(ATTACHMENT 1)

Rulebook for Programs and Projects Based on Normalized Metered Energy Consumption

Version 2.1

Release Date: xxxxxx xx , 202x

Contents

I.   Rulebook Scope

1. Rulebook Background and Applicability

This "NMEC Rulebook" summarizes California Public Utilities Commission (CPUC) requirements for Programs where energy savings are based on normalized metered energy consumption (NMEC). The purpose is to provide a list of the directives and policies that have been established by the CPUC for the administration and implementation of such programs. Issuance of the NMEC rulebook emanates from Decision (D.) 18-01-004 which authorized the assigned Commissioner and/or Administrative Law Judge (ALJ) to issue a ruling "specifying a set of rules, guidelines, and specific requirements to address the critical issues and uncertainties related to M&V [measurement and verification]", including implementation of programs and projects leveraging normalized metered energy consumption (NMEC).

This update to the NMEC Rulebook is being issued for public comment via ALJ Ruling, and is expected to be adopted through a subsequent ALJ Ruling, similar to previous versions of the NMEC Rulebook.

Note: In certain instances, NMEC-based methods may also be used to calculate savings for non-NMEC programs, subject to the rules and processes established for those program types (examples could include custom programs or opt-out behavioral programs). This rulebook does not apply in those instances – though the rules included here could be looked to for best practice guidance on some NMEC issues.

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Unless specifically indicated otherwise, the requirements described herein apply to all the following entities: the investor-owned utilities (IOUs), Community Choice Aggregators (CCA), Regional Energy Networks (RENS) and third-party implementers as per Decision (D.)16-08-019 modified by D.18-01-004 that are funded through the mechanisms above. This manual is not an exhaustive list of all CPUC directives relevant to the current portfolio cycle. CPUC directives that are not included in this manual still apply.

This manual will be updated periodically, however, changes to existing regulatory requirements may change in between updates. Users of this Rulebook should always follow the most up-to-date adopted CPUC requirements if they supersede the requirements herein.

These NMEC program rules have been designed for "opt-in" program designs. Future versions of this Rulebook may include specific guidance on applying NMEC methods for programs that employ other customer adoption strategies. Meanwhile, for program designs utilizing NMEC measurement approaches that include an "opt-out" component, the PA must submit the Program-level M&V Plan, with a description of how control groups will be used, in a pre-program advice letter filing with a Tier 2 status, or Tier 1 for existing programs. Advice letters submitted for third-party solicitation contract approval, or other advice letters filed in accordance with these rules, may be used for this purpose. Population-level NMEC program implementation may begin only after the advice letter has been approved.

This Rulebook reflects existing CPUC policies to either Site-level NMEC, Population-level NMEC, or both. These program approaches will continue to be developed through the Energy Efficiency proceeding (R.13-11-005) or its subsequent proceeding, program evaluations, and with input from stakeholders.

Explanatory text in each section indicates the applicability of each policy to Site-Level and/or Population-Level NMEC approaches.

This Rulebook applies to new NMEC programs, programs being renewed, and programs newly transitioning to NMEC measurement. For third-party programs, subsequent Rulebook versions apply to Program Administrator's Request for Proposals issued *after* the adoption of the revised Rulebook. When new versions of the Rulebook are adopted, PAs (and Implementers) should adapt their existing programs to new Rulebook requirements 60 days after publication.

2. Assembly Bill (AB) 802

The provisions described in this document arise from California Assembly Bill (AB) 802 (Williams 2015), which modifies California Public Utilities Code § 381.2(b) to "authorize electrical corporations or gas corporations to provide financial incentives, rebates, technical assistance, and support to their customers to increase the energy efficiency of existing buildings based on all estimated energy savings and energy usage reductions, taking into consideration the overall reduction in normalized metered energy consumption as a measure of energy savings. Those programs shall include:

- Energy usage reductions resulting from the adoption of a measure or installation of equipment required for modifications to existing buildings to bring them into conformity with, or exceed, the requirements of Title 24 of the California Code of Regulations, as well as
- Operational, behavioral, and retrocommissioning activities reasonably expected to produce multi-year savings.
- Electrical corporations and gas corporations shall be permitted to recover in rates the reasonable costs of these programs. The commission shall authorize an electrical corporation and gas corporation to count all energy savings achieved through the authorized programs created by this subdivision, unless determined otherwise, toward overall energy efficiency goals or targets established by the commission."[1]

3. Site-Level Versus Population-Level NMEC

For both site-level and population-level NMEC, final trued-up energy savings determinations are made using an NMEC approach based on pre- and post-intervention energy usage data observed at the meter, rather than a modeled engineering forecast or deemed value.

A. Projects and programs are referred to as **"Site-Level NMEC"** where the following conditions hold:
- Programs and projects meet the regulatory and filing requirements described in this document;

- NMEC methods used to determine savings are customized to the particular site and project to conform to site-specific conditions and adjust for the particular drivers of savings pertinent to the customer site and project;

- Energy Savings claims and project estimates of savings are submitted for a specific site or project; and

- NMEC-determined energy savings rely on a project-specific M&V plan, customized to the specific characteristics of the site and project.

B. Programs are referred to as **"Population-Level NMEC"** where the following conditions apply:

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[1] Section 381.2(b) (bullets and paragraph breaks added for clarity).

- Programs must meet the Population-level NMEC regulatory and filing requirements described in this document;

- Measurement methods and calculation software are set before the program starts (and not subsequently changed) and apply to all sites in a uniform fashion, as opposed to Site-level NMEC measurement methods which may differ on a site-by-site basis.

4. Site-level NMEC versus Custom Projects:

Similar to custom projects, site-level NMEC requires submission of an application before project installation which includes an M&V Plan. Energy and Total System Benefit claims are based on verified project specific outcomes consistent with the M&V Plan. Many of the policies developed for custom projects apply to NMEC, though not all. Consistency across the platforms helps maintain transparent and fair practices across resource programs, but some exceptions are necessary. This section clarifies the exceptions and differences between custom projects and site-specific NMEC.

A more streamlined development of ex-ante forecast savings is allowed for NMEC relative to custom, warranted by the assurances of robust and timely savings true-ups based on NMEC M&V results. The following exceptions to custom rules are in place for site-level NMEC:

1. NMEC projects measure savings from an existing conditions baseline. Measure Application Types (MATs[2]) are required for NMEC projects and may trigger a requirement to adjust savings claims (see item 5 below).

2. Measure Application Types are necessary for NMEC to inform the measure-level EUL that is used for the savings-weighted EUL calculation. Applications must provide rationale for MAT and EUL choices.

3. NMEC projects are required to meet but not exceed applicable building codes and standards. In cases where there is no applicable code or standard, the project must exceed an Industry Standard Practice efficiency standard.

4. The existing condition for purposes of establishing baseline for site-level NMEC projects means existing equipment and processes that meet the functional and technical needs of the customer.

5. Installation of normal replacement (NR) measures (like-for-like measure) is not consistent with the goal of achieving net savings. Normal replacement measures are installations that occur for reasons outside of program influence. Examples include equipment failure, regular upgrades for occupant comfort or safety, and to accommodate changes in space usage or service needs. Savings attributable to normal replacements is limited to the amount by which the selected equipment exceeds minimum efficiency standards for newly installed equipment. However, the incidental installation of a normal replacement measure as part of a project does not make a

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[2] A measure application type (MAT) is a categorization of energy efficiency measures based on measure attributes – each measure application type has its own baseline treatment, cost basis, eligibility, and documentation requirements. There are six approved measure application types, which include: Accelerated Replacement, Add-On Equipment, Behavioral, Retrocommissioning and Operational, New Construction/New Capacity, Normal Replacement, and Weatherization. (http://www.caltf.org/measure-application-types-1#:~:text=A%20measure%20application%20type%20(MAT,%2C%20eligibility%2C%20and%20documentation%20re quirements.)

project ineligible for site-level NMEC. Normal replacement measures can be installed in a site-level NMEC project with the following provisions:

    i.   An estimate of the below-code portion of savings must be provided, documented and debited from preliminary *and final trued-up* performance based savings estimates.[3]

    ii.   Full measure cost policies apply, consistent with the use of an existing conditions baseline.

6. NMEC performance-based savings calculations must address interactive effects. If site-level models for the fuel where interactive effects reside do not meet requirements, estimated interactive effects must be applied and claimed.

7. All activity with energy consumption implications relevant to the savings measurement at the project site at the time of NMEC project installation must be reported as part of the project application Unreported installation of energy savings measures represents an undetectable NRE and will lead to the rejection of the full project savings claim.

8. Where NMEC guidance documents are not explicit to the contrary, Custom Project Guidelines apply to NMEC projects/programs.

Table 1 below highlights key differences and similarities in the policy guidelines applicable to site-level NMEC versus custom projects.

Table 1. Comparison of Selected Custom Project and Site-level NMEC Guidelines

Policy Area	Custom Project Guideline	Site-level NMEC Guideline
1. Measure Application Types	Must be identified for each measure in the project application.	Must be identified for each measure in the project application.
2. Baseline	Corresponds to measure application type.	Existing conditions, with adjustments for NR measures.
3. Minimum efficiency requirement	Project must be more efficient than either code or Industry Standard Practice, whichever is higher efficiency.	Projects must be at least as efficient as applicable code. Or, if no code is applicable, then at least equal to Industry Standard Practice.
4. Non-program measures or other exogenous	Reporting and adjustments to claims needed only when the measurement method relies on metered data that could reflect	Reporting and adjustments to claims is required.

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[3] DEER provides measure-level savings estimates from existing conditions and from code. An estimate of to-code savings is the mathematical difference. This calculation is sufficient for project adjustment. This DEER existing condition savings estimate should also be used for preliminary savings for that measure. A non-DEER estimate of preliminary savings and to-code savings may be use but calculations for both values should be provided.

changes impacting energy use.	exogenous change or non-program measures.	
5. Interactive effects	Must be accounted for	Must be accounted for

II. Program Level Requirements

1. SITE-LEVEL NMEC

A. Program-level Measurement and Verification (M&V) Plan

1) PAs must submit a Program-level M&V Plan for each Site-level NMEC program. PAs are responsible for ensuring that Program-level M&V Plans comply with CPUC requirements. If CPUC staff review of a site-level NMEC project reveals non-compliance at the program level, staff may direct the PA to update the Program Implementation and M&V Plan to meet CPUC requirements. The Program-level M&V Plan shall be included in Implementation Plan filings for the program and must include:

a. Methodology, analytical methods and software employed for calculating Normalized Metered Energy Consumption, as well as both gross and net savings, resulting from the energy efficiency measures installed and not influenced by unusual fluctuations in weather or other exogenous changes in energy consumption.

b. Data collection plan.

c. Approach to ensure adequate monitoring and documentation of energy savings for each project over the reporting period.

d. A method of identifying and adjusting for non-routine events.

e. Method of determining program influence. Projects shall conform to the program influence guidance for Accelerated Replacement in Resolution E-5115 in all respects except demonstration of existing equipment viability, or as modified by a future CPUC decision or resolution.

f. Programs targeting savings that do not meet fractional savings uncertainty requirements discussed in Section II.1.C of this document must provide a rationale and explanation of how savings will be distinguishable from normal variations in consumption.

g. A description of the incentive structure, including a) a description of which entity receives compensation at each stage of the project; and b) method(s) and tools utilized in the calculation of incentives and/or compensation.

h. Documentation of the expected costs, energy savings, peak impacts, and effective useful life (EUL) of planned measures and intervention strategies. Include supporting documentation.

i. Describe how the project level EUL is calculated using analysis and forecasting at the measure-level.

j. Describe the program target population, and participant eligibility criteria.

k. Demonstrate compliance with Decision 17-11-006 Ordering Paragraph 2 for programs targeting to-code savings.[4] Specifically:

"The investor owned utilities shall ensure that all program proposals and program implementation plans, for programs that target (or will claim) to-code savings, describe what program design elements, data collection activities, and/or analyses will be conducted to help lend insight into the following questions as part of the planned implementation of the proposed program:

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

l. A copy of any Bid M&V Plan submitted by third-party implementers in their bid.

m. Other items as required by this rulebook and other applicable policies and guidelines.

2) Third-party implementers shall provide an M&V Plan as part of their bid package. The Bid M&V Plan in bid packages must include, at a minimum:

a. A description of the program target population and participant eligibility criteria;

b. Documentation of the expected costs, energy savings, peak impacts, and effective useful life (EUL) of planned measures and intervention strategies;

c. Identification of the method(s) and calculation software that will be used to calculate savings, including required information as outlined elsewhere in this rulebook; and

d. Approach to ensure adequate data collection, monitoring and documentation of energy savings for each project over the reporting period.

B. Permissible Project Types

1) NMEC projects must occur at existing buildings.

a. The existing condition, for purposes of establishing baseline for NMEC projects, means existing equipment that meets the functional and technical needs of the customer.

2) NMEC is not permissible for industrial projects, including operations and maintenance (O&M) or behavior, retrocommissioning, and operations (BROs)-type projects.

3) Site-level NMEC projects in industrial buildings are permissible, to the extent they are similar to one that would be carried out in a commercial building. However, the building portion of the industrial customer's load must be separately metered from the industrial processes for the project to qualify for Site-level NMEC.[5]

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[4] All NMEC site-level and population-level programs target to-code savings. Programs targeting 'to-code savings' are those that apply an existing conditions baseline to determine energy savings claims for a range of measures and measure application types, including those typically subject to a standard practice baseline.

[5] See Decision 16-08-019, p. 39 "to the extent there are building-related projects in the industrial sector similar to those in the commercial sector, those types of projects in the industrial sector may also receive an existing conditions baseline, consistent with our approach for the commercial sector"

4) NMEC methods are not permissible to calculate savings for new construction projects or where there is no reference operation for existing conditions.[6, 7]

C. Site-level Design Requirements: Expected Impacts as a Fraction of Total Billing

1) It is recommended that all Site-level NMEC programs and/or projects aim for a minimum expected savings of 10% of annual consumption within a metered project boundary.[8]

2) All site-level NMEC projects shall have fractional savings uncertainty (FSU[9]) of no more than 50% of savings at 90% confidence. [10] The maximum allowable forecast savings percentage for the FSU calculation is 20%. Projects with forecast savings greater than 20% shall use 20% as the forecast savings percentage in calculating the FSU. The 20% maximum is waived for fuel switching projects.

3) For NMEC projects with direct gas savings and a gas model that does not meet model FSU requirements, the PA and the implementor can choose one of the following options:

   a. Make the entire project a regular (non-NMEC) custom project and claim both gas and electric savings. Under this option, the appropriate custom calculation approach should be used to estimate both electric and gas savings, and the entire project should follow the custom project review (CPR) process and requirements.

   b. Make the project an electric-only NMEC project, and don't claim gas savings. The implementation plan should lay out a process for addressing interactive effects. DEER interactive effects will suffice for lighting projects. Other (non-lighting) examples of electric-only projects with interactive gas savings, will be reviewed on a case-by-case basis.

D. Payments and Incentives[11]

1) A significant portion of customer and implementer incentives shall be based on NMEC-determined performance.

2) It is not permissible for NMEC programs to have an incentive structure that is wholly based on pre-installation savings estimates or use of deemed measures.

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[6] Assigned Commissioner and Administrative Law Judge's Ruling Regarding High Opportunity Energy Efficiency Programs or Projects (12/30/2015) Attachment A, at 5.

[7] See Ordering Paragraph 3 of Resolution E-4818: "We direct the Program Administrators to apply a code baseline in cases where there is no reference operation for existing conditions, including new construction, expansions, added load, and projects that occur concurrently with a change in ownership or a lessee, or a change in the function of the space (e.g., office to laboratory), or a substantial change (i.e., 30% or more) in design occupancy."

[8] Assigned Commissioner and Administrative Law Judge's Ruling Regarding High Opportunity Energy Efficiency Programs or Projects (12/30/2015), Attachment A, p. 6.

[9] Fractional Savings Uncertainty, or "FSU" is the savings uncertainty at a particular confidence level expressed as a percentage of the savings. It provides a measure of the degree of uncertainty relative to the predicted savings.

[10] ASHRAE Guideline 14-2014 equations B27 and B33 for FSU for models without and with correlated residuals, respectively. These equations are widely accepted approximations for equation B26 and may be used. B26 avoids the approximation and should be considered if technically feasible.

[11] Assigned Commissioner and Administrative Law Judge's Ruling Regarding High Opportunity Energy Efficiency Programs or Projects (12/30/2015) , Attachment A, pp. 11-12. Also D.18-05-041 Conclusion of Law 3.

3) Incentive payment structure shall be designed to mitigate risk that up-front payments could exceed the value of realized savings.[12]

4) Incentives should reflect project cost and should not be paid for customer activity that would have happened in the absence of the program intervention (see Qualifying Measures for minimum repairs rules).

5) Incentives for behavioral, retrocommissioning, and operational measures shall only be paid once participant commits to a maintenance plan for a minimum of three years (evidence should be made available to CPUC staff upon request).

6) Programs that use NMEC for savings determination and incentive payments should incorporate a pay-for-performance element that not only provides adequate motivation to pursue metered savings, but also provides such motivation to the market actors that have access to performance information and the ability to improve or affect performance as it evolves.[13]

7) D.18-05-041 contains the guidance cited below with respect to design of incentives to be paid to customers or implementers. This guidance should be considered "best practices" and both program administrators and third parties should strive for consistency with these guidelines but the guidelines are not mandatory.[14]

   a. Incentives should generally be calculated on a net lifecycle savings basis, not a first year savings basis, to support and align with achievement of portfolio net lifecycle savings goals.

   b. Incentives should generally be tiered to promote increasing degrees of efficiency above code, particularly when an existing conditions baseline is used and when the direct install delivery channel is used.

   c. Incentives should generally be strategically targeted at commercially available products that offer higher and highest degrees of efficiency and quality, not at all above code high efficiency products.

   d. Incentive structure should take into consideration the variation in barriers to efficiency upgrades faced by different customer segments, instead of being set uniformly for a measure class.

   e. For performance based programs, payment of customer and contractor incentives should tie, in significant part (50 percent or more), to independently verified savings performance estimated on a 12 month post implementation period for capital projects and 24 months, if the project includes behavioral, retrocommissioning, or operational savings, for projects with savings measured with normalized metered energy consumption approaches.

E. Qualifying Measures

In a program using normalized metered energy consumption to measure gross savings, the following measures are permissible:

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[12] Assigned Commissioner and Administrative Law Judge's Ruling Regarding High Opportunity Energy Efficiency Programs or Projects (12/30/2015), Attachment A, at 11-12

[13] D.18-01-004 at 43

[14] D.18-05-041, Conclusions of Law, Item 3, Pages 169-170

1) Measures currently allowable through the deemed and calculated energy efficiency programs.

2) Measures where the program documentation and program-level M&V Plan demonstrates that the savings and EUL forecasts are reasonable for these measures.

3) Behavioral, retrocommissioning, and operational (BRO) measures are permissible, including maintenance and repair, per compliance with these requirements:

   a. The program participant or project owners must commit to a repair and maintenance plan for a minimum of three years via a signed customer agreement under which the repair and maintenance activities will continue, and includes:[15]

      i) Continuous feedback for the building operator (or homeowner) must be provided, to sustain savings;[16]

      ii) Detailed documentation of the operational interventions;[17] and

      iii) A detailed data tracking plan pursuant to the signed repair and maintenance plan described above.[18]

Program Administrators (or for third-party programs, Implementers) shall include training components in all repair and maintenance program offerings in order to ensure participants understand the value of preventive maintenance and good operational practices.[19] This requirement should be carried out consistent with statutorily defined or CPUC adopted workforce standards.

F. Site-Level NMEC Reporting Requirements

Site-level NMEC claims will be reported for the program year and quarter that measures are installed. True-up claims will be filed with the quarterly claim for the quarter ending 12 months after installation and annual claims for the program year following the program year installed – and in subsequent years' quarterly and annual claims if the performance period extends beyond 12 months. True-up claims are the difference between the previously claimed savings and the savings measured during the performance period. Initial and true-up claims count toward IOU goal attainment in the program year claim with which they are filed.

Each site must carry the same unique ID to associate with claims over multiple reporting years, and there is a one-to-one relationship between a project and a site. In the post-M&V year's annual report, PAs will claim an update record for the project, referencing the original claim ID.

1) Claimed Savings for Site-Level NMEC

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[15] Assigned Commissioner and Administrative Law Judge's Ruling Regarding High Opportunity Energy Efficiency Programs or Projects (12/30/2015) Attachment A, at 9-10.

[16] ibid

[17] ibid

[18] ibid

[19] Assigned Commissioner and Administrative Law Judge's Ruling Regarding High Opportunity Energy Efficiency Programs or Projects (12/30/2015) at 22-23

a. PAs will claim the total predicted savings for the site no later than the first quarter of the year following project installation, applying the appropriate ex ante Gross Realization Rate and Net to Gross Ratio.

b. PAs shall report a claim no later than the first quarter of the second year following the year of installation, when a project completes its performance period. This claim will true-up actual costs and savings achievements. The true-up values will be the positive or negative difference between the original claim and post-M&V values for both costs and savings. Savings true-up will reflect final weather-normalized estimate of savings. True-ups must be linked to the original claim ID.

2) Claimed Measure Costs, Incentives and Rebates for Site-Level NMEC

   a. Measure costs are to be reported once, at the time of the initial claims. In any future update records, measure costs must be reported as zero to avoid double-counting.

   b. Rebates and Incentives must be reported in the quarter the payments were made. All update records must reflect actual incentives paid. Partial payment should be addressed consistent with other multi-payment Custom projects.

3) Program Costs for Site-Level NMEC

   a. Full Program Administration, Marketing, and Direct Implementation Non-Incentive (DINI) costs associated with a project should be reported in the installation quarter. In the future year(s), there may be a subset of DINI costs included to account for the M&V costs associated with calculation of final savings.

4) Measure Categorization and Reporting for Site-Level NMEC

   a. In an effort to standardize reporting of NMEC measures, please follow measure categorization schemes put forth in latest Energy Division Staff Guidance regarding reporting.[20]

2. POPULATION-LEVEL NMEC

A. Program-Level Measurement and Verification (M&V) Plan

1) PAs must submit a program-level M&V Plan for each Population-level NMEC program. For third-party programs, the third-party implementer can develop parts or all of the Program-level M&V Plan. HoweverPAs are responsible for ensuring that Program-level M&V Plans comply with CPUC requirements. The program-level M&V Plan must be included in any Implementation Plan filings for the program and must include:

   a. Identification of the analytical methods(s) and calculation software that will be used to determine payable and claimable savings, including references to the version and up-to-date documentation for the method(s) and software.

   b. A description of how the method(s) and software will be used to calculate both gross and net savings and peak impacts, including how they will or will not address the following:

      i. Normalization for weather and other factors;

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[20] As of Feb. 2023, NMEC Reporting Guidance_04242020.pdf

     ii. Determination of gross savings: specify the methods used for adjustments for exogenous effects by using comparison groups or other methods;

     iii. Determination of net savings: specify the methods used for free-ridership (i.e., using default net-to-gross values or other methods);

     iv. Outlier site & non-routine event identification and data treatment including filtering and other amelioration.

     v. Description of any plans to integrate long-lasting energy efficiency deployment with other opportunities like demand response, and including a description of how measurement of energy efficiency and other savings will be disaggregated and paid for.

c. Hourly load shape impact calculations

d. Data collection plan;

e. Approach to ensure adequate monitoring and documentation of energy savings, including meter mapping for each project over the reporting period;

f. A description of plans for the following, in compliance with the rules as outlined in Section II.2. of this rulebook:

     i. Permissible project types;

     ii. Program design criteria, including the calculations for forecasted average savings and FSU;

     iii. Payments and incentives, including the schedule and structure for payments to implementers;

     iv. Qualifying measures;

     v. Cost effectiveness.

g. Description of program participant eligibility criteria, such as the program's approach to participants with non-routine events in their baseline period, participation in other energy efficiency programs and/or other demand side management offerings (electric vehicles, solar PV, storage, tenant turnover, etc.).

h. A description of how the project and program-level EULs will be calculated demonstrating compliance with current Technical Guidelines for determining weighted average EUL, unless staff approves an alternative method for EUL calculation.

i. A full description of the method(s) and calculation software that will be used to determine payable and claimable savings, and the payment terms for any planned payments (to customers, third party implementers, contractors) based on savings measured using Population-level NMEC methods. Describe if/how payable savings may differ from claimable savings, and if so, why is this appropriate and how will the program address risk?

j. Demonstrated compliance with Decision 17-11-006 Ordering Paragraph 2 for programs targeting to-code savings.
"The investor owned utilities shall ensure that all program proposals and program implementation plans, for programs that target (or will claim) to-code savings, describe what program design elements, data collection activities, and/or analyses will be conducted to help lend insight into the following questions as part of the planned implementation of the

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

    k. A copy of any Bid M&V Plan submitted by third-party implementers in their bid.

2) **Bid M&V Plans:** Implementers must develop and submit an M&V Plan as part of their bid. The Bid M&V Plan in bid packages must include at least the following:

    a. A description of the program target population and participant eligibility criteria;

    b. Documentation of the expected costs, energy savings and effective useful life (EUL) of planned measures and intervention strategies;

    c. Identification of the method(s) and calculation software that will be used to calculate savings, including required information as outlined elsewhere in this rulebook.

B. Permissible Project Types

1) Site-level rules in this rulebook regarding Permissible Project Types are also applicable to Population-level NMEC Programs.

2) Population-level NMEC program sites must have building-type similarity such that:

    a. The sites can reasonably be expected to have similar types of equipment holdings, as well as drivers and levels of energy consumption.

    b. There should be a reasonable expectation that the factors that impact both 1) consumption over a 12-month period, as well as 2) energy savings from program interventions, will be similar across all sites in the population.

C. Program Design Criteria

Population-level NMEC program designs must meet or exceed the following threshold. These criteria are based on the best available information we have today but may be adjusted in the future as more is understood regarding their viability.

1) At least 90% confidence / 25% range FSU as calculated using ASHRAE methods at the daily level, or using other methods that achieve at least the same levels of certainty.[21]

2) If this threshold is not met or exceeded in the program design, then the PA must submit the Program-level M&V Plan in a pre-program advice letter filing with a Tier 2 status, or Tier 1 for existing programs. Advice letters submitted for third-party solicitation contract approval, or other advice letters filed in accordance with these rules, may be used for this purpose. Population-level NMEC program implementation may begin only after the advice letter has been approved. The

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[21] Population NMEC FSU reflects the variation of annual savings aggregated across sites. ASHRAE Guideline 14, "Measurement of Energy, Demand, and Water Savings".

Program-level M&V Plan must contain an explanation of why the above threshold is not possible or unnecessary, and what is being done in its place to ensure that savings is distinguishable from normal variations in consumption, mitigate risk to ratepayers and provide value for resource planning.

D. Payments and Incentives

Payments to Implementer(s) made by PAs must be based on payable savings determinations measured using Population-level NMEC approaches, as described below. There is no requirement for customer incentives to be based on payable savings determinations.

1) Ideally, 100% of total PA payments for each population-level program should be made based on payable savings determinations made using NMEC methods. At a minimum, 50% of total PA program payments for each Population-level NMEC Program (not including PA administrative or PA measurement and verification costs) must be based on payable savings determinations made using Population-level NMEC methods.

    a. For third-party programs, this 50% minimum requirement applies to the total contract amount between the PA and the Implementer.

    b. For non third-party programs, this 50% minimum requirement applies to total program payments per program, on an annual basis.

2) If the above threshold is not met, then the PA must submit the Program-level M&V Plan in a pre-program advice letter filing with a Tier 2 status, or Tier 1 for existing programs. Advice letters submitted for third-party solicitation contract approval, or other advice letters filed in accordance with these rules, may be used for this purpose. Population-level NMEC program implementation may begin only after the advice letter has been approved. The program-level M&V Plan must detail:

    a. Why Population-level NMEC is the best fit for the program.

    b. Why this threshold is not viable for the program, and what, if any, portion of program payments will be based on NMEC payable savings determinations.

    c. Strategies to manage ratepayer risk, emphasizing plans for leveraging NMEC results to inform future decisions about program modifications.

3) With regard to payment schedules and true-ups: PA Payments may occur before payable savings determinations are complete (i.e. after the 12-months post-intervention measurement period), or even before the intervention itself, as long as the total payment amount for the program is trued up after 12-month post-intervention measurement period is complete and final payable savings determinations are made.

E. Qualifying Measures

Measures allowed in Population-level NMEC programs include:

1) Measures currently allowable through the deemed and custom energy efficiency programs;

2) Other measures where the program documentation and program-level M&V Plan demonstrates that the savings and EUL forecasts are reasonable for these measures; and

3) Behavioral, retrocommissioning and operational measures are permissible per the Site-level NMEC requirements outlined in Section II.1.B.2 and 3) of this rulebook.

F. Population-Level NMEC Reporting Requirements

1) Savings for Population NMEC:

   a. Population-level NMEC programs should group participants by quarterly cohorts within the calendar year of installation, for reporting purposes. After program participation has been fixed at the end of a quarter, best-available preliminary savings, costs, and actual incentives are reported in in the installation quarter's claims and in the associated annual claim.

   b. Full-year program savings calculations for a quarterly cohort will be reported in the quarterly claim and associated annual claim after the end of the first post-installation 12 months for that cohort, via a true-up claim. True-up claims are the difference between the previously claimed savings and the savings measured during the performance period. Initial and true-up claims count toward goal attainment in the program year claim with which they are filed. Each program must have a persistent and unique ID to associate with claims over multiple reporting years.

2) Measure Costs, Incentives and Rebates for Population NMEC

   a. As with Site-level NMEC Claims, full Gross Measure Costs should be reported with the installation estimates. In the future update records, Gross Measure Costs must be reported as zero to avoid double-counting, unless the records are being corrected in which case they will represent additions or subtractions to the original amount.

   b. Rebates and Incentives paid to the customer or implementer at the time of project installation should be reported in the installation quarter, and all subsequent payments reported in the Claim Yr_Qtr paid. These incentive costs may be trued up to reflect the actual final incentives and rebates paid.

3) Program Costs for Population NMEC

   a. Full program admin, marketing, and direct implementation non-incentive (DINI) costs should be reported in the installation year. In the future year(s), there is expected to be a small percentage of DINI costs included to account for the M&V costs associated with calculation of final savings.

III.   General Requirements

1. Site-Level Programs

A. CPUC Review of Site-Level NMEC Projects

1) PAs must include an up-to-date program-level M&V Plan, as described in this rulebook, in their Implementation plan filings.
2) If the program requires CPUC approval via an Advice Letter, this same program-level M&V Plan should also be included in the Advice Letter filing.

3) Project Review: Project review is necessary for Site-Level NMEC projects. The objective of CPUC staff review of Site-Level NMEC projects is not to approve project savings claims, but to provide early feedback for implementation and to inform CPUC staff-led evaluation.[22]

CPUC staff may review Site-Level NMEC project documentation at any stage of the project (see Table 1 below for a summary of Site-Level NMEC project stages). The review will provide feedback to program administrators and implementers and may be referenced during EM&V activities to assess how CPUC feedback was incorporated. CPUC staff review of NMEC projects does not restrict or delay project development or constitute an approval of related energy savings claims.

B. Project Stages, Site-Level NMEC

Table 1 – Site-Level NMEC Project Stages

Project Feasibility	• Assess eligibility of project based ASHRAE's FSU formulae (II.1.C.2), CPUC policies, and other requirements specified in this document.
Project Application	• Submission of project documentation to Program Administrator. • Program Administrator submits a list to CPUC as per custom project review rules as modified for NMEC projects and programs in this Rulebook. • Projects should have estimates of energy savings and incentive payments. • Project M&V Plan and demonstration of feasibility of NMEC analytical approach. • CPUC staff may select a sample of projects for review and input. o CPUC staff will provide feedback on the project and its documentation including but not limited to the Project M&V Plan, analytical methods, and data collection approaches proposed. • Applications shall document methods and values used to develop project EUL, as well as the NTGR that will be applied to initial and final claims.
Project Implementation	• Installation and commissioning of the energy efficient measures and/or the instituting of behavioral, retrocommissioning and operational measures. • The time between the end of the baseline period and the completion of the Project Implementation stage should not exceed 18 months; otherwise the project shall be re-baselined.
Reporting Period or Post-Implementation Performance	• The reporting period stage begins once the measures are implemented and/or installed and confirmed to be working and producing savings.

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[22] Administrative Law Judge's Ruling on Certain Measurement and Verification Issues, Including for Third Party Programs (01/31/2019) Page 8.

Monitoring Period or Performance Period	• This stage shall last no less than 12 months. • It is recommended that implementers check the data being collected 1 to 2 months into the reporting period to ensure appropriate monitoring is occurring. All adjustments should be documented in the Final M&V Report. • In addition to the review at 1 to 2 months described above, projects should be monitored periodically for deviations from expected savings to identify and adjust for non-routine events. All adjustments should be documented in the Final M&V Report. ○ PAs and implementers are advised to share the details of non-routine events identified during the reporting period with CPUC staff, and to updated M&V plans and reports in a timely manner.
Final M&V Report	• The final M&V Report shall document the activities carried out per the M&V Plan. • The final M&V Report documents data collection (pre- and post-installation) adjustment models and all findings related to routine and non-routine events. • The Final M&V Report presents the first year and lifecycle savings claims, final avoided energy use and final normalized energy savings.

C. Baseline Adjustment, Site-Level NMEC

Refer to LBNL Option C Technical Guidelines Document[23] for further details of the requirements outlined in this section.

1) The baseline adjustment model must span no less than a 12-month period.

2) The baseline energy consumption shall be adjusted for non-routine events, as needed. (See LBNL Technical Guidelines.)

3) Baseline adjustment model must be assessed for goodness-of-fit. See LBNL Technical Guidelines for proposed thresholds.

4) It is strongly suggested that projects be screened for feasibility of proposed methods. See LBNL Technical Guidelines.

5) If the time between the end of the baseline period and the completion of implementation phase lasts more than 18 months, the project must be re-baselined to adjust for potential changes in coverage, normalization conditions and consumption.

6) NMEC claims must account for interactive effects. For installations with a reasonable expectation of increased consumption in another fuel, a model of that other fuel should be included. As interactive effects may be small, CVRMSE requirements are applicable rather than FSU. If site-level models for the fuel where interactive effects reside do not meet requirements, DEER or engineering-based model estimates of interactive effects must be applied. (see also II.1.C.3)

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[23] https://www.cpuc.ca.gov/-/media/cpuc-website/files/legacyfiles/l/6442463695-lbnl-nmec-techguidance-01072020.pdf

D. Project Savings Forecast Estimates, Site-Level NMEC

1) Avoided energy use is an acceptable metric for forecasted energy savings.

2) NMEC project savings forecast methods should be based on existing conditions baseline and must be documented in the Project M&V Plan; Forecast methods must be appropriate to the project type.

3) Forecast savings that use rules of thumb such as a fraction of annual usage are not permitted.

4) Specific sources and rationale substantiating the selection of savings forecast methods must be documented in the program-level M&V Plan and in the project specific M&V Plan.

5) Specific or nearby weather data for baseline model development and avoided energy use calculations are allowed. The same weather data should be used for engineering calculations of savings and performance measurement.

6) Project savings forecasts should use measure-level information to inform expected useful life (EUL). The CPUC-approved NTGR should be applied to initial and final claims for NMEC projects.

7) Project lifecycle savings must be based on a forecast savings-weighted average EUL, unless staff approves an alternative method for EUL calculation.

   a. EULs shall be based on DEER, workpaper or other CPUC adopted values, where available. Measure-level measure application type (MAT) is required to support the default EUL calculation.

   b. The accuracy of savings predictions is primarily important in their role as weights for the EUL calculation. Savings predictions will be trued-up by performance-based savings estimate but EUL cannot be trued-up.

8) Savings forecasts will not be used to determine incentive payments.[24]

E. Project Savings Claims, Site-Level NMEC

1) Final savings claims must be filed only after the reporting period has ended and the M&V has been completed and finalized.

   a. Please refer to Qualifying Measures section for instructions for projects containing behavioral, retrocommissioning and operational measures.

2) Final savings claims must be normalized by long term weather based upon the most up-to-date weather files (such as CZ 2022 or CALEE 2018) [25].

   a. Weather and other normalizing adjustments should be applied to the baseline and performance period.

3) Final savings claims shall be substantiated by an M&V Report, consistent with the specifications in the Project M&V Plan.

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[24] Assigned Commissioner and Administrative Law Judge's Ruling Regarding High Opportunity Energy Efficiency Programs or Projects (12/30/2015) Attachment A, at 8

[25] CALEE2018 files are available for download on the CALMAC website.

     a. The project M&V Report should reflect CPUC staff review recommendations, if the project was selected for review.

     b. Any deviations from the proposed M&V Plan should be documented and substantiated in the M&V Report.

4) Final savings claims should reflect the same effective useful life, gross realization rate and net-to-gross used to adjust savings estimates.

     a. Deviations from methods used to calculate savings estimates should be documented and substantiated in the Final M&V Report.

F. Changing Project Savings Calculation Methods

1) It is possible that normalized metered energy consumption may not work in certain projects due to building characteristics or unforeseen events. In such cases where planned NMEC approaches are not feasible, the project must be re-filed to the CMPA with documentation of the revised savings determination methods. All rules for alternative method chosen, i.e. deemed or custom, must be followed when re-calculating savings claims.

2) Program and project-level M&V Plans must detail methods for tracking feasibility of the NMEC approach and how NMEC failure will be addressed.

2. Population-level Programs

A. CPUC Review of Proposed Population-level NMEC Programs

1) PAs must include an up-to-date program-level M&V Plan, as described in this rulebook, in their Implementation Plan filings.

2) If the program requires CPUC approval via an Advice Letter, this same program-level M&V Plan should also be included in the Advice Letter filing.

B. Program-level Savings Claims

1) Savings claims must be made at the program level for Population-level NMEC programs.

2) Savings claims must be made using the savings determinations calculated according using the methods and software described in the program-level M&V Plan.

3) Final savings claims may be filed only after the 12-month post-intervention monitoring period has ended and the M&V has been completed and finalized.

4) Final savings claims shall be substantiated by an M&V Report, consistent with the specifications in the program-level M&V Plan.

3. All NMEC Programs

A. Tools, Methods, Analytical Approaches and Calculation Software

1) **Ex-post Evaluation:** All NMEC projects and programs are subject to CPUC review of savings measurement methods and estimates, for purposes of program and/or project-level feedback and for purposes of ex-post impact evaluation.[26]

2) **Savings Calculations:** All analytical methods, including tools, algorithms and software used in savings and incentive or compensation payment calculations, must be made available to CPUC staff and its consultants upon request.[27, 28]

3) **Measurement Period**: Savings determinations must be made by comparing at least 12 months of post-intervention energy consumption to at least 12 months of pre-intervention energy consumption.

4) **Transparency**: Data, methods and calculations must be made available to the PAs well as the CPUC and its impact evaluators.[29] [30]

5) **Documentation and Replicability**: The methods used to calculate savings for NMEC programs must be documented in the program-level M&V Plan (for population-level NMEC) or project M&V Plan (for site-level NMEC) sufficiently such that savings calculations are able to be replicated by the PAs well as the CPUC and its impact evaluators. Upon request, the underlying participant consumption data and other data inputs must be made available to the PAs well as the CPUC and its impact evaluators such that savings calculations can be replicated to reach the same result.

6) **Consistent, Pre-Set Method:** For Population-level NMEC programs, the specific measurement method(s) and calculation software must be determined before the program begins and applied uniformly to all sites in the program.

7) **Proprietary Methods & Software**: Savings measurement methods and calculation software that is public, and especially those that are open-source, benefit from a stakeholder vetting process that allows experts and practitioners to share their knowledge and use updated information to inform

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[26] Assigned Commissioner and Administrative Law Judge's Ruling Regarding High Opportunity Energy Efficiency Programs or Projects (12/30/2015) Attachment A, at 7-8

[27] PU code 585.(a) Except as provided in subdivision (d), every public utility and business specified in subdivision (b) shall in any rate proceeding or proceeding establishing a fact or rule that may influence a rate, provide the commission with access to all computer models, as defined in Section 1821, which are used by that public utility or business to substantiate their showing in the proceeding.

[28] It is possible that in the future, protocols and/or certification schemes for evaluating the performance and accuracy of tools may become available. Once these are developed, the CPUC will decide if and how to leverage them.

[29] PU code 585.(a) Except as provided in subdivision (d), every public utility and business specified in subdivision (b) shall in any rate proceeding or proceeding establishing a fact or rule that may influence a rate, provide the commission with access to all computer models, as defined in Section 1821, which are used by that public utility or business to substantiate their showing in the proceeding.

[30] It is possible that in the future, protocols and/or certification schemes for evaluating the performance and accuracy of savings measurement methods and calculation software may become available. Once these are developed, the CPUC will decide if and how to leverage them.

savings estimates. The CPUC has supported the development of public, open-source processes to develop NMEC methods (e.g. CALTRACK) and encourages stakeholders to engage in these open-source initiatives. In the future, the CPUC may update these rules to identify specific methods required for Population-level programs. For now, PAs proposing NMEC programs with proprietary savings measurement methods and/or calculation software for calculating payable and/or claimable savings must comply with additional requirements, as listed below. Note that PAs may elect to levy additional restrictions on third party implementers using proprietary savings measurement methods and/or calculation software.

    a. PAs must submit the proprietary method and/or software to the CPUC for custom pre-program approval, via the Custom Tools Archive in the Non-DEER Resources website (www.deeresources.info). The submission must detail the proposed proprietary method(s) and calculation software and their potential application(s) and provide documentation consistent with the program-level M&V Plan requirements in this rulebook, including references to up-to-date independent verification of the method(s) and/or calculation software if available.

    b. The program-level M&V Plan must describe the appropriateness of the method and/or software for the program.

B. Submetering

Submetering is permissible for all NMEC projects. The table below outlines minimum requirements for submetering equipment accuracy.

Energy Source	Meter Type	Minimum Accuracy[31]
Electricity	Solid State True Root Mean Square electric meter or watt transducer.[32]	+/- 0.5% of reading including current transformer accuracy and corrections for installed conditions.
Natural Gas	Positive displacement.	+/- 2% of reading.
Chilled water / hot water	Solid state Btu meter[33] with temperature sensors and flow meter.	Temperature sensors: +/- 0.15F from 32F - 200F. Flow meter: +/- 2% of reading over expected flow range.

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[31] Rated accuracy must be maintained through the baseline and reporting periods.   Meters and associated sensors must be calibration according to manufacturer's instructions.

[32] Meters must consider bidirectional power flow when equipment is capable of supplying power to the grid.

[33] Continuous integration of flow and temperature difference required to measure delivered energy (Btu). Energy calculations based on Instantaneous measurements of flow and temperature not acceptable.

		Calculator accuracy: +/- 0.1% at 30F delta T.
Steam	Solid state Btu meter[34] with a vortex shedding flow meter, pressure and temperature sensors.	Mass flow meter: +/- 2% of mass flow calculation.

1) **Options if meter does not meet requirements:** Identify the sub-metering and sensors in place and assure their accuracy meets requirements described in ASHRAE Guideline 14 Appendix A. Provide an analysis of data taking into consideration the measurement time interval, integration of flow and temperature readings, and error propagation to the modeling time interval to assure that measurement errors and modeling uncertainties have been sufficiently minimized and meet the required accuracy requirements as described in ASHRAE Guidelines 14 Appendix B.

   a. For chilled and hot water, monitor the flowrates and temperatures to establish the frequency of the change in temperature or flowrate and select a sampling frequency that is at least twice the frequency of the changes in metered flow and temperature. Submit documentation of sensor accuracy and calibration requirements along with evidence that required calibration activities were completed. Temperature sensors must meet minimum accuracy requirements of +/- 0.2 F in accordance with ASHRAE Guideline 14 Appendix A. Flow meters must meet minimum accuracy requirements of +/- 2% in accordance with ASHRAE Guideline 14 Appendix A.

   b. Parallel measurement of Btus, via a rented meter, may be done provided that > 90% of the expected range of measured flowrates and temperatures are captured using accurate calibrated Btu meters or flow totalizers. Calibrate the calculation of Btus based on the customer's flow and temperature readings. Use the calibration to provide a correction to the estimation of Btus over the baseline and performance years. Provide a description of this analysis and results in the M&V Plans and Savings Reports.

   c. For buildings without vortex shedding meters to measure steam Btus, Btus can be measured from the condensate tank using any of the above methods with minimum modeling time interval of daily. Use of condensate return metering should be limited to buildings where "once through" steam loads are not present or are negligible.   Entering steam conditions should be established through measurement of the entering steam temperature and pressure.

Other meter types may be permissible, subject to Energy Division staff approval.

C. Cost-effectiveness:

Existing cost effectiveness policies apply to all NMEC programs and projects.

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[34] Continuous integration of mass flow, pressure and temperature required to measure delivered energy.

IV. DEFINITIONS

Avoided Energy Use [35]

Avoided Energy Use is the amount of energy (or peak demand) that was not consumed or realized as a result of the energy efficiency project or program intervention. Avoided energy use is the difference between actual energy consumption in the "reporting period" and the consumption that is forecast for the same period using the "baseline energy consumption model," and where the baseline energy consumption model use is adjusted to reflect reporting period conditions. The Avoided Energy Use approach is used as the basis of customer incentive calculations and embedded M&V reporting of savings.

Baseline Period

The baseline period is the 12-month period leading up to the energy efficiency intervention or retrofit.

Behavioral

Behavioral activities provide energy savings from interventions that result in changes in actions by customers with respect to energy usage in a building. Behavioral activities consist of actions such as manually turning off lights and equipment, adjusting blinds, reducing water use and so on.

Claimable Savings

Claimable Savings (or "claimed savings", or "savings claims") is the savings reported by Program Administrators to the CPUC prior to formal evaluation, measurement, and verification (EM&V).

Comparison Group

A comparison group is a group constructed after participants have been enrolled in a program, to compare energy consumption changes from program participants against non-participants with otherwise similar usage characteristics. Comparison group analysis can help determine net savings by accounting for externally-driven changes or trends (exogenous factors) that affect energy usage across all customers or all customers within a segment.

Embedded M&V

Refers to the collection of sufficient data to validate the savings claims and document the financial incentives. Implementers must submit an Implementation plan consistent with D.15-10-025 Appendix 4 and include a program-level measurement and verification (M&V) plan that defines the data collection activities. Financial data shall include the amount of financial incentives paid to customers or the amount of compensation offered to implementers or contractors.

Evaluation, Measurement and Verification (EM&V)

EM&V consists of activities that evaluate, monitor, measure and verify performance or other aspects of energy efficiency programs or their market environment. Energy Division has management and contracting responsibilities for all EM&V impact-related studies that will be used to 1) measure and

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[35] Referred to as "Forecast Normalization" in the SEM Guidelines.

verify energy and peak load savings; 2) generate data for savings estimates, cost-effectiveness inputs, and the CPUC's adopted performance basis; and 3) evaluate whether portfolio goals are met. [36]

Implementation Period

The Implementation period[37] is the period between the baseline period and the reporting period. This period covers the time when the measures are installed, and the project construction is completed. The implementation period may also include time to adjust, fine-tune, or commission the measure as part of the construction process.

Maintenance

Requires a minimum of tools and financial expenditures to adjust equipment components and restore expendable materials (such as fluids and filters) to their agreed-upon condition. Typical examples of such tasks include cleaning, adjusting, tightening, calibration, and lubrication.[38] Maintenance should follow manufacturer recommended regularly scheduled work necessary to keep the equipment in optimal working condition, and instructing customers on how to carry out maintenance tasks should be a component of this intervention.

Measurement and Verification (M&V)

The process of using measurement to reliably determine actual savings created within an individual facility by an energy efficiency intervention. Savings cannot be directly measured, since they represent the absence of energy use. Instead, savings are determined by comparing measured use before and after implementation of a project, making appropriate adjustments for changes in conditions[39].

NMEC Savings Measurement Methods and Calculation Software

An NMEC savings measurement method (I.e. "method") is the process (and any associated data collection & preparation needs, requirements and/or other parameters) for determining energy savings from an energy efficiency intervention or set of interventions. NMEC calculation software is the codebase or set of calculations that are used to determine gross savings results for an NMEC program.

Non-Routine Adjustments

Non-routine adjustments are used to account for the effects of non-routine events, where the changes affected by the NRE are not suitable to the baseline or reporting period adjustment models. Non-routine adjustments occur separately from the routine adjustments made using independent variables in the adjustment model. Non-routine adjustments are developed using methods including but not limited to engineering analysis, sub-metering, or other analyses using the metered energy use data.

Methods for identification and tracking of non-routine events and non-routine adjustments must be well substantiated and fully documented in the site M&V report.

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[36] California Public Utilities Commission, Energy Efficiency Policy Manual, v. 5 (July 2013).

[37] Sometimes this is also referred to as the "installation" or "construction" period.

[38] Edited from proposed revision to ASHRAE Standard 180.

[39] International Measurement and Verification Protocol (IPMVP) Volume 1: Concepts and Options for Determining

Energy and Water Savings. Efficiency Valuation Organization, 2010. Available at www.evo-world.org.

Non-Routine Events

A non-routine event (NRE) is an externally-driven (i.e. not related to the energy efficiency intervention) significant change affecting energy use in the baseline or the reporting period and therefore must be accounted for in savings estimations. Typical NREs include changes in facility size, changes in facility activity not affected by the energy efficiency measures (such as addition or removal of a data center) or other modifications to the facility or its operation that alter energy consumption patterns and are unrelated to the program intervention.

Normalized Energy Savings[40]

Normalized energy savings is the reduction in energy consumption or demand that occurs in the reporting period, relative to the baseline period, after both have been adjusted to a common set of normal operating conditions. Normalized Savings are used for the final reporting of energy and demand savings claims that are filed with the CPUC.

Normalized Metered Energy Consumption (NMEC)

NMEC is a method used to measure gross energy savings using metered energy consumption data to compare baseline and reporting period consumption under normal operating conditions. Normalization of energy consumption is achieved using adjustment models that account for routine events, and other adjustments to account for non-routine events so that consumption in baseline and reporting periods can be directly compared, as if all relevant variables were the same in the two periods. Normalized baseline period and/or reporting period energy consumption are calculated using one or more adjustment models.

Normal Operating Conditions

Normal operating conditions should reflect expected operating conditions and occupancy. This includes long-term average weather[41] conditions for the climate zone corresponding to the building location. Normal production and occupancy should be based on observed pre and post-treatment values.

Operational Activities

Operational activities are control-based; they improve or adjust existing controls to optimize equipment performance. Operational activities include maintaining room temperature set points, revising equipment operating schedules consistent with current building occupancy schedule, and changing equipment set points in response to current weather conditions.

Opt-in & Opt-out

"Opt-in" refers to the method that participants are recruited or placed into a program. In an Opt-in program design programs recruit participants, who make an affirmative decision to be part of the program. This approach contrasts with "Opt-out" programs that use experimental design, in which the program places customers into either a participant group or a randomized control group.

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[40] Referred to as "Standard Conditions Normalization" in the SEM Guidelines.

[41] Long term average weather defined in CALEE2018, posted on the CALMAC website: http://www.calmac.org/weather.asp.

Outlier Site

An outlier site is a site with an atypical response, e.g. significantly higher or lower calculated savings, compared to most sites in the population.

Payable Savings

Payable savings are the savings determined via the method and calculation software described in a program's M&V Plan which constitute the basis of payments between the Program Administrator and Implementer(s). Payable savings determinations may differ from claimable savings in that payable savings may account differently for net-to-gross determinations, non-routine events and outliers, and/or other similar considerations.

Population-level NMEC

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 apply 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.

Proprietary Methods and Calculation Software

Proprietary NMEC methods and calculation software are methods and calculation software that are not necessarily available to the public for inspection and/or modification.

Randomized Control Group

A randomized control group is a group identified through randomization (and before program interventions begin) that does not experience a program intervention, in a program that uses experimental design to measure savings. The participant group is then compared against the control group to determine savings attributable to the program.

Repairs

Minor Repairs

Activity that requires tools, parts and or/equipment to return a system or system equipment to operating condition. Tools and parts are simple, and costs are minimal.[42]

Major Repairs

Activity requiring substantial expenditures, tools, parts, equipment and material to return a system back to its normative state.[43]

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[42] Ibid.

[43] Ibid.

Reporting Period or Post-Implementation Performance Monitoring or Performance Period

The Reporting Period is the period of time over which the savings from energy efficiency interventions and retrofits are measured. The reporting period immediately follows the implementation period.

Retrocommissioning

A systematic process of identifying and implementing operational and maintenance improvements to achieve the design intentions consistent with the current usage of a building. The process is designed to improve the performance of building subsystems as well as optimize the performance of the overall system. Retrocommissioning focuses on operations and maintenance improvements and diagnostic testing, although major repairs and equipment upgrades may be identified and recommended through the process. Minor repairs required to conduct diagnostic testing may also be implemented.

Behavioral, Operational, Maintenance and Repair measures may be identified and carried out during a retrocommissioning project. Behavioral, operational and maintenance activities may also be implemented separately as "operations and maintenance" projects in existing buildings.

Routine Adjustments

Routine adjustments account for regularly fluctuating factors that affect energy use in a predictable manner and are variable in the baseline and/or reporting periods. Routine adjustments typically account for factors such as weather, occupancy and/or production volume. Routine adjustments are made through the inclusion of independent variables in the baseline and reporting period adjustment models.

Strategic Energy Management (SEM)

Strategic Energy Management is a holistic, whole-facility approach that focuses on business practice change from senior management through staff, affecting organizational culture to reduce energy waste and improve energy intensity. SEM emphasizes equipping and enabling plant management and staff to impact energy consumption through behavioral and operational change. While SEM does not emphasize a technical or project centric approach, SEM principles and objectives may support capital project implementation.[44] "Strategic Energy Management" as used by the CPUC refers to specific, standalone programs designed by consultants to the investor owned utilities.[45]

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[44] Based on Consortium for Energy Efficiency Definition, available at https://library.cee1.org/system/files/library/11283/SEM_Minimum_Elements.pdf.

[45] The "Strategic Energy Management – California Industrial SEM Design Guide" and the "Strategic Energy Management – EM&V Guide" are available at https://pda.energydataweb.com/ and can be found by entering *Strategic Energy Management* in the search box. The Guides are considered living documents that may be updated during the course of the implementation of the current SEM programs and thereafter. These documents are considered part of the entire NMEC Guidance prepared and maintained by CPUC Staff.

Addendum 1: Matrix of Advice Letter and Other CPUC Approval Requirements

This addendum captures the advice letter and custom submission & approval requirements for NMEC Programs that are described in this rulebook. Programs may also be required to submit advice letters and other filings based on other CPUC rules not outlined in this matrix.

Condition	Additional CPUC Approval Requirement(s)
Population-level program design criteria not met or exceeded per Section II.2.C. of this Rulebook.	Program-level M&V Plan submission by PA in a Tier 2 pre-program advice letter filing, or tier-1 for existing programs.
Population-level payments and incentives criteria not met or exceeded per Section II.2.D. of this Rulebook.	Program-level M&V Plan submission by PA in a Tier 2 pre-program advice letter filing, or tier-1 for existing programs.
Proprietary savings measurement methods and/or calculation tools will be used, as described in Section III.3.A. of this Rulebook.	Submit the proprietary method and/or software to the CPUC for pre-program approval, via the Custom Tools Archive on deeresources.info website.
The program includes opt-out components per section I.1. of this Rulebook.	Program-level M&V Plan submission by PA in a Tier 2 pre-program advice letter filing, or Tier 1 for existing programs.

(END ATTACHMENT 1)