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# Inland Regional Energy Network Public Buildings

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# Normalized Metered Energy Consumption (NMEC) Program Implementation Plan

September 29, 2023

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## PROGRAM OVERVIEW

The Inland Regional Energy Network's (I-REN) Public Buildings Normalized Metered Energy Consumption (NMEC) Program will provide technical support such as eligibility screening and measurement and verification as well as incentives for metered-based energy savings. The program will place a special focus on whole building improvements to community-serving buildings. I-REN will also leverage additional financing mechanisms available through other program administrators and non-ratepayer funded offerings to support whole building upgrades in public facilities. I-REN has designed its public sector offerings to be flexible; its goals and targets can be adjusted to meet the needs of the region. Through their extensive work with local governments and their committee structure, the I-REN governing agencies have become a trusted voice and advocate for the public sector in their two counties.

By collaborating with their member jurisdictions and using their established communication networks, I-REN can provide regionally focused public sector solutions to help local governments succeed as energy efficiency leaders.

## PROGRAM BUDGET AND SAVINGS

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

Public Buildings NMEC

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

IREN-PUBL-002

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

Public Buildings NMEC	2022	2023	2024	2025	2026	2027
Administration	\$12,342	\$152,358	\$135,526	\$139,748	\$138,093	\$133,132
Marketing, Education, & Outreach	\$8,944	\$167,773	\$234,955	\$229,479	\$227,500	\$220,386
Implementation (Non-Incentives)	\$95,562	\$1,656,331	\$1,478,485	\$1,578,307	\$1,624,835	\$1,643,293
Incentives	\$0	\$0	\$751,748	\$2,505,828	\$3,257,576	\$4,234,848
<b>Total</b>	<b>\$116,848</b>	<b>\$1,976,462</b>	<b>\$2,600,714</b>	<b>\$4,453,362</b>	<b>\$5,248,004</b>	<b>\$6,231,659</b>

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

Projected Net Savings	2024	2025	2026	2027
Forecast kWh	285,000	950,000	1,235,000	1,605,500

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Forecast kW	24	71	93	120
Forecast Therms	475	1,425	1,853	2,408

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

2024	2025	2026	2027
0.01	0.04	0.04	0.05

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

2024	2025	2026	2027
0.02	0.04	0.05	0.06

7. Total System Benefit (TSB):

2024	2025	2026	2027
\$172,737	\$572,750	\$741,243	\$955,931

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

Third party-delivered

9. Market Sector

Public

10. Program / Sub-program Type

Resource, equity segment

11. 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

Downstream, incentive, technical assistance

Campaign Goals and Timeline

Phase	Key Deliverables	Dates
<b>Launch readiness</b>	Program design Identify implementer Implementation Plan	Q1 2022 - Q3 2023

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	Program marketing materials	
<b>Program ramp-up</b>	Program launch to customers Program deliverable and template development	Q4 2023
<b>Program steady state</b>	Program deliverable implementation	Q4 2023 - Q2 2027
<b>Program ramp down</b>	Program ramp down plan	Q3 - Q4 2027

## IMPLEMENTATION PLAN NARRATIVE

### 1. Program Description

The three councils of government (COGs) that make up I-REN are Western Riverside Council of Governments (WRCOG), San Bernardino Council of Governments (SBCOG), and Coachella Valley Association of Governments (CVAG). They all have direct relationships and a history of collaborating with the many government jurisdictions in their territory. The COGs aim to help member agencies realize energy and cost savings, address climate-related risks such as extreme heat, and improve their aging infrastructure. But in order to do so, public agencies need resources. This is especially true for hard-to-reach, disadvantaged, and low-income communities that serve vulnerable populations. Most existing energy efficiency (EE) programs require bringing facilities above Title 24 standards, which can deter public agencies from acting due to financial constraints—leaving below-code facilities with the largest EE opportunities “stranded.” I-REN’s NMEC Program will offer comprehensive project delivery support to access “stranded” savings and realize deep energy and cost savings. The NMEC Program will use a normalized metered energy consumption (NMEC) approach to measure energy savings at the meter, incentivizing savings that have historically been excluded from traditional EE programs or are considered to be industry standard practice (ISP). The program will prioritize critical emergency operation and cooling centers and will focus on achieving deep energy savings by offering enhanced incentives for projects that realize significant savings at the meter.

The program is open to all public sector facilities including those operated by county and city governments, school districts, special districts, and tribes.

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## 2. Program Delivery and Customer Services

The NMEC Program will pursue the following objectives:

1. Support comprehensive lighting and whole building projects to improve the comfort and safety of vulnerable populations. The program will focus on critical facilities and emergency or cooling centers
2. Deliver deep energy savings to public agencies at high visibility locations, positioning local governments as EE leaders within their communities and helping to meet local and state EE and greenhouse gas (GHG) reduction goals
3. Provide technical expertise and appropriate training to facility personnel to maximize the persistence of energy and bill savings. The program will deliver savings reports to public agencies to monitor and communicate post-project energy usage.

Using an NMEC approach to calculate energy savings will protect against projected but unrealized savings. Combined with technical assistance and reinforcement of operations and management best practices, public agencies will experience maximized savings for their communities. NMEC program services are outlined below.

### **Project Implementation and Incentive Services**

- **Project Eligibility and Savings Risk Assessment** - I-REN will assess if an agency's project meets the minimum criteria to participate in the NMEC Program, including screening for site-level projects that have pre-installation savings estimates greater than or equal to 10% of annual consumption. On a case-by-case basis, I-REN will consider eligibility for projects that fall under the 10% threshold provided they meet NMEC Rulebook requirements.
- **Project Application** - Once initial project eligibility and program requirements are confirmed, I-REN will work closely with the agency to gather interval data to conduct a detailed analysis and confirm that the project is a good candidate for an NMEC approach. Once confirmed, I-REN will prepare the NMEC incentive application for agency approval and signature. Both the NMEC application and a measurement and verification (M&V) plan will follow the industry-standard International Performance Measurement & Verification Protocol (IPMVP) Option C approach and comply with the CPUC requirements for site-based NMEC Programs per the latest version of the NMEC Rulebook.
- **Application Review and Approval** - Once the application is submitted, I-REN will thoroughly review the project application to verify project calculation methodology and project costs, the M&V plan, and project influence, and to ensure the project meets all applicable CPUC requirements. Applications will be uploaded to the CPUC Custom Measure and Project Archive (CMPA). Once uploaded, I-REN will send an approval letter to the agency with anticipated project savings and incentive amounts, and the agency can begin construction.

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- **Installation Verification** - Upon EE measure installation and commissioning, I-REN will conduct a post-installation inspection to verify all measures were installed as specified in the project application. If planned measures were not implemented or were installed differently than specified, I-REN will update the savings and incentive metrics.
- **Project Completion Incentive** - The program will provide a partial incentive payment upon project completion and early metered savings verification to help subsidize project costs. The remaining incentive will be paid out after the M&V reporting period when persistent savings have been verified.
- **Operations and Maintenance (O&M) Plan and Training** - If needed, I-REN will collaborate with the agency and project contractor to update the Operations and Maintenance (O&M) manual at the facility for the measures installed, or create one if none exists, to maximize energy savings. I-REN can also provide training for facility personnel on the use of the O&M manual if needed. I-REN will offer a recurring check-in with facility staff after installation to answer questions and provide additional training, if required.
- **Persistence of Savings** - After project completion, the project enters the post-installation M&V reporting period. During this 12-month period, agencies will be able to monitor their energy consumption through quarterly savings reports.
- **Quantifying Metered Savings** - After the 12-month post-installation monitoring period, I-REN will prepare a final &V report that will quantify and weather normalize the project's energy savings and account for any non-routine events in alignment with the industry-standard IPMVP Option C approach and in compliance with CPUC requirements for site-based NMEC Programs per the latest version of the NMEC Rulebook.
- **Savings Persistence Incentive** - Once the metered savings are quantified and weather normalized, the agency is eligible to receive the savings persistence incentive for the remaining balance of "trued-up" incentives based on the project's realized savings. The agency will also receive a project impact report to show the life cycle benefits of the project and a project case study that can be shared with agency management and council/board members. Sharing the project's success will position local governments as EE leaders in their communities and inspire further energy-saving actions.
- **Continued Persistence of Savings** - After the 12-month post-installation reporting period and savings persistence incentive payout, the agency will be able to monitor their energy consumption via savings reports. The report will allow continued feedback to facility personnel to manage and track the facility's energy usage. The agency staff can also request a check-in with I-REN to answer questions and ensure the project's energy and cost savings are maximized.

## Continued Engagement

I-REN has multiple engagement strategies that complement Public Buildings NMEC

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Program participation, including:

- **Project Impact Report** - The Project Impact Report will highlight the lifecycle energy savings, cost savings, and GHG reduction benefits of completed EE projects. This deliverable can be shared among agency staff and with the general public to promote the community benefits of EE and position the agency as a regional energy leader.
- **Legislative Body and/or Community Check Presentations** - I-REN facilitates check presentations to governing boards, councils, or other community-recognized avenues. A check presentation will spotlight the financial resources secured by the agency, in partnership with I-REN, to advance the agency's energy goals and encourage continued EE investments.
- **Social Media Posts** - I-REN develops social media content spotlighting agency achievements to post on I-REN social media platforms.

### 3. Program Design and Best Practices

The Public Buildings NMEC Program's design was chosen by I-REN in response to challenges faced by local governments regarding EE improvements. I-REN's local governments have limited incentives to complete energy upgrades and find it difficult to maintain and upgrade these facilities due to limited funding for capital improvements, lack of awareness related to energy efficiency and energy efficiency program opportunities, limited time, limited staff resources, and conflicting priorities.

Strategies to achieve I-REN's goals for the Public Sector will be based on establishing incentives and leveraging existing financing mechanisms to assist local governments with energy efficiency projects in public buildings. To achieve I-REN's goal of helping local governments afford and finance energy efficiency upgrades, the Public Buildings NMEC Program will:

- Provide incentives for savings based on an NMEC approach
- Provide technical support including predictability analysis, a measurement and verification plan, and operations and maintenance training to ensure long-term savings.

### 4. Innovation

The Public Buildings NMEC Program will implement the following innovations:

- **Expedited program application and approvals** - The Program will integrate seamlessly with the I-REN TA and Financing Services Program to provide public agencies with a frictionless experience. Incentive application processing, review, and approval will be completed in-house, resulting in streamlined processing that will allow I-REN agencies to realize cost and energy savings sooner.

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- Comprehensive projects with deep energy savings** - Some of the greatest challenges to participation in the public sector in the I-REN service area may also be indicators of unrealized energy savings potential. I-REN has designed its Public Sector strategies and tactics to help local government agencies, tribal leadership, and staff at school districts and special districts overcome these participation barriers to improve their facilities' energy performance and harvest "stranded" energy savings below code through holistic energy efficiency projects.
- Agency staff monitoring to track persistence of savings** - The Program will support staff training and project monitoring through Savings Persistence Reports via the Building Upgrade Concierge (BUC) software. Such monitoring will empower agency staff to realize persistent energy savings, cost savings, and improved resilience and operations.
- Enhanced incentives for deep energy savings at critical facilities** - The program will prioritize critical emergency operation and cooling centers and will focus on achieving deep energy savings by offering enhanced incentives for projects that realize significant savings at the meter.

## 5. Metrics

Metric	Method	Frequency
<b>Eligible projects</b>	Number of projects eligible for NMEC	Annually
<b>Applications submitted</b>	Number of project applications sent to technical review	Annually
<b>Applications approved</b>	Number of project applications submitted to the CPUC	Quarterly
<b>Persistence of savings training</b>	Number of agency staff trained through the program	Annually
<b>EE projects implemented</b>	Number of completed projects submitted to the CPUC	Quarterly
<b>Energy savings (kWh)</b>	Gross and net annual and lifecycle kWh savings submitted to the CPUC	Quarterly

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<b>Energy savings (kW)</b>	Gross and net annual and lifecycle kW savings submitted to the CPUC	Quarterly
<b>Energy savings (therms)</b>	Gross and net annual and lifecycle therm savings submitted to the CPUC	Quarterly
<b>Funding dispersed</b>	Amount of incentive dollars issued to agencies	Quarterly
<b>Persistence of savings report</b>	Number of Savings Persistence Reports presented to agencies	Annually

6. For Programs claiming to-code savings

The program will use NMEC models for pre-and post-installation periods to evaluate project-level savings on an ex post basis. The program compares this data to an existing conditions baseline and reports full measure costs in accordance with Commission Resolution E-4818 and D.16-08-019. A weighted project-level effective useful life (EUL) is assigned based on measure-level savings since EUL estimates as required by the CPUC's NMEC Rulebook v 2.0.<sup>1</sup>

7. Pilots

<sup>1</sup> <https://www.cpuc.ca.gov/-/media/cpuc-website/files/legacyfiles/n/6442463694-nmec-rulebook2-0.pdf>

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Not applicable.

8. Workforce Education and Training

There are no Workforce Education and Training initiatives for this program.

9. Workforce Standards

Not applicable.

10. Disadvantaged Worker Plan

While this program does not aim specifically to target disadvantaged workers and communities, it is a consistent goal of I-REN's to reach and serve this demographic.

11. Additional information

Not applicable.

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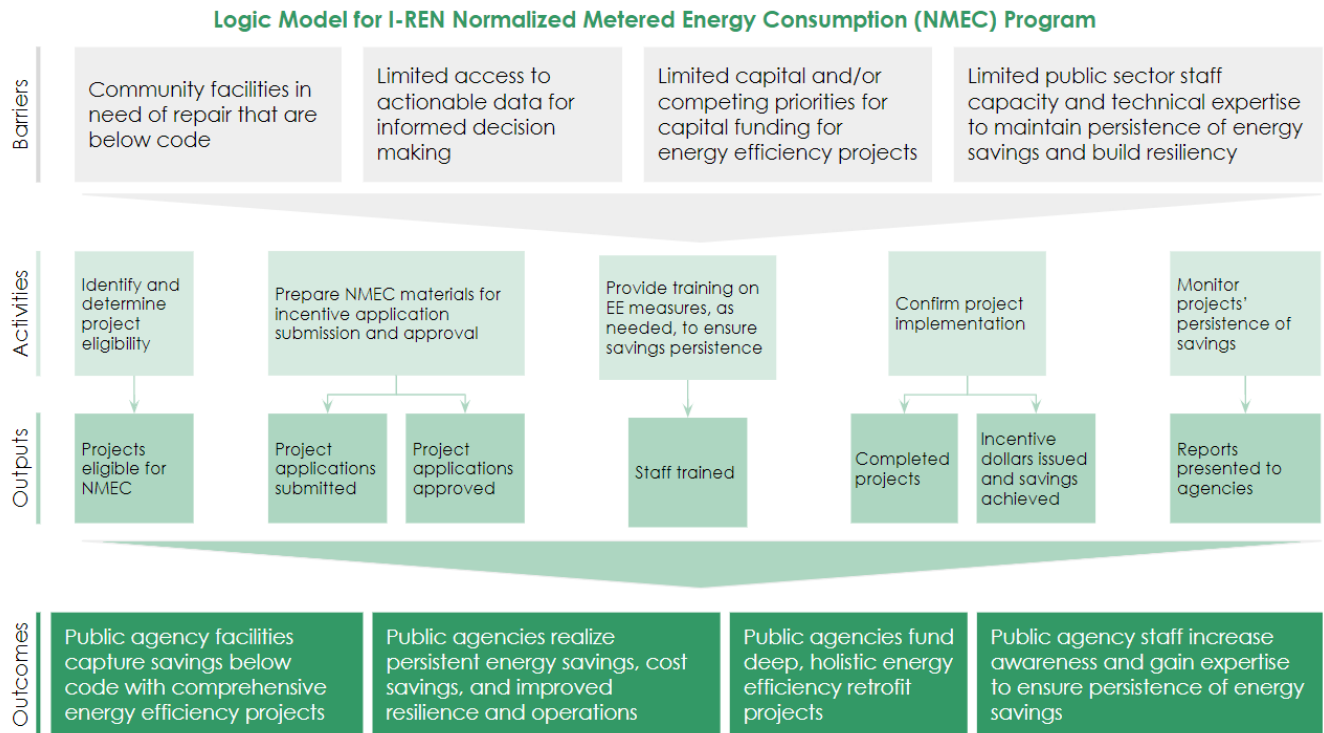


# SUPPORTING DOCUMENTS

## 1. Program Manuals and Program Rules

The Program will maintain a Program Manual that outlines policies and procedures and serves as a guideline for program implementation.

## 2. Program Theory and Program Logic Model

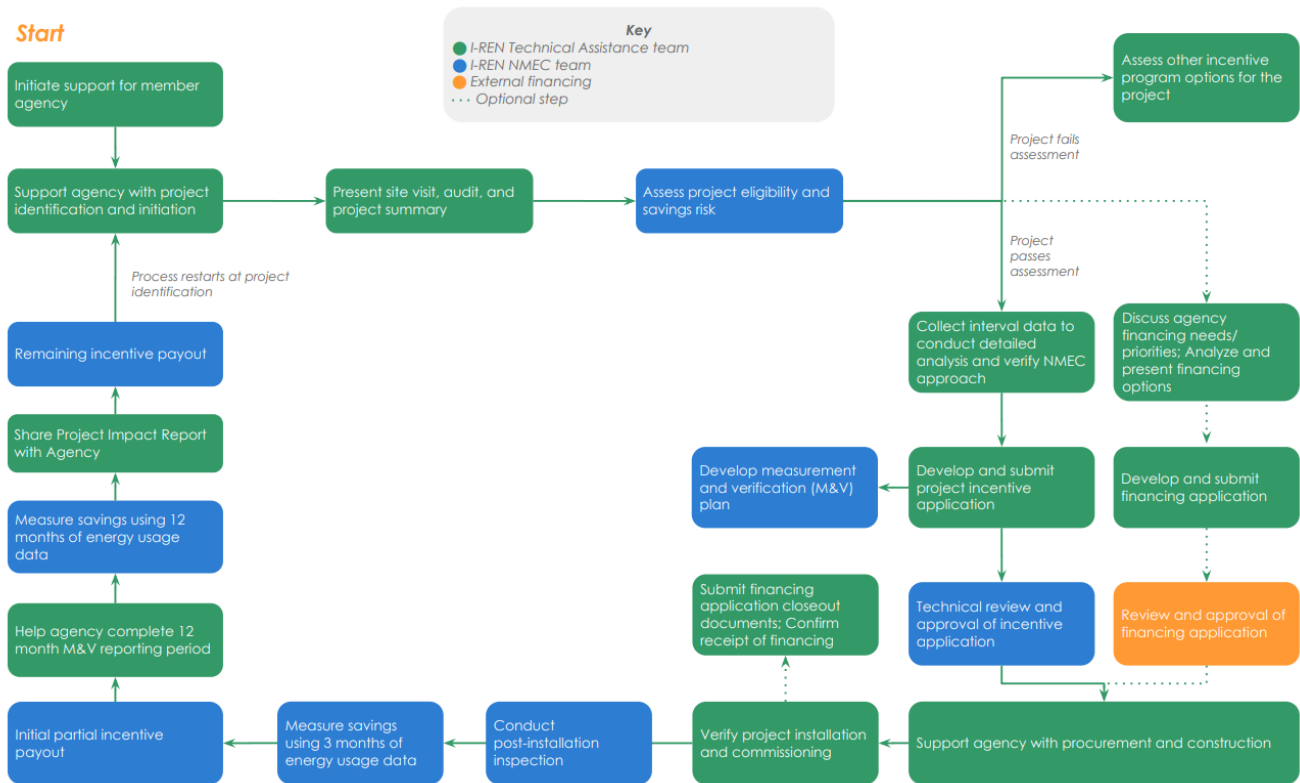


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### 3. Process Flow Chart



### 4. Incentive Tables, Workpapers, Software Tools

The Program will use the Commission direction in Resolution E-4952 for Database of Energy Efficiency Resources (DEER) 2019 and 2020 updated assumptions, methods and values for savings estimates. The program will also apply the direction to future planning, implementation and reporting where applicable. If public sector buildings have unique operating characteristics that deviate from DEER, the program will follow the NMEC procedures for savings documentation. The program will follow the NMEC procedures for claims.

The Program may use the software tools below for CPUC savings calculations and to ensure that market-based solutions, including financing needs and data workflows, are compatible with program savings calculations. Listed below is a summary of tools that the Program is considering.

Tool	Short Description	URL Link or Location Name
CalTRACK	CalTRACK methods describe a process of arriving at a calculation of avoided energy use.	<a href="http://www.caltrack.org">www.caltrack.org</a>

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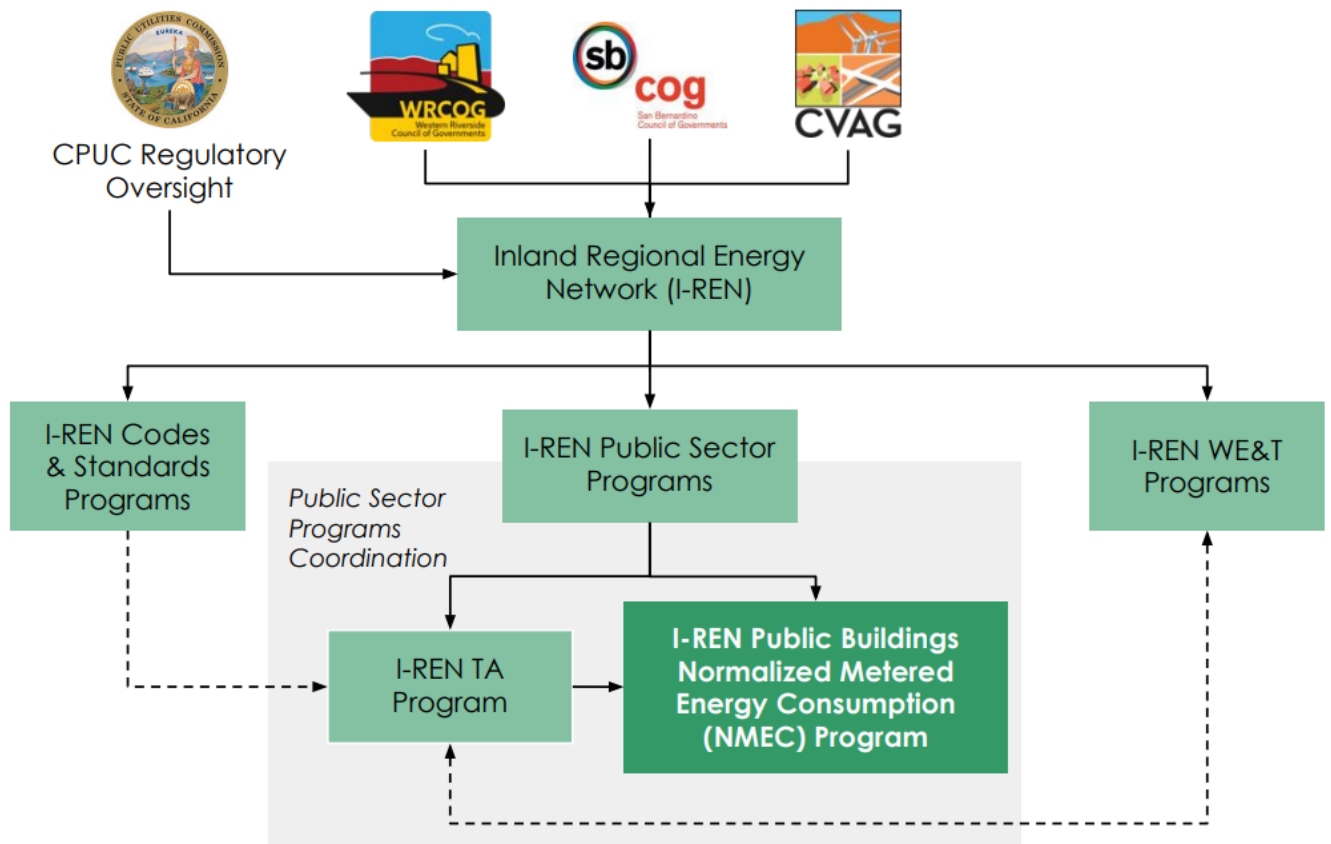


Python	For projects including additional variables not compatible with CalTRACK, Python will be used to calculate avoided energy use.	www.python.org
BUC	User interface for avoided energy use calculations, savings report development, and building data storage	www.aesc-inc.com/praxis

## 5. Quantitative Program Targets

Projected Net Savings	2024	2025	2026	2027
Forecast kWh	285,000	950,000	1,235,000	1,605,500
Forecast kW	24	71	93	120
Forecast Therms	475	1,425	1,853	2,408

## 6. Diagram of Program



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

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The current lack of energy efficiency data about the public sector places added importance on EM&V. I-REN will collaborate with the CPUC and stakeholders to ensure that data collection activities are embedded in Public Sector program design. We will capture the information necessary to meet evaluation requirements and to expand the understanding of energy efficiency potential and best practices in this relatively new sector.

## 8. Normalized Metered Energy Consumption (NMEC)

### **Program Measurement & Verification Overview**

Measurement & Verification (M&V) is the process of using measurements to reliably quantify savings from a resource savings project within a facility, a process, a building, or a building subsystem. The resource saved for the Public Buildings NMEC program is energy (electric kWh or natural gas therms) and/or demand (electric kW).

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

This M&V Plan follows CPUC guidance as codified in its Rulebook for Programs and Projects Based on Normalized Metered Energy Consumption (NMEC Rulebook 2.0), issued on January 7, 2020. The Public Buildings NMEC program is a site-level NMEC program. Project site (or qualifying submeter) energy use models that meet goodness-of-fit criteria will be treated as NMEC.

### **Site-level NMEC Program M&V Plan - Site-level NMEC Overview**

The NMEC Rulebook 2.0 provides the following definition for site-level NMEC approaches:

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

The Public Buildings NMEC program will conduct site-level NMEC M&V following the framework in the International Performance Measurement and Verification Protocol (IPMVP), using the Option C-Whole Facility method. However, CPUC direction will take precedence over any variance to IPMVP methodology. All projects will be subject to CPUC review and dispositions.

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

### **Methodology, Analytical Methods, and Software**

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

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

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

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

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

### **IPMVP Option and Measurement Boundary**

IPMVP Option C, Whole Facility will be used for savings determination. Option C was selected because the Public Buildings NMEC program promotes upgrade projects that encompass multiple energy efficiency measures (EEMs) and may have interactive effects.

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In most cases, utility meters will be used to provide reference consumption data for energy savings calculations. These meters account for all energy use of the facilities. If a facility is served by more than one meter, then all EEMs must be properly attributed to the meter that tracks the associated load. Alternatively, meter-level consumption can be summed to the whole building or site level so long as all meters are included that serve loads affected by the adopted EEMs. In some cases, if a system submeter of appropriate accuracy is present, the submeter may be used for analysis.

### **Data Collection Plan**

The site-level NMEC approach allows for customization of M&V approaches based on site-specific characteristics and unique drivers of savings. The Public Buildings NMEC program will create project-level M&V plans that describe project-specific data collection for each site-level NMEC project. Below is general program-level guidance for site-level NMEC data collection.

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

- Utility data: electricity (15-minute or hourly), natural gas (daily)
- Other independent variables (e.g., occupancy rates)
- Equipment operating parameters (e.g., chilled water and supply-air temperatures)
- Weather data (hourly or daily dry-bulb ambient temperatures)

### **Monitoring and Documentation During the Reporting Period**

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

### **Identifying and Adjusting for Non-Routine Events**

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

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

Significant NREs will be quantified regardless of whether they have a positive or negative impact on savings. Typical potential NREs include:

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

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

1. Remove the data points from the regression data set during the NRE:
  - a. Data points associated with NREs during the baseline period are removed if they constitute a small portion of the overall data, and remaining data points contribute to models exhibiting acceptable goodness of fit.
  - b. Data points associated with NREs during the performance period are investigated if they cause project savings to move above or below a preset threshold. Before data-point removal, these projects undergo manual review and investigation by program engineering staff to determine the true nature of the NRE.
2. Quantify the impact of the NRE by performing measurements and calculations in compliance with custom calculation guidelines for each NRE. Calculated NRE adjustments are normalized.
3. For deviation caused by project-related systems, reconfigure to operate as intended.

### **Determining Program Influence**

NMEC projects will be screened for influence. The following documents will be submitted to demonstrate influence and are based on the most up-to-date Statewide Project Feasibility Study template:

- Timeline of customer-implementer meetings, deliverables, and decision-making milestones
- Description or documentation of customer's replacement and/or upgrade practices, plans, and budgets
- Reports and business cases of options presented to the customer
- Customer-implementer correspondence (e-mails, letters, meeting notes, letters, etc.)

### **Depth of Savings Thresholds and Model Accuracy**

The Public Buildings NMEC program will use a project threshold of 10% of the site's annual energy consumption as measured at the meter or submeter to determine if a site-level NMEC approach is appropriate. On a case-by-case basis, I-REN will consider eligibility for projects that fall under the 10% threshold provided they meet NMEC Rulebook requirements. Site-level NMEC models' goodness-of-fit between energy use and the independent variables will meet thresholds suggested in the LBNL NMEC Guidance and ASHRAE Guideline 14.

### **Incentive Structure**

Site-level NMEC savings will be claimed in accordance with CPUC guidelines. Once the performance period data collection period is over and true NMEC savings are calculated,

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the program savings will be trued-up against the prior savings claimed at the end of project installation. Incentives will be evaluated based on the realized savings and incentive rates.

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