each sampling cell, the Wave 2 sample size will be the difference between the allocations from the full final sample and the Wave 1 allocations.

Under-allocating to the Q1-Q3 PY2022 in Wave 1 will ensure that for most sampling cells, the Wave 2 increment will be positive. To address any sampling cells where the final allocations are for smaller sample sizes than were allocated during Wave 1, the Wave 1 sample will be reduced if still possible based on the fieldwork status, or the overall Wave 2 sample will be adjusted slightly. One challenge in the Q1-Q3 data is that there is only 1 SDG&E site and 0 SCE sites[11]. With no data in the Wave 1 population for these PAs, it is impossible to make a prediction for Q4 enrollment. Sites reserved in the under-allocation will be distributed appropriately to those PAs that did not have data in Wave 1 during the Wave 2 design.

[10] Residential New Construction projects were removed from the population frame and are not part of the CIAC evaluation.

[11] SCE claimed multiple RNC sites in Q1-Q3, which are not included in the CIAC evaluation.

A preliminary look at total 2022 Q4 claims indicates that Q4 electric claims are almost the same as Q1-3 totals, while Q4 gas claims are only a few percent of the Q1-Q3 total. The gas result is largely because there was one very large claim in the Q1-Q3 period, and nothing of similar size occurred in Q4. Thus, to develop an initial projected frame of the full PY2022 claims, as a guide for Wave 1 sampling, the Q4 claims are projected by duplicating all electric claims from Q1-Q3, and all the gas claims except the very large ones. That is, a simulated Q4 2022 frame is created as a copy of all but the largest claims from Q1-Q3. We refer to the resulting frame, the preliminary Q1-Q3 2022 claims, and the simulated Q4 2022 claims, as the projected full frame.

3.3 Group D CIAC sample design

The CIAC sample design will be stratified by PA and fuel type. Custom projects will further be stratified by whether the project is lighting-only or includes non-lighting measures, as lighting-only projects have a smaller projected error ratio and evaluation cost.

A separate sample memo will be provided that details the construction of the sample frame from the preliminary PY2022 tracking data.

Based on a review of achieved error ratios from the past four cycles of California custom evaluations, we have developed the error ratios indicated in Table 3-2 for our impact sample size and allocation.

Table 3-2. Error ratios for preliminary impact sample allocation

	GRR		NTGR	
	Electric	Gas	Electric	Gas
	Not lighting-only		All measure types	
PGE	1.00	1.00	0.56	**0.53**
SCE	1.00	1.00	0.36	**0.36**
SCG	1.00	1.00	0.72	**0.72**
SDGE	1.00	1.00	0.44	**0.78**
	Lighting only			
All PAs	**0.60**			

Table 3-3 summarizes the key assumption for the draft sample allocations. Estimated precisions are shown in subsequent sections.

Table 3-3. CIAC sample design assumptions

Parameter	Description (PY2022)
Population	Tracking data set for program year, aggregated at the application (project ID) level Wave 1: PY2022 Q1-3 final Wave 2: PY2022 Q1-Q4 final
Explicit sampling strata	PA, Size. Measure group PY2022: Q1-3 vs Q4
Gross sample allocation	76 projects for the combined waves, allocated for best overall precision to achieve 90/15 results by fuel type and 90/10 overall (MMBTU)
NTGR sample allocation	Separate sample allocation, starting by attempting NTGR surveys for all projects in the gross impact sample. 150 total projects (76 embedded with the gross sample, 74 non-embedded).
Sample design approach	Stratified ratio estimation
Target parameters	GRR, NTGR

Parameter	Description (PY2022)
Analysis domains	PA, Fuel, Measure Group (Lighting vs. Non-Lighting)
Error ratios	By PA and fuel based on historical Custom and Industrial results from three prior CA evaluation cycles
Projected Precision at 90% confidence (based on current error ratio assumptions)	CIAC PY2022 Gross MMBtu savings by energy unit (electric): 10% Gross MMBtu savings by energy unit (gas): 15% NTGR by energy unit: 10% Net by fuel type: 15%
Savings size stratification	Custom – up to 3 levels based on savings, depending on the number of samples in the cell
Contingency and back-up sample	Gross impact sample: 50% initial over-sample for primary sample to account for projected ineligible and nonresponse rates NTGR sample: 3x initial oversample for primary sample to account for projected ineligible and nonresponse rates. All gross impact primary samples included plus additional as needed. Remaining sites pre-sorted into random selection sequence for each non-census-attempt sampling cell to produce additional back-up cases as needed

The design for the CIAC sample allocates sample points to population cells defined by PA, and fuel type (whether the project includes positive gas savings). Custom is further stratified explicitly by lighting-only versus non-lighting. The allocation is designed to produce estimates at ±15% or better precision at the 90% confidence level. This allocation scheme does not provide the best possible precision for overall CIAC lifecycle gross MMBtu savings but ensures that we have reliable evaluation estimates for each fuel type.

The next tables provide aggregated savings, project counts, sample sizes, and projected precision, by each of the stratification dimensions. The precision estimates are based on the error ratios indicated in Table 3-2.

The precision indicated in all tables is around lifecycle gross savings. Precision for gross kW will generally be like that for gross kWh, and precision for first-year savings will generally be like that for lifecycle savings. Since the error ratios for NTGR are generally smaller than for GRR, as indicated in *Table 3-2* and sample sizes will be similar, NTGR precision is expected to be better than GRR precision.

The total sample sizes indicated in the sample allocation tables includes gas, electric, and combined projects. The majority of these are electric, and electric sample sizes are not separately shown. This is because electric sample sizes are not fully controlled by the design but will depend on the number of combination projects randomly selected from the sampling cells with gas savings. Table 3-9, provided later in this section, indicates ±9.6% precision at the 90% confidence interval for electricity for the PY2022 period, and /±15.3% at the 90% confidence interval for gas.

Table 3-4 provides the overall allocation by sampling wave. Better than ±10% precision at the 90% confidence interval is projected for electric projects, while ±*15%* at the 0-% confidence interval is projected for gas projects for the full PY2022 sample. The Wave 2 sample will be finalized in the July 2023 update.

Table 3-4. PY2022 gross sample allocations by time period for the projected full CIAC sample

Wave	Total number of accounts	Source LC Gross savings (MMBTU)	Sample size (number of projects)	Projected Lifecycle GRR Precision at 90% confidence (MMBtu)
Wave 1	204	1,376,002	38	N/A
Wave 2[12]	204	1,376,002	38	N/A
Total	408	2,585,312	76	±8.5%

Table 3-5 indicates the gross sample allocations by PA. PG&E contributes the largest portion of projects and savings and has the best target precision. PAs with less activity have less precision. SCE is not represented in this sample, as no custom projects were claimed in the PY2022 Q1-Q3 period. An allocation of sites to SCE will be reviewed in Wave 2 depending on activity in 2022 quarter 4.

[12] Based on projected claims for Q4 of 2022.

Table 3-5. PY2022 gross sample allocations by program administrator

Implementation PA	Total number of accounts	Source LC Gross savings (MMBTU)	Sample size (number of projects)	Projected Lifecycle GRR Precision at 90% confidence (MMBtu)
MCE	90	203,181	14	27.3%
PGE	290	2,176,739	44	9.5%
RCEA	2	20	-	0.0%
SCG	6	1,106	6	0.0%
SCR	18	157,900	10	35.1%
SDGE	2	46,367	2	0.0%
Total	408	2,585,312	76	8.5%

Table 3-6 indicates the net sample allocations by PA. The samples presented in this table include those anticipated for completion due to inclusion in the gross sample (above) and added surveys performed for net purposes only. PG&E contributes the largest portion of projects and savings and has the best precision, while other PAs have less participation and subsequently lower precision.

Table 3-6. PY2022 net sample allocations by program administrator

Implementation PA	Total number of accounts	Source LC Gross savings (MMBTU)	Sample size (number of projects)	Projected Lifecycle GRR Precision at 90% confidence (MMBtu)
MCE	90	203,181	22	18.2%
PGE	290	2,176,739	108	2.7%
RCEA	2	20	0	N/A
SCG	6	1,106	6	0.0%
SCR	18	157,900	12	20.9%
SDGE	2	46,367	2	0.0%
Total	408	2,585,312	150	3.0%

Table 3-7 indicates the gross sample allocations by lighting only vs non-lighting. Although lighting only projects represent the majority of total projects and MMBTU, the average size of non-lighting projects is significantly higher, resulting in a larger target sample size to achieve the desired statewide precision.

Table 3-7. PY2022 gross sample allocations by project end use

Implementation PA	Total Number of Accounts	Source LC Gross savings (MMBTU)	Sample Size (number of projects)	Projected Lifecycle GRR Precision at 90% confidence (MMBtu)
Lighting only	352	1,624,089	36	12.1%
Non-lighting	56	961,223	40	10.4%
Total	408	2,585,312	76	8.5%

Table 3-8 indicates the net sample allocations by lighting only vs non-lighting.

Table 3-8. PY2022 net sample allocations by project end use

Implementation PA	Total number of accounts	Source LC Gross savings (MMBTU)	Sample size (number of projects)	Projected Lifecycle GRR Precision at 90% confidence (MMBtu)
Lighting only	352	1,624,089	106	4.0%
Non-lighting	56	961,223	44	4.4%
Total	408	2,585,312	150	3.0%

Table 3-9 indicates gross sample allocation by fuel type. The electric fuel type stratum targets a 9.6% relative precision at the 90% confidence interval, while the gas fuel type targets a 15.3% relative precision at the 90% confidence interval.

Table 3-9. PY2022 gross sample allocations by fuel type

Implementation PA	Total number of accounts	Source LC Gross savings (MMBTU)	Sample size (number of projects)	Projected Lifecycle GRR Precision at 90% confidence (MMBtu)
Electric	370	2,177,980	48	9.6%
Gas	38	407,332	28	15.3%
Total	408	2,585,312	76	8.5%

Table 3-10 indicates net sample allocation by fuel type. The electric fuel type stratum targets a 3.1% relative precision at the 90% confidence interval, while the gas fuel type targets a 9.0% relative precision at the 90% confidence interval.

Table 3-10. PY2022 net sample allocations by fuel type[13]

Implementation PA	Total number of accounts	Source LC Gross savings (MMBTU)	Sample size (number of projects)[14]	Projected Lifecycle GRR Precision at 90% confidence (MMBtu)
Electric	370	2,177,980	120	3.1%
Gas	38	407,332	30	9.0%
Total	408	2,585,312	150	3.0%

[13] DNV will sample a total of 150 customer for the net-to-gross analysis. 150 customers are presented in this table to illustrate the minimum number of completes to achieve the targeted precision.

[14] There is overlap in electric and gas projects, therefore the summation of each will be larger than 150 projects, but the total projects sampled is equal to 150.

4 EVALUATION METHODOLOGY

This section describes DNV's approach to evaluating gross and net savings across all CIAC programs and projects. At its core, our approach will be to maintain consistency with PY2020/2021, PY2019 (and PY2015 net savings approach) evaluation methodologies. Where adjustments to methods are warranted, DNV will coordinate with the CPUC and impacted stakeholders to ensure agreement on proposed changes.

Three aspects of site-specific savings analysis are common to all research areas as described in the list below:

- Baseline selection is a critical aspect of evaluating custom projects for evaluated gross savings estimation. During the evaluation process, the appropriate baselines will be determined based on existing equipment conditions, program influence, remaining and effective useful life (EUL), relevant building code, program rules, CPUC policy requirements, functional, technical and economic requirements, and standard practice when necessary. Measure baselines that cannot be straightforwardly categorized will be elevated to our team's Baseline Advisory Group, which will keep CPUC staff apprised of complex site-specific baseline determinations.
- Discrepancy analysis will assess the reasons why variances were found between the forecasted and evaluated savings for each sampled project. The discrepancy analysis will not only quantify these differences but will provide detailed reasons behind the discrepancies. We will work with CPUC staff to identify the discrepancy factors of interest and will set up our analysis to reflect these changes in savings terms accordingly. The site-level discrepancy assessment will provide a different perspective to the utilities and their program administrators on custom projects and – when aggregated together at sector-, program-, or PA levels – will demonstrate how CPR savings estimates can be improved moving forward.
- Quality control is critical to ensuring credible realization rates (RRs) and program recommendations. All projects will be assigned to a lead engineer who is responsible for the generation of impact estimates and reports. A senior engineer will work with the lead engineer and review the site report. This oversight will focus on the quality and clarity of the documentation and consistency and validity of the estimation methods. Data collected or measured will be checked for reasonableness and possible inaccuracies; suspect data will be inspected for validity and screened from analysis where warranted. All sampled projects will receive a final aggregate review from the engineering lead prior to statistical expansion analysis.

Sections 4.1.3.1 through 4.1.4 below provide research-area specific details related to savings analysis. DNV recognizes that the diversity of projects warrants careful consideration when selecting the most defensible and cost-effective M&V methods for each sampled project. We will assess several key criteria to assign project-level rigor. These considerations will be reflected in the M&V template, so that all field engineers follow standardized, unbiased protocols to match their assigned projects with the most appropriate rigors and site-level budgets. The Statewide Custom Project Guidance Document,[15] program-specific manuals, statewide custom program and policy manual, various CPUC decisions and resolutions, CPUC EE Policy Manual, CPUC guidance, CPR directives, are the primary sources DNV intends to use to determine project eligibility.

4.1 Gross savings methodology

The following sub section describes DNV's approach to estimating gross savings for CIAC projects.

4.1.1 Custom Core Template (CCT)

DNV will create an Excel-based Custom Core Template (CCT) to organize and communicate evaluation information for each claimed project evaluation. The CCT will serve as the final site-specific evaluated savings deliverable and provide value serving as the common source for reference material engineers will use to create M&V plans and document evaluations. The CCT will serve as the focus of custom evaluations to store claim information downloaded from the Tracking database, which

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

serves as the custom claims database. The CCT will house all information relevant to the evaluation to organize and effectively communicate M&V activities, savings calculation methodology, supplemental data, energy model references, site visit documentation, and realization rate determination. The CCT will ensure CPUC guidelines are followed and best practices for pre-implementation review/evaluation are considered. Reference material may consist of key guidance, rulings, decisions, policies, and other regulations.

4.1.2 Gross impact data collection

The CCT defines data collection protocols used by both the CPR and CIAC evaluation teams for recording common characteristics of the project: building firmographics, measure descriptions, and PA custom application characteristics and for the assessment of the measure's conformance to estimation standards with a discrepancy analysis.

The template will include a site-specific measure and verification plan (SSMVP) tab, tabs for scoring the project performance assessment that assesses the quality of the forecasted savings development, and tabs for final site reporting. All primary collected data and final results will be incorporated into a single spreadsheet, providing a consolidated and consistent record of site activities. When possible, additional tabs will include the actual savings calculations. However, non-spreadsheet analysis, like building simulations, or analysis dependent on large, metered datasets will be maintained in separate files. As another streamlining feature, once a study template has been finalized it will be prepopulated with tracking data, which decreases the work and errors associated with manually entering this data.

Custom projects by nature are typically unique and not necessarily conducive to an overarching analysis approach. However, based on our team's experience with custom projects since 2006, we anticipate opportunities to design viable analysis and data collection protocols for specific measure categories and/or customer types.

Our evaluation leads will assign each sampled project to a lead engineer based on measure category, team member experience and specialty, and geography. The assigned engineer will be responsible for each of the subtasks in this section, beginning with the development of an M&V plan for each sampled project.

Depending on project size, complexity, installed technology and data availability from the site, 30 projects will receive at least one site visit (either in-person or potentially virtual, depending on CPUC direction) by the assigned engineer. During any site visits, the field engineer will follow team protocols on safety in the field and for any meters deployed.

All interim and final work products will be readily available to the CPUC Program Manager within 24 hours of the request. Some work products will be maintained online and immediately accessible.

4.1.3 M&V planning and rigor selection

For all sampled projects, whether the analysis can be templated or not, the DNV team will use a standardized, Excel-based approach for M&V planning, data collection, and M&V reporting that will be data-driven but will include clear and sufficient narrative to communicate key project findings on baselines, eligibility, calculation methods, measure operation, and reasons for savings differences. We intend to build on prior M&V planning approaches, such as the site-specific M&V plan (SSMVP) template used in the 2020-2021 evaluation cycle – with innovations that clearly tell the story of each sampled project. While we recognize the cost benefits and consistency from templating custom site work, we understand the value in coherently communicating the critical project-level methods and findings to CPUC staff and other stakeholders.

The M&V plan template will allow information to be easily aggregated automatically, while also allowing field engineers to validate key project information preliminarily determined from project files, such as baseline, eligibility, fuel switching, non-PA fuel source and data availability. The template will also allow a concise account of the field engineer's site-level activities (e.g., which facility representatives were interviewed, what data was requested and received).

Narratives will be broken down into discrete sections including the project summary detailing the measure event and timeline/history, applicant methodology, evaluator on-site findings, and identification and discussion of differences quantified in

savings terms that are impacting realization rate. The DNV team will collaborate with CPUC staff and other stakeholders to develop a mutually agreeable format that ensures that the necessary information is conveyed in a manner that is easy to interpret and comprehend.

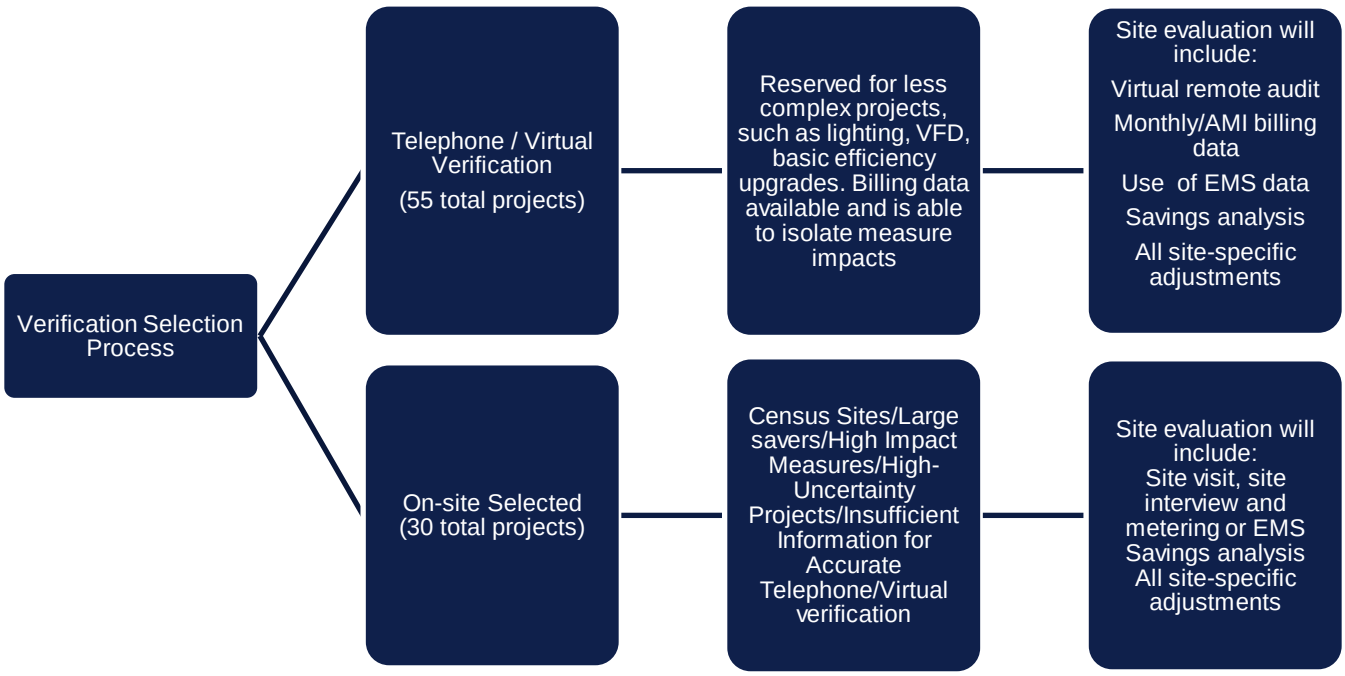
For most sampled projects, the M&V approach and rigor level will be determined based on the type of project and measure types in accordance with the work plan. For other projects, we will designate a default approach based on a preliminary review. The value of additional or more detailed information gathering to the evaluated savings estimate will be a primary consideration in this determination. In either case, the assigned project engineer will review project documentation in detail to ensure the appropriateness of the pre-determined method and, where necessary, modify the approach. Additionally, the engineer will focus review of parameters that are most likely to impact savings, such as EUL/remaining useful life (RUL), HOU, CDF, equipment size and efficiency, load factor, operating hours, production level, temperature/pressure/cfm settings, and pre-installation parameters conditions.

The following sections outline our general methods as well as considerations for the PY2022 evaluation.

4.1.3.1 On-site verification

The DNV team will select 30 of the 76 sampled gross projects for on-site measurement and verification. Projects will be selected based on project size, complexity, installed technology and data availability from the site. Virtual verification and telephone verification will be conducted for the remaining 55 gross sample points. Figure 4-1 provides an overview of the verification selection process used to determine if a project undergoes telephone/virtual verification or on-site verification. These are some of the criteria that we may use, depending on the availability of data provided by the PA. Virtual verification will leverage DNV's virtual data collection software tool, Blitzz, to conduct real-time remote visual verification of installed measures and operating parameters. Blitzz utilizes the customers own mobile phone / desktop computer hardware to directly interface with customers. For customers that are unable to utilize Blitzz, telephone verification will be conducted.

Figure 4-1. Verification selection process



4.1.4 Custom considerations

The following section describes the savings approach and site-specific data collection needs for custom projects.

4.1.4.1 Custom savings analysis

Custom projects, by nature, are unique and therefore warrant tailored approaches to estimate energy and demand savings. However, based on our experience with evaluating custom projects in California since 2006, we anticipate that certain measure groups will be more conducive to templated data collection and analysis tools. We will standardize and test the M&V approaches for such measures when appropriate. Our team has developed automated M&V tools for various end-uses that can leverage high-frequency metered data and estimate the impacts of the installed energy efficiency measures. Our tools are sufficiently flexible and robust enough to capture the savings accurately. Some of the key features of our in-house tools are as follows:

- Reliable analysis with built-in engineering guidance regarding appropriate assumptions and applications
- Traceable calculations including relevant citations
- Automatic vetting of input and output parameters for improved quality control

Table 4-1 below shows a selection of analytical tools our team will leverage for evaluation of custom projects.

Table 4-1. Engineering analysis M&V tools

Energy system	Engineering software tool
Air compressor	Automated 8,760 spreadsheet tool with built-in library of performance curves
Chiller	Automated 8,760 spreadsheet tool
Fan system	Automated 8,760 spreadsheet tool
Injection molding	Automated 8,760 spreadsheet tool
Lighting	Modified Lighting Calculator[16]
Motors and drives	Automated 8,760 spreadsheet tool
Pump system	PA Developed tool
End use and whole facility	Vizualize-IT, analytical tool for viewing and analyzing time series interval data

The above models will follow DEER[17] methods and DEER assumptions including hours-of-use (HOU) unless reliable measured values can be acquired for the evaluated sites. More unique projects will be assigned to engineers with experience in the relevant measure field. One such example is a process-based heat recovery measure, which depends heavily on the site-specific process and application and may not be suitable for templatization. For such projects, the engineer will write a preliminary narrative detailing the measure event, mechanism of savings, baseline conditions, applicant savings methodology, and other relevant information needed for a thorough evaluation. Evaluators will use the information provided to classify the project baseline and identify specific details to pursue during the data collection phase that may lead to baseline reclassification. The approach may replicate the method used in the program application or use a different approach if it is deemed more appropriate for post- retrofit-based evaluator-grade rigor.

All analysis tools and templates have received thorough DNV testing and have been fine-tuned through our team's decades of experience in M&V in support of evaluations of commercial, agricultural, industrial, and new construction projects in California. Nonetheless, all tools used under this contract will undergo senior-level technical review as well and fine-tuning as appropriate.

Possible savings analysis for typical custom measures is outlined in Table 4-2.

Table 4-2. Sample custom savings analysis approach for three example measures

Analysis step	Custom lighting fixture upgrade example	Process motor example	Whole-building RCx example
Analyze and organize metered and trended data	Examine light on/off and intensity variation by hour and day of week.	Investigate motor kW as a function of schedule, production throughput, sales data, or employee hours.	Examine relevant HVAC data (e.g., fan kW, chilled water set-point) as a function of hourly weather conditions and building schedule.
Develop annual as-built hourly profile (8760)	Extrapolate lighting data as a function of schedule over full year using typical facility schedule.	Extrapolate motor kW profile as a function of schedule/production based on typical year with seasonal fluctuations.	Extrapolate HVAC performance as a function of outside air conditions based on typical weather from 16 California climate zones.

[16] Version will be based on date of project approval.

[17] The Database for Energy Efficient Resources (DEER) contains information on selected energy-efficient technologies and measures. The DEER provides estimates of the energy-savings potential for these technologies in residential and nonresidential applications.

Analysis step	Custom lighting fixture upgrade example	Process motor example	Whole-building RCx example
Develop annual baseline profile	Apply pre-project fixture quantities and wattages to as-built profile to determine hourly baseline lighting kW.	Apply baseline motor efficiency (per Title 24, Title 20, or ISP) to annual loading profile to determine hourly baseline kW.	Apply pre-RCx operating characteristics (e.g., higher fan speeds, lower chilled water set-point) to annual operating profiles to determine hourly baseline kW.
Compare profiles and determine savings		Compare annual baseline and post-project as-observed hourly kW profiles. The difference of sums is defined as the evaluated gross first-year energy savings. The evaluated gross peak kW savings is determined by averaging hourly savings over summer peak coincident hours. Lifecycle savings incorporate the measure's Effective Useful Life, and in the cases of dual baseline, the pre-existing equipment's Remaining Useful Life (RUL). In cases where a project is replaced on burnout (ROB) or accelerated replacement, the lifecycle savings calculation requires establishing a second baseline, which would determine savings after the remaining use life of the initial baseline conditions, i.e., at the future point in time where normal replacement would occur.	

4.1.4.2 Custom site-specific data collection and review

The CIAC evaluation team will coordinate with the CPR team on issues observed in the program year under evaluation and to also review the CPR files for selected sites that had a CPR.

All available CPR dispositions for evaluated projects will be taken into consideration during the evaluation. Furthermore, the CPR process relies on documentation provided by the PA, including responses provided by the PA on questions asked by the CPR reviewers. The CPR team rarely talks to the customer directly about the project as the evaluation team does routinely. While CPR dispositions help in ensuring documentation expectations and policy compliance, evaluation findings may acquire additional and/or different information that can lead to a different conclusion as compared to the one reached by the CPR team.

The Statewide Custom Project Guidance Document,[18] program-specific manuals, statewide custom program and policy manual, various CPUC decisions and resolutions, CPUC EE Policy Manual, CPUC guidance, CPR directives, are the primary sources DNV intends to use to determine project eligibility. Measure groups such as lighting and food service are logical candidates to develop measure-specific data collection templates and protocols. Other measure groups in the figure above, such as process and whole building retrofit, are more customer-specific and therefore less likely to benefit from standardized data collection protocols.

Baselines are an important characteristic to any evaluation methodology. An engineer will likely determine the reason for retrofit or replacement for the new installation to determine if pre-existing conditions or market standard/code requirements apply. Each evaluation will follow similar guidelines as the reason for retrofit overlaps across CIAC. Evidence of program influence is required to use accelerated baseline designation. If the technology is replaced on failure or new installation code is required for the type of construction (new construction or major renovation) then a building code or market standard baseline may apply.

Site visits performed may involve the direct observation and/or measurement of equipment. Stipulations will be characterized for projects warranting a basic level of rigor. With the costs of data acquisition and storage continually decreasing, some

[18] California Public Utilities Commission, Custom Projects Review Guidance Documents, cpuc.ca.gov. https://www.cpuc.ca.gov/industries-and-topics/electrical-energy/demand-side-management/energy-efficiency/custom-projects-review-guidance-documents

sampled large commercial and industrial facilities are anticipated to feature sophisticated performance trending systems like energy management systems (EMS) and supervisory control and data acquisition (SCADA) systems. Lighting measures

DNV will use the Modified Lighting Calculator (MLC) to determine lighting project savings. The calculator will apply to projects with lighting that operate during peak periods and affects HVAC end uses (interior lighting). We will directly enter hours of use and enter actual baseline and installed-fixture wattages from actual equipment specifications. For projects including exterior lighting[19] with no demand savings and no HVAC interactions, we will calculate savings using custom spreadsheets. In such cases, we will update key inputs based on our data collection. Key steps for evaluating lighting projects will be:

1. Determine if project includes a deemed measure for which a deemed rebate is available. If yes, flag the project as violating eligibility in the workbook.
2. Determine if the project triggers the Title 24 lighting requirements. If yes, verify that the project meets code requirements for lighting power and controls. If a permit was not pulled but the project triggers Title 24, use the interactive compliance forms to determine if the project meets code requirements.
3. Verify installed lighting products meet program requirements.
4. Determine first baseline for all measure application type (MAT) measures, and second baseline for accelerated-replacement measures.
5. Use DEER HOU or measured HOUs. Self-reported HOUs may be used with an adjustment factor.[20].
6. Recalculate savings based on adjusted baselines and hours of use.

4.1.4.3 SBD savings analysis

DNV's gross evaluation approach for SBD projects will leverage pre-existing building simulation models provided by the PAs and the analysis of gross savings (kWh, kW, and therms) based on project-specific data that will be collected for current conditions as well as historical changes since project installation. Data collected for SBD projects typically include EMS trends, chiller logs, equipment nameplate data, system operation sequences and operating schedules, and a careful description of the current operating conditions. Evaluation engineers will interview the customers and building operating staff to collect relevant equipment operating parameters. As part of the SBD data collection, we will also obtain the new construction building's permit date from the authority having jurisdiction (AHJ) to verify the version of the Title 24 code standards that would apply to the project. In cases where there is a mismatch, we will revise the baseline to the applicable Title 24 code and re-calculated the savings.

The SBD program requires participants to use one of two design approaches to identify and quantify energy-efficient design improvements:

- The performance-based whole building approach: The whole building projects within the non-residential new construction group are very diverse. The size of the projects, the types of installed EEMs, and the energy savings of the projects are highly variable across the population. The whole building approach utilizes building energy simulation models to forecast project-level estimates.
- The prescriptive systems approach: provides individual system estimates for EEMs installed in building systems such as lighting, HVAC, and building shell.

For SBD projects that utilized a whole building approach, we will re-run the PA-provided building simulation models as provided to verify that the modeled results from the performance runs are consistent with tracking savings. The compliance runs will also be executed to verify that the project had a minimum of three EEMs, falling under at least two of the following

[19] When exterior lights are on a separate meter or otherwise constitute major load during evening hours, DNV will use the billing data to validate energy and peak demand savings

[20] DEER hours for the facility type or measured HOUs or stated HOUs adjusted by an adjustment factor developed by Itron.

systems: lighting, envelope, and mechanical, and will reduce energy use by more than 10%, compared to the applicable Title 24 code to be eligible for SBD incentive.

The systems approach will evaluate systems that use energy (such as lighting, HVAC, etc.) on an individual basis. A typical systems approach project uses a simplified modeling tool like a spreadsheet-based analysis or SimCalc,[21] to calculate energy savings by comparing proposed equipment to Title 24 equipment of the same type. Like custom-specific analysis methodologies described in Section 4, we determined the viability of repurposing the PA-provided analysis templates for use as the evaluated model with current information provided by the participant. If the previously used approach is determined to not be a viable method or if we identify a more accurate savings approach, alternative approaches may be used or developed.

4.2 Net savings methodology

DNV's net evaluated savings plan builds on prior experience with custom project attribution research in California. Our team will continue to use the 2015 NTG survey instruments it used in the previous evaluation (PY2020-2021), with some minor changes in question wording in response to stakeholder comments on the previous evaluation report. This instrument was designed to be used for specific program designs including the SBD program.

4.2.1 NTG data collection

The DNV team will use a combination of approaches to field the various survey instruments. Enhanced rigor interviews, for the largest savers and most complex projects, may involve interviews of several entities involved in the project. These might include primary decision-makers, CFOs, vendor representatives, utility account executives, program staff, and other decision influencers, as well as a review of market data to help establish an appropriate baseline. The site engineers may conduct some of these interviews with assistance from other members of the study team who also have experience exploring the multi-faceted nature of these projects and the related decision-making processes.

As a starting point, we will use project size, as measured by program incentives, as the criterion for assigning projects into either basic rigor, standard rigor, or high rigor category. However, we will change the breakpoints from those used to assign projects to the rigor bins in the last round (e.g., $250,000 in incentives for the basic rigor category, $250,000 to up to $1 million in incentives for the standard rigor category, and greater than $1 million in incentives for the enhanced rigor category):. Assignment of projects to the rigor categories in the current study will be based on the follow criteria:

- *Enhanced rigor:* The starting point for this category will be those projects which are in the top 10% of projects based on incentive amount. We will add, to this initial group, any project which contain important measures, or which are especially complex (e.g., contain a mix of measure application types). While project size and complexity are usually correlated, this is not always the case. The in-depth interviews that are part of the enhanced rigor process should be able to shed more light on these projects than a CATI survey.
- *Standard rigor:* This category will include the next quartile of projects in terms of incentive amounts after those already included in the enhanced rigor category.
- *Basic rigor:* This category will include all the remaining projects which did not qualify for the enhanced rigor or standard rigor categories described above.

The NTG survey data collection process will be fully compliant with the CPUC's Self-Report Guidelines. The gross- and net savings teams will work closely together when the NTG surveys/interviews should be conducted and who should conduct them. For example, if the site engineers have completed the data collection they need for their gross savings analysis and the site contact has some availability (and is the project decision-maker), then the site engineers could field the NTG survey at that time. However, if the site contact is not the project decision-maker, or if the site contact otherwise unable to complete a second survey, then the NTG survey/interview will be scheduled for a different time. The site engineers will be trained to conduct the

[21] SimCalc is a California utility-specific tool that is based on a DOE-2 engine and incorporates the Title 24 standards with associated Alternative Calculation Methods (ACM) rulesets to estimate savings associated with systems approach SBD projects.

surveys supplemented with additional professionals with experience levels that are commensurate with the interview requirements. Standard or Enhanced Rigor project interviews may also be conducted by the site engineers or non-engineer trained professionals.

The gross- and net-savings teams will also work together to reduce the amount of time between the completion of the gross savings analysis and the completion of the net savings analysis. This is important because if projects which make claims about AR have evaluated NTGRs at or below 0.5, the gross savings team will have to overturn the AR MAT and establish a different baseline for their analysis. As discussed below, we plan to use internal DNV staff for the NTG interviews/surveys for the embedded projects and this should improve coordination between the gross and net teams which was more difficult when a third party (e.g., the CATI firm) was recruiting some of the embedded sites in the last round.

Some of the surveys for repetitive measures, like lighting, will be conducted via computer-aided telephone interview (CATI) software. Use of a CATI approach has several advantages: 1) the surveys are customized to reflect the unique characteristics of each program, and associated program descriptions, response categories, and skip patterns; 2) it drastically reduces inaccuracies associated with the more traditional paper and pencil method; and 3) the process of checking for inconsistent answers is automated, with follow-up prompts triggered when inconsistencies are found.

Our current sampling approach is to attempt to complete NTG surveys/interviews with the full population of embedded projects, although we realize that it is not realistic to expect a 100% response rate. Since, in the last round, we had a much higher survey/interview completion rate using DNV staff than the CATI firm, in the current round we are planning to reserve the NTG surveys/ interviews with the ~76 embedded sites for internal DNV staff and have the CATI firms focus on the ~70 net only sites.

DNV's data collection approach will vary based on the NTG rigor assigned to the project (see assignment criteria above):

- Basic Rigor: Participants in this group will be subject to NTG surveys which contain all the key questions used for NTG scoring used in the standard/enhanced rigor interview guides, but with fewer follow-up questions for qualitative elaboration of the scores and with generally shorter, simpler question batteries
- Standard Rigor: Participants in this group will be subject to In-depth interviews with more complex and comprehensive question batteries than the Basic Rigor surveys. In some cases, these interviews will include multiple decision makers. These may include vendor interviews as indicated by customer responses. In addition, the DNV team will have more than one evaluator review the interview responses and resolve any differences in the interpretation of these responses to ensure a more rigorous assessment of the evidence.
- Enhanced Rigor: Participants in this group will be subject to in-depth interviews nearly identical to those administered for the Standard Rigor participants. However, Enhanced Rigor projects will be subject to more research from the evaluation team as to how the project baseline assumptions compare to those from Common Practice Baseline studies. In addition, because of their greater size, Enhanced Rigor projects are more likely than Standard Rigor projects to require NTG interviews with multiple project influencers. Finally, similar to the approach taken for the Standard Rigor projects, the Enhanced Rigor projects will have more than one evaluator review the interview responses and resolve any differences in the interpretation of these responses.

4.2.2 NTGR estimation approach

NTG data analysis consists of two steps: (1) computing the project level NTGRs; and (2) using a ratio estimation approach to aggregate to utility and domain-level savings estimates. Each step is discussed below.

SRA Project-level NTGRs. The standard SRA methodology includes a specific algorithm for calculating an NTGR based on responses received. The 0 to 10 scoring is used to develop specific values for each of the three measurements used to calculate NTGR, using an Excel-based spreadsheet. For projects involving more than one measure, separate NTGRs are calculated for each component and a composite NTGR is computed by applying savings weights.

In order to maximize reliability of results, the DNV team will utilize two independent analyses of the data for all Standard or Enhanced Rigor projects. Each of two team members will analyze the data separately and then compare and discuss the results.

If two team members produced NTGR estimates for a given project that were very divergent, we will first try to understand why they differed so much and how similar evidence was interpreted differently by two people with similar training. This analysis would tease out the reasons for these differences – whether this might be an inconsistent application of the methods or simple disagreement on how to interpret similar evidence. Whatever the reasons, we would ultimately have to choose an NTGR which might come from either of the team estimators or a new NTGR estimate informed by both estimators. In rare cases this might involve going back to the project decision makers for additional information. Careful training of analysts in the systematic use of rules will be employed to ensure inter-rater reliability.

PA and domain-level NTGRs. To estimate the net-to-gross ratio (NTGR) at the domain level, the individual NTGRs for each of the projects in the sample will be weighted using:

- The evaluated gross energy savings for “embedded” projects which have been subject to both gross and net savings analyses
- The ex-ante (unevaluated) gross savings for “non-embedded” project which have only been subject to the net savings analyses.

Besides these gross savings weights, the domain-level NTGRs will also be weighted by the proportion of the total sampling domain savings represented by each sampling stratum and by source fuel domain (electricity, natural gas, or source Btus). Weighted NTGRs are calculated for each size stratum for each utility, thereby supporting analysis at the utility (i.e., program administrator) level only.

Previous evaluations have conducted several analyses to explore the variability, reliability, and sensitivity of the NTGRs and to better understand the factors that were driving NTGRs. These analyses included:

- Conducting a sensitivity analysis which explored how much the NTGRs would change if the various measurements of program influence were weighted in different ways.
- Trying to understand drivers of program influence by putting the NTGRs into quartiles and then comparing the top and bottom quartiles in terms of how much they valued various program factors (e.g., rebates, program staff recommendations, program marketing materials, and program-provided technical assistance) and non-program factors (e.g., project decisions made before engaging the programs, industry standard practices (ISPs), corporate policies, etc.).
- Examining the more detailed NTG responses for the Standard and Enhanced Rigor projects to better understand the possible reasons for contradictory responses.
- Exploring whether NTGRs for projects in certain market segments or measures or program delivery strategies (e.g., direct install lighting) are statistically different as compared to custom projects in general.

4.2.3 NTG Scoring

DNV will use the following three scores to calculate the NTGR:

- **Program-attribution index 1 (PAI-1)** score reflects the influence of the most important of various program and program-related elements in the customer’s decision to select the specific program measure. Program influence through vendor recommendations is also incorporated in this score. It is based on the highest rating for a program influence divided by the sum of the highest rating for a program influence plus the highest rating for a nonprogram influence.
- **Program-attribution index 2 (PAI-2)** score captures the perceived importance of the program (whether rebate, recommendation, training, or other program intervention) relative to nonprogram factors in the decision to implement the specific measure that was eventually adopted or installed. We will determine this score by asking respondents to assign

importance values to both the program and the nonprogram influences so that the two total 10. We will adjust the program-influence score (i.e., divided by 2) if respondents say they had already made their decision to install the specific program-qualifying measure before they learned about the program.

- **Program attribution index 3 (PAI-3)** score captures the likelihood that they would have selected the exact same equipment if the program had not been available (the counterfactual). The PAI 3 score is calculated as 10 minus the likelihood of installing the same equipment.

We will calculate the NTGR as the average of these three program attribution index scores.

4.3 Approach for determining cost, lifecycle, and load shape

This section describes our approach to collecting data on measure cost, lifecycle, and load shape. DNV will use the following approaches:

- **Measure cost.** We will review project documentation to verify that valid and appropriate costs consistent with the MATs assigned, supported by invoices, were included per the CPUC requirements defined in the EE Policy Manual V6.0 and the rules defined in the 2019 Investor-Owned Utility Customized Offering Procedures Manual for Business.[22]
- **EUL and RUL**. We will use all available information for each claim to assign it the most appropriate EUL from DEER. If we determine that the claim is an accelerated-replacement measure, we will assign an RUL based on a combination of PA-documented evidence and information from the participant on equipment age and operating condition. Absent definitive evidence to establish RUL of the existing equipment, we will use the CPUC policy default RUL equal to one-third of the EUL of the existing equipment.
- **Whole Building (multiple measures).** While the CPUC has issued a memo dated May 11, 2021, to provide direction on claiming EUL of 14 years for whole building projects (excerpt reproduced below) because of the Covid-19 condition, DNV intends to calculate evaluated EULs using the measure savings-weighted approach:

  "An EUL value of 14 years for use in the Savings by Design program for projects participating under the non-residential new construction Whole Building approach submitted by December 31, 2021. For projects that cannot be completed by December 31, 2021, the PA must request approval to use the 14-year EUL value in writing to CPUC staff and provide supporting information as to why the project cannot be completed by the expiration date. The EUL value of 14 years does not apply to project applications submitted under the new 2021 3P implemented commercial new construction program."

4.4 Identify measure application type (MAT)

As noted in past evaluations, incorrect assignment of MAT resulted in the erroneous reporting of savings. We will review the claimed MAT for each measure to ensure that the appropriate MAT was claimed. If it is found that an incorrect MAT was applied, we will align the MAT per CPUC definitions. There are six approved measure application types:

- Accelerated replacement
- Add-on equipment
- Behavioral, retro-commissioning, and operational (BRO)
- New construction/new capacity
- Normal replacement (Includes replace on burnout)
- Building weatherization (building shell and related components)

[22] PG&E, SCE, SoCalGas, SDG&E. 2019. *2019 Statewide Customized Offering Procedures Manual for Business.* San Francisco, CA: CPUC

4.4.1 Accelerated-replacement claims

DNV will establish if the program accelerated the replacement of measure equipment. Accelerated replacement (AR) requires two sets of baselines and savings values to accurately account for their lifecycle savings. A valid AR baseline assignment requires an understanding of whether the customer would have replaced the existing equipment absent program influence, and the equipment was viable to operate and was providing the intended service. If these two conditions are not met, the measure will be considered normal replacement.

DNV will review supporting documentation to determine the condition of the replaced equipment and the reason for the replacement. DNV will conduct customer interviews that is in-line with CPUC's POE guidance to verify the documentation review findings and obtain additional information as necessary to determine if the measure qualifies for AR or normal replacement.

For accelerated replacement projects that do not pass the equipment viability and/or program influence requirements (evaluated NTG at or below 0.5), the DNV team will change the baseline to normal replacement.

4.5 M&V site reporting

All sampled projects will receive an excel based final site report that is called a Common Core Template (CCT) described in Section 4.1.1 that builds on the preliminary file review reflected in the SSMVP template. The CCT will allow the assigned engineer to categorize project characteristics (e.g., baseline category and justification, measure eligibility) as well as narratives for more site-specific information. This site-specific information will include how on-site interview findings and data collection compared with that planned and drivers of calculated deviations in realization rates from 100%. The site-level discrepancy analysis will be a focus of the CCT for evaluated savings purposes, incorporating both categorization and quantitative breakdowns of the GRRs as well as qualitative explanation as to what happened and what can be readily improved in future program cycles.

4.5.1 M&V plan features

The M&V plan contained within the evaluation's CCT will serve as the roadmap the evaluation. Engineers will follow to document site visits, data collection, and methodology for estimating savings (and ensuing realization rates) within each M&V plan. Each evaluation will consist of a detailed documentation review to understand implemented measures and the previously installed conditions. DNV will then have expert reviewers provide input towards the proposed plan, data collection techniques, and savings calculations to maintain quality standards of typical M&V procedures and policy requirements. Reviewers will consist of senior engineers, subject matter experts, or a combination of both. The CCT and review process will guarantee consistency and repeatability of M&V activities.

As each sampled site is unique, DNV will attempt to provide standard communication and technical support to create a seamless and uniform evaluation process. However, differences will always occur when a vast number of different technologies and M&V approaches exist. We will communicate challenges and provide solutions within our M&V plans to maintain evaluation integrity.

DNV will work with PA account representatives to recruit sampled customers for evaluation and schedule a site contact interview to modify the M&V plan before attempting a site visit. The site contact interview will provide important information about installed technologies, efficiencies, operating conditions, quantities, etc. Using the information obtained during the documentation review and site contact interview, engineers will finalize M&V plans to document the best evaluation option and all requirements as discussed above.

For projects selected for on-site measurement and verification, DNV will schedule site visits once the M&V plan is prepared, reviewed, and approved by the CPUC. Our engineers will use the M&V plan to properly prepare for a site visit and to collect appropriate data for energy savings calculations. The M&V plan will also provide a reference during site visits to identify

discrepancies that exist between documentation, site contact interview, and actual installed conditions. After a site visit, engineers will adjust the CCT to reflect limitations to executing the planned site M&V as well as discrepancies and significant changes found throughout the entire evaluation process.

Significant training to fill out each CCT will ensure field staff appropriately document M&V activities and understand all materials provided in the CCT reference material, as listed above. DNV will maintain a common file archive of evaluation-related resources, industry standard practice (ISP) studies and various versions of Title 24 building-energy-efficiency standards.

4.5.2 Eligibility

DNV will determine project eligibility before developing a full-fledged customized M&V plan for a project. The team will request project documentation and will review all sampled projects for compliance with the CPUC decisions, rulings, and policies as well as the state-wide custom program requirements and program-specific requirements. DNV will review and track reasons for zero savings determination. DNV will define any projects as ineligible, zero saver sites where obvious violations are found that would have otherwise resulted in rejection during PA review. Most zero savers are expected to have policy issues such as failure to meet the definition of EE per the CPUC policy manual, installation of industry standard equipment, installation of measures disallowed by the PAs, or installation outside the program year.

The Statewide Custom Project Guidance Document,[23] program-specific manuals, statewide custom program and policy manual, various CPUC decisions and resolutions, CPUC EE Policy Manual, CPUC guidance, CPR directives, are some of the resources DNV intends to use to determine project eligibility. DNV recommends that the PAs review project documentation for sampled projects for completeness prior to submission to minimize the risk of ineligibility determination by the DNV team:

- Projects have followed the Program guidelines and CPUC policy requirements
- Documentation to support baseline, measure/project concept of energy efficiency, savings estimates
- Submit reproducible savings model that matches savings and EUL claim
- Clearly identify project-approval and installation date, and exceptions granted are documented
- Provide clear documentation of project extensions
- Provide documentation on extended M&V requirements written into the customer agreement

Deemed measures are sometimes claimed in custom projects and may occur in the sample frame. These deemed claims are expected to account for a very low percentage of the lifecycle savings in the total sample frame. DNV will determine the frequency and savings magnitude of deemed measures beginning with sample design preparation. Deemed savings claims that are not associated with a custom project and have paid custom incentives or claimed savings using customized approaches will be considered ineligible and assigned zero savings.

Table 4-3 provides the criteria that will be used in the PY2022 evaluation to determine project ineligibility. This table is based directly on the ineligibility criteria established in previous evaluations and may be updated with additional eligibility criteria, based on reviews of program-specific documents. Additional evaluation guidance DNV intends to follow is shown in APPENDIX A

[23] California Public Utilities Commission, Custom Projects Review Guidance Documents, cpuc.ca.gov. https://www.cpuc.ca.gov/industries-and-topics/electrical-energy/demand-side-management/energy-efficiency/custom-projects-review-guidance-documents

Table 4-3. Project ineligibility criteria

Ineligibility criteria	Evaluation practice	Exceptions/discussion
Tracking data shows measure installation before the program year being evaluated	Remove from the sample frame	Custom projects other than those from the NMEC, HOPPS, or Strategic Energy Management (SEM) programs for which extended measurements are required and carried into multiple program years, will be considered ineligible if the installation did not occur in the program year being evaluated. Custom project installations that occurred in Q4 of the program year immediately preceding the program year being evaluated will remain in the sample frame subject to the evaluation practice described next.
Measure installed in Q4 of the program year immediately preceding the program year being evaluated did not require measurements to true up savings	Measure ineligible for evaluation	When measurements are required to true up savings claims the M&V requirements must be specified and described in the customer agreement to allow the measure savings to be claimed in a different program year.
Measure installed prior to project approval	A measure installed prior to project approval is ineligible	Some programs such as PG&E's Advanced Pumping Efficiency Program (APEP) allow application for incentive after the project is complete and requires submission of pre- and post-test results, savings calculations, and paid invoices. Some DI projects that are identified and implemented rapidly might not have documentation to support sequential approval and installation.
Equipment ordered prior to project approval without the PA authorization	If equipment was ordered prior to project approval, the project is ineligible.	If there is documentation by the PA or implementor dated prior to equipment ordering that allowed equipment ordering prior to project approval, then the project is eligible.
Installation time limit exceeded	If the measure was not installed within the allowed installation time specified as program requirement and/or customer agreement for installation, the project is ineligible	If there is documentation by the PA for authorizing installation time extension(s) in a timely manner, then the project is eligible.
Non-regressive efficiency	If installed equipment has the same or lower efficiency than the existing equipment, the measure is ineligible.	No exceptions.
Fuel substitution test failure	If the project included fuel substitution and required a fuel substitution test (three-prong test prior to August 1, 2019, and two-prong test starting August 1, 2019) and failed required test, then ineligible.	If the test result was not provided, the evaluator will attempt to complete the test to confirm compliance.

Ineligibility criteria	Evaluation practice	Exceptions/discussion
Deemed claims and non-permanent measures	Not eligible as custom savings claims	Deemed savings may be claimed with a custom project for customer convenience provided deemed incentives have been paid. Deemed measures for which custom-calculated savings are claimed and/or custom incentives are paid shall be considered ineligible.
Non-PPP Charge paying customers	If the customer does not pay PPP charges for the sampled fuel, or savings are for fuel not sourced from a California IOU or the project is installed by a departing load customer, the project is ineligible.	No exceptions.
Lack of Required Permits	If there is no documentation of permit closure, per SB-1414, for measure that require the PA to obtain proof of permit closure, then the claim is ineligible. SB-1414.	No exceptions.
Code Year Inconsistent with the Permit Date	If the baseline code year used is inconsistent with the permit date, project savings will be calculated using the applicable code year based on the permit date	No exceptions
Rulebook and Program Rule violations	If the installed measures are not allowed per program rules, such as LED products not listed in the statewide Qualified Products List, = or no permanent measure, then the measure is ineligible.	Deemed measures that are typically not eligible in custom programs but are included with the custom project will be allowed and the savings will be passed through when claimed with deemed savings and deemed rebate.
SBD whole building project without required measures	SBD whole building project that does not have at least three measures applicable to two of the end uses of lighting, envelop and mechanical systems are ineligible.	No exceptions.
SBD whole building projects without required minimum savings	SBD whole building projects that do not have savings that exceed code	No exceptions.

Ineligibility criteria	Evaluation practice	Exceptions/discussion
	baseline by 10% or more are ineligible.	
Participant declines to participate in evaluation	A participant declines two times to participate in the CPUC EM&V studies. Savings will be zeroed out as D.10.04.029 requires participants to fulfil EM&V obligations. Substitute samples will not be drawn.	No exceptions.

4.5.3 Savings analysis and data collection

The sections below generally describe typical savings calculation methodologies and data collection strategies.

4.5.3.1 Monthly Consumption Data Analysis

At the onset of a project evaluation, DNV will conduct a monthly consumption billing analysis to evaluate the impact of an installed measure at the site level. Monthly consumption analysis will enable us to assess the effectiveness of specific implemented energy savings measure or projects. By comparing pre- and post-implementation energy usage, you can quantify the energy savings achieved. This process will allow our engineers to benchmark engineering model results against the consumption analysis to ensure reasonableness of results. Additionally, if an installed measure/project's consumption is a large enough proportion to the overall usage (>10%), the consumption analysis may be used as the final project level analysis.

If interval data is available, project will be required to have a fractional savings uncertainty (FSU) of 50% and 90% confidence. Meaning that a model should explain enough of the variation in the data that if there is an expectation of 15% savings, then the models will create 90% confidence intervals that are +/- 7.5% on either side of that 15% savings.

4.5.3.2 Savings calculation methodologies

Energy savings methodologies vary greatly depending on measure end-use type and are an important focus of custom evaluations. Applicants provide energy savings estimates and supporting evidence for each custom energy efficiency project completed. DNV will provide a review of the methodology used for each site and document the review in the CCT. Normally, savings methodologies used to forecast savings continue to be DNV's approach for energy savings. However, there will be some cases where we will recommend alternative savings methodologies for evaluation purposes depending on the parameters that most impact energy savings, , relevancy of methods and calculations, adherence to CPUC policy guidelines, etc.

Each calculation methodology may contain assumed constants, input parameters, and base formulas that DNV will verify by using metering procedures, site contact interviews, site observations, vendor assistance, or any combination thereof. We will determine if information is reliable or if additional evidence is needed for verification purposes. We will also determine whether it is enough to rely on a phone call or email, or whether it is necessary to conduct an onsite visit for inspections, measurements, or metering.

Based on the measure end-use and savings methodology, DNV will determine the M&V rigor for each sampled project. We will determine the appropriate evaluation approach to estimate impacts and the accompanying resource intensity and engineering needs required to accomplish it. Estimating resource need prior to evaluation initiation is difficult and will vary upon project characteristics and uniqueness. Large scale projects may appear complex due to size but rather follow standard or commonly accepted approaches which reduces resource needs while smaller projects may mislead need estimations by calculating savings on unrefined approaches that require increased time dedicated to deducing assumptions or for engineers to find a recommended alternative methodology.

4.5.3.3 Data collection strategy

DNV will evaluate assess projects based on measure types and measure application types which require adaptation when deciding field instruments, collection procedures, and M&V techniques to gather necessary data. Project-evaluation engineers will develop data collection forms and survey instruments that are customized according to the site-specific M&V plan. An example of this approach is an evaluated HVAC retro-commissioning (RCx) project. This project could involve schedule optimization, economizer optimization, supply air temperature reset for AC units, and discharge air temperature reset for heating units. To determine savings, we can leverage trend data that develops regressions based on a series of actual trends vs. outdoor air temperature (OAT) for the same data period. We can then apply these regressions to CZ2010 weather bins to estimate energy savings at each bin. As part of the data collection efforts, we will attempt collect up to one full year of recent trend data to inform the current operation of the impacted equipment.

Data collected for projects will vary from site to site and can include:

- Verification of installed equipment to make sure that it is operating as intended, spot measurements of significant technology characteristics (kW consumption, surface area, max mass flow rate, etc.), and operation of the specified equipment.
- Operational conditions including but not limited to load, hours of use, process temperatures, and seasonal variations. This information is collected for current conditions as well as historical changes since measure installation.
- Power measurements of equipment that are taken over a representative range of operating conditions and a period long enough to establish normal operational parameters with a high degree of certainty.
- Trend data from onsite monitoring systems or building management systems that show equipment operation.
- Production data if equipment operation is directly related to production.

Project files may contain data collected from the site including facility trend data, baseline conditions, and operation immediately after project installation. DNV intends to use all relevant data provided to estimate energy savings by comparing baseline use with as-found conditions.

Following the approval of this work plan, DNV will develop a list specifying documents required for the sampled projects.

4.5.3.4 As-found data requirements

CIAC projects will be evaluated based on as-found condition of the installed equipment. As-found condition reflects the actual operating conditions of the installed equipment such as controls methods, control setpoints, occupancy levels and building schedule during the time of the evaluation. As-found data includes current post installation data collected during on-site, virtual and telephone verification activities which includes consumption data, spot measurements, long term metering and/or photographic evidence. For telephone and virtual verification, this data can be provided by the customer in form of photographs, EMS screenshots, production logs and any other relevant data to demonstrate the as-found operating condition of the installed system.

4.6 Multi-year project claims

Projects may span multiple years with frequent evaluations performed where incentives are equally spanned over the time of the project. For these projects, it is common that the tracking database contains multiple claim entries across different program years. DNV will seek out these multi-year projects that may exist in the random sample by comparing prior years claims from the same project. To maintain consistency with prior evaluation cycles, DNV will evaluate savings based on the following conditions:

- If the project was claimed in prior years with zero savings (only incentive payment was claimed): Savings are evaluated per the 2022 work plan protocol. EUL is specified for the appropriate measure lifecycle.
- If the project was claimed in prior years with non-zero savings: The project is classified as a zero saver since savings were claimed in a prior year and applied to the EUL for lifecycle savings. Savings are evaluated as zero. Lifecycle savings were previously claimed, so any subsequent claim would only double-count savings. Possible exceptions may appear if the prior year claim assigned an EUL of 1 year instead of a longer appropriate value for the measure. Another example is that subsequent claims in other program years only include an incremental savings value. Incremental savings claims can be evaluated as full savings claims repeated in two successive years may be evaluated with the second claim treated as an incremental claim. DNV will discuss any possible exceptions with the CPUC to determine appropriate handling of evaluated savings.

4.7 Deemed savings approach

For projects that are identified as deemed, the evaluation will use the following approach to determine savings:

- For deemed measures that were not associated with a custom project:
  - Zero savings will be applied.
- When deemed savings and incentives are claimed for a deemed claim associated with a custom project, savings will be passed through:
  - However, if either the savings or incentive values are based on custom-calculated values then the deemed measure was considered ineligible and assigned zero savings. If the entire claim consists of one or more ineligible deemed measures, savings will be set to zero only for the identified ineligible deemed measure, not the entire claim.
- Deemed claims for measures for which deemed incentives are not available can be claimed in custom programs.

Table 4-4 provides a summary of the different scenarios for deemed claims and their corresponding evaluation outcomes.

Table 4-4. Deemed savings approach summary

Reported claim type	Reported savings analysis approach	Reported incentive	Evaluation outcome
Standalone Deemed	Deemed	Deemed	Zero savings
Deemed as part of a custom project	Deemed	Deemed	Savings passed through
Deemed as part of a custom project	Deemed	Custom	Zero savings
Deemed as part of a customer project	Custom	Deemed	Zero Savings
Deemed	Deemed	Custom - no deemed incentive available	Evaluated in custom program

4.8 Multi-Claim project approach

When a project has more than 2 claims, DNV will select the top 2 saving claims based on a standardized MMBTU unit. For projects with 2 or fewer claims, all claims will be evaluated.

The top 2 savings measures will be obtained by aggregating multiple measures installed on site. For example, if there are 3 Lighting measures and 3 HVAC airflow control measures installed on site, each of them will be aggregated into 2 measures (lighting and HVAC), for analysis purposes.

With this, DNV will calculate project level evaluated savings as:

$$Savings_{ExpostEvaluated-Total} = Final\ GRR \times Savings_{PA-Claimed-Total}$$

$$Final\ GRR = \frac{(GRR_{M1} \times Savings_{PA-Claimed\ M1}) + (GRR_{M2} \times Savings_{PA-Claimed\ M2})}{(Savings_{PA-Claimed\ M1} + Savings_{PA-Claimed\ M2})}$$

$$GRR_{M1} = \frac{Savings_{Evaluated\ M1}}{Savings_{PA-Claimed\ M1}},\ GRR_{M2} = \frac{Savings_{Evaluated\ M2}}{Savings_{PA-Claimed\ M2}}$$

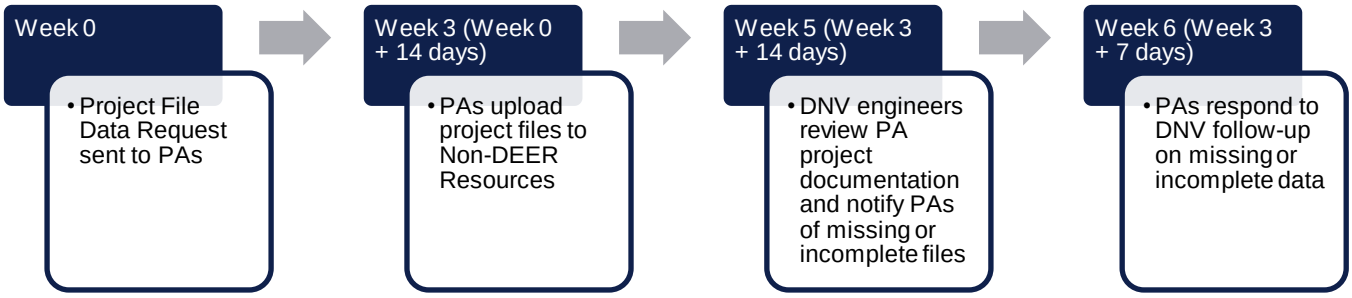
Where,

$Savings_{ExpostEvaluated-Total}$ = Total evaluated savings (project level)
$Savings_{PA-Claimed-Total}$ = Total Claimed savings
$Final\ GRR$ = Average weighted realization rate including top 2 highest savings measures (M1, and M2)
$M1\ \&\ M2$ = Top 2 highest savings measures
GRR_{M1} = Gross Realization Rate (Measure 1) in %
GRR_{M2} = Gross Realization Rate (Measure 2) in %
$Savings_{Evaluated}$ = Evaluated savings (kW, kWh, and therms)
$Savings_{PA-Claimed}$ = Tracking/PA Claimed savings (kW, kWh, and therms)

4.9 Data Request Process

Figure 4-2 outlines the data request process. Pivotal to the success of the evaluation and timely communication of results is an adherence to initial project file data requests and subsequent follow-up request for clarification. DNV will work with PAs and CPUC staff throughout the PY2022 evaluation to communicate expectation surrounding data requests, in particular follow-up requests to PAs. During the initial review of project files (Week 5), we will review submitted project documentation and identify areas that clarification is required. For example, if the savings in the final submitted project saving calculation file do not match the savings in the California Energy Data and Reporting System (CEDARs) tracking system, DNV will notify the PA and request clarifying information. PAs will have 7 calendar days to respond to the follow-up request, after which DNV will conduct their evaluation with the project files submitted during Week 3.

Figure 4-2. Data request process



4.9.1 Customer follow-up process

A DNV engineer or recruiter will contact customers to inform them that they have been selected to participate in the evaluation. If customers are unresponsive or refuse to participate, the DNV team will note this as a refusal/unresponsive and select a backup sample point. If customers have refused or were unresponsive in the past, and this constitutes a second refusal/unresponsive denotation, the project will be marked as having zero attributable savings, and no backup will be selected. If a customer agrees to participate in the evaluation, and then becomes unresponsive on subsequent follow-up data requests or communications, this customer will be noted as a refusal/unresponsive, and the previously noted conditions for zeroing out the savings will apply.

DNV will engage with PAs prior to attempting to recruit customers to ensure the accuracy of contact information. Additionally, if a customer becomes unresponsive, DNV will notify the PA and request support in re-engaging with the customer. DNV will attempt to re-contact customers no more than 3 to 5 times, after which they will be noted as refusal/unresponsive.

5 PORTFOLIO SAVINGS APPROACH

The DNV team will determine portfolio-level savings in the following steps:

1. First Year Savings:
    1. Calculate sample expansion weights for each sample.
    2. Use the sample expansion weights to calculate ratios including the gross realization rate GRR, the Net-to-Gross Ratio NTGR, and the overall realization rate RR.
    3. Multiply the total claim by the GRR to produce evaluated gross savings, and multiply evaluated gross by the NTGR to produce evaluated net savings.
2. Apply EUL and RUL inputs to develop lifecycle savings.

These steps are described more fully below.

5.1 Sample expansion weights

The DNV team will develop weights to expand the sample results to the population. The sampling weights will reflect the sample stratification and population counts and completed sample counts. The sampling weights may also incorporate sample and population characteristics not used for explicit stratification. This approach allows us to adjust more accurately for nonresponse, without requiring a deeply stratified sample.

Response rates to all types of customer collection have been declining, and even with the best practice methods there is the potential for the responding sample to be systematically different from the overall population of interest. DNV's sample expansion procedures will incorporate advanced non-response adjustment methods into our weighting and calibration. These methods allow us to make maximal use of available population characteristics to produce tailored case expansion weights for each respondent, resulting in substantial bias reduction for the final population estimates.

DNV will calculate the sample case weight as the product of two factors:

- The inverse of the inclusion probability using post-stratification as needed
- Post-stratification adjustment, calibrating the full sample to known population totals not included in stratification

For studies representing a participant population enough information about key participant characteristics may be known to enable using the first factor alone. To calculate the second factor, we will use a model-based calibration technique known as iterative proportional fitting (aka raking). This technique allows us to incorporate information into the weighting such as measure type, third party implementer status, climate zone, or other indicators that were not used for stratification but may be related to response rates or to the responses themselves. The approach essentially allows us to estimate response probabilities as functions of these known characteristics and calibrated to population totals. The technique also allows us to constrain the magnitude and variability of the final weight adjustments. This helps reduce unequal weighting in the final adjusted sample weights. Limiting unequal weighting improves precision.

5.2 Realization rates and NTGR

Analysis under other tasks will use the collected data to determine values such as gross and net savings for each sampled unit. Using the sample expansion weights and the design, DNV will develop estimates of the targeted population parameters, along with 90% confidence intervals. For example, if verified gross savings is determined for each sampled customer and net savings for each customer, then the overall realization rate, NTGR, and confidence intervals for these will then be determined.

The basic approach to each of the verified gross savings realization rate, the overall realization rate and the NTGR are described below. These formulas can be adapted for annual or lifecycle savings.

Gross Savings Realization Rate. The gross savings realization rate is calculated as the weighted sample verified gross savings divided by the weighted sample gross tracked savings. Units of analysis in the formula will be defined as appropriate for each study, typically as a site, a measure, or a project. The basic approach to each of the verified gross savings realization rate, the overall realization rate and the NTGR are described below. Each of these formulas can be implemented with the savings terms SAV equal to the first-year or the lifecycle savings.

$$GRR\% = \frac{\sum w_i \times SAV_i^{Evaluated}}{\sum w_i \times SAV_i^{Tracking}}$$

Where:

$GRR\%$	= Gross savings realization rate
w_i	= sample weight for unit of analysis *i*
$SAV_i^{Evaluated}$	= evaluated gross savings for unit of analysis *i*
$SAV_i^{Tracking}$	= tracking gross savings for unit of analysis *i*

Net-to-gross Ratio. The net to gross ratio is calculated as the weighted sample net savings divided by the weighted sample evaluated gross savings. Units of analysis in the formula will be defined as appropriate for each study, typically as a site, a measure, or a project.

$$NTGR\% = \frac{\sum w_i \times SAV_i^{Net}}{\sum w_i \times SAV_i^{Evaluated}}$$

Where:

$NTGR\%$	= net to gross ratio
w_i	= sample weight for unit of analysis *i*
SAV_i^{Net}	= evaluated net savings for unit of analysis *i*
$SAV_i^{Evaluated}$	= evaluated gross savings for unit of analysis *i*

Overall Realization Rate. The overall realization rate is the product of the GRR and the NTGR

$$RR\% = GRR\% \times NTGR\%$$

Where:

$RR\%$	= overall realization rate
$GRR\%$	= Gross savings realization rate
$NTGR\%$	= Net to gross ratio

5.3 Standard error calculations

The gross realization rate and NTGR are both calculated as stratified ratio estimators. The DNV Team will use standard routines to calculate the ratios together with their corresponding standard errors. The overall realization rate is the product of the GRR and NTGR. The DNV Team will apply a standard formula for calculating the standard error of a product to produce the standard error of the overall realization rate.

6 REPORTING

The primary objective of this task is to provide clearly written reports with high-quality results and recommendations, delivered by the deadlines set forth by the CPUC. Non-technical language will be used, particularly in the executive summary, so that the findings and conclusions are accessible to even non-technical audiences.

Shortly after completing the work plan, DNV will provide a preliminary final report outline to help the team focus on final results, engage the team's Professional Technical Writer early, and give CPUC staff an early opportunity to contribute to the report scope. DNV acknowledges the importance of the CPUC timeline and the need to coordinate with of the CPUC to ensure that all products, components, and results required to be incorporated in this deliverable are completed in time to meet due dates for evaluation report each year.

To achieve the primary objective, we will:

- Conduct a staged review process with key reporting deliverables spread out weeks apart to allow for feedback and revisions from CPUC staff, key stakeholders, and the public
- Start reporting as early as possible in the evaluation cycle to stay on schedule and maintain high quality in all reporting deliverables
- Craft clearly written methodologies sections for each report, including sample design, data collection, analysis, and any other methodologies required for each study
- Report study results that thoroughly address each of the research questions set forth in the final work plan
- Write concise and clearly written executive summaries so that study results are accessible to non-technical audiences and are available for public consumption
- Produce informative graphics to allow readers to quickly and easily interpret results and key findings
- To successfully complete the impact evaluation reports, we propose a set of reporting deliverables that allow for review and feedback from CPUC staff, stakeholders, and the public. The key reporting deliverables include the following:
- Draft and final outlines for the impact evaluation reports
- Draft impact evaluation reports due to CPUC staff
- Draft impact evaluation reports due to stakeholders and the public
- Stakeholder presentations/workshops
- Final impact evaluation reports on PDA and CALMAC

The outlines, draft reports, stakeholder presentations, and final reports impact evaluation reports are due at distinct stages in the reporting process to allow for adequate time for CPUC and stakeholder feedback and revisions. We provide further details on the reporting deliverables timeline in the Schedule and Deliverables section.

6.1.1 Report layout and content

Each impact evaluation report will include, at minimum, the following sections:

- Executive summary
- Introduction and study background
  - Background
  - Evaluation objectives
  - CPUC policies and guidance
- Methodology
  - Sample design
  - Gross savings methods
  - Net savings methods

- Results
  - Gross LC and FY electric savings and realization rates
  - Gross LC and FY natural gas savings and realization rates
  - Net savings results and ratios
- Conclusions and recommendations
  - Gross savings conclusions and recommendations
  - Net savings conclusions and recommendations
  - Overall conclusions and recommendations
- Appendices
  - IESR tables
  - Site-specific gross savings summary

The reports will thoroughly address each of the objectives defined in the final research plan for each study. The overall report will follow overarching style guidelines in the CPUC's most recent *Correspondence and Reference Guide*. In addition to the above, CCTs and project level analyses will also be uploaded to Non-DEER Resources once the final report has been released.

Executive summaries will be accessible to non-technical audiences. Language in the executive summary will be clear, concise, and easily understandable and will be approximately 10% of the length of the report it describes. DNV's internal reviewers will include staff not involved with the study who will provide guidance and editing support on the readability of the executive summary and other sections of the report. We will also ensure that each executive summary follows *Guide to Writing an Effective Executive Summary*, Navy and Marine Corps Public Health Center (updated June 2017).

Key stylistic elements we will apply in the executive summaries include:

- Using clear language and minimizing the use of technical words or industry jargon
- Keeping sentences short and to the point
- Avoiding overly complex sentences with multiple ideas
- Avoiding or minimizing the use of acronyms and clearly defining any acronyms used
- Keeping the executive summary to 10 pages or less

For methodology sections, we will describe our study approach as simply as possible and ensure that the description of our methodology is transparent and that our methodology can be replicated by others. Any changes to the planned activities as outlined in this work plan will also be documented. We will document the data sources used for each impact evaluation either in the main body of the report or as a separate section in the appendices. The main body of each report will also include a study results section that fully addresses the objectives laid out in the final research plan and end with conclusions and recommendations. Appendices will include any data collection instruments used for each impact evaluation and other key information relevant to the evaluation.

Appendices will conform to the guidelines in CPUC's *Energy Division and Program Administrator Energy Efficiency Evaluation, Measurement and Verification Plan 2018-2020 (Version 9)*. These sections will come from Deliverables 8, 9, and 10 respectively and will be compiled into an overall database for reporting purposes.

6.1.2 Report editing

Devoting adequate time and resources to report editing is critical for producing high-quality final reports. We will provide the key elements in our editing:

- Readability, accessibility, flow, and logic
- Grammar and style
- Technical and peer review
- Graphic design

Readability is essential for the reports to be accessible to non-technical audiences. The executive summary will be clear, concise, and easily readable for non-technical audiences. A DNV professional copyeditor will review and edit each draft and final report to ensure that CPUC staff and stakeholders can focus their reviews on the content of the reports rather than on grammatical errors. The copyeditors at DNV have at least a decade of experience copyediting prior reports delivered to the CPUC as well as reports delivered to other large clients. All draft reports will include peer review from independent technical experts. All reports will also include graphic designs to allow for data visualization and easier consumption of information.

6.1.3 Report format

DNV will electronically transmit an Adobe PDF and a Microsoft Word file to the CPUC that can be uploaded by CPUC staff to the CPUC website for distribution to the public. This PDF will include the final graphic design and layout of the evaluation report. Approximately one to two weeks after delivering the draft final reports, we will meet with the CPUC Project Manager and other appropriate staff to discuss actionable recommendations from the impact evaluation reports. The purpose of these meetings is to ensure that the recommendations in the impact evaluation reports are clear and practical, allowing program staff to make meaningful and useful program changes. We will document and address comments on the draft reports from the CPUC staff and its peer reviewers via a comment's matrix. Following delivery of the reports, the DNV team will present findings in stakeholder workshops or presentations during March and early April of each year. We will track comments on the draft final reports and any comments received during the presentations in a comment matrix. Incorporating comments received after submitting reports in February, we will deliver final reports to the CPUC by May 1, 2024.

7 QUALITY ASSURANCE AND QUALITY CONTROL

To ensure that DNV's team executes all projects successfully, we have developed an oversight process that defines responsibilities for all staff throughout each project. Responsibility for oversight and internal review rests primarily with project managers (both DNV and subcontractor staff). Each task deliverable lead provides guidance and quality control across sectors, and any of these individuals can call upon the Subject Matter Experts as needed. Ultimately, our Senior Portfolio Lead, Amit Kanungo, holds all team members accountable for their primary roles for delivery and oversight. Our oversight process includes the following:

- We start with an evaluation work plan that details the purpose, approach, deliverables, responsibilities, timeline, and budget for each major task included within the overall evaluation study. Depending on the level and complexity, the task lead or project manager prepares work plans in consultation with the Sector Lead. The relevant subject matter experts then review the work plan to approve the study's scope, methods, and timeline.
- DNV will specify the schedule for internal and external reviews with as much notice as possible to ensure that advisory resources are available and have enough time for review.
- We strongly encourage engagement of external stakeholders, both through PCG processes as well as through quarterly public stakeholder meetings. Progress being made on each evaluation study, as well as gaps/needs identified within each Sector, should be periodically discussed with a wider group than just the evaluation contractors, CPUC project manager, and advisory consultants. The purpose of engaging with these external organizations is to gather reactions and input to help design and improve studies.

DNV evaluation engineering leads are responsible for ensuring oversight of all analytic work; they will facilitate or directly provide inspection of data collection instruments, field procedures, equipment installations, and analytic processes and approaches used during each project. This process is for everyone on DNV's team, including all subcontractors and we have internal processes in place such as weekly meetings, shared SharePoint and Microsoft Teams sites for collaboration, and progress reporting. In addition, the overall Senior Portfolio Lead, Amit Kanungo, as well as the assigned Sector, are responsible for ensuring deliverable leads and subject matter experts review draft and final deliverables at critical milestones throughout each project.

7.1 Engineering review quality assurance and quality control

Engineers will be trained to assess and determine project-level information such as baselines, measure application types, measure lifecycle, remaining useful life, second baseline and associated savings, measure cost consistent with the measure application type, etc, for projects included in this study. Additional training will be held to train project engineers on the use and interpretation of project tools, available resources (such as weather files and measure savings histories), quality control procedures, administrative requirements, evaluation plans, and reporting templates. Training is not intended to be technology-specific, as the engineers assigned to evaluate specific technologies are expected to have familiarity with those technologies.

Each project-level document that the DNV team develops and submits to the CPUC will be reviewed and vetted by an assigned senior engineer. The senior engineer will assist in providing technical feedback, provide any additional guidance if necessary, and ensure that deliverables meet the quality standards outlined by the CPUC. The assigned senior engineer will also provide technical and clarification questions to the project engineer to ensure reporting is clear, concise, and accessible to non-technical reviewers.

8 PROJECT MANAGEMENT PLAN

This section of the work plan will describe the project management approaches to staffing, ongoing-communication and schedule. DNV acknowledge the CPUC staff's role as project manager and approver of methods, approaches, and other evaluation related decisions.

8.1 Schedule and milestones

Figure 8-1 provides a summary of major milestones and associated timetable for the CIAC evaluation. Blue action items in the figure represent deliverables and timelines associated with internal DNV and CPUC tasks. Orange action items represent external deliverables and timeless applicable to the broader stakeholder group.

Figure 8-1. Milestone summary for evaluation activities

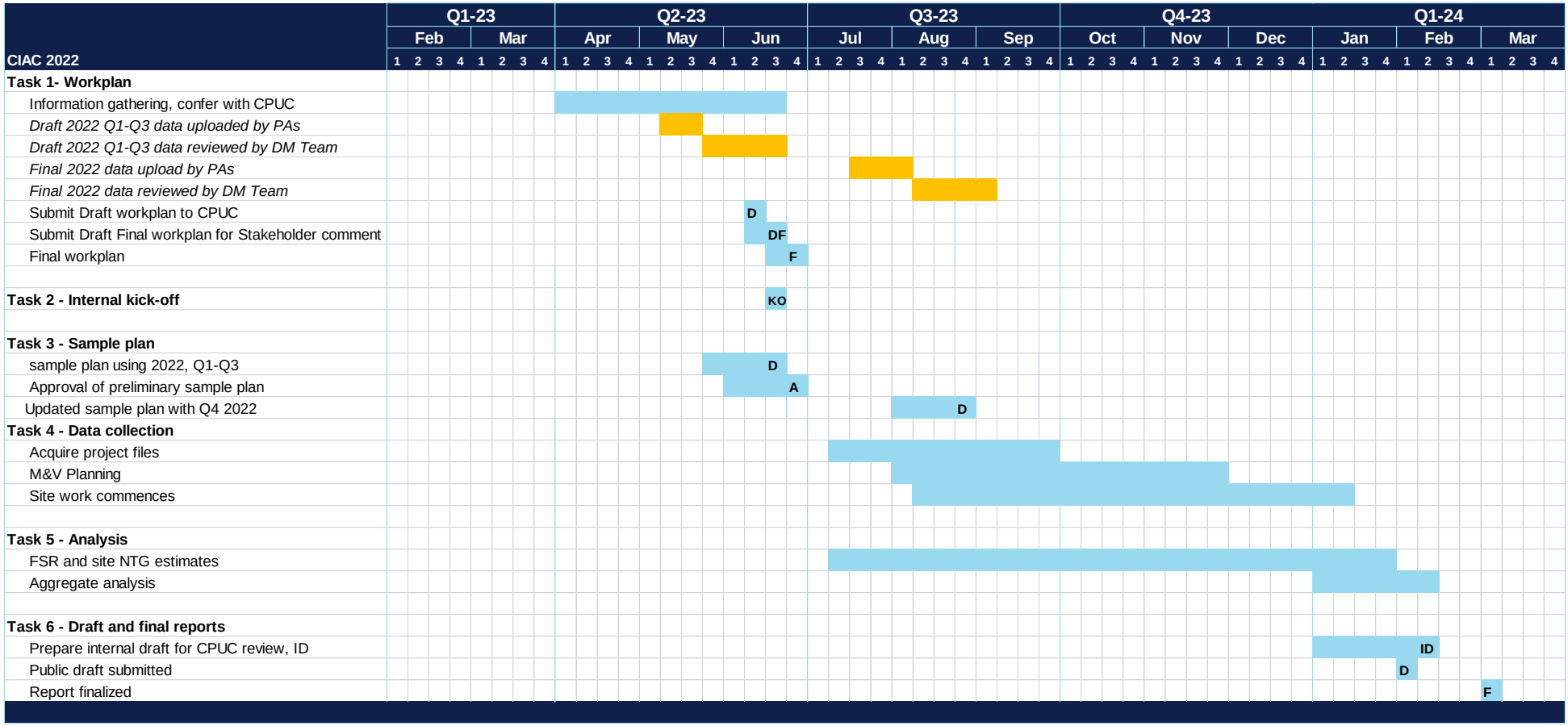
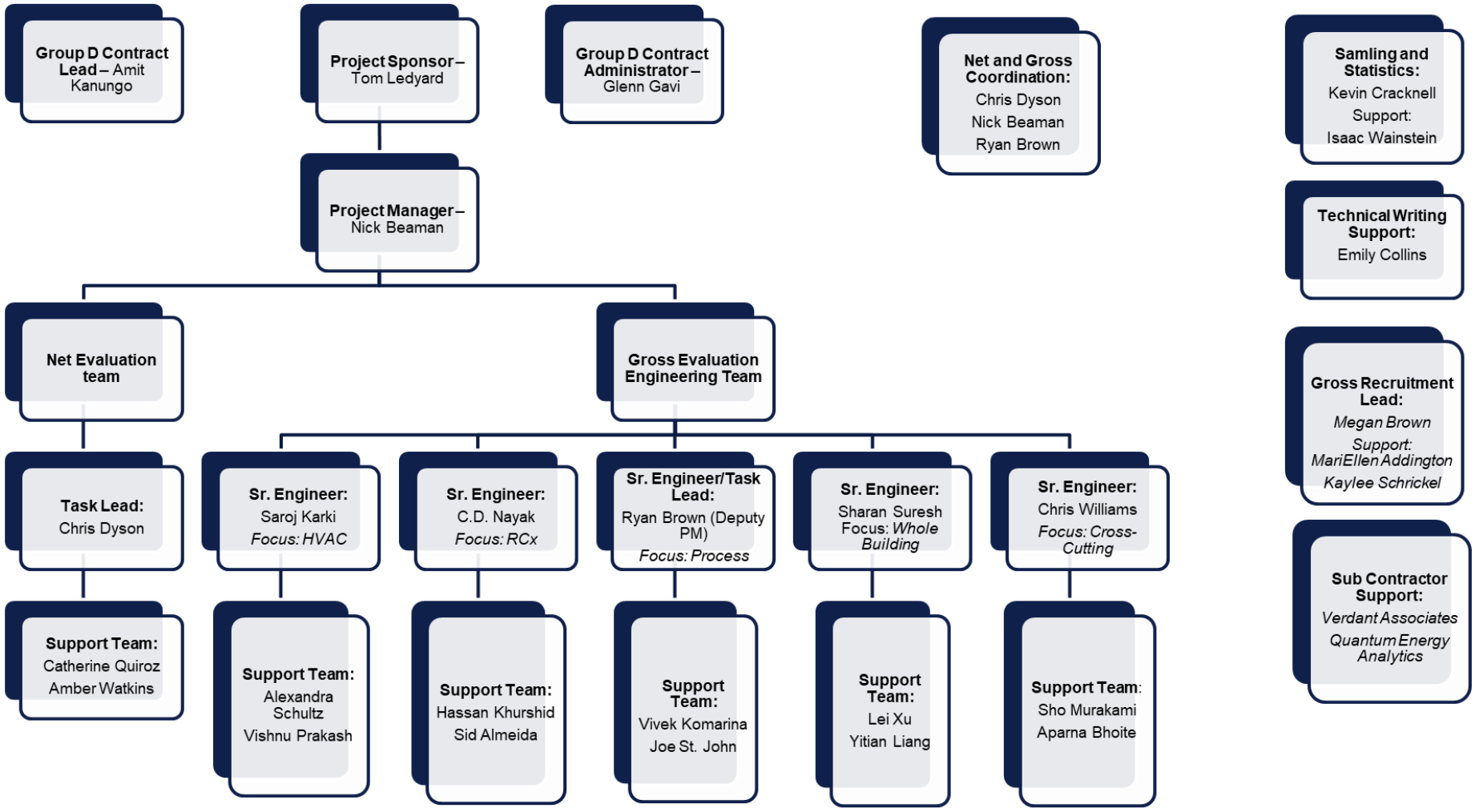


Figure 8-2. DNV Team Organization

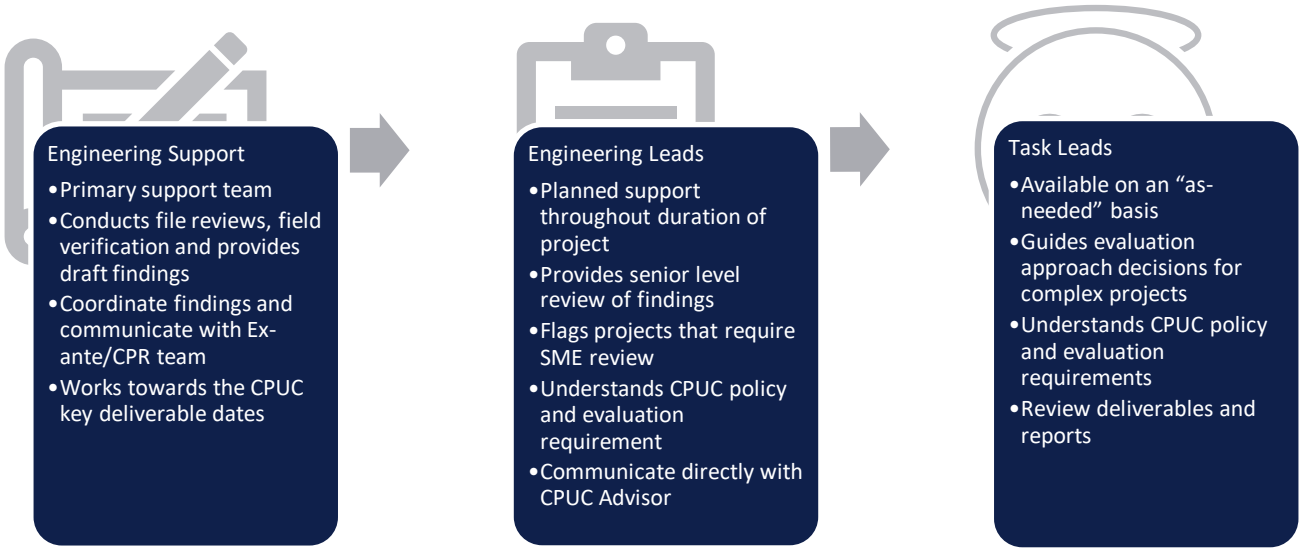


8.2 Team organizational structure

Figure 8-2 above shows the overall DNV team organizational structure. Four senior engineers have been assigned to lead a focused group of junior engineers, dedicated to HVAC, retro-commissioning (RCx), process and whole building projects. A fifth team is allocated to cross-cutting projects. In addition to DNV's dedicated resources, Quantum Energy Analytics (Quantum) and Verdant Associates, LLC (Verdant), will provide engineering support. Quantum will focus on lighting only projects, while Verdant will focus on non-lighting projects.

Figure 8-3 outlines the different roles and responsibilities of the support team, Sr. Engineers and tasks leads.

Figure 8-3. Roles and responsibilities



8.3 Ongoing communication and coordination

The DNV CIAC Leads will work with the CPUC Project Manager(s) to establish a weekly coordination meeting with a regular agenda of standing topics followed by emerging issues. The DNV lead will draft a weekly agenda and will produce minutes to document discussions and decisions. These will be published in Basecamp for easy reference at any stage in the project.

Table 8-1 provides a summary of the anticipated recurring meetings and communications schedule.

Table 8-1. Recurring meetings and communications schedule

Meetings	Weekly	Biweekly	Monthly	Quarterly	Biannual
DNV Team: Project Level - CIAC project updates or troubleshooting (sector leads, engineers, etc. invited at need - project details discussion meetings)	X				

DNV Team: PCG Call - PAs to discuss sampling, data needs, recruitment, and to foster dialogue [1 hr]			X		
DNV Team: EM&V Stakeholder engagement [1.5 hrs.]				X	
All: EM&V Public Stakeholder meeting [1.5 hrs.]					X

8.4 Risks and mitigation

Table 8-2 provides a summary of preliminary identified risks and DNV's proposed mitigation strategies associated with the evaluation of CIAC projects.

Table 8-2. Evaluation risk assessment and mitigation

Risks	Mitigation strategies
Incomplete tracking data availability impact schedule of semi-annual sampling and reporting	• Leverage the experience of the DNV team in requesting and vetting data. • Use advanced statistical techniques to develop mid-year sample with imperfect tracking data, to be resolved in following semi-annual sample design
High volume of work requires significant resources, particularly around April 1 bus stop	• Two-wave sample design, execution, and recommendations development flattens the workload and allows for more managerial control. • Regular coordination, through formal meetings and informally via web-based repository, ensures all team members are prepared for annual wrap-up. • Deep engineering team bench will be tapped
Representativeness of sample	• Sample design segmentation plan ensures representation of populations of interest • High recruitment rates minimize non-response bias. • Remote verification techniques increase recruitment minimizing non-response bias
Differences between the CPR-reviewed projects and the DNV evaluation findings	• The DNV evaluation team will regularly coordinate with CPR team through meetings and disposition review. • For sampled projects that underwent CPR review, evaluation results can supersede CPR findings. •
Challenges in reaching key project decision-makers and project stakeholders	• Use professional interviewers highly experienced in in-depth interviews for complex projects • Incentivize such interviews as needed • Utilize similar interview techniques as successfully completed in prior custom cycles • Leverage assistance from the PAs.
Delayed data response from the PAs in receiving project files	• Giving PAs advanced notice on the data requests so that they are better prepared to respond the data requests • Submitting data requests to the PAs in baches to reduce burden • Setting up calls with the PAs after the data requests are sent to ensure both parties are on the same page in-terms of the request
Challenges in recruiting customers for gross and net evaluation	• Ensure to receive most up-to-date customer contact information from the PAs • Include PAs account representative from the beginning of the site recruiting for better success

9 COMMUNICATION AND COORDINATION PLAN

This section of the plan outlines the communication and coordination approach that the CIAC evaluation team will follow to ensure compliance with evaluation-wide requirements, contribute key information, ensure sample and study coordination, and share the study results. The DNV evaluation leads will work with the CPUC Project Manager to establish a weekly coordination meeting with a regular agenda of standing topics followed by emerging issues. In addition, DNV evaluation subject matter experts (SMEs) for the individual research areas will frequently attend by invitation. The DNV lead will draft a weekly agenda and produce minutes to document discussions and decisions and publish these in Basecamp for easy reference at any stage in the project.

- **Weekly meetings with DNV Leadership team (DNV internal)**: The DNV leadership team (Contract Manager, Project Manager, Project Sponsor) will meet weekly to discuss the ongoing status of the project and to identify any potential risks that need to be communicated to the CPUC staff.
- **Weekly meetings with DNV Task Leads (DNV internal)**: The project manager will coordinate weekly meetings with engineering and NTG research task leads. Task leads will update a single project tracker that will be used to report all project level results to CPUC staff, including gross and net results.
- **Weekly meetings with the CPUC Staff**: The evaluation team and the CPUC staff will conduct weekly contract and sector lead calls to coordinate efforts and maintain project evaluation overall timeline remains on track.
- **Monthly Project Coordination Group (PCG) meetings with the PAs**: The evaluation team and the CPUC staff will meet with the PA staff through PCG meetings to review progress and share the status of the on-going evaluation activities. These monthly meetings will also provide the evaluation team, and PA representatives the opportunity to discuss the project status, data requests, PA assistance requests, methodologies, preliminary and final data collection findings, and general topics relevant to the research study and cross-cutting studies.
- **Quarterly Stakeholder Meetings**: Stakeholder workshop will be held every quarter. To ensure that we successfully integrate our overall work with the other energy efficiency evaluation contractors, DNV's team will continue to rely on quarterly stakeholder meetings to communicate our progress and accomplishments throughout each project. These meetings will be used to provide stakeholders with updates on ongoing evaluation activities and will not include evaluation results.

9.1.1 Progress reporting to the CPUC

DNV will commit to provide periodic progress status updates to the CPUC staff. As described below, DNV will use three principal activities to track and communicate progress of the CIAC evaluation:

- Weekly meeting to report progress to the CPUC staff discussing upcoming activities and current project status
  - These weekly meetings will be used to consult with staff on policy and implementation issues and seek assistance in a timely manner.
- A tracking database will contain site evaluation status and net-to-gross survey assignments. This tracking database will address cross-project leads to coordinate all planned site activities among evaluation groups and the PAs.
  - DNV will assign lead engineers the task of updating the project tracker on a weekly basis to ensure all information is accurate and up to date.
- Periodic meetings in addition to the above-described meetings at a frequency as directed by the CPUC staff. This will be held to discuss accomplishment plans/decisions.

9.1.2 CPUC Staff approval of work

The CPUC staff will approve work products such as site-specific evaluated savings and supporting data, participant surveys and NTG results, interview transcripts, zero saver assignments, data depository, interim data and findings, draft and final reports, and make key decisions where needed. Budget guidance will be solicited for assignments undertaken within the

Group D contract. Approval will be taken for draft and final MV plans, site MV reports, Net-to-gross results, and other interim products as needed.

9.1.3 Coordination with PAs

The PAs will have the opportunity to review draft and final reports and offer comments or suggestions. All communications necessary will be provided in conformance with the PCG and stakeholder communications protocol. The CIAC evaluation work plan will be available to the PAs and stakeholders for review. Comments received will be reviewed by the evaluation team and the CPUC. The CPUC staff will determine if changes must be made to the work plan based on PA comments. DNV's responses to the stakeholders' comments will be published publicly and posted on the CPUC PDA website.

9.1.3.1 Customer recruitment support

If after two attempts to contact the customer and DNV recruiters are unsuccessful, DNV will request the PAs to assist the evaluator in recruitment efforts, including providing accurate customer contact information, providing introductory correspondence, and contacting the participant to encourage them to participate in evaluation activities, including NTG surveys, on-site and telephone verifications.

The evaluation team will make reasonable attempts to recruit the sample participants before zeroing them out. Each sample site will be actively contacted at a minimum twice with keeping the PA account executive in the loop and if the participant is non-responsive, the evaluator will leverage PA account executive to recruit the participant. If the participant is still non-responsive, the evaluation team will move to a back-up. However, for the repeat non-responsive participants, the evaluator will zero out the savings after two unsuccessful attempts of contacting them while keeping the PA account executives in the loop. For the NTG survey, the evaluation team will make reasonable attempt to identify the decision maker of the site to conduct the survey if the individual is no longer available at the organization before dropping the site from the sample, at which point a backup site will be selected. The proposal is to perform net evaluation on all selected gross sample points.

9.1.3.2 Program documentation delivery

PAs will be responsible for providing the evaluator with timely delivery (within 14 days) of program documentation, including program manuals, program marketing material, and program support documents.

9.1.3.3 Project documentation delivery

PAs will be responsible for providing the evaluator with timely delivery (within 14 days) of project documentation, including:

- **Working calculators.** Spreadsheet models or hourly-model input files.
- **Justification for fuel substitution.** If a retrofit project results in an energy consumption shift from electricity to gas or vice versa, then the three-prong test[24] is required to assess eligibility for substituting fuel. The three-prong test was retired as of August 1, 2019 and will only apply to projects approved before that date. After that date, the fuel substitution test (two-prong test) was required and associated calculations were requested if missing.
- **On-site generation analysis.** Any on-site generation, such as cogeneration or behind-the-meter solar arrays at the site, requires analysis that considers the marginal change in PA-supplied fuels resulting from the project.
- **Justification of accelerated replacement and remaining useful life.** Early-retirement projects require evidence that the existing equipment is functional and could continue to be used for the claimed remaining useful life.
- **Evidence of program influence.** Eligible projects require evidence that project initiation was influenced by the program.

[24] Energy Efficiency Policy Manual Version 5, page 24, Cost Effectiveness Rule XV.10

- **Permitting.** If permits are required for measure installation, the customer/installer must obtain such permits. Additional requirements for installation of some HVAC equipment became effective on January 1, 2019, which specifies that the PAs must obtain documentation that the required permits were obtained and closed out, per SB-1414.
- **Contact information**. Names and contact information for decision-makers or other parties familiar with the systems, equipment or practices affected by the project.
- **M&V data**. Trend logs, interval data, billing energy use data, or other metering records that were obtained by the program during the baseline or post-installation periods. This would include any test results associated with commissioning the affected systems or equipment.
- **Affected systems, equipment, or practices**. Clarification of the characteristics of the systems, equipment, or practices that were affected by the project, including both baseline and post-installation conditions.
- **Costs**. Invoices or other related cost information used to determine the measure cost.
- **Customer agreement.** Signed final customer agreement.
- **ISP determination.** When an ISP has been conducted or used to determine the applicable baseline, the PA shall provide this documentation to the evaluator.
- **EUL and RUL.** The PA will provide sources of EUL and RUL if different from DEER assigned values.

9.1.3.4 Communication with the PAs

Communication with the PAs regarding evaluation efforts will be transmitted through the appropriate CPUC staff. Additional protocols for communication with the PAs will be developed during PCG meetings.

Communication of ineligible projects. As identified, DNV will communicate weekly with PAs on a regular basis the status of ineligible and zero/negative savings projects. Opportunity for the PAs to file comments on identified projects will occur at the time of filing comments on the final draft report for CPUC staff review. Any reconsideration of the initial zero saver determination by CPUC staff will be solely based on the initially submitted project documentation in response to project data requests.

Status updates. We will also meet with PA and CPUC staff to review progress and status of evaluation work on a monthly basis during the PCG meeting. The agenda for these meetings will address any questions from the evaluation team and PAs. Meeting notes will be provided that will be summarized with questions, decisions and important points of interest documented and made available for all attending parties as well as appropriate CPUC management. The evaluation team will give the PAs and stakeholders the opportunity to discuss survey status, methodologies, sample design, data requests, preliminary and final data findings and discuss general topics relevant to the research study and cross-cutting studies. Furthermore, the evaluation team will encourage the PAs to provide updates regarding their new 3P programs in terms of program design, delivery, and goals as we believe there will be increased 3P programs in the near future.

9.1.4 Cross-cutting coordination

The DNV evaluation team and CPR teams will meet monthly. Communication protocols and data sharing platforms will be established to facilitate coordination on critical cross-cutting issues and findings that have implications for both forecasted and evaluated savings efforts. This might include newly recognized trends in measure offerings, best practices in approaches to apply, concerns surrounding eligibility screening or baseline determination, etc.

APPENDIX A. EVALUATION GUIDANCE FOR CIAC 2022

Fundamental concepts:

- Sites evaluated using as found conditions, no forecasting. Savings calculated for the impact on the grid/distribution system
- No revisions will be made to the final claims data used for sampling projects
- Contact with PAs to understand project details is permissible through well-defined data requests.
- CPUC evaluation contractors are responsible for providing expertise needed to evaluate all projects and will hire consultants with specialized expertise as necessary.
- Programs must collect and submit sufficient data to allow a thorough evaluation.

#	Evaluation question	Evaluation practice	Foundation for evaluation practice	PA- recommended guidance	Differences and issues	10-12 through 2021Practice (current)	2022 Practice
1	Claimed savings in tracking data different from the project documentation	Use the tracking database value based on which sample was drawn and calculate gross realization rate	Established evaluation practice and sampling fundamentals.	Contact PA EM&V staff for discrepancy resolution.	Frozen final claims are used to draw sample. Evaluators do not correct final claims from which projects/measures are sampled.	No Change in evaluation practice.	No change from current practice
2	Claimed project was not installed (incomplete project or project never installed in the first place)	Installation rate adjustment	A measure must be verified as installed, operating correctly and has potential to generate predicted savings. (CA Evaluation Protocols p. 56-57)	Query PA EM&V staff for explanation. Zero out savings if certain that installation did not and will not occur.	None. Frozen claims cannot be revised. Check with PA for additional information to confirm project status before assessing evaluated savings	No change in evaluation practice	No change from current practice
3	Measure was ineligible per program rules or CPUC policies	Measure given zero gross savings	Violation of CPUC policies and/or deviation program rules invalidates savings.	Note ineligibility (for program process improvement purposes) but estimate and report savings (both negative and positive) per appropriate methods.	CPUC policies, directives, and guidance applicable to designing and implementing EE programs would have to be waived.	No change in evaluation practice. Note and report ineligibility separately and assign zero savings to ineligible projects.	No change from current practice. See ineligibility criteria table

#	Evaluation question	Evaluation practice	Foundation for evaluation practice	PA- recommended guidance	Differences and issues	10-12 through 2021Practice (current)	2022 Practice
4	Measure was reported as installed but not found at site	Installation rate adjustment after reasonable attempts are made to locate the measure with participant / implementer involvement	A measure must be verified as installed, operating correctly and has potential to generate predicted savings. (CA Evaluation Protocols p. 56-57)	Probe customer for why the measure was not found at the location specified in the tracking documents. Involve PA EM&V staff if the problem appears to be a tracking system error or if there is difficulty in obtaining sufficient information directly from the customer. Correct tracking system data if needed. If the tracking data are accurate determine savings that accrued at original site and expected savings from repositioning at the new site (e.g., in the case of pump off controllers being moved to other wells).	Equipment moved to new location may be operating under different parameters than those in the project documents. Equipment changeout program rules require that a measure must be planned to be in place for five years to qualify for incentives.	Assign zero savings for measures not found during verification or M&V activities.	No change from current practice
5	Measure was not operational temporarily; the facility had a firm restoration schedule	Project-specific evaluation; largely evaluated as found considering both operational and nonoperational periods since measure installation; apply annual savings as found from last full calendar year operation	A measure must be verified as installed, operating correctly and has potential to generate predicted savings. (CA Evaluation Protocols p. 56-57)	Probe customer for reasons underlying operational schedule. Estimate first year and lifecycle savings based upon most likely operational schedule (or based upon probability-weighted operational schedules).	Original schedule and operation may never be observed. Reported data may have to be used to estimate savings. CPUC evaluations may require additional documentation in order to determine whether there is a firm restoration schedule. .	No change in evaluation practice.	No change from current practice

#	Evaluation question	Evaluation practice	Foundation for evaluation practice	PA- recommended guidance	Differences and issues	10-12 through 2021Practice (current)	2022 Practice
6	Measure was permanently non-operational	Zero gross savings after the date of verified operation; report savings considering both operational and nonoperational periods since measure installation	A measure must be verified as installed, operating correctly and has potential to generate predicted savings. (CA Evaluation Protocols p. 56-57)	Estimate first year and lifecycle savings based upon most likely operational schedule (or based upon probability-weighted operational schedules).	A permanently nonoperational measure does not provide EE resource. Estimating lifecycle savings from a likely schedule requires forecasting and back-casting and would be fictional since the measure is not in operation in any event.	No change in evaluation practice.	No change from current practice
7	Measure was temporarily not operational, and the restoration schedule could not be ascertained	Zero gross savings after the date of verified operation, reporting savings considering both operational and nonoperational periods since measure installation	A measure must be verified as installed, operating correctly and has potential to generate predicted savings. (CA Evaluation Protocols p. 56-57)	Contact PA EM&V staff for assistance in obtaining the restoration schedule. If an acceptable schedule can be determined estimate first year and lifecycle savings based upon most likely operational schedule (or based upon probability-weighted operational schedules). If an acceptable schedule cannot be determined afford the program administrators the ability to continue to track the project and adjust savings when the operating schedule is resumed.	A nonoperational measure does not provide EE resource. Estimating lifecycle savings from a likely schedule requires forecasting and back-casting and would be fictional since the measure is not in operation in any event.	No change in evaluation practice.	No change from current practice

#	Evaluation question	Evaluation practice	Foundation for evaluation practice	PA- recommended guidance	Differences and issues	10-12 through 2021Practice (current)	2022 Practice
8	Measure was operational during data collection, but other evidence that suggests a plant shutdown or change in operations is anticipated	Apply full positive gross savings for each measure year through the EUL.	CPUC policy is not to forecast future operations. (Engineering Working Group Memo dated 9-8-07)			No change in evaluation practice	No change from current practice
9	New construction building was less than 50% occupied	Evaluate as found	IPMVP Vol 3. Pg 7. Savings for new construction = projected baseline energy use – post construction energy use. Baseline is established from current occupancy.	Base first year energy savings calculations on observed occupancy levels, but lifecycle savings on most likely occupancy levels.	Predicting most likely occupancy levels requires forecasting.	Evaluate as found	No change from current practice
10	New construction building was more than 50% occupied	Evaluate as found	IPMVP Vol 3. Pg 7. Savings for new construction = projected baseline energy use – post construction energy use. Baseline is established from current occupancy.	Base first year energy savings calculations on observed occupancy levels, but lifecycle savings on most likely occupancy levels.	Predicting most likely occupancy levels requires forecasting.	Evaluate as found	No change from current practice

#	Evaluation question	Evaluation practice	Foundation for evaluation practice	PA- recommended guidance	Differences and issues	10-12 through 2021Practice (current)	2022 Practice
11	Participant declined an M&V site visit	Attempt to reach PA account representative to help with recruitment. If unsuccessful, draw a backup sample.	Established evaluation practice	Contact PA EM&V staff for assistance in obtaining onsite access. If PA cannot facilitate onsite visitation, consider removing the participant from the sample and finding an alternate.	None	No change in evaluation practice	Participation in EM&V conducted by CPUC is required. Repeated refusals to participate increases evaluation costs and results become highly variable. D.10.04.029 grants staff the authority to enforce EM&V participation. If a participant refuses to participate in CPUC evaluations in more than one program year, project savings will be zeroed out.

#	Evaluation question	Evaluation practice	Foundation for evaluation practice	PA- recommended guidance	Differences and issues	10-12 through 2021Practice (current)	2022 Practice
12	Participant declined to provide access to some areas where measure was installed	Not experienced widely; extrapolate when appropriate based on area where access was granted or collect measure-specific information from other sources (EMS, as-built plans, etc.). Or, draw an alternate sample.	Established evaluation practice	Contact PA EM&V staff for assistance in obtaining onsite access. If PA cannot facilitate onsite visitation, consider removing the participant from the sample and finding an alternate.	None; however, measure specific data must be available for most cases, where access was restricted. Time and budget may be limiting.	No change in evaluation practice	No change from current practice
13	Measure was adjusted temporarily to operate differently from original specifications; the facility had a firm restoration schedule	Evaluated as found, considering actual operation since measure installation and typical operation	A measure must be verified as installed, operating correctly and has potential to generate predicted savings. (CA Evaluation Protocols p. 56-57)	Estimate duration of "temporary" adjustments, then make best estimate of first year, savings. Estimate lifecycle savings based upon provided restoration schedule.	Restored schedule and operation may never be observed.	No change in evaluation practice	No change from current practice
14	Measure was adjusted temporarily to operate differently from original specifications; the restoration schedule was not known.	Evaluated as found, considering actual operation since measure installation	A measure must be verified as installed, operating correctly and has potential to generate predicted savings. (CA Evaluation Protocols p. 56-57)	Contact PA EM&V staff for assistance in obtaining the restoration schedule. If an acceptable schedule can be determined estimate first year and lifecycle savings based upon most likely operational parameters (or based upon probability-weighted operational parameters).	None. Impacts are based on independently verified information from the facility and other sources. Estimating lifecycle savings from estimated schedule requires forecasting.	No change in evaluation practice	No change from current practice

#	Evaluation question	Evaluation practice	Foundation for evaluation practice	PA- recommended guidance	Differences and issues	10-12 through 2021Practice (current)	2022 Practice
15	Measure was adjusted permanently to operate differently from original specifications	Evaluate as found, considering actual operation since measure installation	A measure must be verified as installed, operating correctly and has potential to generate predicted savings. (CA Evaluation Protocols p. 56-57)	Estimate first year and lifecycle savings based upon new operating parameters.	None.	No change in evaluation practice	No change from current practice
16	Measure was adjusted to operate differently from original specifications but the nature of adjustment – temporary or permanent – could not be ascertained	Evaluate as found considering actual operation since measure installation	A measure must be verified as installed, operating correctly and has potential to generate predicted savings. (CA Evaluation Protocols p. 56-57)	Contact PA EM&V staff for assistance with customer contacts to help ascertain if the change is temporary or permanent. Follow #14 or #15 as appropriate.	None. Impacts are based on independently verified information from the facility and other sources. Estimating lifecycle savings from estimated schedule requires forecasting.	No change in evaluation practice	No change from current practice

#	Evaluation question	Evaluation practice	Foundation for evaluation practice	PA- recommended guidance	Differences and issues	10-12 through 2021Practice (current)	2022 Practice
17	Facility shut down after initial verification site visit	Credit annual savings over the measure EUL for the period the measure was verified as operating; then zero gross annual savings for the remaining measure EUL.	CPUC staff Decision Framework for Updating PA savings claims with Best Available Data (Nov 2009).	Adjust short term savings to reflect the change, including savings for the period the facility was operational. Estimate lifecycle savings based on probable facility use in future.	Requires forecasting to credit future savings. Forecasting not done in accordance with concept 1 above.	No change in evaluation practice	No change in current practice
18	Facility was found shut down at the time of initial contact	Zero savings	A measure must be verified as installed, operating correctly and has potential to generate predicted savings. (CA Evaluation Protocols p. 56-57) no economic forecasting.	Adjust short term savings to reflect the change, including savings for the period the facility was operational. Estimate lifecycle savings based on probable facility use in future.	Measure is not operational and cannot be verified as ever having operated or the likelihood of operating in the future. Requires forecasting to credit savings, which is not allowed. See concept 1 above.	No change in evaluation practice	No change in current practice
19	Measure savings may increase or decrease over time	Evaluate as observed considering actual operation since measure installation; verify seasonal measures in peak and other seasons if possible	Established evaluation practice and IPMVP Vol 1 pg. 13. Adjustments made to baseline based on actual occupancy.	Base first year savings estimates upon observed operational parameters. Estimate lifecycle savings on most likely operational parameters.	Only seasonal changes not observed during the evaluation may be considered in estimating savings. Future increases or decreases in production will require forecasting.	No change in evaluation practice	No change in current practice

#	Evaluation question	Evaluation practice	Foundation for evaluation practice	PA- recommended guidance	Differences and issues	10-12 through 2021Practice (current)	2022 Practice
20	Participant is not paying PPP charge	Zero gross savings	Violation of program eligibility requirements.	If participant paid PPP charge through installation provide full savings credit. If the customer never paid the PPP charge estimate and report savings but note ineligibility in report.	Requires exception to CPUC and PA policy on program eligibility.	No change in evaluation practice	No change from current practice
21	12-month billing history for the saved fuel for the equipment where EE measure was installed is not available for the participant and M&V plan calls for using the billing analysis method	Project-specific evaluation; Consider using appropriate statistical or engineering methods to estimate typical energy usage or drop the sample point. Check program participation requirements for the minimum period on the grid to qualify for EE incentives.	Established evaluation and standard engineering practice	Consider dropping the participant from the sample. If the participant cannot be dropped and a full year of billing data is essential for the analysis (e.g., for space conditioning measures) impute consumption based upon data from other customers with similar equipment and operating patterns, otherwise employ the partial year data.	No change, except for possibly dropping as un-evaluable	No change in evaluation practice	No change from current practice

#	Evaluation question	Evaluation practice	Foundation for evaluation practice	PA- recommended guidance	Differences and issues	10-12 through 2021Practice (current)	2022 Practice
22	New load served by inefficient equipment was added, load that was in operation for less than 12-months, and EE retrofit was then installed on this new load	Project-specific evaluation. Use appropriate M&V methodology to estimate savings from available data.	Review with CPUC/PA/PCG where helpful	Contact the PA EM&V staff to verify that the inefficient load baseline was a planned temporary action. If the new load addition was temporary, determine timeframe and treat as early replacement with full savings for the temporary action timeframe and reduced savings (relative to code or industry standard practice) for the remainder of the EUL. If the new, inefficient, load addition was permanent treat as a baseline for the full EUL.	None. May inform development of new baseline determination procedures.	No change in evaluation practice	Apply appropriate measure application type (MAT) and evaluate if the project qualifies per program rules such as minimum period required to qualify for EE incentives for new accounts

#	Evaluation question	Evaluation practice	Foundation for evaluation practice	PA- recommended guidance	Differences and issues	10-12 through 2021Practice (current)	2022 Practice
23	Fuel substitution implemented without following the three-prong or two-prong test[25]	Evaluate if eligible and the PA submitted results of the fuel substitution test. If the PA did not conduct the fuel substitution test but data are available in the application documentation to perform the fuel substitution test, perform the test and evaluate the project. If the PA's test results verified by the evaluator or the result of the evaluator-conducted fuel substitution test is negative, zero out gross savings	CPUC Policy Manual, v. 4.0 (p. 11-12)	Contact the PA EM&V staff to ascertain why the project was not deemed as fuel substitution. If, after discussion, there is disagreement between parties regarding the definition of the project, Energy Division staff will make the determination as to whether the project is fuel substitution. The appropriate tests would be applied after the determination was made. If the three-prong test is passed, estimate savings per accepted protocols. If the project fails the three-prong test, but still yields cost-effective savings, report the savings, and report the project ineligibility in the report. (Note that current parameter values needed for the three-prong test - particularly heat rate values - may not be readily available.)	Eligible projects that pass the fuel substitution test may claim savings. Allowing ineligible projects to claim savings will be an exception to CPUC policies	No change in evaluation practice	No change in current practice

[25] Three-prong test for applications approved before August 1, 2019, and two-prong for applications approved on or after August 1, 2019)

#	Evaluation question	Evaluation practice	Foundation for evaluation practice	PA- recommended guidance	Differences and issues	10-12 through 2021Practice (current)	2022 Practice
24	Accelerated replacement did not pass the equipment viability and/or program influence requirements (evaluated NTG less than 0.5)	Change the baseline to normal replacement. Coordinate with net team	CPUC resolution E-4818	Contact PA EMV staff to understand justification for program induced early retirement classification. Use correct baseline(s) to estimate savings.	Accelerated replacement guidance per the CPUC Decisions and resolutions.	No change in evaluation practice	No change in current practice
25	Measure efficiency does not exceed applicable standard practice outside of NMEC programs	Zero or negative gross savings unless at-code/SP installations and incentives allowed by the program and approved by staff	Established evaluation practice; violation of the CPUC's measure efficiency guidance and PA program policy.	Contact PA EM&V staff to discuss what is the applicable "standard practice" for the particular business type/customer size and what is the RUL of the measure for the participant in question. If, after discussion between PA staff and EM&V consultants there is disagreement about the appropriate standard practice and RUL, Energy Division will decide the appropriate values. Early replacement savings should be estimated. The attribution assessment should fully outline the customer decision making process underlying the decision to replace with less than standard practice efficiency.	ISP would be decided upfront per the CPUC decisions and resolutions	No change	No change in current practice

#	Evaluation question	Evaluation practice	Foundation for evaluation practice	PA- recommended guidance	Differences and issues	10-12 through 2021Practice (current)	2022 Practice
26	For normal replacement and new construction, standard practice has not been documented	Follow the ISP Guidance document process to identify standard practice	Established evaluation practice		N/A	No change	No change in current practice
27	Standard practice identified is more than five years old and prior standard practice was marginally lower than more efficient option or market progress suggests change in standard practice	Perform mini-ISP study or establish project-specific standard practice	Evaluation practice and ISP Guidance Document		N/A	No change	No change in current practice
28	EUL for new measure not established correctly	Correct to the closest DEER EUL or Energy Efficiency Policy Manual if not in DEER	D.05-09-043 requires use of DEER EULs	Contact PA EM&V staff to make certain the measure is properly defined and to make alterations in program processes and protocols to reflect the needed change for like measures.	None, except more consultation available with PAs and in custom project review process.	No change in evaluation practice	No change in current practice

#	Evaluation question	Evaluation practice	Foundation for evaluation practice	PA- recommended guidance	Differences and issues	10-12 through 2021Practice (current)	2022 Practice
29	Measure baseline is inappropriate	Estimate gross savings using CPUC baseline definitions and baseline selection guidance (E-4818)	Standard evaluation practice.	Contact PA EM&V staff to ascertain why a seemingly inappropriate baseline was employed. Employ an appropriate baseline for savings calculation if one exists. Employ the "infeasible baseline" for savings calculation if it renders a reasonable approximation of what would have occurred with the use of a "feasible baseline."	Requires making exceptions to the CPUC baseline guidance.	No change in evaluation practice	No change in current practice
30	Evidence of measure installation or service rendered was not recorded in enough detail to guide evaluation-based verification	Installation rate adjustment	CA protocols: measure must be verified; measure must be installed, operating correctly and has potential to generate predicted savings. (CPUC Evaluation Protocols p. 56-57)	Contact PA EM&V staff to verify that evidence of service does not exist. If it does not exist and the program design and protocols required that it be collected zero out savings for the participant. If the program protocol did not require evidence of service rendered in the manner anticipated by EM&V consultants discuss alternative savings verification and estimation processes with PA EM&V staff.	Work paper reviews and evaluability assessments typically define data required to estimate savings. Programs should ensure that the required evidence of service is maintained and provided at initial data request.	No change in evaluation practice	No change in current practice

#	Evaluation question	Evaluation practice	Foundation for evaluation practice	PA- recommended guidance	Differences and issues	10-12 through 2021Practice (current)	2022 Practice
31	Critical pre-installation data on equipment specifications or operations were not provided and/or replicable savings model in the form of engineering calculations/simulation was provided	Numerous data requests to the PA to get baseline data and transparent savings model. Installation rate adjustment or normal replacement savings or zero savings.	Standard evaluation practice.	Contact PA EM&V staff to verify that the requested pre-installation data do not exist. If not, see if the specifications can be found using existing data, such as model #'s, photos, or other data. If the program protocol did not require pre-installation data rendered in the manner anticipated by EM&V consultants, discuss alternative savings verification and estimation processes with PA EM&V staff.	Using alternate savings verification and estimation processes would mean approximating savings without verification.	No change. Use appropriate baseline and evaluate if reliable data/model are reliably available or assign zero savings if data are not available to verify/estimate savings.	No change in current practice

#	Evaluation question	Evaluation practice	Foundation for evaluation practice	PA- recommended guidance	Differences and issues	10-12 through 2021Practice (current)	2022 Practice
32	Measure or the NR/NC baseline lacks engineering foundation for claiming savings or fails to meet the functional, technical and economic needs of the customer	Zero gross savings if measure does not meet the definition of energy efficiency per the EE Policy Manual.	Standard engineering practice when measure does not save energy. CPUC presumption of non-evaluability if data are not sufficient.	Contact PA EM&V staff to determine if all available information has been made provided. Enlist third party expert (jointly chose by PA EM&V staff and ED staff) to estimate savings.	If measure is ineffective, evaluation will return zero savings. If data are insufficient, additional data or clarifications will be requested. Depending on the completeness of the data request response, the site may receive reduced or zero savings. All required data should be provided upfront with initial data requests and include sufficient documentation of engineering approach. Repeated data requests are time consuming for PA and evaluators. Evaluators are responsible for providing all required expertise. No third-party experts will be used.	No Change in evaluation practice	No change in current practice
33	Multi-fuel impacts not reported	Estimate significant other fuel impacts; ascertain if other tracking records contain these other fuel impacts.	Engineering group guidance	Estimate secondary fuel impacts if significant and reflect in lifecycle savings and net benefits.	None.	No change in evaluation practice	No change in current practice

#	Evaluation question	Evaluation practice	Foundation for evaluation practice	PA- recommended guidance	Differences and issues	10-12 through 2021Practice (current)	2022 Practice
34	Peak demand savings do not match the CPUC definition	Use the CPUC definition of demand savings	D.06-06-063 requires use of DEER peak demand definition	Estimate first year and lifecycle peak demand savings using the applicable CPUC definition.	None.	No change in evaluation practice	Current practice
35	12-month baseline or post-installation production history not available	Project-specific determination to identify stable and typical baseline and post-installation periods, normalized for equivalence	Established evaluation practice	New guidance issue, not sent to PAs	Assure that production history is provided with initial data request with project documentation.	No change in evaluation practice	Current practice
36	Standard practice baseline determined using used equipment or transfer of equipment from another location	Inappropriate as cost effectiveness and lifecycle evaluation of used equipment cannot be reliable performed. Only new equipment that meets the customer's functional, technical and economic needs, and is available in the market, and costs less than the installed higher efficiency equipment qualifies to be used as baseline	CPUC policy			No change in evaluation practice	Current practice

#	Evaluation question	Evaluation practice	Foundation for evaluation practice	PA- recommended guidance	Differences and issues	10-12 through 2021Practice (current)	2022 Practice
37	Participant declined a NTGR Interview	No guidance.	No guidance.	No guidance.	No guidance.	No guidance.	Participation in EM&V conducted by CPUC is required. Repeated refusals to participate increases evaluation costs and results become highly variable. D.10.04.029 grants staff the authority to enforce EM&V participation. If a participant refuses to participate in more than one CPUC evaluations project savings will be zeroed out after requesting the PA's assistance to recruit the participant.
38	Project implemented at a site with self-generation	Calculate savings as described in the CPUC guidance document - Savings at Sites with non-IOU Fuel Sources	Established evaluation practice to credit savings on the grid/system under CPUC's jurisdiction			Calculate savings as described in the Savings at Sites with non-IOU Fuel Sources	Current practice

#	Evaluation question	Evaluation practice	Foundation for evaluation practice	PA- recommended guidance	Differences and issues	10-12 through 2021Practice (current)	2022 Practice
39	Measure implemented to improve energy efficiency of self-generation equipment at a customer's site	Typically, ineligible unless the equipment is on the customer side of the meter, reduction in the PPP-paying energy source is reflected on the grid/system under CPUC's jurisdiction, and the measure is serving a specific end use(s) and meets the definition of an energy efficiency measure as defined in the EE Policy Manual V 6.0.	Established evaluation practice to calculate eligible savings on the grid			Calculate eligible savings impact(s) on the grid/system	Current practice
40	Departed load customer pays PPP charges	Eligible only for specific rate schedules and savings reflect on the grid/system	Established evaluation practice. CPUC Early Opinion in 2021.			Eligible only if savings are directly reflected on the grid/system under the CPUC's jurisdiction	Current practice

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