

Attachment UU

Energy Efficiency Resources Measurement & Verification Procedures

Energy Efficiency Resources

Energy Efficiency (EE) Resources are specific projects resulting in installed measures on retail customer facilities that achieve a permanent reduction in electric energy usage while maintaining a comparable quality of service. The EE Resource must achieve a permanent, continuous reduction in electric energy consumption (during the defined EE Performance Hours) that is not reflected in the peak load forecast used for the Planning Resource Auction for the Season(s) in the Planning Year for which the EE Resource is proposed. The EE Resource must be fully implemented at all times during the Season, without any requirement of notice, dispatch, or operator intervention. Examples of EE Resources are efficient lighting, appliance, or air conditioning installations; building insulation or process improvements; and permanent load shifts that are not dispatched based on price or other factors. A DEAR can include EE Resources as part of its aggregation.

All of the requirements to register an EE Resource with the Transmission Provider are detailed in the Business Practices Manual 011 – Resource Adequacy and the Business Practice Manual 026 – Demand Response. One of the major requirements includes the measurement and verification of the EE Resource’s expected Coincident Peak Demand reduction for the Season. The expected Coincident Peak Demand reduction is the demand (MW) reduction expected under “50/50” planning criteria, during those hours in the Season for which the coincident peak is likely to occur. Those hours currently include the hours 15:00, 16:00 and 17:00 Eastern

Prevailing Time (EPT) for the Spring, Summer and Fall Seasons and hours 08:00, 09:00, 19:00 and 20:00 EPT for the Winter Season.

A valid Measurement & Verification (M&V) plan describes the methods and procedures for determining the expected Coincident Peak Demand reduction of an EE Resource and confirming that the reduction is achieved. The EE Resource provider must submit an initial M&V plan for the EE Resource no later than 30 days prior to the PRA in which the EE Resource is to be initially offered. The EE Resource provider must submit an updated M&V plan for the EE Resource no later than 30 days prior to the next PRA in which the EE Resource is to be subsequently offered. Post-installation of the EE Resource, the EE Resource provider must submit an initial Post-Installation M&V Report for the EE Resource prior to the first Planning Year that the EE Resource is committed to PRA. The EE Resource Provider must submit updated Post-Installation M&V Reports prior to each subsequent Planning Year that the resource is committed. Failure to submit an updated Post-Installation M&V Report prior to a subsequent Planning Year or failure to demonstrate that post-installation M&V activities were performed in accordance with the timeline in the approved M&V Plan will result in an expected Coincident Peak Demand reduction equal to zero MWs for the applicable Season(s) in the Planning Year.

The last Post-Installation M&V Report submitted and approved by the Transmission Provider prior to the Planning Year that the EE Resource is committed in any Season establishes the expected Coincident Peak Demand reduction that is used to measure PRA commitment compliance during the Season(s) in the Planning Year. Details regarding PRA commitment compliance and the associated penalty for failure to deliver the amount of a PRA capacity commitment are detailed below.

The Transmission Provider reserves the right to audit the results presented in an initial or updated Post-Installation M&V Report. The M&V Audit may be conducted at any time. If the M&V Audit is performed and results finalized prior to the start of a Planning Year, the expected Coincident Peak Demand reduction confirmed by the Audit becomes the expected Coincident Peak Demand reduction that is used to measure PRA commitment compliance during the applicable Season(s) in the Planning Year. If the M&V Audit is performed and results finalized after the start of a Season within the Planning Year, the expected Coincident Peak Demand reduction confirmed by the M&V Audit becomes the expected coincident peak load reduction prospectively for the remainder of that Season within the Planning Year and any qualified corresponding Season in future Planning Years, unless replaced by a subsequent M&V Audit.

Energy Efficiency installations that are installed prior to any given Planning Year are eligible to participate in PRAs for that Planning Year and the three subsequent Planning Years. For example, an Energy Efficiency Resource installed and qualified prior to June 1, 2013, could participate in the 2013/14, 2014/15, 2015/16, and 2016/17 Planning Year PRAs. Following the end of the eligible Planning Year participation, EE Resources no longer register with the Transmission Provider, and any associated expected Coincident Peak Demand reductions should be incorporated into the relevant load forecast.

Description of M&V Plan

The M&V Plan is a document that defines project-specific M&V methods and techniques that will be used to determine and verify the expected Coincident Peak Demand reduction (i.e., the demand reduction) resulting from an EE Resource. A single M&V Plan may be submitted to cover multiple EE Resources. The single M&V Plan must clearly document the expected

Coincident Peak Demand reduction of each EE Resource covered in the M&V Plan, for each Season in the Planning Year in which the EE Resource expects to qualify.

In addition to providing accurate methods to calculate the expected Coincident Peak Demand reduction, a good M&V Plan is clear, and uses a consistent and repeatable scientific approach.

All the assumptions, procedures, and data for the M&V Plan should be recorded properly so that they may be easily referenced and verified by others. The data included should be sufficient for a third party to audit the M&V procedures and verify the expected Coincident Peak Demand reduction of an EE Resource.

M&V activities include, but are not limited to, site surveys, demand and energy measurements, metering of key variables, data analyses, calculations, and quality assurance procedures. All of these key components need to be adequately detailed in the M&V Plan.

General Requirements of M&V Plan

An M&V Plan submitted to the Transmission Provider must include for each Season in the Planning Year in which the EE Resource expects to qualify.

- A summary of the methodologies used to determine the expected Coincident Peak Demand reduction;
- A description of why the methodology or combination of methodologies selected is the most appropriate, relative for its project;
- A description of any variables that affect the project's electrical demand (such as outside temperature, time of day, process changes, occupancy, etc.) that will be measured or monitored and used in the determination of the expected Coincident Peak Demand reduction;

- All substantive assumptions for the expected Coincident Peak Demand reduction of the project, including but not limited to, baseline demand consumption, post- installation demand consumption, process changes, and life expectancy;
- Specifications of the equipment or types of equipment for projects being installed and/or modified. The information may include, but is not limited to, engineering analysis utilized to specify equipment, program design measures and or practices, or applications of equipment, measures or practices relative to end-use or processes in the facility.

If one or more of the variables that will be measured or monitored and/or assumptions that will be used in the determination of the EE Resource's expected Coincident Peak Demand reduction are not known at the time the EE Resource provider submits its initial M&V Plan to the Transmission Provider for review and approval, the EE Resource provider may supply alternative information and/or forecasts and indicate the portion of the expected Coincident Peak Demand reduction associated with such measurement and monitoring variables and/or assumptions and explain the basis for such forecasts.

The M&V Plan should also include the following, as applicable:

- References to engineering best practices in the M&V literature, reference reports, or state-of-the-art techniques to demonstrate that its proposed M&V approach is appropriate for the EE Resource type and will produce an accurate and reliable expected Coincident Peak Demand reduction result.
- A description of the technical capabilities of its project team and subcontractors to implement its proposed methodology.

Initial M & V Plan Components

The following are the project level and measurement level components that are required to be contained in the initial M&V Plan. Each component includes a description of the required information.

Project Level Components

The project level components lay the groundwork for obtaining information about the project and provide a shared understanding about its objectives, sponsorship, costs, benefits, timeframes, resources and mandate. All of the project level components of the M&V Plan should be complete in the initial M&V Plan.

Project Description/Executive Summary

- Company name
- Project name
- Submission date
- Company address and contact information
- Project goals
- Energy Efficiency Application – how it reduces demand during the times relevant to the expected coincident peak demand
- Applicable Energy Efficiency or performance standards (i.e., 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)
- Anticipated energy, demand and cost savings for each EE application, and total anticipated savings (all EE applications comprising the project)
- Anticipated costs for Measurement and Verification

- Location of EE Resource (physical location(s), Demand Balancing Authority area, and Planning Resource Zone)
- Anticipated expected Coincident Peak Demand reduction (MW) of EE Resource for each Season in the Planning Year in which the EE Resource expects to qualify.

Schedule

Timeline for EE installation and Measurement and Verification activities.

Measurement Level Components

The measurement level components define the M&V processes selected and provide detailed rationale for the selection. The following measurement level components must be included in the Initial M&V Plan. The information submitted in these components should be refined, when appropriate, with each Updated M&V plan submittal.

Measurement Description

- Specific details about each EE project
- Demand, Energy, & Cost Savings claimed
- Rationale for selected form of measurement

Equipment Specifications and Documentation

- History of equipment to be replaced or modified
- Equipment standards

M&V Approach

- M&V Option
- General description of approach

- Monitoring parameters and variables
- Monitoring interval and period
- Measurement equipment specifications
- Measurement data collection and management
- Data validation, editing and estimating plan
- Accuracy of monitoring and verification methods
- Savings uncertainty and confidence level
- Factors most uncertain or difficult to quantify

Assumptions

Baseline and post-installation assumptions that affect demand and energy consumption (building occupancy schedules, equipment efficiencies, equipment operating strategies, load shapes, weather data, etc.)

M&V Activities: Baseline Period

- Who will do M&V Activities
- List of activities before and after installation
- List of variables affecting demand and energy consumption and how they will be quantified
- Critical baseline condition factors

M&V Activities: Post-Installation Period

- List of variables affecting energy consumption, variance from baseline case, and how they will be quantified
- Evidence that proper equipment/systems were installed, are operating correctly,

and have the potential to generate the predicted savings (verification methods include surveys, inspections, spot measurements, and short-term metering.).

- New equipment surveys
- Critical post-installation condition factors
- Activities to ensure equipment operating as intended

Calculations & Adjustments

- Equations, calculations and analysis procedures for baseline and post-installation demand and energy consumption
- How performance models will be developed
- Description of population(s)
- Sample size calculations
- Method of sampling
- How demand and energy savings will be calculated
- How adjustments will be made

Metering Plan

- Who will provide and maintain metering equipment
- Specifications of metering equipment, accuracy, calibration procedures
- How data will be collected, maintained and reported
- Accuracy and quality assurance procedures

Updated M&V Plan Components

An updated M&V Plan must include any updates to the project level & measurement level components that were included in the initial M&V plan or prior updated M&V plan.

The updated M&V plan must include:

- Cover page with list of changes/updates contained in the updated M&V plan
- Details of any changes between the prior M&V plan, including any changes to the project status, and any changes to the demand and energy savings
- Updated/refined expected Coincident Peak Demand reduction calculations, including any baseline adjustments performed.

Initial Post-Installation M&V Report Components

Post-installation M&V activities are conducted to ensure that proper equipment/systems were installed, are operating correctly, and have the potential to generate the expected Coincident Peak Demand reduction of the EE Resource. Verification methods include surveys, inspections, spot measurements, and short-term metering.

An initial post-installation M&V report must include any updates to the project level & measurement level components that were included in the prior updated M&V plan.

The initial post-installation report should include:

- Cover page with list of changes/updates contained in the initial post-installation M&V report
- Details of any changes between the prior updated M&V plan and as-built conditions, and any changes to the estimated demand and energy savings
- Detailed list of installed equipment
- Documentation of all post-installation verification activities (verifying that the equipment/systems were installed and are operating)
- Documentation of performance measurements conducted to validate the expected

Coincident Peak Demand reduction of the EE Resource (if applicable in accordance with the approved M&V plan)

- Detail any changes to the expected Coincident Peak Demand reduction of the EE Resource

Updated Post-Installation M&V Report Components

An updated post-installation M&V report should include any updates to the initial post-installation report or a prior updated post-installation report.

The updated post-installation report should include:

- Cover page with list of changes/updates contained in the updated post-installation M&V report
- Documentation of all post-installation verification activities (verifying that the equipment/systems are still installed and operating)
- Documentation of performance measurements conducted to validate the expected Coincident Peak Demand reduction of the EE Resource (as applicable in accordance with the approved M&V plan)
- Detail any changes to the expected Coincident Peak Demand reduction of the EE Resource.