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Implementation Plan for the Advanced Energy Program

Prepared for Pacific Gas and Electric Company

March 12, 2021

Contents

1 Implementation Plan

1.1 Program Overview

The Advanced Energy Program (the Program) will support PG&E's High-Tech and biotech (HTBT) customers in achieving next-generation energy performance by providing concierge-level support, multi-stage strategic engagements, expert technical assistance, innovative incentives and financing solutions, and turnkey project implementation.

1.2 Program Budget and Savings

1. **Program and/or Sub-Program Name**

   Advanced Energy Program

2. **Program / Sub-Program ID number**

   PGE_XXX_XXX

3. **Program / Sub-program Budget Table**

EE Program Contract Budget	EE PROGRAM BUDGET	IDSM PROGRAM BUDGET	TOTAL (EE & IDSM)
3P Program Administrative Costs	$110,384.00	$4,140.00	**$114,524.00**
Marketing & Outreach Costs	$227,473.00	$4,140.00	**$231,613.00**
Direct Implementation: Incentives & Rebate Costs	$2,563,745.00	$16,202.00	**$2,579,947.00**
Direct Implementation: Non-Incentive (DINI) Costs	$2,208,688.00	$129,720.00	**$2,338,408.00**
Contract Performance Reserve (with bonus potential)	$1,637,857	-	**$1,637,857.00**
Exempt DINI Costs (does not include IDSM costs)	$130,846.00	-	**$130,846.00**
TOTALS	$6,878,993.00	$154,202.00	**$7,033,195.00**

4. **Program / Sub-program Gross Impacts Table**

ANNUALIZED FIRST-YEAR ENERGY SAVINGS - GROSS								
	2021	2022	2023	2024	2025	2026	Total	Lifecycle
kWh	-	8,241,741	13,149,084	8,612,861	-	-	30,003,686	285,160,568
kW	-	1,683	2,723	1,737	-	-	6,143	71,564
therms	-	159,076	287,372	164,106	-	-	610,555	6,071,058

5. **Program / Sub-Program Cost Effectiveness (TRC)**

   1.71

6. **Program / Sub-Program Cost Effectiveness (PAC)**

   2.38

7. **Type of Program / Sub-Program Implementer (PA-delivered, third party-delivered or Partnership)**

   Third Party-Delivered

8. **Market Sector(s) (i.e., residential, commercial, industrial, agricultural, public)**

   Commercial

9. **Program / Sub-program Type (i.e., Non-resource, Resource)**

   Resource

10. **Market channel(s) (i.e., downstream, midstream, and/or upstream) and Intervention Strategies (e.g., direct install, incentive, finance, audit, technical assistance, etc.), campaign goals, and timeline.**

    Market Channel: Downstream

    Intervention Strategies: Incentive, Technical Assistance, Financing, Audit

1.3 Implementation Plan Narrative

1.3.1 Program Description

1.3.1.1 Brief Summary

The Advanced Energy Program will support PG&E's High-Tech and biotech (HTBT) customers in achieving next-generation energy performance by providing concierge-level support, multi-stage strategic engagements, expert technical assistance, innovative incentives and financing solutions, and turnkey project implementation.

1.3.1.2 Program Rationale

High-Tech and biotech firms operate sensitive facilities with diversified manufacturing and complex control systems. Energy performance is not their highest priority so they require tailored solutions. They invest discerningly, often requiring vendors to prove a solution's demonstrable and persistent benefits before moving forward, and have complex internal approvals processes. Developing and delivering successful projects in this subsector demands an acute understanding of customer needs, the ability to successfully apply incentives and targeted support, and an incredible amount of coordination and diligence to successfully align numerous decision makers and shepherd projects through multiple levels of review. The Advanced Energy Program will offer a personalized tailored toolkit of support and services to assist customers in overcoming their unique barriers in order to optimize energy performance of their complex facilities.

1.3.1.3 Program Objectives

The Advanced Energy Program objectives include:

- Engage PG&E's sophisticated HTBT segments with innovative offerings and comprehensive approaches to energy optimization
- Deliver cost-effective electrical and natural gas savings
- Develop trusted, long-term relationships with HTBT customers and Market Partners
- Increase customer satisfaction through the program's breadth, simplicity, and concierge-level service
- Serve disadvantaged communities (DACs) through targeted and prioritized engagements

1.3.2 Program Delivery and Customer Services

The Advanced Energy Program will optimize the energy performance of HTBT customers' entire portfolios of facilities across PG&E's service territory, including sensitive areas such as clean rooms, data centers, dry/wet labs, and production and fabrication facilities; as well as less sensitive facilities with high savings potential like offices and warehouses.

The Nexant Team - comprised of Nexant, AECOM, Redaptive, National Energy Improvement Fund (NEIF), and Sagent – has the scale, reach, and broad expertise and relationships that will allow us to efficiently serve HTBT facilities across PG&E's service territory. A closed network of Market Partners, developed and managed by our Team, will provide customers with additional technical assistance and project installations, and considerably extend the program's reach.

Our Team will utilize a multi-faceted, scalable, and cost-effective marketing and outreach strategy to engage customers. Key approaches include relationship-based direct outreach and the use of data analytics to conduct targeted campaigns. Our Team will leverage and expand existing relationships with large HTBT customers, Account Representatives, Market Partners, and other market actors (e.g. contractors, vendors, and industry associations) to increase awareness, identify leads, and reach customer decision makers to drive action through direct outreach. Additionally, we will utilize data-driven customer targeting, insights, and analytics to identify, prioritize, engage customers and enhance outcomes. For example, we will conduct customer portfolio analyses and targeted data-driven segmented campaigns to identify, engage, and maximize participation of customers located in DACs.

The Program will provide participating customers with a tailored suite of solutions, based on their unique needs and priorities, to drive project completion. Solutions will be coordinated by our Energy Associates, who are the single point of contact for customers, and may include:

- Portfolio-Level Strategic Energy Planning (screening, scoping, prioritization, etc.)
- Technical Services (e.g. energy interval data analytics, energy audits, MBCx, etc.)
- Project Facilitation & Support (e.g. financial analyses, non-energy benefit analysis)
- Installation Support (e.g. referrals, scope of work development, project coordination) and Optional Turnkey Projects Approach (including Efficiency-as-a-Service option)
- Financial Incentives, Targeted Bonuses, Non-Monetary Incentives, Financing Options, And Flexible Participation Pathways.

1.3.3 Program Design and Best Practices

The Program will utilize the following elements and best-practices to overcome identified market barriers:

HTBT Market Barrier	Barrier Details	Proposed Program Elements and Best-Practices to Overcome Barriers
Lack of awareness, expertise, time, and installation support	HTBT customers are unable to identify, quantify, and install energy efficiency projects	▪ Use comprehensive customer engagement to boost awareness ▪ Provide technical assistance to identify and quantify measure impacts ▪ Offer turnkey project implementation services and help refer customers to qualified Market Partners
Complexity of approvals	HTBT customers require multiple approvals across business units, which can create delays or withdrawn projects	▪ Energy Associates identify key customer decision makers; develop strong trusting relationships; and provide highly personalized assistance, messaging, and support to gain approvals ▪ Offer targeted non-monetary incentives or discretionary financial incentives, when needed

HTBT Market Barrier	Barrier Details	Proposed Program Elements and Best-Practices to Overcome Barriers
Financial	HTBT customers face cash flow constraints or unfavorable paybacks when comparing energy efficiency projects to other investments	▪ Energy Associates help customers recognize full project benefits ▪ Provide financial incentives and integrated financing options ▪ Offer Efficiency-as-a-Service solution
Large multi-site customers	Large HTBT customers struggle to strategically develop and implement projects across their portfolio of buildings	▪ Energy Associates develop portfolio-level strategic energy action plans ▪ Provide technical assistance to identify both unique site-specific measures and replicable cross-site measures ▪ Offer turnkey project implementation services
Sensitive and risk-averse facilities	HTBT customers have zero risk tolerance for any projects that impact core business priorities	▪ Energy Associates build customer trust by deeply understanding specific customer issues and constraints ▪ Provide technical assistance that plans and accounts for customer requirements ▪ Energy Associates use sales enablement materials to highlight similar successful projects
Protection of customer data, intellectual property, and IT systems	HTBT customers' strict security measures that protect their customer data, proprietary information, and IT systems makes working with outside vendors a challenge	▪ Energy Associates identify any security concerns and coordinate NDAs, security badging, legal approvals, and data access/integration issues ▪ Program Team and Market Partners are all highly qualified and professional, and can meet all customer requirements

1.3.4 Innovation

The Advanced Energy Program includes experience-based innovations to drive participation, increase the uptake of cost-effective energy efficiency, and enhance customer satisfaction:

Technology Innovations

- Implement advanced technical solutions and measures across sensitive HTBT facilities
- Maximize savings and persistence through a holistic approach to projects and by leveraging interval data analytics and cutting-edge fault detection and diagnostic (FDD) and monitoring-based commissioning (MBCx) software platforms

Market Strategy Innovations

- Align incentives with customer priorities through flexible participation pathways
- Move high-value projects forward through creative, non-monetary incentives

Delivery Approach Innovations

- Portfolio-level outreach strategy for customer engagement
- Deploy Energy Associates to provide personalized concierge-level services
- Offer targeted bonuses and support to address the persistent market barrier of completing priorities
- Bring valuable grid resources to PG&E through DR and DER integration
- Reach additional customers through our Team's integrated partnerships
- Offer customers options for turnkey project facilitation and implementation
- Provide customers with streamlined, integrated financing solutions

1.3.5 Metrics

Program progress will be tracked through the following metrics:

- Energy Savings (gas and electric) – estimated and verified
- Energy Savings in DACs
- Cost Effectiveness
- Pipeline Quality
- Savings Forecast Accuracy
- Customer Satisfaction
- Engineering Quality
- Measure Install Pass Rate (deemed)

1.3.6 For Programs claiming to-code savings

To-code (and to-industry standard practice, or "to-ISP") savings potential exists in the HTBT subsector, particularly in older facilities where equipment has remaining useful life but the specifications or applicability of codes have evolved.

HTBT dry and wet labs, production, data center, and office buildings have significant heating, ventilation, and air conditioning (HVAC) or process cooling energy consumption. As an add-on-equipment measure, variable frequency drives (VFDs) on HVAC and process cooling systems serving HTBT buildings presents promising cost-effective to-code savings opportunities. Water side economizers and hot/cold aisle containment are additional cost-effective to-code savings measures.

Sites often have equipment and systems that continue to operate below code as long as they remain operable. Changes to any portion of these systems or equipment can trigger additional upgrades in order to come into compliance with current code and standards. It is common for customers in this situation to avoid bringing equipment to code as the costs outweigh benefits, and the incentive for bringing a system to code is not sufficient to accelerate turnover.

HTBT labs have huge opportunities for air flow setback during non-business hours. The customers are not implementing setbacks commonly because it is expensive to implement, highly technical, and requires a number of approvals. Nexant will work with customers at the start of the project to determine setback potentially by doing deep dive in to the lab system or by hiring a design team or an air balance team. Nexant will educate the labs occupants on the safety of setback measures and work with customer to get internal approvals. Further, Nexant will provide additional incentives or bonus to offset the implementation cost.

California Assembly Bill 802, and other policies, have explicitly recognized and sought to address such opportunities. To influence these potential projects, measures that capture to-code savings will be a component of the Program and will be eligible for incentives and savings claims.

1.3.7 Pilots

Not applicable.

1.3.8 Workforce Education and Training

Not applicable.

Formal workforce education and training is not budgeted for nor included in this program. However some general best practices will be passed along to the HTBT workforce during the delivery of the Program through market engagement and project facilitation and completion.

1.3.9 Workforce Standards

Workforce standards for both HVAC Measures and Advanced Lighting Control Measures are applicable to the Advanced Energy Program on a project-by-project basis, as dictated in D. 18-10-008.

1.3.10 Disadvantaged Worker Plan

Nexant will provide disadvantaged workers with improved access to career opportunities in the Program through several approaches, including:

- Nexant and our partners and subcontractors will follow best-practices for developing a diverse applicant pool for any hiring of new employees into the Program.
- Nexant will follow PG&E's Supply Chain Responsibility policy.
- Nexant will track diversity and inclusion goals and progress for our subcontractors. In addition, we will provide subcontractors with training and materials on the benefits of diversity and inclusion. We will provide resources to help create or improve their diversity programs and provide ideas for how they can put those plans into action.

Disadvantaged Worker information will be initially collected during the onboarding process for all subcontractors. We will send voluntary surveys to the participating workforce on an annual basis in order to track the program participation and training efforts of disadvantaged workers. Responses to the surveys will be completely anonymous and will only be used for understanding and reporting on disadvantaged worker participation in the Advanced Energy Program.

1.3.11 Additional information

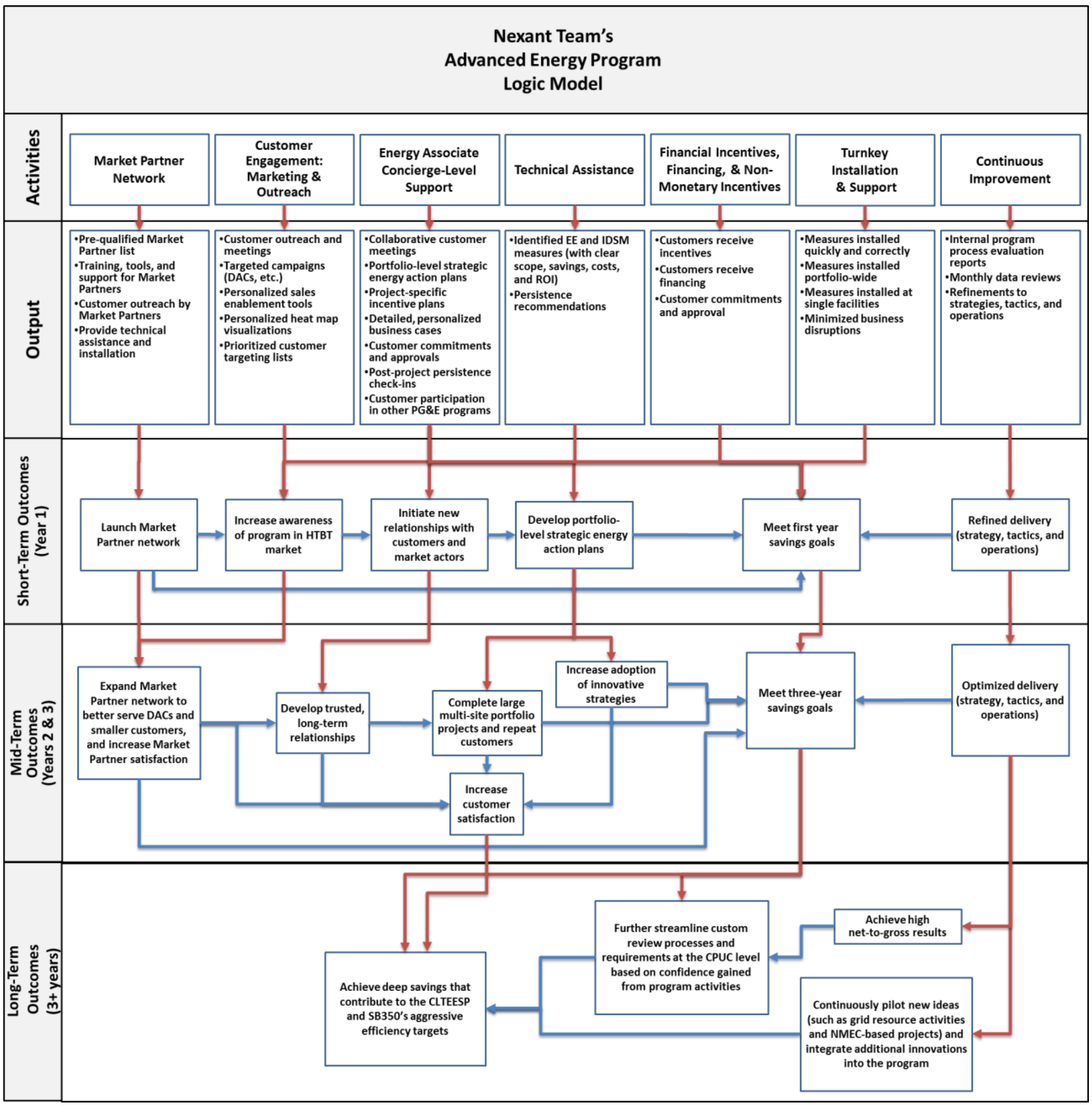
None

1.4 Supporting Documents

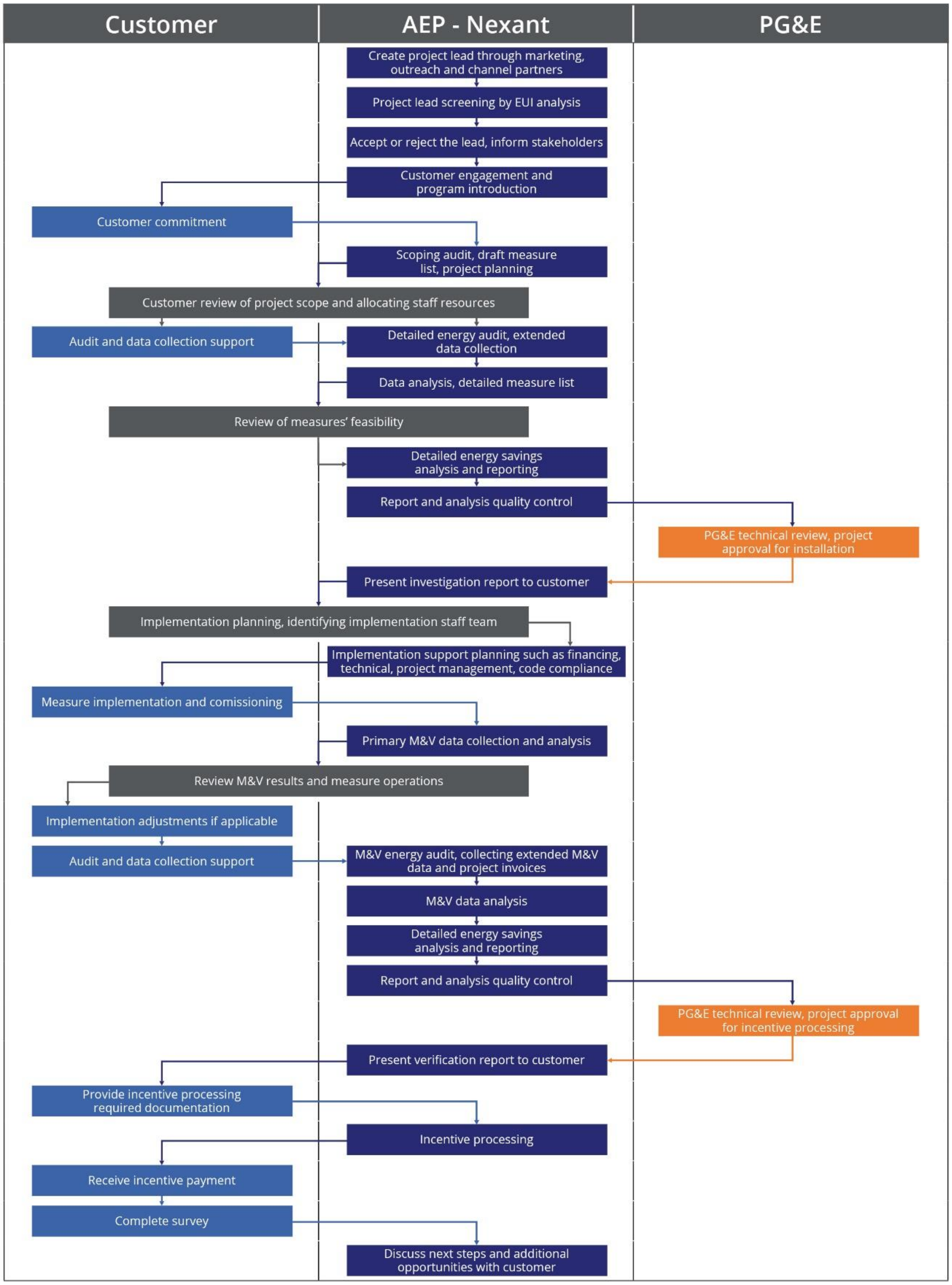
1.4.1 Program Manual

Provided in a separate document

1.4.2 Program Theory and Program Logic Model



1.4.3 Process Flow Chart



1.4.4 Incentive Tables, Workpapers, Software Tools

AEP Incentive rates are provided in the following table

Measure Application Type	Electric ($/kWh)	Gas ($/therm)
BRO and AOE	$0.06	$0.50
Retrofits	$0.10	$0.50

Incentive is cost capped at 50% of project costs. Cost cap may be increased to 100% of the project cost by the program team when applicable.

Incentive adders may also be available for program priorities, including but not limited to: capital projects and large system retrofits, meeting agreed upon project timelines, high opportunity conversion rates (i.e. from identified to installed), etc.

1.4.4.1 Workpapers

No applicable workpapers.

1.4.4.2 Software Tools

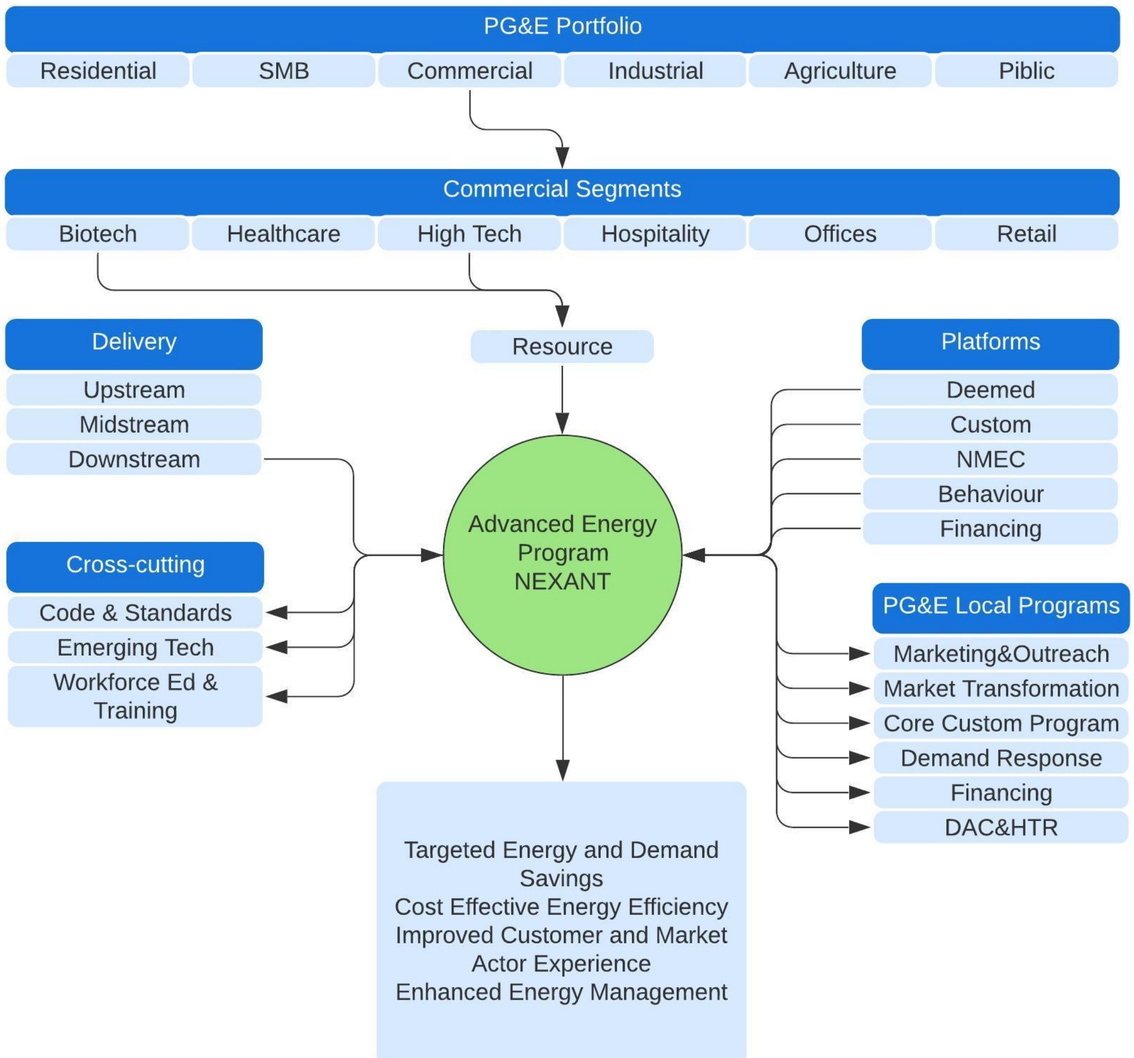
No applicable software tools.

1.4.5 Quantitative Program Targets

See section 1.2 for details about program budget and goals

Target	PY 2021	PY 2022	PY 2023	PY 2024
Number of Projects	-	20	33	22

1.4.6 Diagram of Program



1.4.7 Evaluation, Measurement & Verification (EM&V)

Not applicable

1.4.8 Normalized Metered Energy Consumption (NMEC)

Provided in a separate document

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Site-Level NMEC M&V Plan for the Advanced Energy Program

Prepared for Pacific Gas and Electric Company

March 12, 2021

Contents

1 Site-Level NMEC M&V Plan for the Advanced Energy Program (AEP)

1.1 Appropriate use of Site-Level NMEC in the AEP

The Advanced Energy Program (AEP) targets a sector of commercial buildings that specialize in Hi-Tech/Bio-Tech (HTBT) operations for deep and cost-effective energy savings. Buildings and operational patterns for this sector range from large multi-building campuses housing discrete processes from research and development to office areas, to smaller scale facilities with all functions under a single roof. Select facilities in this sector are appropriate and well matched candidates for an application of NMEC M&V techniques, the measurement of avoided energy use through building level metered energy consumption.

NMEC aligns the interests of the program with the participant and PG&E. The candidate buildings selected for the NMEC M&V approach have been screened and selected as only those buildings with high baseline energy consumption. These candidate buildings will have the potential for comprehensive measures on multiple energy systems with savings representing 10% or more of a facilities baseline year energy use. The NMEC approach allows the AEP team to track savings for a site throughout the performance period ensuring proper installation and commissioning. With an interim post-installation check on building performance after around 90 days, the metered energy use compared to the NMEC model forecasts can identify if measures were not properly commissioned and offer an opportunity to correct any deficiencies at the site. With true pay for performance for a project on a whole building basis as measured at the meter, visibility to the participant is greatly enhanced in comparison to typical custom retrofit projects where discrete measure incentives are often reduced for measure type baseline considerations. The connection between incentive payments for an NMEC project and measured savings at the meter are a powerful program influence that enhances the value of NMEC as a customer engagement tool.

1.2 Eligibility

Nexant's AEP will only utilize the Site-Level NMEC M&V approach for those facilities that meet the requirements as outlined in the CPUC Rulebook for Programs and Projects Based on Normalized Metered Energy Consumption, V2.0 (January 2020). Any changes in the program guidelines will be incorporated as they are published and made effective.

A project will be eligible for AEP incentives using a Site-Level NMEC M&V approach if it is currently allowable through the Deemed and calculated energy efficiency programs. This includes other measures where the program documentation and program-level M&V Plan demonstrates that the savings and EUL forecasts are reasonable, or if the measures are behavioral, retro-commissioning, and operational (BRO) measures, including maintenance and repair.

1.3 Pre-Screening

Pre-screening of candidate facilities is a critical step in ensuring that a Site-Level NMEC approach will result in a project with accurate savings estimates that result in measured energy savings at the utility meter(s) in alignment with the projected savings. By focusing efforts on larger buildings with significant amounts of baseline energy use, NMEC minimizes the M&V costs of collecting and analyzing trend or logger data and the measured savings accounts for all interactions between measures. An aggressive cost-effectiveness goal of the program aligns well with Site-Level NMEC methods for larger, heavy energy use buildings where numerous measures can be implemented. Because the Site-Level NMEC approach is not expected to be used for most of the facilities in the AEP, thorough pre-screening for “well behaved” buildings with high savings potential, and a good model fit will help to increase the use of this technique as success breeds success.

Only facilities that have at least a one-year and preferably two or more of continuous records of utility gas and/or electric billing data will be considered for Site-Level NMEC. In addition, analytics software that quickly evaluates relationships between the buildings energy use and independent variables such as ambient conditions and time of week and occupancy will be used.

Nexant intends to use one or more of the public domain software tools for screening buildings and analyzing the metered energy data, weather data and occupancy data to develop accurate models of the independent variables and the dependent energy use data. AEP anticipates using NMEC-R developed by KW Engineering, or Energy Charting and Metrics (ECAM), developed under funding provided by the Bonneville Power Administration for model development, screening, and data analysis/cleaning. Both sets of tools provide the necessary visual and statistical analysis of the data to quickly determine if the candidate building is suitable for Site-Level NMEC M&V.

1.4 Site-Level NMEC Project Periods

1.4.1 Baseline Period

The length of the baseline period is required to be at least 12 consecutive months (1 year). If valid adjustment models cannot be created for the baseline year due to Non-Recurring Events (NREs) or other anomalies in the meter data, additional metered data recorded prior to an NRE or other anomaly may be required. Covid-19 has now become an almost 1-year long NRE that has impacted many facility operations and is expected to be a common NRE.

The customer and implementer will work together to establish the start and end date of the baseline period. The baseline period should be as recent as practical at the time of the AEP project implementation.

1.4.2 Implementation and Installation Verification

After receiving written approval from the AEP Program Manager, installation of the approved measures may begin. The participant must inform PG&E and the AEP Program Manager when the energy efficiency measures (EEMs) have been installed and fully commissioned. Verification of the measure(s) installation may be done by the implementer or the customer.

1.4.3 Performance and Reporting Period

The Performance Period must be at least 12 months commencing once the measures are fully installed and commissioned. First year energy savings will first be assessed with an interim check on project performance around 90 days after the beginning of the performance period using meter data and the NMEC energy models. The interim check allows the program and the customer to assess the project performance and address any problems with commissioning of the measures. The first of two performance payments will be based on the annualized savings after verification that the project is complete. A true-up of the full year building performance and energy savings, normalized for any NREs, will follow at the end of the Performance Period. The interim assessment of building performance is key to ensuring the project is delivering intended savings, and further links the performance payments to actual savings visible to the customer in utility bills.

The Performance Period may be extended in the event that additional EEMs were installed following the initial Implementation Period. The total duration of the Performance Period must allow for at least 12 months of monitoring for each intervention of one or more EEMs.

1.5 Site Level NMEC Methodology

1.5.1 Baseline Model Development Program Theory and Program Logic Model

Only a small fraction of the facilities targeted by the program will use Site-Level NMEC M&V for savings verification. Each potential project must first be pre-screened for appropriateness and eligibility to avoid misapplication of the NMEC techniques on a building. Project pre-screening will be based on a combination of techniques including billing data review, building EUIs and benchmarks for similar building types, discussions with the building owner, scoping assessments to assess equipment and its condition, any planned facility changes and/or upgrades, efficiency measure opportunities, level of interest in achieving deep savings, and potential for incentives based on expected savings. Much of this early screening is critical to program influence as customer engagement is gained through the process of identifying the opportunities and costs associated with a comprehensive energy efficiency project.

A year of energy use, weather, occupancy patterns and other potentially impactful and variable data is collected and analyzed to determine whether an acceptable energy model may be developed that meets the eligibility requirements. These modeling criteria are:

- Savings >10% of adjusted baseline energy use

- Coefficient of Variation of the Root Mean Squared Error: CV(RMSE)>25%
- Net Mean Bias Error: NMBE<0.5%
- Coefficient of Determination: R^2>0.7 7 (suggested only – R^2 may be somewhat lower when CV(RMSE) is also below criteria maximum)

1.5.1.1 Covid-19 and other NRE Considerations on Baseline or Performance Period Adjustments

The baseline year of metered data will be reviewed for unusual energy use patterns that may be caused by non-routine events (NREs); an ongoing example of an NRE that has lasted almost a full year is Covid-19. Analyzing a year of baseline data that included the beginning of the shutdowns that occurred in March 2020 is likely to have a pronounced impact on charts of daily or hourly energy use over the full year. This and other suspected NREs will be investigated with assistance from the program participant, and documented with a clear description of how their impacts on baseline energy use and/or savings will be addressed. Pre-screening documentation will be submitted as part of the Project Feasibility Study.

Once a screening has identified a facility with high energy use and potential for significant savings then the savings analysis in the AEP for Site-Level NMEC begins with development of a baseline period energy use model. Baseline data preparation should also be considered at this stage to identify and address any outliers in the data set, or other anomalies that can distort the baseline model.

During either the baseline or performance periods, NREs may have occurred. The past year of Covid-19 impacts on facility operations is clearly going to be the more common and significant factor in analysis of baseline energy data on many of the HTBT facilities. Identification of an NRE through visual inspection of the metered energy use data is a first cut approach, and other automated data algorithms may be developed that help reduce the level of effort in automating this task. In the case of longer term NREs including Covid-19, the addition of more baseline data including the previous year of baseline energy data prior to 2020 may be necessary. Longer baseline data periods may allow accurate adjustments to the baseline to recreate normal operating conditions. For other NRE's that may have occurred during or before Covid-19 impacts, time-series charts of energy use data may be used to identify shifts in energy use patterns. If energy use data is significantly outside expected values as determined by the model, an NRE may be present. AEP staff will use professional judgement to identify NREs, but a situation in which an independent variable departs its baseline mean by ±3 standard deviations will serve as a flag of a potential NRE.

Methodologies to quantify NRE impacts in the baseline include:

- Removing data from a short period of time an NRE occurred, or extending the baseline period to provide pre-NRE meter data for similar conditions with respect to the independent variables (temperature, time of week).

- Using an indicator variable in the savings model for the time period when the NRE occurred. A simple indicator variable may be appropriate for an NRE that creates a constant addition or removal of energy. More sophisticated variables may be used when the NRE has variable energy use impacts.

During the performance period, any NREs will be identified through charting of the metered energy data and comparison with modeled energy data. Visual inspection of the differences will reveal shifts or changes in the facility use that may represent an NRE. During the performance period when a significant amount of performance period energy use data is available, a TOWT model (time-of-week and temperature) which is typically used for electric savings, or daily energy use model (for natural gas savings) may be compared with actual metered energy data. If the energy use data begins trending significantly outside expected values as determined by the models, an NRE may be present. Other NRE detection algorithms, including automated ones, may be used. Each NRE approach will be described in the project-level Energy Savings Reports and final M&V reports.

1.5.2 Model choices for Baseline

Because the main influences on HTBT facilities are most often ambient temperature and building operation schedules, the most appropriate modeling algorithm for electric savings is the Time-of-Week and Temperature (TOWT) model developed by Lawrence Berkeley National Laboratory (LBNL). For natural gas savings, the approach that has shown the best agreement is a model correlating daily gas consumption with average temperature. These models were converted to open source code by KW Engineering in R-Studio and shared publicly for open review on github. LBNL's TOWT modeling algorithm accurately predicts building energy use for non-residential building types and includes flexibility for improving model fit.

The scripts written in R-Studio include 10 models:

- For use with hourly, daily, and monthly time interval data:
  - Simple Linear Regression with Outside Air Temperature
  - Three Parameter Linear Model (Cooling)
  - Three Parameter Linear Model (Heating)
  - Four Parameter Linear Model

- Five Parameter Linear Model

- For use with hourly and daily time interval data:
  - Time-of-Week Model
  - Time-of-Week and Temperature (TOWT) Model - Preferred

- For use with monthly time interval data only:
  - Heating Degree Day Model
  - Cooling Degree Day Model
  - Heating & Cooling Degree Day Model

As specified by the CPUC in the NMEC Rulebook, the final baseline model must meet the goodness-of-fit criteria indicted in Section 1.5.1. If the model fit does not conform to these criteria, the facility may still be eligible for Site-Level NMEC M&V depending on which of the criteria that was not met for goodness-of-fit. The coefficient of variation is one metric that may be easily explained if the slope of the regression is relatively flat, accompanied by a very low CV(RMSE) that signals a very tight spread of the data around the mean. If explanations are inadequate, then the project shall be ruled as ineligible for application of site-level NMEC M&V.

In addition to verifying that the main criteria for goodness-of-fit are met, baseline and performance period energy models will be visually checked using scatter plots of residuals; the residuals should show a relatively narrow range of values, and clustered around the mean. Any apparent slopes, either positive or negative, of residual data trend lines may indicate NREs that must be considered. The residuals charts, baseline data scatter plots and any other charts used for visual fitness assessment, will be included in the Site-Level M&V Plan.

1.5.3 Baseline and Performance Period Data

For energy interval data, the AEP will typically rely on the data collected by the utility at the utility-owned meter and made available online. In some cases such as a HTBT campus with a single utility meter serving the entire campus, sub-metering data for individual buildings that meet PG&E requirements for meter precision, accuracy, and data storage must be used. As with utility meter data, any sub-metered data must be available for a minimum 1-year of baseline building performance.

In addition, central plants that supply a campus with chilled water, steam or heating hot water or other energy sources may be the facility identified for an energy efficiency project. If the proposed project and analysis of the sub-metered data meet the eligibility criteria including low CV(RMSE), a savings fraction above 10% of the baseline, and show good fit in the energy models, the Site-Level NMEC approach may be a better and more cost-effective approach for conducting M&V than custom M&V approaches that may require extensive monitoring and or trend data analysis. The AEP staff and customer will develop agreements to provide timely access to any submeter data, along with the details on the meters and data storage will be provided with the PFS. Any submeter that the program team relies on for project data will meet the requirements per the CPUC NMEC Rulebook

The format of electricity data is a time-series of kWh values with a fixed interval, usually 15 minutes. The format of gas data is a time-series of gas use values, usually hourly or daily. The format of central plant data will typically be time series with Btu or Btu/h units and, typically, 15-minute or hourly intervals.

1.5.4 Data Collection

Project-level M&V Plans will include a section on data collection and preparation that describes:

- The source of both dependent and independent variable data to be used throughout the project duration, how data will be collected from each source, and how often.
    - Utility data will be indicated by meter identification or service agreement identification number and sources named, such as utility account representative or via PG&E’s Share My Data platform for third party access to interval data.
    - How the meters used in the analysis will be mapped to the customer accounts, premises, and measurement boundaries of the loads affected by the EEMs.
    - If used, data from participant-owned, or short-term meters will be identified, and their accuracy specifications documented. Recent calibration documentation will be provided for meters that require periodic calibration. Minimum accuracy requirements will adhere to CPUC specifications.
- Weather station sources will be named and their distances from the project site listed. When alternate weather station data is used, a justification will be provided.
- The anticipated format for all energy use and independent variable data and the parties responsible for providing the data.
- How the implementer, PG&E, and participant will work together to ensure data is available throughout the project duration.
- How often energy use and independent variable data will be collected and prepared for analysis.
- What data quality issues were identified and how they were treated. Data quality issues include missing data – in small or large quantities, erroneous or outlier data, and

repeated data values. The site-level M&V Plan will include a clear description of how the raw data was prepared for analysis and modeling.

1.5.5 Coverage Factor

ASHRAE Guideline 14 indicates that performance period data should cover between 90%-110% of the expected range for independent variables in the baseline model for the normalized savings claim of the performance period. Interim checks on building performance are not expected to achieve this coverage, but use of Typical Meteorological Year (TMY) weather data will inform the AEP as to the ongoing performance of the implemented measures. With a full year of data for the final savings claim, the program expects that the data will include sufficient variation in the independent variables to meet the ASHRAE guidelines for coverage.

1.5.6 Site-Level NMEC Incentive Schedule

Customers will be paid in two installments for completion of energy efficiency projects; the first payment will be generated once the implementation of the measures is verified and approved by the program. The first incentive payment will be based on the savings estimated from the energy modeling taking into consideration any measures that were not implemented or were implemented differently than proposed. The payment structure for the first payment is equal to 70% of the engineering estimates of savings, with the second payment serving as a true-up payment based on the final normalized energy savings claim for the project. The final payment will occur after analysis of one year of performance period metered data and will be limited by the final project cost and any applicable program caps. If the project performance exceeds the modeled savings after any normalization, the second payment may exceed the estimated incentive from the PFS. Conversely, underperformance of the measures may result in a reduced true-up payment. With an interim check on building performance and possible interventions to correct commissioning problems during the performance period, the AEP does not anticipate large deviations for the true-up payments

1.6 Project Feasibility Study

Although data analytics software packages available can readily identify relationships between independent variables including weather data and occupancy in Time of Week and Temperature (TOWT) models, individual energy systems must still be assessed for measure feasibility and implementation costs and cost effectiveness. A Project Feasibility Study (PFS) will be completed to accurately assess the potential savings on a measure level basis through a bottom-up assessment of measure savings that align with the NMEC energy savings modeling of the pre and post periods at the project level. The Project Feasibility Study will provide an in-depth assessment of potential energy efficiency measures and provides information to meet the requirements set forth by the CPUC.

The AEP may include either capital retrofits or retrocomissioning strategies that may be classified under any of the CPUC measure types; individual measures will be assessed for their EULs, after which a savings-weighted average EUL will be calculated for the project.

Included in the PFS are the following major elements of the report:

- Site Pre-Screening Results, including assessment of site eligibility, summary of existing energy use and expected savings, and availability of at least 12 months of historic energy and weather data.

- A data collection plan that describes how meter data is collected, and analyzed for baseline modeling as well as prediction modeling after EEM implementation. The plan will describe how data is screened for any outliers or anomalies and how such data points are to be addressed.

- Summary information on the facility, existing energy systems, general age and size of the building, any unique characteristics of the building and its operations, climate zone the building is located in, and historical energy use and demand. Any non-IOU energy sources will be disclosed with an analysis of potential savings vs. imported IOU energy to ensure all savings estimated in the project impact the grid.

- List of EEMs, including measure types (e.g. capital, BRO) and measure application type. Existing energy systems and equipment will be documented along with host equipment RULs for BRO and AOE measure types. Per NMEC Rulebook guidance, the PFS will also identify any normal replacement EEMs within the scope.

- Predictions of annual energy savings and expected useful life (EUL) at the measure level for each EEM. Savings estimates will be based on engineering judgment and available data to establish approximate project level savings via bottom-up calculations that align with the NMEC model predictions for baseline and post implementation models. The bottom-up energy savings estimates will not be the basis for savings claims, incentive offers, or performance payments; NMEC model estimates from data analytics will be the basis for initial savings claims that will be verified with post-installation meter data and normalization for any non-recurring events.

- Adjusted baseline total energy usage and predictions of total savings during the performance period. To assure savings are detectable above model noise, the AEP will conform to recommendations that targets facilities with 10% or greater savings of baseline year electric and natural gas consumption. If lower than 10% savings are anticipated, the PFS will describe how the meter-based analysis may be used to quantify the savings at an acceptable certainty level, consistent with best practices described by ASHRAE Guideline 14 and other documented references.

- Influence Documentation, including POE for any AR measure types.

- Project specific Site-Level NMEC M&V Plan

1.6.1 Site-Level NMEC M&V Plan

A project-level M&V Plan will be included with each PFS that is specific and tailored to the facility, and its operations. The M&V Plan will describe:

The data collection plan documenting how and from where baseline data is collected and how it is prepared for analysis. The building's utility meters, or participant-owned submeters, including electric, natural gas, or energy delivered from a central plant (chilled, hot water, or steam).

- Utility meter ID numbers.
- Description of energy systems and equipment.
- Documentation of how EEMs will be verified as installed and operating.
- Description of the modeling methods, algorithms and software used to develop the building's baseline energy models.
- The baseline energy model's goodness-of-fit (GOF) and accuracy metrics, showing how they meet program criteria.
- Assessment of expected savings uncertainty and how savings will be detectable at an acceptable level of certainty.
- Documentation of how baseline period NREs (if any) were identified and analyzed for the baseline period models.
- Documentation of measure level, and weighted average EULs based on best available information.
- Documentation of how anticipated NREs occurring in the installation and performance periods will be identified and impacts removed from the final savings estimation.
- Description of how savings will be documented and reported twelve months into the performance period.
- Description of how all data and savings calculations used to determine the meter-based savings estimations will be made available.
- Plan for collecting relevant to-code information, including equipment specifications, owner survey (specifically asking about barriers to code-compliant equipment replacement), and code references for any applicable measure involving to-code or above-code savings.

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