

**MODEL EM&V METHODS**

**STANDARDIZED REPORTING FORMS**

**FOR ENERGY EFFICIENCY**

**Version 1.0**

**A project of the Regional Evaluation, Measurement and Verification Forum**

JULY 2014

**Facilitated and Managed by Northeast Energy Efficiency Partnerships**

**PREFACE**

**Background**

These *Model EM&V Methods Standardized Reporting Forms* were prepared by the Regional Evaluation, Measurement and Verification Forum (‘the Forum’). The Forum, established in 2008, is a regional project facilitated and managed by Northeast Energy Efficiency Partnerships (NEEP) representing states in New England[[1]](#footnote-1), New York, Maryland, Delaware, and the District of Columbia.

As the Forum region continues to increase its investment in energy efficiency as resource and strategy to meet a range of public policy goals (energy and economic), as well as newly proposed federally mandated regulations for greenhouse gases under US EPA’s Clean Air Act 111(d) proposed regulations, the need for understanding and documenting the EM&V practices used by states to support efficiency program savings is as important as ever.

Program administrators in the Forum region conduct a range of evaluation activities to determine savings from their programs, including impact evaluations, market assessments and characterizations, and process evaluations to identify changes and improvements to program design. Since its inception in 2009, the Forum has been working to develop greater transparency and consistency in EM&V practices to support the inclusion of energy efficiency as a resource or key strategy in meeting state, regional and ultimately, national energy and environmental goals and/or markets. To date, the Forum has developed [*Regional EM&V Methods Guidelines*](http://neep.org/Assets/uploads/files/emv/emv-products/A2%20Regional%20EMV%20Methods%20Savings_Assumptions_Guidelines_May_2010-FINAL.pdf) (adopted by the Forum Steering Committee in 2010), which document recommended impact evaluation and savings calculation methods intended for use/referencing by program administrators and 3rd party evaluators when conducting evaluations to determine gross energy/demand savings, and for state regulators in reviewing evaluations. The extent to which this Forum guidance document or other recently developed EM&V guidance documents (e.g., the US DOE [Energy Efficiency Savings Protocols](https://www1.eere.energy.gov/office_eere/de_ump_protocols.html) which are consistent with the Forum’s Guidelines but more detailed) are being used or referenced in the Forum region is limited or unclear[[2]](#footnote-2).

Anecdotally, many of the evaluation practices in the Forum region are considered ‘best practice’ and likely align with the Forum’s *Regional EM&V Methods Guidelines or* US DOE Savings Protocols, however it is very difficult, if not impossible, to confirm either way absent better documentation of such practices. EM&V practices used by the states are not readily transparent because the methodologies used to evaluate a program or savings parameter are typically described in the specific evaluation studies or appendices, and as such are “buried” in a multitude of documents that makes it difficult for interested stakeholders to readily determine and understand what EM&V practices are used, why they are used, and how they compare to methods use for different programs within and across states.

As such, the Forum embarked in 2013 to create **a** **model template that supports greater transparency of program administrator/state EM&V practices used to calculate EE savings via a straightforward, standardized EM&V methods ‘check list.’** This type of document is intended to help energy and environmental policy and market players readily understand and compare EM&V approaches used to estimate reported EE program savings to inform their specific needs. In fact, such a model template is likely to be useful for, and could be referenced by, the US EPA to support its Clean Air Act 111(d) proposed rule on carbon for existing power plants, in which energy efficiency is identified as a major building block, and EPA will be developing associated EM&V requirements to support its rule[[3]](#footnote-3). For the Forum/RGGI states, where a mass-based model is being pursued in which energy efficiency is an ‘observed’ impact (*that contributes to delta total emissions from power plants relative to a baseline*) and where demonstration of EM&V to EPA would not be required, the model standardized reporting forms herein would be nonetheless valuable to supporting state EM&V plans submitted to EPA as part of their compliance plans, and to help track progress towards RGGI states carbon cap goals using consistent, standardized tools across the states. For states in the US that pursue a rate-based approach under CAA 111(d), where energy efficiency is a *calculated emission reduction (i.e., x amount of EE savings translates to y avoided emissions),* the standardized EM&V methods forms herein could be helpful to EPA as a model for state reporting of EM&V practices used to determine efficiency savings. Such standardized reporting can also inform the Forum/RGGI states of EM&V practices used by states outside the region.

**Objectives and Audiences**

The key objectives of the *Model EM&V Methods Standardized Reporting Forms* are to identify EM&V approaches used to determine energy and demand savings impacts from programs in order to:

* Make state/program administrator **EM&V practices more readily transparent** to interested parties, and provide supporting information to increase basic understanding of approaches;
* Provide for **standardized comparability of EM&V practices** through the use of a simple, model template/reporting format with supporting consistent definitions;
* Help to **reduce administrative costs associated with presenting and reviewing EE program impacts** by having a consistent format for reviewing results; and
* Support ability for interested parties **to compile data and analyze common practices** and associated impacts.[[4]](#footnote-4)

The primary audiences these standardized forms can support include:

* State Public Utility Commissions
* State Air Regulators
* State Energy Offices
* US DOE and US EPA
* ISO/RTO system planners
* Program evaluators and implementers
* Researchers (e.g., LBNL, ACEEE, NGOs, etc.)

The specific types of questions the forms can address to support the above audiences interests are:

1. **What EM&V methods(s) was used to estimate savings** for a program or input parameter? How was the baseline, verification of installations, measure life and persistence of savings determined? How were gross and net energy and demand savings calculated (deemed savings, engineering desk review, M&V, large-scale billing analysis)?
2. **How reliable are the reported energy or peak demand savings?**  How was certainty/rigor addressed for a particular study or around reported savings for a program? What was the validity of the results in terms of data quality, how the data was collected (sampling methods), statistical confidence and precision of the results, and appropriateness of the measurement methods to address bias?
3. **How do the EM&V approaches used compare to other state practices for similar programs**? Is it the EM&V methodology, program design, or something else that drives differences in savings assumptions when study results and TRM values are compared across states?
4. **How do the EM&V approaches used align with any existing state, regional or national EM&V protocols?** The standardized reporting forms do not prescribe a certain EM&V method or protocol, but allow a program administrator or 3rd party evaluator to reference existing protocol(s) that align with the methods/practices used.
5. **Where should an interested party focus his/her attention of an EM&V review.** The standardized forms provide sufficient information to address the above questions that can point a reviewer to where they may want to better understand the details of a study (or group of studies), without having to review every study. This helps to streamline the evaluation review process and reduce costs.

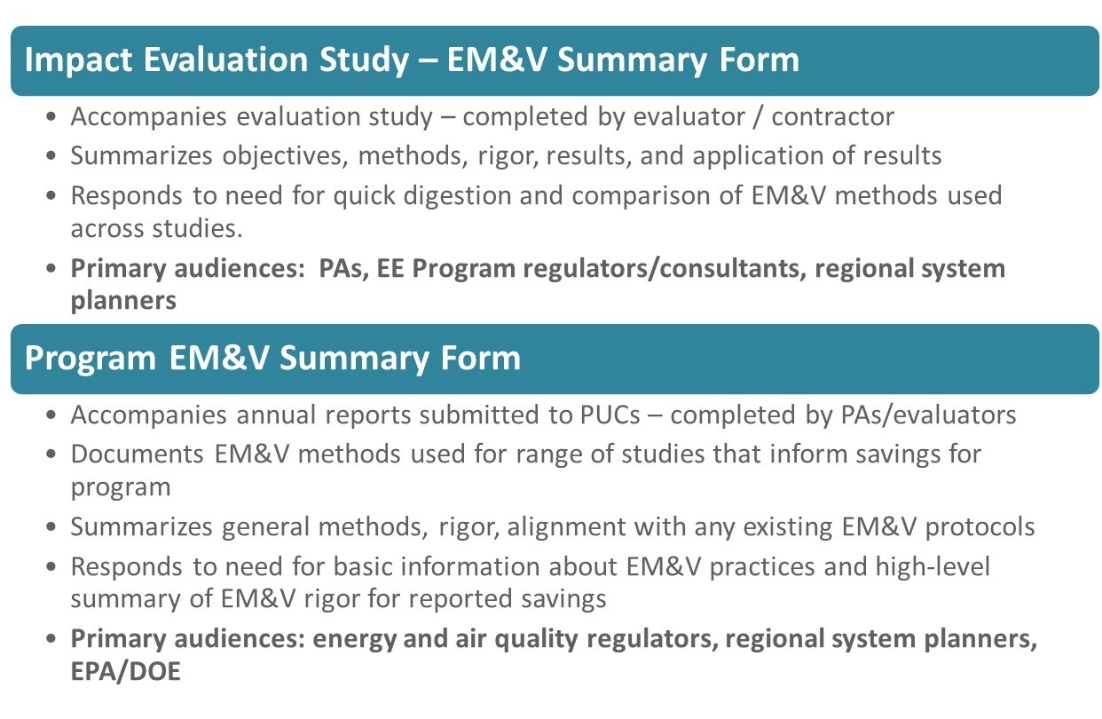
**Description of the Standardized EM&V Methods Reporting Forms**

The standardized EM&V methods reporting forms provided herein provide two levels of reporting, each with a discrete but complementary purpose:

1. An ***Impact Evaluation EM&V Summary Form*** - intended to accompany individual energy efficiency impact evaluation studies that summarize the impacts and document the EM&V method(s) used *in that study*; and
2. A ***Program EM&V Summary Form* –** intended to accompany program administrator Annual Energy Efficiency Program Reports submitted to their regulatory commission that summarizes the EM&V methods and level of rigor around the reported savings *for that program* (which may include a number of supporting studies).

The intended purpose, use and audiences for these forms, as well as likely responsible entity to complete the forms, are summarized in Figure 1 below:

**Figure 1.**



**Attachment A** presents the standardized template of the *Impact Evaluation Study EM&V Summary Form.* **Attachment B** presents the standardized template of the *Program EM&V Summary Form.* The forms are supported by a **User Guide and Glossary (Appendix 1)**, and are also available to be downloaded in a web-based (filemaker) format.

**Stakeholder Process for Developing Standardized EM&V Methods Forms**

The standardized forms provided in Attachments A-B were developed by the project contractor, Cadmus Group, in consultation with NEEP and the Forum project subcommittee, which provided extensive comment on several versions of the draft forms. Representative entities on the project subcommittee are provide below in Table 1.



**Considerations and Recommendations**

As the first of its kind to be developed in the country, these standardized EM&V methods reporting forms are considered to be an effective solution to creating transparency and providing basic understanding of EM&V practices used by the Forum states, with the caveat that this is a work in progress. The forms herein are **Version 1.0** of what is likely to be an evolving product that improves with time and use. On-going refinements will be made to the forms in consultation with the project subcommittee, in coordination with US DOE and with US EPA.

Recommended areas for Forum work to support implementation and use of the standardized forms for 2015-16 include:

1. Refinements to the standardized forms
2. Development of a supporting on-line database that allows for uploading/downloading the standardized forms (currently in a web-based format), with capability for users to query data in order to compare/aggregate methods used across programs or studies
3. Integrate the on-line EMV Methods Form database with the Regional EE Database (REED), for ready access to supporting EM&V practice associated with reported EE savings data in REED
4. Support state needs for inclusion of EE in state compliance plans for national ambient air quality standards and forthcoming greenhouse gas regulations, in coordination with Northeast States for Coordination Air Use Management (NESCAUM), the Regional Greenhouse Gas Initiative (RGGI), and other key organizations, using the above tools.

**State Use of the Standardized EM&V Methods Forms**

Forum Steering Committee adoption of these standardized EM&V Methods reporting templates indicates the states’ intent to encourage the use of the forms in the respective Forum states, with the understanding that the forms will be refined and improved with guidance from representative state members on the project subcommittee, and that each state will determine how best to incorporate the use of standardized forms into its own required reporting process.

**Attachment A. Program Portfolio EM&V Summary Form**

|  |  |
| --- | --- |
| **Program Administrator:** |  |
| **State:** |  |
| **Program Name:** | **Program Sector: Program Year:** |
|  |  |

# PROGRAM YEAR SUMMARY

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Indicate the program performance for the reported program year by providing the reported values for each savings parameter. Select “Not Reported” if the program does not report savings for a savings parameter. | | | | |
| Savings Parameter | Units | Adjusted Gross Annual Savings | Net Annual Savings | Adjusted Gross Lifetime Net Savings // Adjusted Net Lifetime Savings |
| Electric Energy | * Not reported * kWh |  |  |  |
| Electric Demand | * Not reported * kW * MW |  |  |  |
| Natural Gas | * Not reported * MMBTU * Therms * CCF |  |  |  |
| Indicate whether the program reports savings to any of the capacity markets. | | | | |
| Demand Resource for Capacity Market | * Not Reported * ISO-New England * PJM * Other: \_\_\_\_\_ | | | |

# Program EM&V Methods Summary

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Describe the program EM&V activity, including (1) overall EM&V strategy for the program, (2) how EM&V targets the major sources of uncertainty, (3) new EM&V results that influence savings in this program year, and (4) ongoing/planned EM&V activity for future years. | | | | | |
|  | | | | | |
| If new EM&V results influence any savings categories (compared to the previous program year), check the box and identify the relevant study. | | | | | |
| Baseline | | Install Verification | Gross Savings | Net Savings | Lifetime |
| * Study: \_\_\_\_\_\_ | | * Study: \_\_\_\_\_\_ | * Study: \_\_\_\_\_\_ | * Study: \_\_\_\_\_\_ | * Study: \_\_\_\_\_\_ |
| Check the box if the savings categories (baseline, install verification, gross savings, etc.) are studied at the program level. | | | | | |
| Baseline | Install Verification | | Gross Savings | Net Savings | Lifetime |
| * Program EM&V | * Program EM&V | | * Program EM&V | * Program EM&V | * Program EM&V |
| For each savings category, indicate ALL methods used to estimate program performance for the reported program year. | | | | | |
| Baseline | Install Verification | | Gross Savings | Net Savings | Lifetime |
| Methods:   * + - * Stipulated baseline       * Building Code or Federal/State Standard       * Standard Practice (Market Baseline)       * Existing Conditions       * Dual or Dynamic Baseline       * Other: \_\_\_\_\_\_\_\_ | Methods:   * None * Document Review * Survey * On-Site Inspection * Other * N/A:*\_\_\_\_\_\_\_\_\_* | | Methods:   * None * Deemed Savings * Engineering Desk Review * Measurement & Verification   + - * + IPMVP Option A         + IPMVP Option B         + IPMVP Option C         + IPMVP Option D * Large Scale Consumption Data Analysis (billing analysis)   + - * + Randomized Control Trial         + Quasi-Experimental Methods       * Top Down       * Other: \_\_\_\_\_\_\_\_\_\_\_\_\_ | Adjustments include:   * + - * N/A       * Free-ridership       * Participant spillover       * Non-participant spillover       * Other: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_   Methods:   * + - * None       * Stipulated NTG ratio       * Top-down       * Self-reporting surveys       * Enhanced self-reporting surveys       * Large-scale consumption data analysis       * Cross-sectional study       * Market sales data analysis       * Structured expert judgment       * Historical Tracing (Case Study) | Calculation   * + - * + Single value for program         + Measure-level lifetimes   Source   * + - * + Stipulated         + Project-specific * Persistence Factors   + - * + None         + Degradation         + Rebound         + Other |

# Program EM&V Rigor Summary

|  |
| --- |
| Describe the overall EM&V strategy for the program including how EM&V targets the major sources of uncertainty. |
| **Describe:**  **Characterization of EM&V Rigor**  The following four questions aim to provide information on the overall rigor of the evaluation. In the context of this form, we define “rigor” strictly in terms of the validity of the results, based on (1) the quality of the data, (2) appropriateness of the way the data was collected, (3) statistical confidence and precision of the results, and (4) appropriateness of the measurement methods. *For general information about interpretation of this information, see the instructions, glossary, and user guide (include link to instructions page)*  **Data Quality (select one)**   * EM&V is recent and based on recent, primary research * EM&V based on recent, secondary research * Savings are not based on recent research   **Sampling Methods (select one)**   * All program components use census or random (incl. stratified) sampling methods * Most program components use census or random (incl. stratified) sampling methods * Program components use non-random sampling methods   **Confidence and Precision (select one)**   * All program components achieve the planned level of confidence and precision * Some program components achieve the required level of confidence and precision * No quantification of program EM&V confidence and precision levels.   **Measurement Methods (select one)**   * Measurement methods address all major sources of bias * Measurement methods address some major sources of bias * Measurement methods do not address potential sources of bias |

# Relevant EM&V Documents

|  |  |  |
| --- | --- | --- |
| Identify any specific EM&V Methods standards, protocols or guidance documents with which the EM&V methods used to inform the reported savings for this project are consistent and briefly describe: | | |
| **National Protocols**   * US DOE Uniform Methods Project (UMP): Energy Efficiency Savings Protocols for Gross Savings ([link](http://energy.gov/eere/about-us/uniform-methods-project-determining-energy-efficiency-program-savings/energy-efficiency-savings)) * US DOE Uniform Methods Project (UMP): Energy Efficiency Savings Protocols for Net Savings ([link](http://energy.gov/eere/about-us/initiatives-and-projects/uniform-methods-project-determining-energy-efficiency-program)) * International Performance Measurement and Verification Protocol® (IPMVP) ([link](http://www.evo-world.org/)) * North American Energy Standards Board (NAESB) – Wholesale/Retail Electric Quadrant Energy Efficiency M&V Standards * ASHRAE Guideline 14, Measurement of Energy and Demand Savings * Federal Energy Management Program (FEMP) M&V Guidelines * U.S. DOE Superior Energy Performance Measurement and Verification Guide for Industry * SEE Action, Energy Efficiency Program Impact Evaluation Guide * Other: *\_\_\_\_\_\_\_\_\_\_\_\_* * Don’t Know | **Regional/State Protocols**   * NEEP Regional EM&V Methods and Savings Assumptions Guidelines ([link](https://neep.org/Assets/uploads/files/emv/emv-rfp/emv-products/A2%20Regional%20EMV%20Methods%20Savings_Assumptions_Guidelines_May_2010-FINAL.pdf)) * ISO New England Manual for M&V of Demand Reduction Value from Demand Resources ([link](http://www.iso-ne.com/rules_proceds/isone_mnls/MMVDR/index.html)) * PJM Manual 18B: Energy Efficiency Measurement & Verification ([link](http://www.pjm.com/~/media/documents/manuals/m18b.ashx)) * State-specific EM&V Protocols or guidance documents. Link: \_\_\_\_\_\_\_\_\_\_\_ * Other: *\_\_\_\_\_\_\_\_\_\_* * Don’t Know |  |
| List the TRM and EM&V impact evaluation studies relevant to the estimated program performance for the reported program year. | | |
| EM&V Studies: | | |

**Attachment B. Impact Evaluation Summary Form**

|  |  |
| --- | --- |
| **Report Title:** |  |
| **Report Date (Month YYYY):** | **Report Author(s):** |
|  |  |

# GENERAL INFORMATION

|  |  |  |  |
| --- | --- | --- | --- |
| Complete the fields below to characterize the study. | | | |
| **Provide information to describe the specific program(s) studied.** | | | |
| Program Administrator(s) | | Program Name(s) | |
| State(s) | | Program Year(s) or Time Period | |
| **Provide information to characterize the studied parameters.** | | | |
| **Sector**  (Check all that apply) | * Low Income * Residential | | * Multifamily * Commercial/Industrial |
| **Program Type (Market)**  (Check all that apply) | * Lost Opportunity - Prescriptive * Lost Opportunity – Custom | | * Retrofit – Prescriptive * Retrofit – Custom |
| **Program Delivery Method(s)**  (Check all that apply) | * Upstream * Midstream * Prescriptive Rebate | | * Direct Install * Implementer * Custom |
| **End-Use**  (Check all that apply) | * Lighting * HVAC * Refrigeration * Water Heating * Motors/Drives | | * Process * Appliances * Whole-Facility * Other: \_\_\_\_\_\_\_\_\_\_\_\_\_ |
| **Measure Type(s)**  (Check all that apply) | * Equipment * Controls * Motors/Drives * Weatherization | | * Energy Reports * New Construction Design * Custom * Other: \_\_\_\_\_\_\_\_\_\_\_\_\_ |
| **Fuel/Resource Type**  (Check all that apply) | * Electric Energy * Electric Peak Demand * Natural Gas * Fuel Oil | | * NEB * Other: \_\_\_\_\_\_\_\_\_\_\_\_\_\_ * NA: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| **Indicate whether the study verified impacts for capacity markets.**(Check all that apply) | * None ISO-NE FCM * PJM * Other: \_\_\_\_\_\_\_\_\_\_ | |  |

# STUDY SUMMARY

|  |  |
| --- | --- |
| Complete the fields below to describe the study objective, results, application of results, and to discuss the EM&V rigor. | |
| **Study Objective**  Describe the study objectives, including studied savings parameters and study population. |  |
| **Results**  Describe the key evaluation findings related to program savings, including increase or decrease from previous or existing results. |  |
| **EM&V Rigor** *(separate tab in filemaker)*  For each EM&V category, describe the EM&V rigor, estimated reliability of results, and any threats to validity. | Method:  Precision of Result:  Sample:  Bias: |

# STUDY RESULTS (SAVINGS IMPACTS)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Complete the table to describe the study results. Select menu items in the last two columns to characterize the savings type (e.g., resource type) and parameter type (e.g., impact factor) for each result. | | | | | | | | |
| # | Program or Measure | Evaluated Parameter | Value | Units | Relative Precision (%) | Confidence  (%) | Savings Type | Parameter Type |
| 1 |  |  |  |  |  |  | Select type. | Select type. |
| 2 |  |  |  |  |  |  | Select type. | Select type. |
| 3 |  |  |  |  |  |  | Select type. | Select type. |
| 4 |  |  |  |  |  |  | Select type. | Select type. |
| 5 |  |  |  |  |  |  | Select type. | Select type. |

# Evaluation Protocols

|  |  |
| --- | --- |
| Identify any EM&V Methods standards, protocols or guidance documents that the EM&V methods used to inform the reported savings. For selected protocols, indicate how the protocol was used. | |
| **National Protocols** | **Describe use of protocol:** |
| * US DOE Uniform Methods Project (UMP): Energy Efficiency Savings Protocols for Gross Savings ([link](http://energy.gov/eere/about-us/uniform-methods-project-determining-energy-efficiency-program-savings/energy-efficiency-savings)) |  |
| * US DOE Uniform Methods Project (UMP): Energy Efficiency Savings Protocols for Net Savings ([link](http://energy.gov/eere/about-us/initiatives-and-projects/uniform-methods-project-determining-energy-efficiency-program)) |  |
| * International Performance Measurement and Verification Protocol® (IPMVP) ([link](http://www.evo-world.org/)) |  |
| * North American Energy Standards Board (NAESB) – Wholesale/Retail Electric Quadrant Energy Efficiency M&V Standards |  |
| * Federal Energy Management Program (FEMP) M&V Guidance |  |
| * ASHRAE Guideline 14, Measurement of Energy and Demand Savings |  |
| * SEE Action, Energy Efficiency Program Impact Evaluation Guide |  |
| * U.S. DOE Superior Energy Performance Measurement and Verification Protocol |  |
| * Other |  |
| * Don’t Know |  |
| **Regional/State Protocols** | **Describe use of protocol:** |
| * NEEP Regional EM&V Methods and Savings Assumptions Guidelines ([link](https://neep.org/Assets/uploads/files/emv/emv-rfp/emv-products/A2%20Regional%20EMV%20Methods%20Savings_Assumptions_Guidelines_May_2010-FINAL.pdf)) |  |
| * ISO New England Manual for M&V of Demand Reduction Value from Demand Resources ([link](http://www.iso-ne.com/rules_proceds/isone_mnls/MMVDR/index.html)) |  |
| * PJM Manual 18B: Energy Efficiency Measurement & Verification ([link](http://www.pjm.com/~/media/documents/manuals/m18b.ashx)) |  |
| * State-specific EM&V protocols or guidance |  |
| * Other |  |
| * Don’t Know |  |

# EM&V Methods for Gross Savings Analysis

|  |  |  |
| --- | --- | --- |
| Describe EM&V methods for estimating gross savings impact. | | |
| **Describe EM&V methods for estimating gross savings impact. If multiple methods are used, describe how each method is used.** | | |
|  | | |
| **Indicate all methods used to evaluate gross savings. For each selected EM&V Method in the first column, select the appropriate subcategory(ies) to the right of the first column.** | | |
| * N/A (gross savings not estimated) | n/a | |
| * Deemed Savings | * Stipulated deemed savings value * Deemed savings calculation | Indicate source:   * TRM Version: * Prior Year Evaluation: * Other: |
| * Engineering Desk Review | n/a | |
| * Measurement & Verification | * IPMVP Option A * IPMVP Option B * IPMVP Option C * IPMVP Option D * Other: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | |
| * Large Scale Consumption Data Analysis (i.e., billing analysis) | * Randomized Control Trial (RCT) * Quasi-Experimental Methods * Pre/Post Energy Use * Matched Control Group * Other:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ * Other: | |
| * Top-Down (macro-consumption) | * Indicate the level of aggregation: * Sector * Utility * State * Region * Other: | |

|  |
| --- |
| Describe and characterize the sampling approach for the gross analysis. |
| **Describe the sampling method for the gross savings analysis.** |
|  |
| **Check all applicable boxes to characterize the sampling approach and final sample sizes.** |
| * Census * Sample * Sampling Unit: \_\_\_\_\_\_\_\_\_\_\_\_\_\_ * Participant sample size (units): \_\_\_\_\_\_\_\_\_\_\_\_\_\_ * Non-participant sample size (units): \_\_\_\_\_\_\_\_\_\_\_\_\_\_ * N/A: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |

|  |
| --- |
| Describe and characterize data collection for the gross savings analysis. |
| **Describe the data collection methods for the gross savings analysis. If multiple methods are used, describe how each method is used.** |
|  |
| **Check all applicable boxes to characterize the sampling approach and final sample sizes.** |
| Installation/Purchase Verification Approach   * None * Documentation review * Survey * Mail * E-Mail * Telephone * In-person * Other: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ * On-Site Inspection * N/A :\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_   Primary Data Collection for Energy Consumption   * None * Utility consumption data (“billing data”): □ PRE □ POST * Interval whole-building building data: □ PRE □ POST * On-Site Metering Data: □ PRE □ POST |

|  |
| --- |
| Describe and characterize the baseline approach for gross savings analysis. |
| **Describe the methods for estimating for modeling the baseline.** |
|  |
| **Check all applicable boxes to characterize the approach for estimating the baseline for gross savings analysis.** |
| * Stipulated * Building Code or Federal/State Appliance Standard * Standard Practice (market baseline) * Dual or Dynamic Baseline * Existing conditions (including pre-installation metering) * N/A: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ * Other: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |

# EM&V Methods for Net Savings

|  |
| --- |
| Describe and characterize the methods for estimating net savings or measuring attribution. |
| **Describe EM&V methods for estimating net savings. If multiple methods are used, describe how each method is used.** |
|  |
| **Indicate all methods used to measure or assess attribution and evaluate net savings.** |
| * N/A (study does not measure attribution) * Combined with impact evaluation (i.e., can’t separate net and gross) * Stipulated net-to-gross ratio * Self-reporting surveys * Customer * Trade-Ally * Enhanced self-reporting surveys * Panel of trade allies * Large-scale consumption data analysis * Cross-sectional studies * Top-down evaluations (or macro-economic models) * Market sales data analysis * Structured expert judgment approaches * Historical Tracing (or Case Study) Methods * Other: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |

|  |
| --- |
| Describe and characterize the sampling approach for the net savings analysis. |
| **Describe the sampling method for the net savings analysis.** |
|  |
| **Check all applicable boxes to characterize the sampling approach and final sample sizes.** |
| * Census * Sample * Sampling Unit: \_\_\_\_\_\_\_\_\_\_\_\_\_\_ * Participant sample size (units): \_\_\_\_\_\_\_\_\_\_\_\_\_\_ * Non-participant sample size (units): \_\_\_\_\_\_\_\_\_\_\_\_\_\_ * N/A: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |

# RECOMMENDATIONS

|  |  |  |  |
| --- | --- | --- | --- |
| Complete the table below to describe the study recommendations and (if possible) The Program Administrator’s response. | | | |
| **#** | **Recommendation** | **Response** | **Description of Response** |
| 1 | [Insert evaluation contractor recommendation] | Select response. | [Describe PA response.] |
| 2 | [Insert evaluation contractor recommendation] | Select response. | [Describe PA response.] |
| 3 | [Insert evaluation contractor recommendation] | Select response. | [Describe PA response.] |
| 4 | [Insert evaluation contractor recommendation] | Select response. | [Describe PA response.] |

**APPENDIX 1.**

**USER GUIDE AND GLOSSARY – TO BE INSERTED HERE**

1. Connecticut, Massachusetts, Maine, New Hampshire, Rhode Island, and Vermont. [↑](#footnote-ref-1)
2. While 2-3 states reference the Forum *Regional EM&V Methods Guidelines,* the extent of such referencing is limited and static, and not necessarily reflected or cited in completed impact evaluation studies. In one case, a Forum state indicated general concern that existing regional and national evaluation guidance documents tend to prescribe the “lowest common denominator” in EM&V practices, which may not be aligned with a state’s actual practices. Anecdotally, both the Forum *Regional EM&V Methods Guidelines* and *US DOE EE Savings Protocols* largely provide guidance consistent with best practices in EM&V methods, and are aligned with acceptable methods set forth in ISO/RTO forward capacity market M&V manuals, although do not prescribe specific levels of rigor on savings results. [↑](#footnote-ref-2)
3. See EPA Technical Support Document – State Considerations on EM&V requirements for Energy Efficiency pgs 36-60). <http://www2.epa.gov/sites/production/files/2014-06/documents/20140602tsd-state-plan-considerations.pdf> [↑](#footnote-ref-3)
4. Examples of such analyses include review of state’s savings impacts and evaluation approaches and reported reliability of such impacts; analyses of all states (common practice) use of certain evaluation approaches; the type of EM&V approach used for different kinds of programs and quantity of savings per each approach; etc. [↑](#footnote-ref-4)