

EE Post-Installation Measurement & Verification Report Template

This document serves as a template for a Delivery Year Post-Installation Measurement & Verification (PI M&V) Report that involves direct installations such as lighting, HVAC, chiller, or motor retrofits. At a minimum, PJM expects that the following items outlined in this template be included in a Delivery Year Post-Installation M&V Report. See Manual 18B for more details on developing an acceptable PI M&V Report.

I. Executive Summary

- A. Submission Date**
- B. Applicable Delivery Year**
- C. Company Name**
- D. Company Address and Contact Information**
- E. Type(s) of Energy Efficiency (EE) Installation(s)**

This Section must include:

- *A list of the types of EE installation(s) completed (e.g., Lighting, HVAC, Chiller, or Motor retrofits).*
- *A statement attesting that the EE installation(s) meets the EE Resource definition as provided in Section 1.1 of Manual 18B.*

F. Applicable Energy Efficiency or Performance Standards

This Section must include for each EE installation type:

- *The building codes, appliance standards, or other relevant standards that are in effect at the time of the installation, as known at the time of commitment for each type of EE installation*
- *Documentation that demonstrates that the EE installation(s) exceeds the standards.*

G. Nominated EE Value by EE Resource

This Section must include:

- *A spreadsheet/table that documents the nominated value of the demand reduction (i.e., Nominated EE Value) claimed by each EE Resource defined by installation period and transmission zone (or sub-zone, if plan to model and offer EE Resource in DPL South or PS North LDA).*
- *Only those EE Resources that are eligible for the relevant Delivery Year of the PI M&V Report should be included in the table.*
- *The Nominated EE Value for each EE Resource reported in the table should agree with the claimed Nominated EE Values of the installation sites that constitute the EE Resource (in accordance with the EE installation site data provided in Section II.)*
- *Show the calculated relative precision value for each EE Resource based on an aggregation of all EE installation sites that constitute the EE Resource.*

H. Capacity rights to use an Energy Efficiency Installation as Capacity Resource

The EE Resource Provider offering an Energy Efficiency Resource as a Capacity Resource into the PJM capacity market must demonstrate to PJM that it has the legal authority to claim the demand associated with such Energy Efficiency Resource. The EE Resource Provider can satisfy this requirement by utilizing one of the following options:

1. Submit to the Office of the Interconnection a written sworn, notarized statement of one of its corporate officers certifying that the EE Resource Provider has the legal rights and authority to

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claim the demand reduction associated with the EE installation(s) that constitute the Energy Efficiency Resource for the applicable Delivery Year.

2. Inserting the following statement directly into the Post-Installation Measurement & Verification Report: “By submitting this Post-Installation Measurement & Verification Report to PJM, [insert company name] affirms and acknowledges that it has the legal authority to claim the demand reduction associated with the EE installation(s) that constitute the Energy Efficiency Resource for the applicable Delivery Year.”

PJM presumes that the EE Resource Provider would obtain such legal rights and authority by entering into contracts with end-use customers providing the EE Resource Provider with the right to offer the EE installation into the PJM capacity market and/or possession of a written statement from the end-use customer that he/she/it does not have an agreement with another EE Resource Provider to offer the EE installation into the PJM capacity market. Copies of any such agreement or statement do not need to be provided to PJM unless PJM requests a copy of the same. PJM intends to rely solely on the sworn statement or affirmation of the EE Resource Provider unless it is advised or has reason to believe that the EE Resource Provider does not have the legal rights and authority to commit the demand reduction into the PJM capacity market.

II. Site Documentation to Support Installed EE Resources

*For EE programs that involve direct installations (e.g., lighting, HVAC, chiller, or motor retrofits) at an end-use customer’s site, this section must include a spreadsheet showing **all the EE installations by site** and their claimed Nominated EE value by site. Each installation would include:*

- Installation Site Name
- EDC account number at installation site
- Transmission Zone location of installation site
- Building Type of installation site (Office, School, Warehouse, etc.)
- Period of Installation (must be an installation period that is eligible for the Delivery Year of this PI M&V Report per section 1.2 of Manual 18B)
- Type of EE installation (e.g., lighting, HVAC, Chiller, or motor.)
- Gross demand before the EE installation
- Gross demand basis: Standard Baseline or Current Load Baseline (If Current Load Baseline is reported, justification for the use of Current Load Baseline is required in Section III)
- Gross demand after the EE installation
- Gross demand reduction = Gross demand before the EE installation – Gross demand after the EE installation
- Coincidence Factor (site level)
- Interactive Factor (if applicable)
- EDC Loss Factor (Optional. If no EDC Loss Factor is provided, an EDC Loss Factor = 1.0 will be assumed.)
- Nominated EE Value = Gross demand reduction * Coincidence Factor* (1 + Interactive Factor)* EDC Loss Factor
- Name of the EE Resource in which the site is included.

In Section I. G., a separate spreadsheet/table was requested showing the Nominated EE Value by EE Resource. The sum of the claimed Nominated EE Values of all the installation sites that constitute the EE Resource must equal the reported Nominated EE Value for the EE Resource in Section I.G, unless

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there are other types of EE programs that are also included in the Nominated EE Value of the EE Resource.

Each EE installation listed in the spreadsheet should have supporting documentation that includes the details of equipment before and after the installation, the equipment specifications and ratings, and the calculations that show the gross demand before and after the EE installation. PJM requests that the sites that constitute each EE Resource be ordered from the site with the highest Nominated EE Value to the lowest. At a minimum, PJM requests that the EE Resource Provider submit supporting documentation for a sample of 10% of the sites per EE Resource starting from the sites with highest Nominated EE Value for PJM review. If the calculated sample (10% of population) is less than 25 sites, please include supporting documentation for all the sites that constitute the EE Resource. Even though the EE Provider provided supporting documentation for a sample of EE installations, PJM may request the supporting documentation for any EE installation included in the spreadsheet provided by the EE Resource Provider.

III. Measurement & Verification Results

A. Methodology Used

This section must include for each EE installation type:

- *Confirm the International Measurement and Verification Protocol (IPMVP) Option (as referenced in PJM Manual 18B, Section 7) that was used to accomplish the M&V work. Per Section 7.5 of Manual 18B, if an alternative M&V methodology was used, the EE Resource Provider must demonstrate that the alternative method was equivalent to one of the accepted methodologies and justify the need to deviate from the acceptable methodologies.*

B. Measurement Activity Details

This section must include for each EE installation type:

- *The parameter(s) or variable(s) measured (e.g., coincidence factor (CF) for a building type based on time of use measurements during EE Performance Hours or electrical demand (KW) measurements during EE Performance Hours) :*
- *Identification of the equipment used in measurement activities (e.g. Light logger, interval electrical demand meters, etc.).*
- *A statement attesting that the measurement equipment met the requirements of Section 12 of Manual 18B.*
- *A discussion of the monitoring interval (i.e., the sample rate of the monitoring equipment and the time period (time of year and duration) of the monitoring period.*
- *A discussion of how sampling bias was minimized (See Section 9.2 of Manual 18B).*
- *The calculations used to determine the measured parameter (e.g., measured Coincidence Factor or measured demand reduction) for a single sample*
- *A discussion and calculations to show how the measured demand reduction values were adjusted to the Zonal WTHI standard in case of weather sensitive demand (detailed in Manual 18B, Appendix A).*
- *Spreadsheet showing the population, initial Coefficient of Variation (c.v.) assumed, sample size required to meet the precision, actual sample size, mean of the measured parameter for the sampling, standard deviation for the sampling, coefficient of variation for sampling, and the relative precision for the sampling. (See Section 9 of Manual 18B).*
- *Spreadsheet showing the aggregation of EE sites to calculate the relative precision for each EE Resource. (An example is available at <http://pjm.com/markets-and->*

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[operations/rpm/~media/markets-ops/rpm/rpm-auction-info/estimation-of-precision-of-aggregated-energy-efficiency-installation.ashx](#)) The relative precision should be no worse than 10% at 90% confidence level (one-tailed) (equivalent to two-tailed 80% confidence level) at the EE Resource level. The relative precision values by EE Resource should be summarized in Section I. G.

C. Verification Activity Details

This Section must include for each EE installation type:

- Description of verification method used (e.g., surveys, on-site inspections, spot measurements, and short-term metering) to provide evidence that the equipment/systems were installed and still operating.
 - Sample documentation (e.g., copy of the questionnaire used in a telephone survey, sample documentation from an on-site inspection (such as an email from a facilities manager verifying the installation), etc.).
 - A discussion of how sampling bias was minimized (See Section 9.2 of Manual 18B).
- Date of verification activities: Verification must be performed prior to each Delivery Year; however, verification activity should not be performed earlier than December 1 prior to the Delivery Year).
- Spreadsheet showing the population, initial Coefficient of Variation assumed, sample size required to meet the precision, actual sample size, mean of the measured parameter for the sampling, standard deviation for the sampling, coefficient of variation for sampling, and the relative precision for the sampling. (See Section 9 of Manual 18B). The relative precision should be no worse than 10% at 90% confidence level (one-tailed) (equivalent to two-tailed 80% confidence level).