# PACIFIC GAS AND ELECTRIC COMPANY

November 25, 2020

Program Implementation Plan

# Government And K-12 Third Party Implementer Program

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# Program Overview

## Program Budget and Savings

**Program Name:** Government and K-12 Program

**Program ID Number:** PGE_Pub_009

*Exhibit 1. Program Budget Tables*

Energy Efficiency Budget:

| Cost Categories | 2021 | 2022 | 2023 | 2024 | Total |
|---|---|---|---|---|---|
| Administration | $210,614 | $204,294 | $253,900 | - | $668,808 |
| Marketing/Outreach | $157,960 | $153,221 | $190,425 | - | $501,606 |
| Direct Implementation – Non-Incentive | $1,026,067 | $995,938 | $1,237,879 | $343,158 | $3,603,042 |
| Direct Implementation – Incentive | $1,384,063 | $1,353,484 | $1,684,029 | $344,968 | $4,766,544 |
| Total | $2,778,704 | $2,706,937 | $3,366,234 | $688,126 | $9,540,000 |

Integrated Demand Side Management (IDSM) Budget:

| Cost Categories | 2021 | 2022 | 2023 | 2024 | Total |
|---|---|---|---|---|---|
| Administration | $5,625 | $5,625 | $5,625 | - | $16,875 |
| Marketing/Outreach | $7,500 | $7,500 | $7,500 | - | $22,500 |
| Direct Implementation – Non-Incentive | $136,875 | $136,875 | $136,875 | - | $410,625 |
| Direct Implementation – Incentive | - | - | - | - | - |
| Total | $150,000 | $150,000 | $150,000 | - | $450,000 |

Total Program Budget:

| Cost Categories | 2021 | 2022 | 2023 | 2024 | Total |
|---|---|---|---|---|---|
| Administration | $216,239 | $209,919 | $259,525 | - | $16,875 |
| Marketing/Outreach | $165,460 | $160,721 | $197,925 | - | $22,500 |
| Direct Implementation – Non-Incentive | $1,162,942 | $1,132,813 | $1,374,754 | $343,158 | $410,625 |
| Direct Implementation – Incentive | $1,384,063 | $1,353,484 | $1,684,029 | $344,968 | - |
| Total | $2,928,704 | $2,856,937 | $3,516,234 | $688,126 | $9,990,000 |

*Exhibit 2.* *Program Gross Impacts Table*

| Program Goals | 2021 | 2022 | 2023 | 2024[1] | Total |
|---|---|---|---|---|---|
| Gross Electric Savings (kWh) | 9,368,650 | 9,088,830 | 9,011,654 | - | 27,469,134 |
| Net Electric Savings (kWh) | 7,467,335 | 8,066,481 | 7,997,986 | - | 23,531,801 |
| Gross Demand Reduction (kW) | 1,320 | 1,527 | 1,514 | - | 4,361 |
| Net Demand Reduction (kW) | 1,000 | 1,350 | 1,338 | - | 3,689 |
| Gross Gas Savings (therms) | 83,653 | 145,197 | 143,964 | - | 372,813 |
| Net Gas Savings (therms) | 54,223 | 127,930 | 126,844 | - | 308,997 |

*Exhibit 3.* *Program Cost Effectiveness (TRC)*

| | |
|---|---|
| 2021 | 1.44 |
| 2022 | 1.22 |
| 2023 | 1.20 |
| 2024 | 1.14[2] |

*Exhibit 4.* *Program Cost Effectiveness (PAC)*

| | |
|---|---|
| 2021 | 1.53 |
| 2022 | 1.33 |
| 2023 | 1.31 |
| 2024 | 1.26 |

**Type of Program Implementer:** Third-Party Delivered

**Market Sector:** Public, excluding wastewater treatment, state-owned facilities or UC, CSU, or California Community Colleges

**Program Type:** Resource

**Market Channel:** Downstream

**Intervention Strategies:** Direct Install, Incentive, Finance, Audit, Technical Assistance

**Timeline:** October 2020 – March 2025

# Implementation Plan Narrative

## 1. Program Description

The Government and K-12 program (GK12 or GK12 program) serves Federal facilities, local-government facilities, and K-12 Schools across the Pacific Gas and Electric Company (PG&E) service territory. This program contributes to PG&E's efforts to achieve its share of California's ambitious EE and greenhouse gas reduction goals. The program also contributes to PG&E's efforts to comply with the requirements of the California Public Utility Commission's (CPUC) D.16-08-019, which directed program administrators to transition to a majority of third-party designed and implemented programs. GK12 offers energy efficiency (EE) options tailored to small / medium / large, disadvantaged-community (DAC)[3], and hard-to-reach (HTR) customers and utilizes the deemed, custom and normalized metered energy consumption (NMEC) measurement platforms.

[1] For the year 2024, no savings impacts are listed, though the energy efficiency budget does include costs. This is due to forecasted NMEC projects being claimed in 2023 using ex ante estimates but trued up and paid in 2024 following completed measurement & verification.

[2] The program's Cost Effectiveness Tool (CET) model uses fully measured and verified savings (i.e., 12-24 months of M&V for NMEC projects), which is why TRC and PAC values are listed in 2024.

[3] Pursuant to Section 39711 of the Health and Safety Code, DACs the California Environmental Protection Agency (CalEPA) developed a means for identifying disadvantaged communities, which may include, but are not limited to: 1. Areas disproportionately affected by environmental pollution and other hazards that can lead to negative public health effects, exposure, or environmental degradation. A.17-01-013 et al. 2. Areas

**Rationale:** The GK12 program addresses opportunities within public sector buildings by providing local government, federal government, and K-12 customers with the technical and economic resources that are otherwise unavailable for comprehensive retrofits. These customers are served through an open network of Trade Pros, community-based organizations, local contractors, and subcontractors.

**Objectives:** As presented in its Business Plan, PG&E's goals for the Public sector include saving energy and reducing customer demand for electricity, broadening customer program participation, and increasing the operational efficiencies of the Public sector overall. Based on prior program experience in the Public sector, PG&E identified the following five strategic interventions to achieve its Public sector goals:

- Data Access to increase customer awareness of energy use, and target high potential opportunities
- Data Analytics to identify energy efficiency opportunities
- Technical Assistance and Tools to build energy efficiency capacity and knowledge
- Loans, Rebates, and Incentives to overcome constrained budgets and first-cost barriers
- Outreach and Education to reach public sector customer constituencies with the value of energy efficiency

## 2. Program Delivery and Customer Services

**Program Savings Delivery:** To serve the above delineated market segments, GK12 uses a multifaceted approach to customer enrollment, as highlighted in the exhibit below:

*Exhibit 5. Strategies and Tactics to Support Program Goals*

| Strategy | Tactic |
|---|---|
| Prioritize existing relationships | ▪ Leverage Relationships with Trade Pros, municipalities, trade associations, and prior participating and served customers across segments<br>▪ Strategic Partnerships. For example, with fellowship programs, local government programs, community choice aggregators (CCAs), regional energy networks (RENs), community-based organizations (CBOs), faith-based organizations (FBOs), and PG&E Account Representatives. |
| Outreach to HTR/DAC | ▪ Partner with trusted HTR/DAC experts to identify decision-makers, build customer trust, and reduce costs<br>▪ Intelligent targeting using proprietary software to home in on DAC regions and the customers in those regions with the most to gain from EE<br>▪ Offer higher incentives to HTR/DAC customers to improve uptake |
| Build awareness | ▪ Attend industry events to promote the program<br>▪ Educate customers by relating EE/DR value to their objectives and long-term planning goals (ZNE) |
| Instill confidence | ▪ Risk Mitigation – offer solutions to minimize risk and increase customer buy-in<br>▪ Open Trade Pro Network – use customer's preferred/pre-approved Trade Pros |
| Tailored solutions | ▪ Full-Service Approach – Program offers a one-stop-shop offering solutions that are tailored to the customer's needs (e.g., flexible incentives, technical support, financing, DI services) |

with concentrations of people that are of low income, high unemployment, low levels of homeownership, high rent burden, sensitive populations, or low levels of educational attainment. CalEPA's CalEnviroScreen tool is used to identify census tracts that meet the definition of a disadvantaged community. The tool can be found here: https://oehha.ca.gov/calenviroscreen.

| | |
|---|---|
| | ▪ Determine savings via PG&E platform (e.g., Deemed, Custom, NMEC) based on the measures identified, cost-effectiveness of the project and the customer's needs (budget available, willingness to use financing, long term plans for the facility, etc.)<br>▪ Translate EE and DR value through tailored reports and energy modeling that communicates benefits using relevant metrics<br>▪ Zero-Upfront-Cost Financing – using OBF/OBF-NI and six other potential financing options |
| Continuous engagement | ▪ Single Point-of-Contact (POC) works with clients throughout journey to ZNE with re-engagement/follow-up strategies<br>▪ Annual Recognition Awards to highlight achievers, re-engage leads, and motivate |

Reaching Customers: The marketing approach uses flexible and diverse strategies that appeal to the wide-ranging set of public customers (e.g., subsegment, size, and geographic region. To elicit customer interest and solicit participation, a wide net is cast using a diverse pool of program partners, including community-based organizations that have strong existing relationships with key decision makers. To support sales efforts, GK12 leverages marketing materials and collateral in various forms, including, but not limited to:

- Program marketing and informational flyers
- Case Studies
- Direct mailers / postcards
- Email campaigns
- Virtual EE workshops/webinars
- Social media campaigns

Services Provided: The program's customer-first mentality extends into its service offerings. Instead of dictating the customer journey, we first use a consultative approach to understanding their energy needs and then reach into an expansive toolkit to provide custom solutions. The following services are part of this toolkit:

- Intelligent outreach
- Technical services
- Bundled EE, DR, and energy management technologies (EMTs)
- Financing assistance
- Do-It-Yourself path with technical assistance, quality assurance, and equipment purchasing.

## 3. Program Design and Best Practices

Strategies/Tactics to Reduce Market Barriers: The GK12 program leverages six main strategies and supporting tactics to reduce market barriers (Exhibit 6). These have been developed based on lessons learned and best practices identified through past program delivery.

*Exhibit 6. Strategies and Tactics to Reduce Market Barriers*

| Targeted Customer Group | Market Barriers | Strategies/Tactics to Overcome Barriers |
|---|---|---|
| Local Gov't | Limited Knowledge/Access to Energy Data. Limited insight into energy consumption/ how to improve. Difficulty translating EE and DR to decision-makers in a compelling way with risk aversion | Technical Assistance. Serve as embedded support staff to counteract long timelines with support throughout project lifecycle. Educate on EE, DR, and BROs and allow governments to lead by example |
| | Limited Funds/ Planning Cycle. Procurement process requires dedication of resources with a longer timeline—frequent staffing changes impact project status. Prevailing wage results in higher costs. | Financial Planning. Support provided from initial financial planning through implementation. Leverage bulk purchases and all financing options (e.g. bonds, incentives, OBF) to enable EE projects. |
| Federal Gov't | Acquisition/ Procurement Regulations. Complicates EE purchases. | Financial Planning. Provide bill credit to apply incentives to benefit local customer versus general fund. |
| | Financial Procedures. Delay projects to match multi-year planning cycles and spending categories. | Economies of Scale. Regional or statewide scale to bundle and save. |
| | Organizational Hierarchy complicates and slows decision-making process. | Decision-Making Process. Program team's knowledge of decision-making hierarchy, organizational silos, chain-of command/ authority requirements |
| K-12 | Lack of awareness. limited staff and insight dedicated to EE. | Educate and Empower. Train staff on system maintenance. Enable data access to additionally educate students on energy. Share examples of successes to recognize and elevate districts that participated. |
| | Lack of dedicated funds to building improvements and maintenance. High costs with procurement requirements and prevailing wage. | Financing and Performance Contracting. Option for no upfront cost. |
| | Short vs. Long-term planning horizons. more reactive to equipment failures due to lack of funds. | Continuous Support. Implementation team stays engaged for the full process. |

**Best Practices/Lessons Learned**: The strategies and tactics listed above were designed based on lessons learned and best practices identified through past program delivery. For example, GK12 adds elements like end-to-end technical services and multiple financing options to improve upon historic public EE portfolio program offerings (e.g., audits without implementation support, low TRC performance).

**Software**: GK12 leverages proprietary software for intelligent outreach and modeling. This starts by identifying customers with high savings potential through benchmarking, applying factors for likelihood to participate, and specifying optimal measure mixes through simplified facility modeling. These resources can be used to target customers with the highest opportunities to benefit from DSM programs. They also identify optimal measure bundles to reach customer and program goals.

## 4. Innovation

GK12 combines multiple innovative features, enabling all customers (including HTR/DAC customers) to be served. These innovations allow the program to cost-effectively integrate distributed energy resources (DERs) and other integrated demand-side management (IDSM) resources and to provide EE as a grid resource.

Innovations include:

- Integrated delivery team that provides full-service support and a simplified offer to customers. This includes embedded M&V and is enabled for EM&V.
- EE, DR, and EMTs to increase persistent EE savings and DR enrollments
- Online platform to track and manage all program activities, data, advanced analytics, communication, and KPIs. This provides a historical record for reference during and after program implementation and provides an easy means of transferring information to program stakeholders.
- Simple, customer-friendly offer that provides path to no incentives by offering financing and technical services options before offering incentives
- Intelligent outreach using software and modeling technologies to improve results. This includes benchmarking, likelihood to participate, and identification of optimal measure mixes.
- Do-It-Yourself option whereby GK12 staff identify simple measures the customer can install. Staff also provide quality assurance to ensure proper installations.
- Journey to Zero Net Energy – educate customers on the value and benefits of balancing energy consumption and generation, to reduce monthly expenses and maximize operational budgets.

This program continues the iterative process to generate new innovations. As innovative practices are developed, they will be reviewed by the implementer on a regular basis to assess their impact and determine feasibility for wider adoption.

## 5. Metrics

The GK12 program tracks program processes and provides clear, detailed insight into program status by capturing the following metrics:

- Savings (kWh, kW, therms)
- Savings to Goal
- TRC
- Budget Spent
- Savings to Budget Alignment
- Passed Inspections (overall and separated by Subcontractor)
- Data, forecast, and calculation quality/accuracy
- Customer Satisfaction Score (overall and separated by Subcontractor)
- % Savings and Budget Delivered to HTR/DAC
- Innovation: Number of customers who install bundled EE, DR, and EMTs

## 6. To-Code Savings

Where to-code savings potential resides: CPUC Decision 17-11-006 requires that program execution lend insight into to-code savings potential. The GK12 program tracks and reports the specific to-code measures and savings by building type, segment, and geography. The program also offers a normalized metered energy consumption (NMEC) methodology to capture full to-code savings (where program has displayed clear influence and the upgrades would not have been implemented in the absence of the program) for comprehensive measure packages. Custom

calculated approaches for accelerated replacement (AR) and BRO measures also capture to-code savings. To-code savings potential for specific equipment, building types and segments, and geography follows below.

To-code savings potential for specific equipment, building types, segments, and geography:
*Equipment Types* – Heating ventilation and air conditioning (HVAC) equipment has the greatest to-code savings potential. This potential resides in deferred maintenance, change in use or occupancy from original HVAC system design, poor initial design, failed or overridden controls, and Add-On-Equipment (AOE) opportunities.

Significant to-code savings potential also resides in refrigeration. Measures include floating head and suction pressure resets, gasket and walk-in door seal repairs, installation of night covers, and anti-sweat heater controllers. For lighting, eligible to-code savings potential resides primarily in Accelerated Replacement (AR) measures.

Some AOE potential resides in lighting equipment. Measures include LED retrofit and replacement fixtures. Eligible to-code savings potential resides primarily in AR measures. This potential is high in these small customers. Some AOE potential resides in the installation of occupancy sensors or daylighting controls for existing lighting systems.

*Building Type, Customer Segments* – Smaller K-12 and government facilities may have a deferred maintenance and "repair indefinitely" approach to equipment maintenance, lending to higher to-code savings potential. Larger facilities often have maintenance staff and comprehensive preventative maintenance practices in place, but significant to-code HVAC modification and control optimization opportunities still exist.

*Geographical Locations* – To-code savings potential spans all PG&E territory geographies. Inland and desert regions possess higher potential for to-code HVAC measures than coastal regions due to extreme temperatures that create higher cooling and heating loads.

Barriers that prevent code-compliant equipment replacements: Barriers that prevent code-compliant replacements include lack of time, capital, information, and technical expertise, as well as complexity and cost of meeting regulatory requirements (e.g., permitting).

Why natural turnover is not occurring within certain markets or for certain technologies: One important reason why natural turnover does not occur is "repair indefinitely" practice, where customers repair or bypass existing failed equipment rather than replace with to-code (or higher efficiency) equipment. Technologies in this market that are not being replaced by natural turnover are packaged air-conditioning units and heat-pumps, refrigeration systems, non-Title 24 compliant thermostats, air-cooled chillers, failed HVAC controls, VFDs, and economizers.

Other customers may have capital but require 24/7 operation and are sensitive to downtime required for installation. Large capital replacements are intrusive, costly, and often require design, permitting, and long timelines. Technologies that are not experiencing natural turnover at these critical facilities (and other large facilities with central plants) are chiller replacements, HVAC modifications such as variable air-flow conversions, and controls upgrades. To address these barriers, the program offers technical expertise, financing options, code-compliant education, and flexible incentives for customers to reach (and where possible, surpass) applicable codes and standards.

Program interventions that would effectively accelerate turnover: The primary intervention GK12 uses to accelerate equipment turnover begins with identifying cost-effective NMEC and Accelerated Replacement measures and project management assistance to capture to-code savings. By employing both technical and financial intervention approaches, GK12 staff help to identify and claim to-code savings and benefits. Customers are educated on to-code and higher efficiency options, with the associated benefits and incentives for each.

## 7. Pilots

Pilots are not part of GK12 at this time.

## 8. Workforce Education and Training

Expand/initiate partnerships with entities that do job training and placement: A program partner that specializes in workforce development and training (ASWB) will provide program job training and placement. In addition, implementation partners will also provide training during the program launch period. GK12 will also network with

the statewide workforce education and training (WE&T) program and PG&E's Energy Training Centers to identify training opportunities that support program staff and contractors.

**Require placement experience for any new partners in the workforce, education, and training programs and new solicitations**:

New partners will be appropriately placed based on experience and certifications. For partners seeking additional resources to improve their experience, GK12 will assist in referrals to training programs and facilities (e.g., WE&T program, PG&E Energy Training Centers, SMACNA).

**Require "first source" hiring from a pool of qualified candidates, before looking more broadly, beginning with self-certification:**

The GK12 program prioritizes employing local residents when new positions need to be filled. This includes posting available roles to local job boards and recruiting within local workforce development programs, training centers and CBOs. This also includes engagement, training, and working with local contractors with whom the customer already has relationship and experience. In doing so, the program can spread the strategy of comprehensiveness beyond the partner contractors/integrators already familiar with the program approach.

**Facilitate job connections by working with implementers and contractor partners and utilizing energy training centers**:

An online platform will allow for coordination and facilitation of implementers and contractor partners. PG&E-hosted trainings will be leveraged when applicable. Program announcements will allow proactive engagement of participating contractors and implementers by promoting training offered by GK12, PG&E's Energy Centers, and others to increase the depth of EE strategy per project.

## 9. Workforce Standards

GK12 includes workforce standards and takes all prudent efforts to improve quality and reduce risk of lost lifecycle savings from poor installation, modification, or maintenance of EE measures.

### HVAC Control Measures:

The standards pursuant to D.18-10-008 are applicable. The program includes the installation, modification, and maintenance of incentivized (potentially greater than $3,000) HVAC measures in non-residential buildings by program, subcontractor, and Trade Pro staff, triggering the applicable workforce standards. When required, the program verifies that the installation team has completed and/or is enrolled in a California or federally accredited HVAC apprenticeship, completed at least five years of work at the journey level, passed an HVAC system installation competency test, received training specific to the equipment being installed, and has a C-20 HVAC contractor license from California's Licensing Board.

To further enhance quality and deliver deep, durable energy savings, GK12:

- Establishes workforce standards that meet or exceed those set forth in the contract with respect to apprenticeship, journey level experience, and licensing.
- Requires and provides training that improves overall quality of installers, including subcontractors and Trade Pros.
- Requires and provides training targeted at specific measures.
- Performs comprehensive QA/QC and requires targeted, remedial training based on those outcomes.

Compliance is demonstrated and enforced throughout the program life cycle by:

- Establishing workforce standards requirements in customer applications/project agreements that are tied to incentive eligibility.
- Collecting and verifying proper worker documentation ("qualified documents").
- Retaining "qualified documents" for reporting and periodic inspection by SDG&E.

### Lighting Controls Workforce Standards

The GK12 program includes the installation, modification, and maintenance of incentivized (potentially greater than $2,000) lighting controls measures in non-residential buildings by program staff, team subcontractor staff, and Trade Pros, triggering the applicable workforce standards.

The program:

- Establishes workforce standards for lighting controls installations requiring California Advanced Lighting Controls Training Program (CALCTP) certification where applicable.
- Requires and provides training that improves the overall quality of implementation workers across program staff, subcontractors, and Trade Pros.
- Requires and provides training targeted at specific measures proposed and implemented.
- Tracks installing technicians for measures installed and maps measures to applicable trainings, providing valuable workforce education and training metrics.
- Performs comprehensive QA/QC, ties outcomes to specific technicians, and requires targeted, remedial training based on those outcomes.

Compliance is demonstrated and enforced throughout the program life cycle by:

- Establishing workforce standards requirements in customer applications/project agreements that are tied to incentive eligibility.
- Collecting proper worker documentation ("qualified documents"); for lighting controls projects, installer certification is obtained directly from CALCTP.
- Retaining "qualified documents" for reporting and periodic inspection by SDG&E.

## 10. Disadvantaged Worker Plan

Willdan's program will provide Disadvantaged Workers with improved access to career opportunities in the energy efficiency industry by supporting outreach initiatives (training, mentorship, and/or apprenticeships) in collaboration with a combination of our subcontractor, CBO, government, and educational partners. For example, CBOs often have ties to local Building Trades Councils, community colleges, and workforce development boards that can be leveraged to connect disadvantaged pre-apprentices with supportive services. Additionally, Willdan and its partners will target Disadvantaged Workers for employment opportunities within its program.

The program tracks and reports Disadvantaged Worker participation in outreach programs, as well as program hiring, including the following metrics:

*Exhibit 7. Outreach and hiring metrics*

| Outreach | Hiring |
|---|---|
| ▪ # of training, mentorship, and/or apprenticeship opportunities offered<br>▪ # of participants<br>▪ # of staff and/or partner hours devoted to outreach initiatives | ▪ # recruiting channels promoting access to Disadvantaged Workers<br>▪ % of job opportunities made available to Disadvantaged Workers<br>▪ % of candidates screened<br>▪ % of candidates interviewed<br>▪ % of candidates offered a position<br>▪ % of candidates hired |

## 11. Additional Information

Not Applicable.

# Supporting Documents

## Program Manuals and Program Rules

*The contents of this section address the topics set forth for "program manuals" in version 2.1 of the Implementation Plan Template Guidance document.*

### 1. Eligible Measures

The Government and K-12 Program offers a full range of energy efficiency and demand flexibility measures, summarized in the "Incentive Tables, Workpapers, Software Tools" section. The GK12 program will continue to work toward expanding the measure list and ensuring a comprehensive offering.

GK12 utilizes deemed, custom, and NMEC savings platforms to influence, calculate, and incentivize customers for energy savings. Deemed measures must have an approved and non-expired workpaper or be listed in the Database for Energy Efficient Resources (DEER) as an active measure. Custom measures must be cost-effective and meet the criteria specified in the Statewide Custom Project Guidance Document. NMEC measures will follow guidance set forth in the CPUC NMEC rulebook.

### 2. Customer Eligibility Requirements

Customers meet the eligibility requirements for the program if they:

- Are a local government, federal government, or K-12 school entity
- Pay the Public Purpose Program surcharge on their PG&E electric or natural-gas meter where the energy efficiency (EE) equipment is to be installed[4]
- Do not double dip/apply for savings between multiple programs or platforms
- Adhere to all applicable federal, state, and local laws and codes

### 3. Contractor Eligibility Requirements

In order to participate in the GK12 program, installation contractors must meet the following CPUC requirements:

- Install all measures in accordance with all applicable federal, state, and local laws building codes, manufacturers' specifications, and permitting requirements.
- If a contractor performs the installation or improvement, the contractor must hold the appropriate license for the work.
- A rebate or incentive can only be provided if the customer or contractor certifies that the improvement or installation has complied with any applicable permitting requirements, including from California Building Standards Code (Title 24 of the California Code of Regulations).
- If a customer or contractor is the recipient of a rebate or incentive offered by an energy efficiency program specifically for the purchase or installation of air-conditioning or heat pump units, and their related fans, the rebate or incentive will be paid only if the customer or contractor provides proof of permit closure.
- Follow workforce standards pursuant to D.18-10-008.

Contractors must maintain high customer satisfaction and perform quality work, as evaluated by GK12 quality control staff. Contractors will no longer be eligible for participation in GK12 if there are complaints about Contractor performance and problems are not resolved to the satisfaction of the customer and program administration. Contractor will also be ineligible for participation if it is determined that fraudulent misrepresentation of removed or installed equipment has occurred, or that the program has been falsely described or represented in any way.

[4] From the PG&E Platform Rulebook v1.0: Exception: Customers who are exempt from paying gas PPP per Public Utilities Code Section 896 need not meet this [PPP] requirement. These exempt PG&E customers include the United States government (federal facilities), United States Coast Guard, the American Red Cross, and Indian reservations

## 4. Additional Services

Additional services include:

- Energy Concierge Approach with Technical Assistance
- Providing an Energy Master Plan to Customers
- Providing Diverse Financing Options to Customers
- Providing an Online Platform with Simplified Application
- Managing Turnkey Installation Services
- Managing open network of Trade Pros
- Facilitating Do-It-Yourself for Simple Measures
- Interface with Statewide and Local Programs
- IDSM Services in Addition to the EE Budget

## 5. Audits

GK12 requires in-person audits to determine the recommendations for each site.

Audits are comprehensive and include EE measures and distributed energy resources. The GK12 team and its partners and subcontractors perform the audits. During mandatory trainings, all partners and subcontractors learn how to identify good candidates for the program offerings during an audit.

## 6. Program Quality Assurance Provisions

Program success and customer satisfaction are rooted in adherence to our quality assurance procedures. GK12's quality assurance and quality control (QA/QC) procedures verify accuracy and completeness of documentation and record errors and corrections through pre- and post-installation documentation review and field verification. The implementer's experienced partners will continue to improve program QA/QC processes and tools. Partnered firms will oversee tool development for NMEC M&V, the Custom Review Guidance Document, review checklists for early screening, and application and installation reports. These firms will assess program-level performance.

Additionally, QA/QC tools are built into an online platform and follow a four-step process: (1) Early Screening, (2) Application Review, (3) Post-Installation Review, and (4) Feedback and Refinement. Each step has a checklist that must be completed before advancing to the subsequent step.

## 7. Other Program Metrics

An online platform tracks the following data points and KPIs:

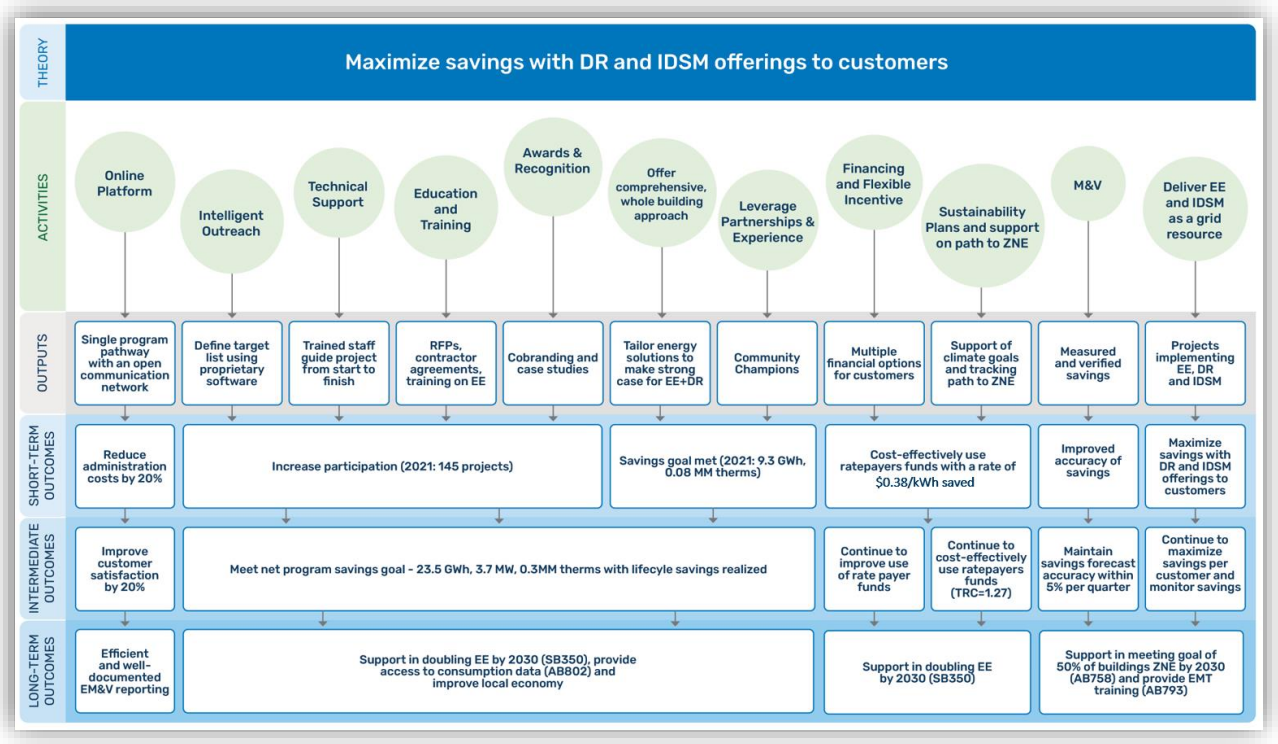
- Gross kWh Annual and Lifecycle Savings
- Net kWh Annual and Lifecycle Savings
- Gross kW Annual Lifecycle Savings
- Net kW Annual Lifecycle Savings
- Gross therm Annual Lifecycle Savings
- Net therm Annual Lifecycle Savings
- Project and Program TRC Ratios
- Budget Spent
- Budget Allocated
- Inspection Fail Count/Rate
- Number of Customers in Each Status/Phase of Project (contacted, lead, enrolled, etc.)

- Customer Satisfaction Survey Results
- Forecasted Savings and Budget (monthly, quarterly, annually)
- Number of Customers Served in HTR/DAC
- Savings Forecasted and Delivered in HTR/DAC

## Program Theory and Program Logic Model

The program theory is to increase energy efficiency and IDSM adoption rates in K-12, local government, and federal government customers. The activities listed in the program Logic Model below lead to outputs and short-term, intermediate, and long-term outcomes.

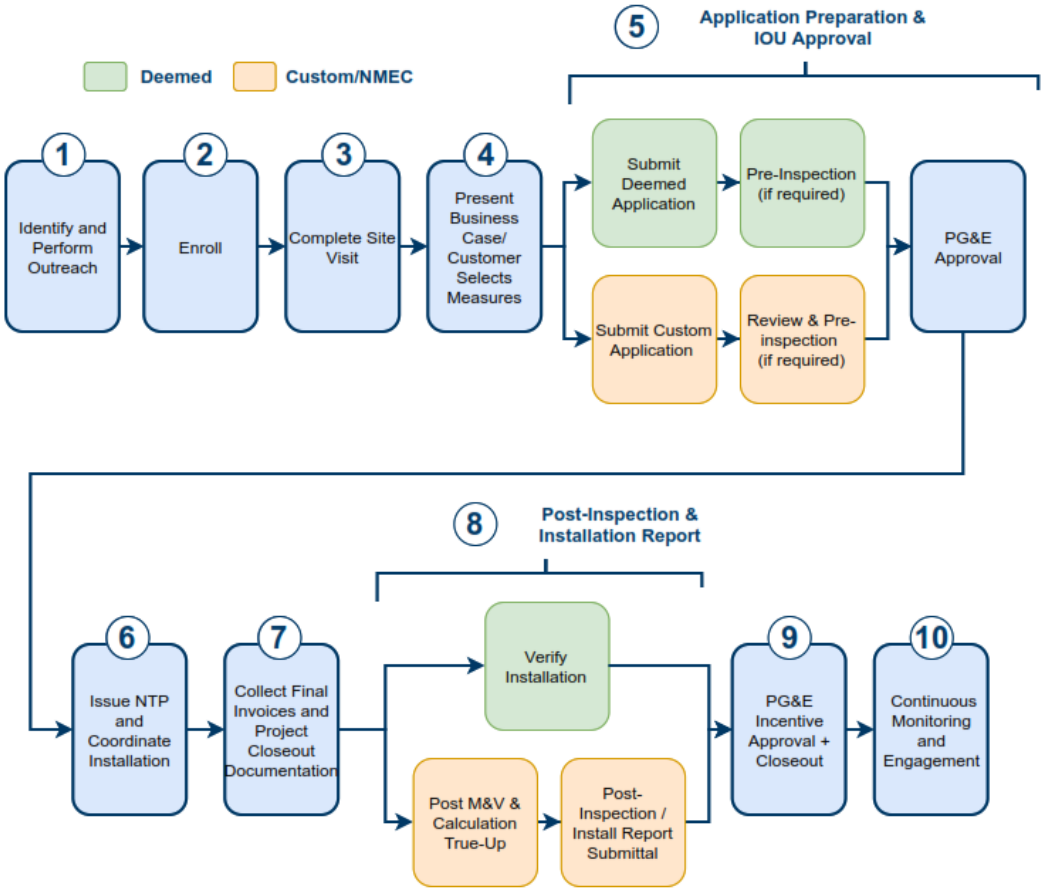
*Exhibit 8: Program theory and logic model*



## Process Flow Chart

A typical project in the Government and K-12 program will include the following major steps:

*Exhibit 9: Process flow chart*




**Step 1** – *Identify and Perform Outreach*. Implementer follows strategies outlined in the GK12 program marketing plan to use data-driven approaches to target customers with a high propensity for savings and participation. Next, the team reaches out to the targeted list, leveraging existing relationships and new outreach channels.

**Step 2** – *Enroll*. Implementer enrolls customer; application and Site Access Agreement form are signed.

**Step 3** – *Complete Site Visit*. Implementer performs a comprehensive site audit whereby site data is gathered, and customer barriers are identified along with potential measures. For smaller facilities, this may be performed at the same time as enrollment (Step 2).

**Step 4** – *Present Business Case*. Implementer presents the list of recommended measures, report of findings (savings, costs, detailed measure descriptions), along with the technical services, financing options, and/or incentives offered. Customer's specific decision-making needs are addressed during presentation of the business case. Customer selects measures for implementation.

**Step 5** – *Application Preparation and Approval*. For Deemed projects, customer approves application triggering internal pre-inspection when required. For Custom and Site-NMEC projects, implementer prepares a report, which includes M&V data (measurements and trending) and Ex Ante savings calculations. Submittal

of report and supporting documents triggers review and a pre-inspection, if required. Step 5 may also include CPUC project review for selected projects. Applications are approved by PG&E prior to implementation.

Step 6 – *Issue Notice to Proceed (NTP) and Coordinate Installation*. Upon PG&E approval of the project, the customer is sent a NTP, allowing the installation phase to begin. Then, customer or implementer team procures materials and schedules and completes installation of measures.

Step 7 – *Collect Final Invoices and Closeout Documentation*. Following the installation of all project measures, final documentation is submitted for desktop review. This includes final invoices, calculations, photos, cut sheets, and W-9 form.

Step 8 – *Post-Inspection and Installation Report*. For Deemed projects, implementer verifies installed quantities, obtains invoices, and receives final customer sign-off on Installation Report. For Custom and NMEC projects, implementer verifies post-operating conditions, performs post-installation trending, completes the Installation Report, and obtains customer sign-off. This triggers PG&E post-inspection and Installation Report review. Step 8 may also include CPUC project review for selected projects.

Step 9 – *Incentive Approval and Closeout*. Implementer completes the incentive process, updating all documentation for PG&E. Incentive is paid to the recipient noted in the project documentation.

Step 10 – *Continuous Monitoring and Engagement*. NMEC projects require continuous monitoring to check for non-routine events and verify savings for progress payment(s). This is primarily accomplished using utility meter data but may also utilize a combination of existing building automation systems, installed energy management technologies, and project-specific monitoring equipment. Custom projects that require post-install M&V will leverage the same monitoring approaches.

## Incentive Tables, Workpapers, Software Tools

All incentives will be determined by a flexible incentive calculation and are dependent on installed project savings. Many of the offerings will have numerous values for the incentives based on the implementation method, savings derivation and if the customer is considered as hard to reach (HTR). Incentive caps are applied as shown in exhibit 10 below.

*Exhibit 10: Incentive types, cost basis, and incentive caps*

| | | | Downstream | | Direct-Install | |
|---|---|---|---|---|---|---|
| **Incentive Types** | **Baseline** | **Cost Basis** | **Custom Incentive Cap** | **Deemed Incentive Cap** | **Custom Incentive Cap** | **Deemed Incentive Cap** |
| Normal Replacement (NR) | Code/ISP | Incremental (IMC) | 100% of IMC | 100% of FMC | 100% IMC | 100% of FMC |
| Accelerated Replacement (AR) | Existing | Accelerated Replacement (ARC) | 100% of ARC | | 100% of FMC | |
| Add-on Equipment (AOE), Behavioral Retro-commissioning or Operational (BRO) | Existing | Full Measure (FMC) | 50% of FMC | | 50% of FMC | |

The following table provides a summary of potential deemed measure offerings and associated workpapers. Links to statewide workpapers can be found on the California Technical Forum website: https://www.caetrm.com/

Custom and NMEC offerings include any cost-effective measures (i.e., high TRC per CET output) not eligible under the deemed platform.

*Exhibit 11: PG&E Deemed Incentive table*

| Measure | Workpaper |
|---|---|
| Small Gas Instantaneous Water Heater <= 200 kBtuh Et = 0.90 | SWWH006 |
| Hot water boiler (300 - 2500 kBtuh, 85.0 Et, OA Reset from 140 to 165 F) | SWWH005 |
| Condensing Hot Water Heater, 300-2500 kBTUh, TE>94% | SWWH005 |
| Hot water boiler (> 2500 kBTUh, 85.0% combustion efficiency, forced draft) | SWWH005 |
| Hot water boiler (> 2500 kBTUh, 94.0% combustion efficiency, condensing) | SWWH005 |
| Packaged Heat Pump <55kBtuh 16 SEER (12.4 EER) | SWHC027 |
| Food Service - Combination Oven-Electric | SWFS003 |
| Food Service - Combination Oven-Gas | SWFS003 |
| Steamer-Electric | SWFS005 |
| Steamer-Gas | SWFS005 |
| Food Service - Commercial Gas Fryer | SWFS011 |
| Commercial Conveyor Oven | SWFS008 |

| Measure | Workpaper |
|---|---|
| Food Service - Griddle-Gas | SWFS004 |
| Motors - VFD - HVAC Fans (per Hp) | SWFS004 |
| Variable Frequency Drives (VFDs) for HVAC Fans | SWHC018 |
| Water Heating - Lg Storage Water Heater TE>=0.9 | SWWH007 |
| Interior High Bay and Low Bay 4500 to < 5400 ≥ 110 LPW < 130 LPW | SWLG012 |
| Interior High Bay and Low Bay 5400 to < 6500 ≥ 110 LPW < 130 LPW | SWLG012 |
| Interior High Bay and Low Bay 6500 to < 7800 ≥ 110 LPW < 130 LPW | SWLG012 |
| Interior High Bay and Low Bay 7800 to < 9400 ≥ 110 LPW < 130 LPW | SWLG012 |
| Interior High Bay and Low Bay 9400 to < 11800 ≥ 110 LPW < 130 LPW | SWLG012 |
| Interior High Bay and Low Bay 11800 to < 14800 ≥ 110 LPW < 130 LPW | SWLG012 |
| Interior High Bay and Low Bay 14800 to < 18500 ≥ 120 LPW < 130 LPW | SWLG012 |
| Interior High Bay and Low Bay 18500 to < 23100 ≥ 120 LPW < 130 LPW | SWLG012 |
| Interior High Bay and Low Bay 23100 to < 30000 ≥ 125 LPW < 135 | SWLG012 |
| Interior High Bay and Low Bay 30000 to < 39000 ≥ 125 LPW < 135 LPW | SWLG012 |
| Interior High Bay and Low Bay 39000 to < 50700 ≥ 125 LPW < 135 LPW | SWLG012 |
| Interior High Bay and Low Bay 50700 to < 65900 ≥ 125 LPW < 135 LPW | SWLG012 |
| Interior High Bay and Low Bay 4500 to < 5400 ≥ 130 LPW | SWLG012 |
| Interior High Bay and Low Bay 5400 to < 6500 ≥ 130 LPW | SWLG012 |
| Interior High Bay and Low Bay Interior High Bay and Low Bay | SWLG012 |
| Interior High Bay and Low Bay 7800 to < 9400 ≥ 130 LPW | SWLG012 |
| Interior High Bay and Low Bay 9400 to < 11800 ≥ 130 LPW | SWLG012 |
| Interior High Bay and Low Bay 11800 to < 14800 ≥ 130 LPW | SWLG012 |
| Interior High Bay and Low Bay 14800 to < 18500 ≥ 130 LPW | SWLG012 |
| 1 inch Insulation layer, <= 1 inch pipe, <=15 psig steam, Indoor | SWWH017 |
| 1 inch Insulation layer, <= 1 inch pipe, >15 psig steam, Indoor | SWWH017 |
| 1 inch Insulation layer, <= 1 inch pipe, Hot Water, Indoor | SWWH017 |
| 1 inch Insulation layer, > 4 inch pipe, <=15 psig steam, Indoor | SWWH017 |
| 1 inch Insulation layer, > 4 inch pipe, >15 psig steam, Indoor | SWWH017 |

## Quantitative Program Targets

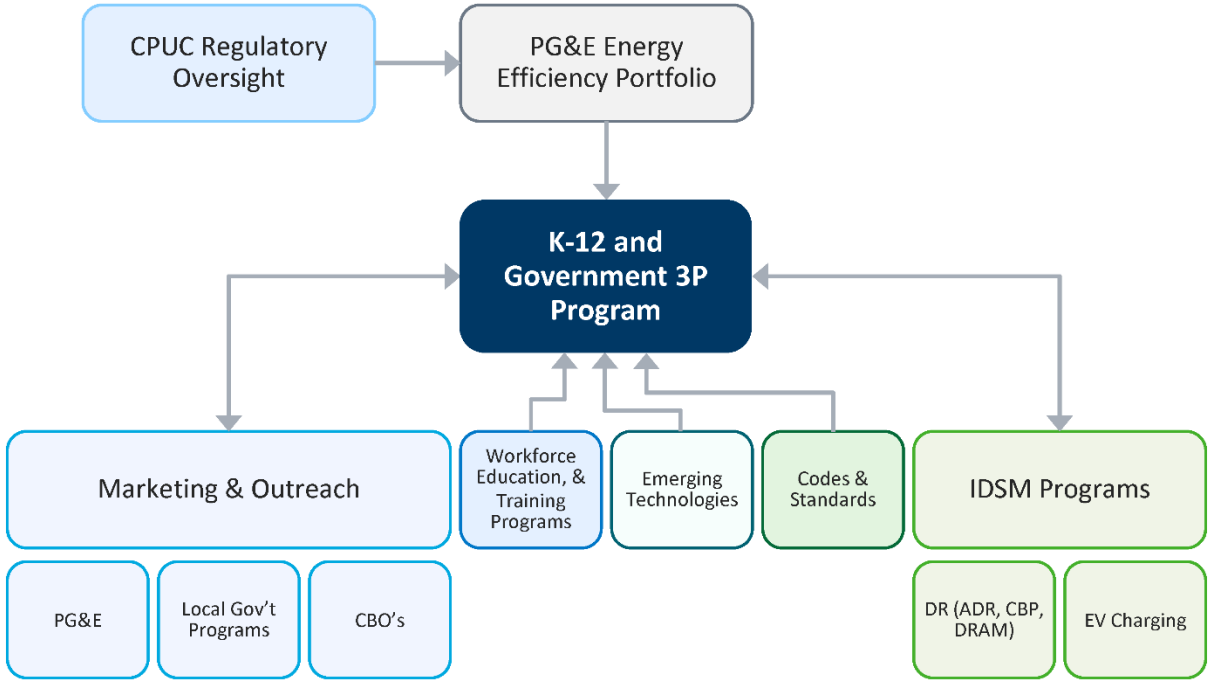
*Exhibit 12. Quantitative program targets by year*

| Year | 2021 | 2022 | 2023 | Total |
|---|---|---|---|---|
| Total Customers Served | 145 | 178 | 177 | 500 |
| Hard-to-Reach (HTR) Customers Served | 24 | 29 | 29 | 82 |
| Disadvantaged Community (DAC) Projects | 25 | 31 | 31 | 87 |
| Incentives Delivered[1] | $1,384,063 | $1,353,484 | $2,028,997 [2] | $4,766,544 |

[1]Incentives delivered include materials, installation labor, turnkey services, project management, etc.
[2]2023 incentive value shown includes $344,968 of incentive payments made in 2024 post-M&V

## Diagram of Program

*Exhibit 13. Program diagram with linkages to other programs*



## Evaluation, Measurement & Verification (EM&V)

The purpose of EM&V at the program level is to provide ongoing performance feedback during implementation, produce impact evaluations once the program term is over, and to inform planning for future program cycles. To provide robust program EM&V, the implementation team ensures program data integrity through rigorous Quality Assurance/Quality Control (QA/QC) procedures and extensive records retention. These data collection and review strategies are embedded in the design of the program from end-to-end. This promotes accurate reporting and allows near-term optimization of Program performance.

The implementation team is committed to providing quality program delivery and meeting customer needs, compliant with PG&E and CPUC requirements and statewide guidance. The Government and K-12 integrates project and program management tools, providing a platform for sharing information with all stakeholders. The QA/QC procedures were developed and will be overseen by a team of industry experts, with emphasis on continuous improvement in response to QA/QC metrics, cost-effectiveness tracking, and any changes in legislation, regulation and technologies.

### 1. Quality Assurance Plan (QAP) Features

The QAP has the following features:

- Oversight by Industry Expert Partners: Third-party program partners, including EM&V experts, oversee QA/QC training, review tool development and execution of QA/QC procedures, as well as provide full process review and analysis of program level metrics for Key Performance Indicators (KPIs). Our quality assurance effort integrates with M&V and drives continuous process evaluation and improvement.
- QA/QC Process Review Tools: Third-party program partners will oversee development and continuous improvement of QA/QC review documents consolidating guidance from various sources, and QA/QC checklists, refined from the existing CPUC checklist.
- Early Screening: Willdan justifies measure eligibility, influence, measure application type, and other measure attributes, then screens for project cost effectiveness prior to submittal of application. Willdan may opt to send completed Early Screening documents to PG&E for approval prior to completion of Pre-Installation reports.
- Enforcement, Documentation and Transparency: Program staff enforce QA/QC procedures, requiring sign-off of review checklists by Sr. level engineers before project advancement. The GK12 program implementer provides visibility to submittals and QA/QC documentation and tracks QA/QC metrics.
- M&V Plans: Custom and NMEC projects require development and execution of M&V plans, compliant with the most current versions of the Statewide Custom Project Guidance Document, CPUC NMEC Rulebook, LBNL site Level Technical Guidance and International Performance Measurement and Verification Protocol (IPMVP).
- Customer Satisfaction: The QAP reduces review times and errors, preventing erosion of savings and incentives with the aim of satisfying PG&E customers.
- Continuous Improvement: Feedback of our QA/QC metrics will be used to revise our review tools and guidance documents as well as targeting training of Willdan engineers and Trade Pros.

### 2. Data Collection and Management to Support EM&V

Comprehensive and thoughtful data collection practices are vital for streamlining EM&V efforts. The implementation team will obtain and securely manage all data including internal and external (e.g., customer interaction) program activities. Examples of these activities include targeting, outreach, project scope definition, project installation, QA/QC, invoicing, and performance tracking. EM&V industry expert partners provide feedback on our data collection process to ensure support for process and impact evaluations.

# Normalized Metered Energy Consumption (NMEC)

## 1. Program Measurement & Verification Overview

Measurement & Verification (M&V) is the process of using measurements to reliably quantify savings from a resource savings project within a facility, a process, a building, or a building subsystem. In investor owned utility (IOU) energy efficiency programs, the resource saved is typically energy (electric kWh or natural gas therms), demand (electric kW), or water (gallons). For simplicity, this plan focuses on energy savings, but the approach can be applied to any resource.

M&V is used to verify that an energy efficiency project is achieving its intended savings. Energy savings represents the absence of energy use and cannot be directly measured. Therefore, the M&V approach describes how savings are determined from measurements of energy use before and after implementation of a project, with appropriate adjustments made for changes in conditions. Such adjustments may be routine and expected, while others are nonroutine and unexpected, due to factors unrelated to the project.

The Pacific Gas and Electric Company (PG&E) Government and K-12 (GK12) M&V Plan conforms to California Public Utilities Commission (CPUC, or Commission) guidance as codified in its Rulebook for Programs and Projects Based on Normalized Metered Energy Consumption (NMEC Rulebook 2.0), issued on January 7, 2020 (NMEC Rulebook 2.0[5]). For purposes of meeting Commission guidance, PG&E GK12 is a combined "Site-level NMEC program" and "Population-level NMEC program." Per NMEC Rulebook 2.0, Site-level and Population-level NMEC is differentiated as follows:

Population-level NMEC is an energy savings calculation approach in which results are based on pre- and post-intervention energy usage data observed at the meter and calculated across a group of sites, rather than a modeled engineering forecast or deemed value (or a Site-level metered savings calculation). For Population-level NMEC, measurement methods are fixed before the program starts and applied to all sites in the group in a uniform fashion, as opposed to Site-level NMEC measurement methods which may differ on a site-by-site basis.

Projects will be sorted for NMEC platforms based on the following criteria:

- Project site (or qualifying submeter) energy use models that meet goodness-of-fit criteria will be treated as NMEC
- Projects belonging to program population groups (e.g., typical K-12 school projects, typical government office projects) will be treated as Population-level NMEC
- Projects not eligible for Population-level NMEC, but with estimated depth of savings greater than 10%, will be treated as Site-level NMEC

Projects that do not meet the above criteria will be treated as deemed or custom platform projects.

[5] NMEC Rulebook https://www.cpuc.ca.gov/WorkArea/DownloadAsset.aspx?id=6442463694

# 2. Site-level NMEC Program M&V Plan

## 2.1. Site-level NMEC Overview

The PG&E Resource Savings Rulebook provides the following definition for site-level NMEC approaches:

- Savings are determined on a site-by-site basis and claimed at the level of the individual site or project.
- The method used to estimate savings is developed based on building/site-specific characteristics and reflect the unique drivers of savings at the site or project.
- The method may include adjustments for site-specific non-routine events (NREs) that occurred at the site during the baseline, reporting, or installation period.

The PG&E GK12 program will conduct site-level NMEC M&V following the framework in the International Performance Measurement and Verification Protocol (IPMVP), using the Option C-Whole Facility method.

This document covers the Program-level M&V. For each site-level NMEC project, a supplemental site-level M&V plan will be provided. These site-level M&V plans will include the site-specific details indicated above.

## 2.2. Methodology, Analytical Methods, and Software

The initial step in the NMEC approach is to create a mathematical model of the project site (or submeter) energy consumption. This is a regression model, that relates energy consumption (the dependent variable), to one or more independent variables. The specifics of the regression model are determined by observing actual data. In the case of the baseline model, this data comes from the historical performance of the site.

In most cases, weather (outdoor dry-bulb temperature) is the primary independent variable for site-level NMEC models. Secondary variables (such as day-of-week, occupancy rate, or other variables describing operational variation) are added if they demonstrate significant explanatory power on energy use. After collecting 12-months of baseline data, one of three regression models is selected, based on data availability.

- Model #1: Daily Energy and Daily Weather Data (with Optional Daily Secondary Variable) – Single variable (or optional two variable) least squares linear regression will be performed using 365 data points.
- Model #2: Hourly Energy and Hourly Weather Data – Time of Week and Temperature (TOWT) – Temperature regression with time-of-week as a proxy for occupancy. Separate models fit within temperature buckets in each month. This allows analysis of sites with custom operation schedules.
- Model #3: Monthly Energy, Weather, and Secondary Variable Data – For sites that demonstrate strong correlations with a secondary variable, but have only monthly secondary data available, daily usage and weather data are totaled into monthly data. Two variable least squares linear regressions are performed using monthly data (minimum 12 data points).

NMEC modelling calculations will follow recognized CalTRACK 2.0 and LBNL NMEC procedures. These modelling calculations will have the following characteristics:

- Automated collection of utility AMI (or sub-meter) data, weather data import, and NMEC calculations compliant with NMEC guidance. Automation saves engineering effort.
- Scalable and not cost prohibitive for most customers and projects.
- Provide monitoring capability (necessary for NMEC) and trigger notifications of potential sub-performance or NREs (persistence of savings). Calculate statistical fitness metrics to validate appropriateness of a meter-based approach.

### 2.2.1. IPMVP Option and Measurement Boundary

IPMVP Option C, Whole Facility will be used for savings determination. Option C was selected because PG&E GK12 promotes upgrade projects that encompass multiple EEMs and may have interactive effects.

PG&E's revenue meters will be used to provide reference consumption data for both natural gas and electricity savings calculations. These meters account for all energy use of the facilities. If a facility is served by more than one

meter, then all EEMs must be properly attributed to the meter that tracks the associated load. Alternatively, meter-level consumption can be summed to the whole-building or site level so long as all meters are included that serve loads affected by the adopted EEMs. In rare cases, if a system submeter of appropriate accuracy is present, the submeter may be used for analysis with prior approval from PG&E.

### 2.2.2. Example NMEC Regression and Normalization

This example addresses an electricity savings project, but the approach can be similarly applied to gas savings projects.

Electricity is correlated with weather (and secondary variable if it demonstrates influence), using a least-squares linear regression model. Weather data takes the form of Heating Degree Days (HDD), and Cooling Degree Days (CDD). OpenEEMeter tools automatically defines HDD and CDD balance point temperatures that will provide the best correlation to the energy profile.

The typical mathematical form of the regression for Model #1 (defined above) follows:

$$kWh(daily) = A_e \times CDD\ (daily) + B_e \times Secondary\ Variable\ (daily) + C_e$$

Where $A_e$, $B_e$ and $C_e$ are the constants resulting from the electricity regression. If no secondary variable, constants $B_e$ is zero. If there is electric heat (e.g., heat pumps), an HDD term is automatically added to the electric regression formula. Constants $C_e$ is the base (non-temperature dependent) portion of consumption. The mathematical form for Model #3 is the same at that for #1 but uses monthly data. Model #2 (TOWT) uses hourly data.

The resulting regression formula is then applied to the most recent typical year weather data (CALEE2018) for the appropriate climate zone to calculate baseline energy use over a normal weather year. This is the normalized baseline.

### 2.2.3. Net Savings Determination

PG&E GK12 program projects using the population-level NMEC approach will install a combination of measures and will therefore use a Net-to-Gross (NTG) ratio of 0.95, per Commission Resolution No. E-4952.

### 2.2.4. Adjustments for COVID19

To account for the impacts of COVID19 on energy consumption, a routine adjustment to gross savings will be used to ensure savings claims are not over/underestimated. Methods to perform this adjustment will be submitted to PG&E for approval prior to implementation.

The most straightforward method of adjustment for site-level NMEC will be to adjust the COVID19-impacted baseline period data associated with a project to reflect more accurately expected future site behavior. This adjustment could take the form of moving the baseline data collection window to look at a period unaffected by COVID19 (e.g., 12-months prior to February 2020). More elaborate adjustments to the baseline models could also be made based on the site behavior as observed during the implementation period or reporting period.

Another method of adjustment will be to utilize the “difference-of-differences” approach using an appropriate comparison group of sites. This adjustment will utilize a comparison group of non-participating customers from the pilot territories that meet all eligibility requirements for the pilot. Comparison group customers will be selected randomly and will be stratified using characteristics such as location (e.g., by California climate zones within Program territory), building end use (e.g., schools, offices, etc.), observed COVID19 impacts and energy consumption (high vs low). This stratification will be based off the anticipated target customers at the start of the Program. The comparison group will be evaluated on a quarterly basis to ensure that it is reflective of the acquired portfolio. If the comparison group is no longer reflective of the treatment group (e.g. energy consumption patterns are no longer statistically similar), the comparison group may need to be resampled. PG&E will be informed of the process for selecting comparison group customers in advance of performance payments being issued.

The CalTRACK 2.0 methodology will be applied in an identical fashion to both the treatment and the comparison group. The 12 month baseline period and 12 month performance period will be set to occur over the same time period for both participants (treatment group customers) and the comparison group customers. Then the change in energy consumption for each comparison group customer will be calculated as avoided energy use in accordance with the information in this document and external CalTRACK 2.0 documentation. Performance payments will be

calculated as the difference in differences between the treatment group customers avoided energy use and the comparison group customers avoided energy use.

The details of the process used to select comparison groups is informed by the Department of Energy-funded Comparison Groups Working Group led by Recurve Analytics, Inc. The working group facilitated open discussion via bi-weekly meetings and a public github forum. The findings of this effort can be found in the final report, *Comparison Groups for the COVID Era and Beyond*[6]. The GK12 program will follow the recommended methods included in that final report.

## 2.3. Data Collection Plan

The site-level NMEC approach allows for customization of M&V approaches based on site-specific characteristics and unique drivers of savings. The PG&E GK12 program will create project-level M&V plans that describe project-specific data collection for each site-level NMEC project. What follows is a discussion of general program level guidance for site-level NMEC data collection.

For the purposes of NMEC savings evaluation, models of energy use at site level meters will be created for the baseline period (pre-implementation) and reporting period (post implementation) using 12 months of input data as required by NMEC guidelines. Data requirements and sources for creation of site-level NMEC energy use models are listed in Exhibit 14.

*Exhibit 14 – Site-level NMEC Data Sources*

| Description of Data | Data Sources |
|---|---|
| PG&E Utility Data: Electricity (15-minute or hourly); Natural Gas (daily) | PG&E: Automated "Share my Data" and Building Benchmarking Portal<br>External: Utility API import<br>Contingency: PG&E send data monthly for select accounts enrolled in Energy Insight; Account reps and CISR form |
| Other Independent Variable (e.g., occupancy rates) | Data supplied by customer |
| Building occupancy schedule; Equipment specifications, schedules, and sequences | Audit observations, BMS inspections, building drawings, specifications and building staff interviews |
| Equipment Operating Parameters (e.g., chilled water and supply-air temperatures) | Audit observations, BMS inspections and trending, spot measurements and logging |
| Weather data (hourly or daily dry-bulb ambient temperatures) | Automatic download from NOAA or Dark Sky websites into NMEC Tools |

Ex-ante savings estimates will be generated during the initial project investigation. Shorter term data will be gathered for these ex-ante savings estimates. These calculations will use industry standard tools (e.g., spreadsheet calculations, eQUEST models) and methods that are compatible with CPUC energy efficiency policy. Exhibit 15 shows examples of data collection that will be required for typical ex-ante savings estimates. This example data would be needed in addition to what is shown for the NMEC models in Exhibit 14 above.

[6] https://grid.recurve.com/uploads/8/6/5/0/8650231/recurve_comparison_group_methods_final_report_2.pdf

*Exhibit 15 – Example Data Requirements for Ex-Ante Savings Estimates*

| Data Point and Units | Typical Measure Relevancy | Data Source – Measurement Device | Data Duration / Interval |
|---|---|---|---|
| CHW Pump #1 & #2 Operating speed (Hz) | HVAC | Building Management System (BMS) Trending | May 1 to June 15 / 15-minutes |
| Secondary CHW Loop Cooling Load (tons) | HVAC | BMS Trending | May 1 to June 15 / 15-minutes |
| AHU-1 Supply fan operating speed (Hz) | HVAC | BMS Trending | May 1 to June 15 / 15-minutes |
| AHU-1 supply, return mixed air temperatures (°F) | HVAC | BMS Trending | May 1 to June 15 / 15-minutes |

## 2.4. Monitoring and Documentation During the Reporting Period

Implementation team engineers (or Trade Pros) will remotely observe energy consumption data for each site-level NMEC project on a routine schedule over the reporting period. The reporting period observation frequency will be set for each project based on size and risk when completing the Pre-Implementation project-level M&V Plan. Observations will be frequent at first (typically monthly), but intervals will increase over time if performance is found to be stable. The purpose of these observations is to identify out-of-range performance or potential non-routine events (NREs) triggering investigation and corrective action. Performance indicating 10% or more savings variance will be considered a justifiable significant NRE triggering further evaluation (ASHRAE 14 Guideline).

Projects incorporating Energy Management Technologies (EMTs) will incorporate continuous monitoring and automated flagging of out-of-range performance and potential NREs for further investigation.

Project-level M&V reports will be submitted to PG&E at intervals matching customer incentive payment structure described below. PG&E reviewers will also be allowed remote access to all NMEC program participant EMT portals, to verify performance and accuracy of M&V reports. Supporting data will be available to PG&E reviewers through the program's online platform or can be sent directly by request. The M&V reports, with the data, will provide sufficient detail for PG&E reviewers to replicate the NMEC results.

In the event that a project is selected by CPUC Energy Division (ED) for further review, the Program Implementer will provide "marked" confidential copies of all relevant project files for PG&E review with all identifying customer information highlighted. Upon review, PG&E will redact all highlighted identifying information on the confidential copies and send them to ED for review.

## 2.5. Identifying and Adjusting for Non-Routine Events

NREs are unexpected changes in building operation that significantly impact energy use, skewing meter-based results. NREs may occur during baseline or post M&V periods, may be one-time occurrences which must be isolated from the regression model, or recurring events requiring adjustments incorporated into the model.

Site-level NREs will be identified by observing baseline and reporting period energy use and identifying where savings deviate from ex-ante estimates by greater than 10% (ASHRAE 14 Guideline). These deviations will be further evaluated, and corrective action will be taken. Corrective action will take the form of adjustments to the savings models and/or modifications to the installed measures.

Significant NREs will be quantified regardless of whether they have a positive or negative impact on savings. Typical potential NREs for PG&E GK12 program customers are:

- Equipment outages or maintenance shutdowns
- Operating hours change
- Equipment replacements, additions, or removals unrelated to program measures
- Building use or tenancy changes

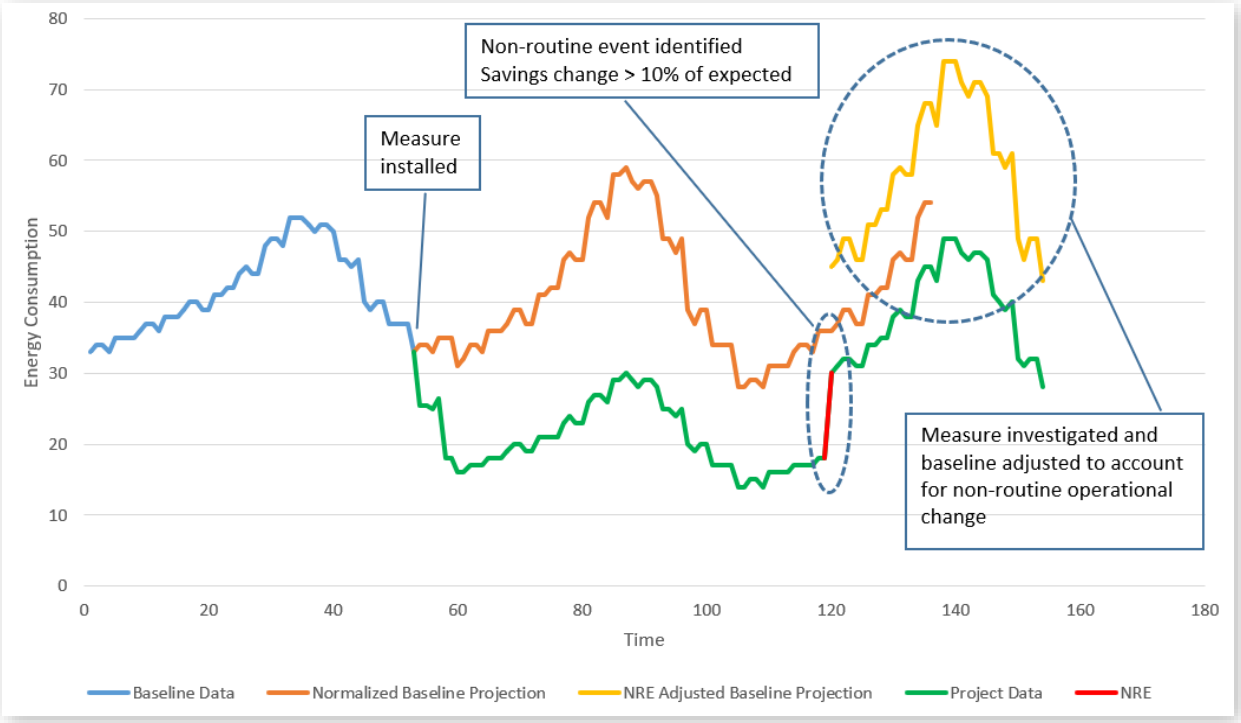
- Construction or facility closures

Typical methods employed to prevent NREs from skewing NMEC results are:

1. Remove the data points from the regression data set during the NRE.
    a. Data points associated with NREs during the baseline period will be removed if they constitute a small portion of the overall data, and remaining data points contribute to models exhibiting acceptable goodness of fit. Where this is not the case, the associated projects will be moved to custom or deemed savings platforms or rejected from the program as appropriate.
    b. Data points associated with NREs during the performance period will only be investigated if they cause project savings to move above or below a preset threshold. Prior to data-point removal, these projects will undergo manual review and investigation by program engineering staff to determine the true nature of the NRE and will be submitted to PG&E for approval.
2. Quantify the impact of the NRE by performing measurements and calculations in compliance with custom calculation guidelines for each NRE. Calculated NRE adjustments will be normalized.
3. For deviation caused by project related systems, reconfigure to operate as intended.

Exhibit 16 depicts how an NRE is identified and adjusted for. In this example, the customer site implemented increased operating hours during the reporting period.

*Exhibit 16 – Identifying and adjusting for a typical NRE*




## 2.6. Determining Program Influence

Influence for NMEC projects will follow the same procedures as that for custom, following PG&E's free-ridership screening processes. The program's Early Screening QA/QC procedure step requires determination and documentation of program influence. This screening identifies customers' plans for upgrades/replacements, barriers to implementing higher efficiency options, and the incentives or services needed to overcome these barriers. This step requires description of the options presented to customers, normal replacement practices for the customer, and how the monetary incentives, technical services or financing assistance influenced the customer to invest in higher efficiency. The following documents will be submitted to demonstrate influence:

- Timeline of customer/implementer meetings, deliverables, and decision-making milestones
- Documentation of customers replacement/upgrade practices, plans, and budgets.
- Reports and business cases of options presented to customer (requires measure level preliminary or Ex Ante savings estimates).
- Customer-implementer correspondence (e-mails, letters, meeting notes, letters, etc.)

All influence documentation associated with each project will be uploaded and stored in the program's online platform.

## 2.7. Depth of Savings Thresholds and Model Accuracy

PG&E GK12 program will not use Site-level NMEC methodology on projects that save less than 10% of the annual utility (or sub) metered consumption. Site-level NMEC models' goodness-of-fit between energy use and the independent variables will meet thresholds suggested in the LBNL NMEC Guidance and ASHRAE Guideline 14.

## 2.8. Incentive Structure

Site-level NMEC savings will be claimed by PG&E by when the projects are installed, prior to the end of performance period data collection. These savings will be calculated based on ex-ante savings estimates, adjusted as needed by changes in project details (e.g., scope, operating parameters) found during post-implementation inspections and review. Software and calculation methods are discussed in Subsections "Analytical Methods and Software" and "Calculation of Energy Savings and Peak Impacts".

Once the performance period data collection period is over and true NMEC savings are calculated, the program savings will be trued-up against the prior savings claimed at the end of project installation. This savings true-up will be implemented in the form of reductions in current project savings at the time the true-up process is implemented.

Payments to the Implementer (Willdan) will be made in a fashion similar to program savings claims. When savings claims are trued-up at the end of the performance-period, Implementer payments will be similarly trued-up. Willdan will establish similar payment structures with its subcontractors.

Program payments to customers will be split in portions between payments tied to installation, and a follow up payment provided after the performance period has been evaluated. See Subsection "Payments and Incentives" for more detail. In the even that savings degrade during the performance period to the point that the upfront payment was found to be in excess (i.e., greater than the NMEC verified savings multiplied by the appropriate incentive rates), the Implementer will evaluate whether excess incentive paid is above a threshold value and responsibility for savings degradation, and decide whether to recover incentive funds from the customer.

## 2.9. Customer Incentives

Maximum customer incentives will be calculated based on net, lifecycle savings. Lifecycle savings will be based on project-level EULs (see M&V Plan Subsection "Project Level EULs").

EULs for electric energy and gas energy (kWh and therms) will be discounted for the purposes of incentive calculations. EUL is discounted at 7.66% (PG&E's rate in CPUC's Combining Measures Claims workbook).

Net, discounted lifecycle savings will be multiplied by site-level NMEC incentive rates to calculate the maximum incentive. These calculations will be based on ex-ante savings estimates, which will then be trued-up to NMEC measured savings once obtained.

Maximum incentive calculations may receive a DAC, HTR, or Grid Constrained Load Shape Benefit multiplier where justified.

Depending on customer barriers and needs, the calculated maximum incentive may be provided as equivalent technical or financing services, or direct cash incentives.

The program will pay (at its discretion) up to 50% of the estimated (ex-ante estimates) approved customer incentive following verified installation, for measures with submitted and approved installation completion documentation, including itemized invoices. The program may offer less than 50% based on our assessment of risk to savings. The remainder of the customer incentive will be paid, as follows:

- The full remainder of the verified incentive for all non-BRO measures, and 50% of the remaining incentive for BRO measures at approval of the **12-month post-installation M&V report.**
- The full remainder of the incentive for all BRO measures after approval of the report following the **CPUC-approved post-installation monitoring period for BRO measures.** No more than 75% of the incentive for BRO measures will be paid prior to verification of this CPUC-approved BRO monitoring period post-implementation M&V report.

For the purposes of the above payment approach, BRO measure impacts will be estimated based on ex-ante savings estimates and trued up to NMEC measured savings.

## 2.10. Expected Costs, Energy Savings, Peak Impacts and EULs

Program estimates of costs, energy savings, peak impacts and effective useful life of project measures are based on Database for Energy Efficient Resources (DEER) values and latest workpapers. Costs from previously implemented projects or other reputable sources (e.g., RS Means) may be used when DEER or approved workpaper values are unavailable. Exhibit 17 shows the DEER references that are incorporated into the program.

*Exhibit 17 – DEER Workpaper Measure List*

| Measure Description | Source |
|---|---|
| <=24 kBtu/hr High Efficiency Package Terminal Heat Pump (Non Res) DX Equipment | SWHC027 |
| <=24 kBtu/hr High Efficiency Package Terminal Air Conditioner (Non Res) DX Equipment | SWHC027 |
| Water Heating - Storage Water Heater 0.67-0.69 EF 40 gal | SWWH007 |
| Water Heating - Storage Water Heater 0.70+ EF 40 gal | SWWH007 |
| Water Heating - Storage Water Heater 0.67 - 0.69 EF 30 gal | SWWH007 |
| Water Heating - Storage Water Heater 0.70 - 0.71 EF 30 gal | SWWH007 |
| Water Heating - Storage Water Heater 0 .67-0.69 EF 60 gal | SWWH007 |
| Water Heating - Storage Water Heater 0.70+ EF 60 gal | SWWH007 |
| Water Heating - Storage Water Heater 0.67 - 0.69 EF 50 Gal | SWWH007 |
| Water Heating - Storage Water Heater 70 + EF 50 gal | SWWH007 |
| Food Service - Combination Oven-Electric | SWFS003 |
| Food Service - Combination Oven-Gas | SWFS003 |
| Steamer-Electric | SWFS005 |
| Steamer-Gas | SWFS005 |
| Food Service - Commercial Gas Fryer | SWFS011 |
| Commercial Conveyor Oven | SWFS008 |
| Food Service - Griddle-Gas | SWFS004 |
| Motors - VFD - HVAC Fans (per Hp) | SWFS004 |
| Variable Frequency Drives (VFDs) for HVAC Fans | SWHC018 |
| Water Heating - Lg Storage Water Heater TE>=0.9 | SWWH007 |
| Interior High Bay and Low Bay 4500 to < 5400 ≥ 110 LPW < 130 LPW | SWLG012 |
| Interior High Bay and Low Bay 5400 to < 6500 ≥ 110 LPW < 130 LPW | SWLG012 |
| Interior High Bay and Low Bay 6500 to < 7800 ≥ 110 LPW < 130 LPW | SWLG012 |
| Interior High Bay and Low Bay 7800 to < 9400 ≥ 110 LPW < 130 LPW | SWLG012 |
| Interior High Bay and Low Bay 9400 to < 11800 ≥ 110 LPW < 130 LPW | SWLG012 |

| | |
|---|---|
| Interior High Bay and Low Bay 11800 to < 14800 ≥ 110 LPW < 130 LPW | SWLG012 |
| Interior High Bay and Low Bay 14800 to < 18500 ≥ 120 LPW < 130 LPW | SWLG012 |
| Interior High Bay and Low Bay 18500 to < 23100 ≥ 120 LPW < 130 LPW | SWLG012 |
| Interior High Bay and Low Bay 23100 to < 30000 ≥ 125 LPW < 135 | SWLG012 |
| Interior High Bay and Low Bay 30000 to < 39000 ≥ 125 LPW < 135 LPW | SWLG012 |
| Interior High Bay and Low Bay 39000 to < 50700 ≥ 125 LPW < 135 LPW | SWLG012 |
| Interior High Bay and Low Bay 50700 to < 65900 ≥ 125 LPW < 135 LPW | SWLG012 |
| Interior High Bay and Low Bay 4500 to < 5400 ≥ 130 LPW | SWLG012 |
| Interior High Bay and Low Bay 5400 to < 6500 ≥ 130 LPW | SWLG012 |
| Interior High Bay and Low Bay Interior High Bay and Low Bay | SWLG012 |
| Interior High Bay and Low Bay 7800 to < 9400 ≥ 130 LPW | SWLG012 |
| Interior High Bay and Low Bay 9400 to < 11800 ≥ 130 LPW | SWLG012 |
| Interior High Bay and Low Bay 11800 to < 14800 ≥ 130 LPW | SWLG012 |
| Interior High Bay and Low Bay 14800 to < 18500 ≥ 130 LPW | SWLG012 |
| Interior High Bay and Low Bay 18500 to < 23100 ≥ 130 LPW | SWLG012 |
| Interior High Bay and Low Bay 23100 to < 30000 ≥ 135 LPW | SWLG012 |
| Interior High Bay and Low Bay 30000 to < 39000 ≥ 135 LPW | SWLG012 |
| Interior High Bay and Low Bay 39000 to < 50700 ≥ 135 LPW | SWLG012 |
| Interior High Bay and Low Bay 50700 to < 65900 ≥ 135 LPW | SWLG012 |
| 1 inch Insulation layer, <= 1 inch pipe, <=15 psig steam, Indoor | SWWH017 |
| 1 inch Insulation layer, <= 1 inch pipe, >15 psig steam, Indoor | SWWH017 |
| 1 inch Insulation layer, <= 1 inch pipe, Hot Water, Indoor | SWWH017 |
| 1 inch Insulation layer, > 4 inch pipe, <=15 psig steam, Indoor | SWWH017 |
| 1 inch Insulation layer, > 4 inch pipe, >15 psig steam, Indoor | SWWH017 |
| <=24 kBtu/hr High Efficiency Package Terminal Heat Pump (Non Res) DX Equipment | |

## 2.11. Project Level EULs

Project level EULs will be calculated as weighted averages of individual measure level EULs that make up a given project. Weighting of the measures in these calculations will be based on the individual measure level savings converted to BTUs. Savings for the purposes of this calculation are estimated first-year savings.

Individual measure level EULs will be based on the 2014 DEER EUL table. If a DEER EUL does not exist for a measure, the implementation team will propose an estimated EUL for PG&E approval.

To facilitate EUL estimation, the implementation team will collect site-level data for the implemented measures and document any equipment being replaced.

## 2.12. Program Target Population and Eligibility

The PG&E GK12 program serves local government, federal government, and K-12 customer of all types (including HTR, DAC), sizes (small, medium, large), and geographic regions (all of PG&E's four distribution planning regions (DPRs)).

All customers without excessive variability in operations and occupancy (except industrial processes) that meet savings levels and statistical fitness thresholds are eligible for NMEC. NMEC will be used for project bundles with interactive, predominantly existing baseline (AR, AOE and BRO), measures. The program's Early Screening step includes screening for NMEC. This includes verification of an appropriate utility meter location (or sub-meter

meeting accuracy requirements as found in LBNL NMEC Guidance), and permissible project types. Site-level NMEC will not be used for projects with ex-ante savings estimates below 10% of baseline energy consumption. Eligible site-level NMEC projects must be able to have their energy use simulated with models meeting statistical goodness-of-fit thresholds suggested in the LBNL NMEC Guidance and ASHRAE Guideline 14.

## 2.13. To-Code Savings Insight

Insight into questions surrounding to-code savings will be generated during the program's Early Screening QA/QC procedure. This step includes an identification of customers' business-as-usual plans for upgrades/replacements, the customers' barriers to implementing higher efficiency options, and the incentives or services needed to overcome these barriers. The following documents will contribute to insight into why these customers currently operate below code requirements:

- Documentation of customers replacement/upgrade practices, plans, and budgets.
- Reports and business cases of options presented to customer (requires measure level preliminary or Ex Ante savings estimates).
- Customer-implementer correspondence (e-mails, letters, meeting notes, letters, etc.)

See the "To-Code Savings" section of the Implementation Plan for more information.

## 2.14. Bid M&V Plan

An M&V Plan was included in the Implementer's original bid.

# 3. Population-level NMEC Program M&V Plan

## 3.1. Population-level NMEC Overview

The PG&E Resource Savings Rulebook provides the following definition for population-level NMEC approaches:

- Savings are determined based on the aggregation of many buildings and claimed at the program level, for a group of participants.
- A consistent methodology is used to estimate savings across all sites or projects. This may include a pooled approach, in which savings from all sites or projects are estimated in a single model, or an approach in which the same model is applied to all sites or projects.
- Data collection is consistent across all sites or projects, data cleaning steps are applied consistently across all sites, and any eligibility rules are applied consistently across all sites.

The PG&E GK12 program will conduct population-level NMEC M&V following the framework in the International Performance Measurement and Verification Protocol (IPMVP), using the Option C-Whole Facility method.

## 3.2. Analytical Methods and Software

The M&V plan presented here adheres to the specifications set forth in the International Performance Measurement and Verification Protocol (IPMVP) Core Concepts - 2014[7]. The Plan also incorporates CalTRACK 2.0 standards, which provides transparent and peer-reviewed protocols for Option C implementation[8]. The CalTRACK methods were developed in an open and transparent stakeholder process that used empirical testing to define replicable methods for calculating NMEC using either monthly or interval data from an existing condition baseline.

## 3.3. Calculation of Energy Savings and Peak Impacts

This M&V plan describes how energy savings will be quantified for PG&E GK12. The overarching approach is the "difference of differences" model. In this approach, a baseline model is fit to all treatment and comparison group meters over the baseline period. In this context, the treatment group are the meters where the program is implementing energy savings projects; the comparison group are similar meters where the program is not implementing projects. These baseline models are projected forward through the treatment period as treatment and comparison group counterfactuals The change in energy consumption between the comparison group counterfactual and actual behavior is used to adjust the counterfactual of the treatment group, which is then used as the baseline against which actual treatment group energy use is compared to yield the adjusted gross savings. This approach and relevant formulas are covered in detail in Chapter 4 of the report, *Comparison Groups for the COVID Era and Beyond*.

The purpose of the "difference of differences" model is to clearly identify the savings resulting from PG&E GK12 project implementation and remove the effects of other non-related impacts on the customers' energy use even if the specific impacts are unknown. This approach assumes that these non-related impacts affect the treatment group and the comparison group similarly.

### 3.3.1. Normalization for Weather and Other Factors

Savings calculations will be normalized for weather and other factors using the OpenEEMeter tool and following CalTRACK 2.0 hourly methods for schools and other sites as appropriate (daily or monthly methods may be used for non-school sites if found to be more accurate/feasible).

The OpenEEMeter tool models energy use at sites as a combination of base load, heating load, and cooling load. Heating load and cooling load are assumed to have a linear relationship with heating and cooling demand, as approximated by heating and cooling degree days, beyond particular heating and cooling balance points. The OpenEEMeter modelling approach is discussed in detail in the CalTRACK Methods document.

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[7] IPMVP Core Concepts https://evo-world.org/en/products-services-mainmenu-en/protocols/ipmvp

[8] CalTRACK Methods http://docs.caltrack.org/en/latest/methods.html

OpenEEMeter models are fit to baseline data using 12-months of historical records. Data is screened for sufficiency and the presence of NREs and corrected when required.

Since the OpenEEMeter models generated for the program are based on temperature based independent variables (heating and cooling degree days), they can be normalized against typical mean year (TMY) weather data.

PG&E GK12 program population-level NMEC sites will be grouped such that normalization for factors other than weather will not be required. To illustrate: models could potentially be normalized based on variability of annual operating hours, but K-12 school sites served under the program should not exhibit significant variability in operating hours. The same is true for government office sites.

If it is found during the program that normalization for other factors is desired, the implementation team will propose a methodology to PG&E for approval prior to implementation.

### 3.3.2. Net Savings Determination

PG&E GK12 program projects using the population-level NMEC approach will install a combination of measures and will therefore use a Net-to-Gross (NTG) ratio of 0.95, per Commission Resolution No. E-4952.

### 3.3.3. Outlier and NRE Identification

NREs are unexpected changes in building operation that significantly impact energy use, skewing meter-based results. NREs may occur during baseline or post M&V periods, may be one-time occurrences which must be isolated from the regression model, or recurring events requiring adjustments incorporated into the model.

Significant NREs will be quantified regardless of whether they have a positive or negative impact on savings. Typical potential NREs for PG&E GK12 program customers are:

- Equipment outages or maintenance shutdowns
- Operating hours change
- Equipment replacements, additions or removals unrelated to program measures
- Building use or tenancy changes
- Construction or facility closures

The table in Exhibit 18 lays out the program's process for NRE detection and adjustment.

*Exhibit 18 – NRE Detection and Adjustment Process*

| Step | Associated Program Activities | Action |
|---|---|---|
| 1. | Eligibility Screening | Screen customers and provide PG&E with lists of eligible customers that may participate in GK12 program population-level NMEC approach. Accounts with photovoltaic installations within the prior 12-months or baseline model CVRMSE > 1.0 will not be included on the eligible customer list. |
| 2. | Pre-Audit, Project Development, Implementation, Customer Follow-up | Flag and report qualifying NRE events that are indicated during preliminary audit and project development, and those reported by Trade Pros. |

| | | |
|---|---|---|
| 3. | **Eligibility Screening, Data Collection, Savings Calculation** | Automated (tool enabled) flagging of projects with data suggestive of possible NREs:<br>▪ Normalized consumption model CV(RMSE) > 0.5<br>▪ Projects with highest and lowest 1% of savings within portfolio, plus any with savings deviating from ex-ante estimates by +/- 20%<br>▪ Utility account changes |
| 4. | **Eligibility Screening, Savings Calculation, Customer Follow-up** | Review and investigate projects identified as having possible NREs. If NRE is due to project related equipment, rectify issues. If not Propose non-routine-adjustments (NRAs) to data for affected sites to PG&E for approval.<br>Apply approved NRAs as outlined and calculate appropriate performance payment. |
| 5. | **Program Reporting** | Track NRAs. |

Typical NREs that will be flagged in Step 2 above by Program Engineers or Trade Pros are listed in Exhibit 19.

*Exhibit 19 – Typical NREs Found Through Field Investigation and Reporting*

| NRE Description | Threshold for Program Engineer or Trade Pro Reporting | Temporary or Permanent? | Load Increase or Decrease? |
|---|---|---|---|
| **Building remodel / rehab event** | Change conditioned floor area by ≥ 10% | Permanent | Mostly Increase |
| **Addition of onsite renewable energy generation** | Any new installation | Permanent | Decrease |
| **Addition of electric vehicle charging capabilities** | Any new installation | Permanent | Increase |
| **Change in space type/use** | Change affecting ≥ 50% conditioned floor area | Temporary or Permanent | Increase or Decrease |
| **Change in tenancy (new tenant or owner)** | Any change in tenancy | Permanent | Increase or Decrease |
| **Change in occupancy (number or density of occupants)** | Annualized change ≥ 20% | Temporary or Permanent | Increase or Decrease |
| **Change in operating hours or equipment operation that is unrelated to energy efficiency measure performance** | Annualized change ≥ 20% | Temporary or Permanent | Increase or Decrease |

| | | | |
|---|---|---|---|
| Added loads (new IT center, additional plug loads) | Annualized change in energy consumption ≥ 5% | Temporary or Permanent | Increase |
| Change in zone temperature set points that is unrelated to energy efficiency measure performance | Annualized change in energy consumption ≥ 5% | Temporary or Permanent | Increase or Decrease |
| Change in production volume | Annualized change ≥ 20% | Temporary or Permanent | Increase or Decrease |

Exhibit 20 shows the types of Utility account changes which will be flagged for investigation as potential NREs, as noted in Step 3.

*Exhibit 20 – Utility Account Changes Triggering NRE Investigation and Adjustments*

| NRE Description | Detection Methods | Threshold for Reporting | Temporary or Permanent? | Load Increase or Decrease? |
|---|---|---|---|---|
| Addition of onsite renewable energy generation | Utility interconnect request or change in tariff status to "NEM" | Any new installation | Permanent | Decrease |
| Addition of EV charging capabilities | Change in utility tariff | Any new installation | Permanent | Increase |
| Change in tenancy (new tenant or owner) | Change in utility account status | Any change in tenancy | Permanent | Increase or Decrease |

### 3.3.4. IPMVP Option and Measurement Boundary

IPMVP Option C, Whole Facility will be used for savings determination. Option C was selected because PG&E GK12 promotes upgrade projects that encompass multiple EEMs and may have interactive effects.

PG&E's revenue meters will be used to provide reference consumption data for both natural gas and electricity savings calculations. These meters account for all energy use of the facilities. If a facility is served by more than one meter, then all EEMs must be properly attributed to the meter that tracks the associated load. Alternatively, meter-level consumption can be summed to the whole-building or site level so long as all meters are included that serve loads affected by the adopted EEMs. In rare cases, if a system submeter of appropriate accuracy is present, the submeter may be used for analysis with prior approval from PG&E.

### 3.3.5. Adjustments for COVID19

To account for the impacts of COVID19 on energy consumption, a routine adjustment to gross savings will be used to ensure savings claims are not over/underestimated. Methods to perform this adjustment have been developed by the Department of Energy-funded Comparison Groups Working Group led by Recurve Analytics, Inc. The working group facilitated open discussion via bi-weekly meetings and a public Github forum. The methods to be used for adjustment are found in their final report: *Comparison Groups for the COVID Era and Beyond*[9]. The GK12 program will follow the recommended methods included in that final report.

## 3.4. Hourly Load Shape Impacts

The CalTRACK 2.0 methods that will be used for calculation of population-level NMEC projects for this program allow for evaluation and reporting of hourly load shape impacts at the measure level. This approach will be used here to most accurately characterize savings value based on hour of occurrence.

## 3.5. Data Collection Plan

For the purposes of NMEC savings evaluation, models of energy use at site level meters will be created for the baseline period (pre-implementation) and reporting period (post implementation) using 12 months of input data as required by NMEC guidelines.

Because the Program will be using the "difference of differences" approach for population-level NMEC analysis, baseline period and reporting period data will be collected for both comparison groups and treatment groups, for creations of energy use models for both groups. Four datasets and associated models are needed for this approach:

- Treatment group baseline period data and models (Sites included in program pre-implementation)
- Comparison group baseline period data and models
- Treatment group reporting period data and models (Sites included in program post-implementation)
- Comparison group reporting period data and models

Data requirements and sources for creation of population-level NMEC energy use models are listed in Exhibit 21.

[9] https://grid.recurve.com/uploads/8/6/5/0/8650231/recurve_comparison_group_methods_final_report_2.pdf

*Exhibit 21 – Population-level NMEC Data Sources*

| Description of Data | Data Sources | Notes |
|---|---|---|
| PG&E Utility Data: Electricity (15-minute or hourly); Natural Gas (daily) | PG&E: Automated "Share my Data" and Building Benchmarking Portal for program participants (treatment group)<br>Comparison Group Program Partner: Partner obtains comparison group data directly from PG&E. | Collected for all comparison group and treatment group sites. Comparison group data will be anonymized prior to transfer to Implementer. |
| Weather data (hourly or daily dry-bulb ambient temperatures) | Automatic download from NOAA or Dark Sky websites into NMEC Tools | |
| Other Independent Variable (e.g., occupancy rates) | Data supplied by customer | Used to confirm site conforms to population-based analysis. Does not impact calculation for specific site under population-based approach. If data shows that customer is not a good fit for population-based approach they will be moved to another platform |
| Building occupancy schedule; Equipment specifications, schedules, and sequences | Audit observations, BMS inspections, building drawings, specifications and building staff interviews | |
| Equipment Operating Parameters (e.g., chilled water and supply-air temperatures) | Audit observations, BMS inspections and trending, spot measurements and logging | |

## 3.6. Monitoring and Documentation over the Reporting Period

Program engineers will remotely observe energy consumption data for each population-level NMEC projects using the automated population level NMEC tools over the reporting period. The purpose of these observations is to identify out-of-range performance or potential non-routine events (NREs) triggering investigation and corrective action by program engineers. Performance indicating 10% or more savings variance will be considered a justifiable significant NRE triggering further evaluation (ASHRAE 14 Guideline).

Projects incorporating Energy Management Technologies (EMTs) will incorporate continuous monitoring and automated flagging of out-of-range performance and potential NREs for further investigation.

Program-level M&V reports will be submitted to PG&E regularly. PG&E reviewers will also be allowed remote access to all NMEC program participant EMT portals, to verify performance and accuracy of M&V reports. Supporting data will be available to PG&E reviewers through the program's online platform or can be sent directly upon request. The M&V reports, with the data, will provide sufficient detail for PG&E reviewers to replicate the NMEC results.

In the event that a group of population-level NMEC projects are selected by CPUC Energy Division (ED) for further review, the Program Implementer will provide "marked" confidential copies of all relevant project files for PG&E review with all identifying customer information highlighted. Upon review, PG&E will redact all highlighted identifying information on the confidential copies and send them to ED for review.

## 3.7. Program Plans for Population-level NMEC

### 3.7.1. Permissible Project Types

Projects meeting the following criteria will be included in the program's population-level NMEC approach:

- Projects with site (or qualifying submeter) energy use models meeting goodness-of-fit criteria

- Projects at sites belonging to designated program population groups (K-12 schools, typical government offices)
- Projects not exhibiting baseline NREs, unless there is an approved non routine adjustment that can be made

If a project initially qualifies for population-level NMEC, but is later found not meet the above criteria, attempts will be made to change the approach to site-level NMEC, deemed, or custom as circumstances dictate. Changes in individual project approach will be submitted to PG&E for prior approval.

### 3.7.2. Program Design Criteria

Forecasted average savings for population-level NMEC projects is 10% of baseline. The program will achieve a maximum portfolio level Fractional Savings Uncertainty (FSU) of 25%.

FSU is a declining function of portfolio size and average percentage improvement over baseline consumption. As the number of projects in the population level portfolio increases, and average savings as a percentage of baseline improves, the FSU will decrease. If the program is unable to execute a quantity of population-level NMEC projects that allow for a portfolio level FSU of 25% or below, the projects in the portfolio will be converted to site-level NMEC, deemed, or custom approaches as appropriate. As an alternative to converting all projects to other platforms in the event that the FSU threshold cannot be met, the Program Implementer will propose modifications to the population level savings evaluation (e.g., derating of overall savings). The implementer will propose a conversion plan or savings modification plan and submit to PG&E for prior approval.

### 3.7.3. Payments and Incentives

This section focuses on incentive payments to utility customers. For a broader discussion of the relation of payments and incentives between the PA, the Program Implementer, and utility customers, see the section “Payable and Claimable Savings” below.

Maximum customer incentives will be calculated based on net, lifecycle savings. Lifecycle savings will be based on program-level EULs (see M&V Plan Subsection “Project and Program Level EULs”).

EULs for electric energy and gas energy (kWh and therms) will be discounted for the purposes of incentive calculations. EUL is discounted at 7.66% (PG&E’s rate in CPUC’s Combining Measures Claims workbook).

Net, discounted lifecycle savings will be multiplied by the site-level NMEC incentive rates to calculate the maximum incentive. These calculations will be based on ex-ante savings estimates, which will then be trued-up to NMEC measured savings once obtained.

Maximum incentive calculations may receive a DAC, HTR, or Grid Constrained Load Shape Benefit multiplier where justified.

Depending on customer barriers and needs, the calculated maximum incentive may be provided as equivalent technical or financing services, or direct cash incentives.

The program will pay (at its discretion) up to 50% of the estimated (ex-ante estimates) approved customer incentive following verified installation, for measures with submitted and approved installation completion documentation, including itemized invoices. The Program may offer less than 50% based on our assessment of risk to savings. The remainder of the customer incentive will be paid, as follows:

- The full remainder of the verified incentive for all non-BRO measures, and 50% of the remaining incentive for BRO measures at approval of the 12-month post-installation M&V report.
- The full remainder of the of incentive for all BRO measures after approval of the report following the CPUC-approved post-installation monitoring period for BRO measures. No more than 75% of the incentive for BRO measures will be paid prior to verification of this CPUC-approved BRO monitoring period post-implementation M&V report.

For the purposes of the above payment approach, BRO measure impacts will be estimated based on ex-ante savings estimates and trued up to NMEC measured savings.

For details regarding program payments to the Implementer, refer to the "Compensation & Performance" section of the program implementer's contract.

### 3.7.4. Qualifying Measures

PG&E GK12 seeks to develop a scalable model for government and K-12 school facility retrofits that leverages rapidly emerging market actors and products while minimizing administrative and implementation costs. The objective is to increase the number of comprehensive government and K-12 upgrades in the program territory, particularly in advanced lighting and lighting controls, HVAC, refrigeration, and food service EEMs.

PG&E GK12 is designed to offer maximum flexibility for retrofit options coupled with operational and behavioral interventions. As a result, there is no list of required EEMs and the list of eligible EEMs is treated as non-exclusive. In alignment with CPUC and PG&E guidance, the implementation team will report intervention tactics and associated implementation dates to inform the evaluation process.

Customers who add solar PV while enrolled must provide verifiable production data to calculate energy savings for that site.

### 3.7.5. Cost Effectiveness

Cost-effectiveness will be calculated according to existing cost-effectiveness policies and using the latest version of the Cost Effectiveness Tool, using inputs as described in the subsection "Calculation of Energy Savings and Peak Impacts".

## 3.8. Program Target Population and Eligibility

The PG&E GK12 program serves local government, federal government, and K-12 customer of all types (including HTR, DAC), sizes (small, medium, large), and geographic regions (all of PG&E's four distribution planning regions (DPRs)).

All customers without excessive variability in operations and occupancy (except industrial processes) that meet savings levels and statistical fitness thresholds are eligible for NMEC. NMEC will be used for project bundles with interactive, predominantly existing baseline (AR, AOE and BRO), measures. The program's Early Screening step includes screening for NMEC. This includes verification of an appropriate utility meter location (or sub-meter meeting accuracy requirements as found in LBNL NMEC Guidance), and permissible project types. Population-level NMEC will not be used for projects with ex-ante savings estimates that will cause the portfolio level fractional savings uncertainty (FSU) to rise above 25%. Eligible population-level NMEC projects must be able to have their energy use simulated with models meeting statistical goodness-of-fit thresholds required by CalTRACK Methods.

## 3.9. Project and Program Level EULs

Project level EULs will be calculated as weighted averages of individual measure level EULs that make up a given project. Weighting of the measures in these calculations will be based on the individual measure level savings converted to BTUs. Savings for the purposes of this calculation are estimated first-year savings.

Likewise, Program level EULs will be calculated as weighted averages of individual project level EULs that make up the Program. Weighting of the projects will be based in individual project level savings converted to BTUs. Savings for the purposes of this calculation are estimated first-year savings.

Program level EULs will be calculated and updated on an annual basis, as program measure mix estimates are informed by prior program year(s) performance.

Individual measure level EULs will be based on the 2014 DEER EUL table. If a DEER EUL does not exist for a measure, the implementation team will propose an estimated EUL for PG&E approval.

To facilitate EUL estimation, the implementation team will collect site-level data for the implemented measures, and document any equipment being replaced.

Where applicable, the CPUC's "Combining Measures Claims" workbook[10] will be used to facilitate calculation of project and program level EULs.

## 3.10. Payable and Claimable Savings

Population-level NMEC savings will be claimed by PG&E by when the projects are installed, prior to the end of performance period data collection. These savings will be calculated based on ex-ante savings estimates, adjusted as needed by changes in project details (e.g., scope, operating parameters) found during post-implementation inspections and review. Software and calculation methods are discussed in Subsections "Analytical Methods and Software" and "Calculation of Energy Savings and Peak Impacts".

Once the performance period data collection period is over and true NMEC savings are calculated, the program savings will be trued-up against the prior savings claimed at the end of project installation. This savings true-up will be implemented in the form of reductions in current project savings at the time the true-up process is implemented.

Payments to the Implementer (Willdan) will be made in a fashion similar to program savings claims When savings claims are trued-up at the end of the performance-period, Implementer payments will be similarly trued-up. Willdan will establish similar payment structures with its subcontractors.

Program payments to customers will be split in portions between payments tied to installation, and a follow up payment provided after the performance period has been evaluated. See Subsection "Payments and Incentives" for more detail. In the even that savings degrade during the performance period to the point that the upfront payment was found to be in excess (i.e., greater than the NMEC verified savings multiplied by the appropriate incentive rates), the Implementer will evaluate whether excess incentive paid is above a threshold value and responsibility for savings degradation, and decide whether to recover incentive funds from the customer.

## 3.11. To-Code Savings Insight

Insight into questions surrounding to-code savings will be generated during the program's Early Screening QA/QC procedure. During this step we will identify customers' business-as-usual plans for upgrades/replacements, the customers' barriers to implementing higher efficiency options, and the incentives or services needed to overcome these barriers. The following documents will contribute to insight into why these customers currently operate below code requirements:

- Documentation of customers replacement/upgrade practices, plans and budgets.
- Reports and business cases of options presented to customer (requires measure level preliminary or Ex Ante savings estimates).
- Customer-implementer correspondence (e-mails, letters, meeting notes, letters, etc.)

See the "To-Code Savings" section of the Implementation Plan for more information.

## 3.12. Bid M&V Plan

An M&V Plan was included in the Implementer's original bid.

[10] ftp://ftp.cpuc.ca.gov/gopher-data/energy_division/EnergyEfficiency/RollingPortfolioPgmGuidance/Combining_Measures_Claims.DRAFT.xlsm