
TO: Therese Harris, Public Utility Commission of Texas (PUCT), and Texas Electric Utilities
FROM: Lark Lee, Evaluation, Measurement, and Verification Project Manager; and Tina Yoder, TRM Lead
SUBJECT: Program Year 2024 Texas Technical Reference Manual (TRM) Version 11.0
DATE: October 30, 2023

Maintenance of the statewide Texas Technical Reference Manual (TRM) is one of the primary objectives of the Public Utility Commission of Texas' evaluation, measurement, and verification (EM&V) of the investor-owned utilities' energy efficiency programs. This memo summarizes the updates made for the program year (PY) 2024 (PY2024) Texas Technical Reference Manual Version 11.0 (PY2024 TRM 11.0), including the stakeholder input process through the Energy Efficiency Implementation Project (EEIP).

TRM Overview

The first TRM was created in 2013 for use in PY2014. Annual updates have taken place since that time; PY2024 TRM is the eleventh update. Commission staff, the EM&V team, the utilities, and the utilities' contractor work collaboratively to prioritize and implement updates (referred to as "the TRM Working Group"). In addition, public input for new measures or updates is solicited through the EEIP in the spring of each year. Following the TRM Working Group's updates, public input is again sought in the fall of each year. The redlined, updated TRM is filed in the EEIP Project No. 38578 and reviewed as part of the fall EEIP meeting. A two-week comment period then follows the fall EEIP meeting to allow additional review comments before the TRM is finalized and Commission staff approve the TRM for use in the next program year.

The TRM is divided into five separate documents for ease of use:

- **Volume 1: TRM Overview and User Guide** covers the process for TRM updates and version roll-outs, weather zones, TRM structure, and the format of the TRM measure overviews.
- **Volume 2: Residential Measures** contains the measure descriptions and deemed savings estimates for measures installed in residential dwellings.
- **Volume 3: Nonresidential Measures** contains the measure descriptions and deemed savings estimates for measures installed in nonresidential facilities.
- **Volume 4: M&V Protocols** has standardized measurement and verification (M&V) protocols for technologies and new program types.
- **Volume 5: Implementation Guidance** contains EM&V recommendations regarding program implementation that may affect claimed savings. Volume 5 also includes the single and multifamily Low-Income (LI)-Eligible Verification Forms.

PY2024 TRM 11.0 Call for Updates

Commission staff issued a call for PY2024 TRM updates to the EEIP listserv on March 31, 2023, following the spring EEIP meeting held on March 28. Suggestions were to be submitted by May 1. Table 1 includes the details of the TRM suggestions incorporated into PY2024 TRM v11.0. Any suggestions not incorporated into PY2024 TRM v11.0 are documented in the TRM Tracker Repository for consideration in future TRM updates. The South-Central Partnership for Energy Efficiency as a Resource (SPEER) requested the TRM Working Group assess additional savings for variable speed heat pumps. While insufficient data were available for the PY2024 TRM 11.0 update, Commission staff and the EM&V team are forming a Heat Pump Working Group to have more robust data to inform a possible PY2025 TRM update for variable speed heat pumps.

Table 1. Stakeholders' Suggestions Incorporated in PY2024 TRM v11.0

TRM volume	Measure	Description	Originator
2	2.2.4 AC/HPs	In the first paragraph of the baseline condition section, clarify the sentence beginning, "These baselines are also applicable..." to show that the new construction baseline is not applicable to heat pumps (HP) replacing air conditioners (AC) with central gas heat. Of the examples listed, it should only be applicable to the evaporative and room AC scenarios. For early replacement (ER) of AC with gas heat replacing with HP, note that ER cooling baselines should be used in combination with the new construction (NC) heating baseline.	EnerChoice
2	2.2.4 AC/HPs	Provide clarity on the Manual J documentation requirement for upsizing one-half tons or provide an alternative way to enforce upsizing requirements.	Oncor
2	2.2.4 AC/HPs	Clarify that upsizing is only allowed for variable speed and not for multi-stage. The current language referring to "multi-stage systems operating at variable speeds" is causing confusion.	TNMP
2	2.2.4 AC/HPs	Address rightsizing scenario for NC. Define documentation requirements.	ICF
2	2.2.4 AC/HPs	Due to there occasionally being a substantial difference between SEER and SEER2 rated capacities, reassess guidance about when to use rated versus nominal capacity.	Oncor
2	2.3.1 Air infiltration	Develop a prescriptive list of improvements that are required above the building tightness limit with deemed savings.	Oncor
2	2.3.2 Ceiling insulation	Request to remove LI/hard-to-reach eligibility requirement to use reduced cooling/heating savings for residences with space cooling/heating.	TNMP

TRM volume	Measure	Description	Originator
2	2.3.6 Duct insulation	New measure proposal. Savings vary based on cooling/heating type, baseline R-value, and home square footage. Measure life is 20 years. TNMP would like to include metal, flex, and fiberboard duct types in Texas.	TNMP
3	2.1.2 Lighting controls	Clarify eligibility requirements for <i>lighting controls</i> in NC applications.	Oncor
3	2.2.7 HVAC variable frequency drives (VFD)	Add deemed savings for cooling tower fans. Alternatively, provide guidance about a semi-deemed/simplified custom path for <i>cooling tower fans</i> .	Oncor
3	2.2.7 HVAC VFDs	Add deemed savings for <i>condenser water pumps</i> .	Oncor
3	2.4.4 ENERGY STAR® electric griddles	TRC has proposed several new food service measures, including <i>sandwich preparation tables, conveyor toasters, pizza deck ovens, dipper wells, coffee makers, griddles, and flight-type dishwashers</i> . Update: <i>Griddles</i> is the only measure that received enough votes to proceed.	TRC
3	2.5.10 High-speed doors for cold storage facilities	New measure proposal. Create a stipulated savings approach for <i>air infiltration in refrigerated warehouse</i> .	CenterPoint and CLEARResult
3	2.6.1 Heat pump water heaters	New measure proposal. The methodology would be similar to the existing residential measure. Incorporate updated federal standards for commercial domestic hot water.	AEP SWEPCO
3	2.7.9 Industrial high-frequency battery chargers	New measure proposal. The measure applies to industrial electric vehicle fleets for material handling or forklifts.	AEP SWEPCO
3	2.7.14 Projector laser retrofit	New measure proposal. Cinemark Theaters provided a whitepaper estimating savings for replacing a Xenon projector lamp with a Barco Laser, lowering exhaust fan power, projector consumption, and HVAC interactive effects.	AEP TEXAS and SWEPCO
3	Multiple measures	Align building type names across all measures where possible. For example, <i>stand-alone retail: supermarket</i> versus <i>mercantile/food sales: 24-hr stand-alone retail, supermarket, or convenience store</i> .	Oncor

TRM volume	Measure	Description	Originator
4	2.5.6 ENERGY STAR uninterruptible power supply (UPS)	New measure proposal for installing an ENERGY STAR UPS in a telecommunications or similar application.	CenterPoint

PY2024 TRM 11.0 Updates Summary

Commission staff filed and sent a notice to the EEIP listserv that the redlined PY2024 TRM 11.0 was available for review on September 25, 2023, with the comment period closing on October 10, 2023. The TRM revisions were discussed at the fall EEIP meeting held on September 26, 2023, including a reminder to submit comments on the redlined TRM by October 10, 2023. A summary of EEIP comments can be found at the end of this section.

Several deemed savings updates and additions were made in Volumes 2, 3, 4, and 5 and are summarized in Tables 2-6, 7-12, 13, and 14, respectively. Updates made in response to EEIP review comments are shown in the tables below in blue.

Table 2. Residential PY2024 TRM 11.0 Volume 2 Updates by Measure—Lighting

Measure category	Measure description	Point estimates	Deemed savings tables	Savings algorithm	Calculator	M&V	11.0 update
Lighting	ENERGY STAR general service LED lamps	–	–	X	–	–	Added in-service rates (ISR) by program type and clarification of lamp types .
	ENERGY STAR specialty and directional LED lamps	–	–	X	–	–	Added ISRs by program type.
	LED nightlights	–	–	X	–	–	Added ISRs by program type.

Table 3. Residential PY2024 TRM 11.0 Volume 2 Updates by Measure—HVAC

Measure category	Measure description	Point estimates	Deemed savings tables	Savings algorithm	Calculator	M&V	11.0 update
HVAC	Air conditioner or heat pump tune-up	–	–	X	–	–	Updated demand savings. Clarified eligibility for packaged terminal air conditioners (PTAC) and packaged terminal heat pumps (PTHP).
	Central heat pumps without SEER2 ratings	–	X	–	–	–	Measure and Appendix A retired.
	Mini-split heat pumps without SEER2 ratings	–	X	–	–	–	Measure and Appendix B retired.
	Central mini-split air conditioners and heat pumps with SEER2 ratings	–	–	X	–	–	Defined rightsizing and documentation requirements. Updated ER age eligibility.
	Room air conditioners	–	–	X	–	–	Incorporated updated Department of Energy (DOE) final rule and ENERGY STAR specification v5.0. Updated ER age eligibility.
	Packed terminal heat pumps	–	–	X	–	–	Updated ER age eligibility.
	Ground source heat pumps (GSHP)	–	X	X	–	–	Integrated federal standard change and SEER2 test procedure.
	Large capacity split system and single-package air conditioners and heat pumps	–	–	X	–	–	Updated GSHP estimated useful life (EUL)
	Evaporative cooling	–	X	–	–	–	No revision.
	ENERGY STAR connected thermostats	–	X	–	–	–	Incorporated algorithm approach. Incorporated new SEER2 test procedure.
	Smart thermostat load management	–	X	–	–	–	No revision.
Duct sealing	–	–	–	X	–	X	No revision.

Table 4. Residential PY2024 TRM 11.0 Volume 2 Updates by Measure—Building Envelope

Measure category	Measure description	Point estimates	Deemed savings tables	Savings algorithm	Calculator	M&V	11.0 update
Building envelope	Air infiltration	–	X	–	–	X	Added electric resistance documentation adjustment factor.
	Ceiling insulation	–	X	–	–	–	Added electric resistance documentation adjustment factor.
	Attic encapsulation	–	X	–	–	–	Added electric resistance documentation adjustment factor.
	Wall insulation	–	X	–	–	–	Added electric resistance documentation adjustment factor.
	Floor insulation	–	X	–	–	–	Added electric resistance documentation adjustment factor.
	Duct insulation	–	X	–	–	–	TRM v11.0 origin.
	Radiant barriers	–	X	–	–	–	Clarified savings normalization by area. Added electric resistance documentation adjustment factor.
	Cool roofs	–	X	–	–	–	Added electric resistance documentation adjustment factor.
	Solar screens	–	X	–	–	–	Added electric resistance documentation adjustment factor.
	ENERGY STAR windows	–	X	–	–	–	Updated ENERGY STAR specification. Added electric resistance documentation adjustment factor.
	ENERGY STAR low-e storm windows	–	X	–	–	–	Added electric resistance documentation adjustment factor.

Table 5. Residential PY2024 TRM 11.0 Volume 2 Updates by Measure—Domestic Hot Water

Measure category	Measure description	Point estimates	Deemed savings tables	Savings algorithm	Calculator	M&V	11.0 update
Domestic water heating	Water heater installation—electric tankless and fuel substitution	–	–	X	–	–	Removed requirement to install HPWH for DHW > 55 gallons. Incorporated updated ENERGY STAR specification v5.0. Updated documentation requirements.
	Heat pump water heaters	–	X	–	–	–	Incorporated updated ENERGY STAR specification v5.0. Updated documentation requirements.
	Solar water heaters	–	X	–	–	–	Incorporated updated ENERGY STAR specification v5.0. Updated documentation requirements.
	Water heater tank insulation	–	X	–	–	–	Clarified baseline and added deemed savings. Updated documentation requirements.
	Water heater pipe insulation	–	–	X	–	–	No revision.
	Faucet aerators	–	–	X	–	–	No revision.
	Low-flow showerheads	–	–	X	–	–	No revision.
	Showerhead temperature-sensitive restrictor valves	–	–	X	–	–	No revision.
	Tub spout and showerhead temperature-sensitive restrictor valves	–	–	X	–	–	No revision.
	Water heater temperature setback	–	–	X	–	–	No revision.

Table 6. Residential PY2024 TRM 11.0 Volume 2 Updates by Measure—Appliances

Measure category	Measure description	Point estimates	Deemed savings tables	Savings algorithm	Calculator	M&V	11.0 update
Appliances	ENERGY STAR ceiling fans	–	–	X	–	–	No revision.
	ENERGY STAR clothes washers	–	X	–	–	–	No revision.
	ENERGY STAR clothes dryers	–	X	–	–	–	No revision.
	ENERGY STAR dishwashers	–	X	–	–	–	No revision.
	ENERGY STAR refrigerators	–	–	X	–	X	Updated ER age eligibility.
	ENERGY STAR freezers	–	X	–	–	–	Updated ER age eligibility.
	Refrigerator/ freezer recycling	X	–	X	–	–	No revision.
	ENERGY STAR air purifiers	–	X	–	–	–	Updated baseline to Tier 1 federal standard.
	ENERGY STAR pool pumps	–	–	X	–	–	Updated baseline to current federal standard. Added new savings tiers. Updated documentation requirements.
	Advanced power strips	–	X	–	–	–	Added ISRs. After the EEIP meeting, proposed that three ISRs be reduced to one for all program types using this measure.
	ENERGY STAR electric vehicle supply equipment	–	X	–	–	–	Updated algorithm with days coefficient. Updated documentation requirements.
Induction cooking	–	X	–	–	–	Updated documentation requirements.	

Table 7. Nonresidential PY2024 TRM 11.0 Volume 3 Updates by Measure—Lighting

Measure category	Measure description	Point estimates	Deemed savings tables	Savings algorithm	Calculator	M&V	11.0 update
Lighting	Lamps and fixtures	–	–	X	X	X	Added guidance for delisted lighting products and for NC exterior lighting zone selection . Aligned building type names across all commercial measures.
	Lighting controls	–	–	X	X	X	Clarified new construction (NC) controls eligibility. Updated control types. Consolidated energy and adjustment factors into control adjustment factor (CAF) and added column for NC CAF. Added documentation requirements for networked lighting control (NLC) systems.
	Exterior photocell and time clock repair	–	–	X	X	X	No revision.
	LED traffic signals	–	–	X	X	X	No revision.

Table 8. Nonresidential PY2024 TRM 11.0 Volume 3 Updates by Measure—HVAC

Measure category	Measure description	Point estimates	Deemed savings tables	Savings algorithm	Calculator	M&V	11.0 update
HVAC	Air conditioning and heat pump tune-ups	–	–	X	–	X	Clarified eligibility criteria.
	Split and packaged air conditioners and heat pumps	–	–	X	X	X	Removed < 5.4 ton HP sell-through exception. Updated ER baselines for compliance with the updated federal standard. Updated NC/replace-on-burnout (ROB) 5.4+ ton baselines to incorporate the current federal standard. Clarified pre- and post-capacity limits. Aligned building type names across all commercial measures. Incremented remaining useful life (RUL) table for code compliance.
	HVAC chillers	–	–	X	X	X	Aligned building type names across all commercial measures. Incremented RUL table for code compliance.
	Package terminal air conditioners/heat pumps and room air conditioners	–	–	X	X	X	Corrected current federal standard effective date. Added separate RUL table for PTHP. Aligned building type names across all commercial measures. Incremented RUL table for code compliance.
	Computer room air conditioners	–	–	X	X	–	Added reference to new standard and plan to incorporate in PY2025.
	Computer room air handler motor efficiency	–	–	X	X	–	No revision.

Measure category	Measure description	Point estimates	Deemed savings tables	Savings algorithm	Calculator	M&V	11.0 update
	HVAC VFD	–	X	X	–	–	Added cooling tower fan and condenser water pump applications. Updated maximum temperatures for linear regression equations to correspond with the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) design conditions. Aligned building type names across all commercial measures.
	Condenser air evaporative pre-cooling	–	–	X	–	X	Aligned building type names across all commercial measures.
	High-volume low-speed fans	–	–	X	–	–	No revision.
	Small commercial evaporative cooling	–	X	X	–	–	Aligned building type names across all commercial measures.
	Small commercial smart thermostats	–	–	X	X	X	No revision.

Table 9. Nonresidential PY2024 TRM 11.0 Volume 3 Updates by Measure—Building Envelope

Measure category	Measure description	Point estimates	Deemed savings tables	Savings algorithm	Calculator	M&V	11.0 update
Building envelope	Cool roofs	X	–	X	X	–	No revision.
	Window treatments	X	–	X	X	–	Extended eligibility to windows with existing louvered or Venetian blinds. Added reduced baseline solar heat gain coefficient values for windows with louvered blinds.
	Entrance and exit door air infiltration	–	X	X	–	–	No revision.

Table 10. Nonresidential PY2024 TRM 11.0 Volume 3 Updates by Measure—Food Service

Measure category	Measure description	Point estimates	Deemed savings tables	Savings algorithm	Calculator	M&V	11.0 update
Foodservice	ENERGY STAR combination ovens	–	X	X	–	–	No revision.
	ENERGY STAR electric convection ovens	–	X	X	–	–	No revision.
	ENERGY STAR dishwashers	–	X	X	–	–	Clarified that residential dishwashing equipment can be installed in commercial applications following the methodology in Volume 2 of the TRM.
	ENERGY STAR electric griddles	–	X	X	–	–	TRM v11.0 origin.
	ENERGY STAR electric fryers	–	X	X	–	–	Updated documentation requirements to collect fryer type rather than fryer width.
	ENERGY STAR electric steam cookers	–	X	X	–	–	No revision.
	ENERGY STAR hot food holding cabinets	–	X	X	–	–	No revision.
	ENERGY STAR ice makers	–	X	X	–	–	No revision.
	Demand controlled kitchen ventilation	–	X	X	–	–	Aligned building type names across all commercial measures.
	Pre-rinse spray valves	–	X	X	–	–	Adjusted mixed water hot temperature to match Consortium for Energy Efficiency guidance. Aligned building type names across all commercial measures.
	Vacuum-sealing and packaging machines	–	X	–	–	–	No revision.

Table 11. Nonresidential PY2024 TRM 11.0 Volume 3 Updates by Measure—Refrigeration

Measure category	Measure description	Point estimates	Deemed savings tables	Savings algorithm	Calculator	M&V	11.0 update
Refrigeration	Door heater controls	–	X	X	–	–	No revision.
	ECM evaporator fan motors	–	–	X	–	–	Clarified duty cycle assumptions and references.
	Electronic defrost controls	–	–	X	–	–	No revision.
	Evaporator fan controls	–	–	X	–	–	No revision.
	Night covers for open refrigerated display cases	–	X	X	–	–	No revision.
	Solid and glass door reach-ins	–	–	X	–	–	Updated ENERGY STAR efficiency requirements. Clarified that residential refrigerator and freezer equipment can be installed in commercial applications following the methodology in Volume 2 of the TRM. Updated documentation requirements.
	Strip curtains for walk-in refrigerated storage	–	X	–	–	–	No revision.
	Zero-energy doors for refrigerated cases	–	X	X	–	–	No revision.
	Door gaskets for walk-in and reach-in coolers and freezers	–	X	X	–	–	No revision.
	High-speed doors for cold storage	–	X	X	–	–	No revision.

Table 12. Nonresidential PY2024 TRM 11.0 Volume 3 Updates by Measure—Water Heating and Miscellaneous

Measure category	Measure description	Point estimates	Deemed savings tables	Savings algorithm	Calculator	M&V	11.0 update
Water heating	Heat pump water heaters	–	–	X	–	–	TRM v11.0 origin.
	Central domestic hot water controls	–	X	X	–	–	No revision.
	Showerhead temperature-sensitive restrictor valves	–	–	X	–	–	No revision.
	Tub spout and showerhead temperature-sensitive restrictor valves	–	–	X	–	–	No revision.
Miscellaneous	VFDs for water pumping	–	X	X	–	–	No revision.
	Premium efficiency motors	–	–	X	–	–	Aligned building type names across all commercial measures. Incremented RUL table for code compliance.
	Pump-off controllers	–	X	X	–	–	No revision.
	ENERGY STAR pool pumps	–	X	X	–	–	No revision.
	Lodging guest room occupancy sensor controls	–	X	–	–	–	No revision.
	Vending machine controls	–	X	X	–	–	No revision.
	Computer power management	–	X	X	–	–	No revision.
	ENERGY STAR electric vehicle supply equipment	–	X	X	–	–	No revision.
	Industrial high-frequency battery chargers	–	X	X	–	–	TRM v11.0 origin.
Steam trap repair and replacement	–	X	X	–	–	Aligned building type names across all commercial measures.	

Measure category	Measure description	Point estimates	Deemed savings tables	Savings algorithm	Calculator	M&V	11.0 update
	Hydraulic gear lubricants	–	–	X	–	–	No revision.
	Hydraulic oils	–	–	X	–	–	No revision.
	Hand dryers	–	X	X	–	–	No revision.
	Laser projectors	–	–	X	–	–	TRM v11.0 origin.

Table 13. M&V Protocols PY2024 TRM 11.0 Volume 4 Updates by Measure

Sector	Measure category	Measure description	11.0 update
Residential and nonresidential	HVAC	Air conditioning tune-ups	Added age requirement to eligibility. Removed pressure correlation equation and replaced with deemed pressure by climate zone. Added language describing efficiency loss factor determination in more detail and implementer/evaluator responsibilities. Added an additional airflow rate determination method. Added additional tracking system and documentation requirements. Added reference to ASHRAE Fundamentals Chapter 1.
Nonresidential	HVAC	GSHPs	Updated program tracking and documentation.
Nonresidential	HVAC	Variable refrigerant flow systems	Updated baseline conditions to match the federal regulations.
Residential	Whole house	Residential NC	Added clarification on baseline study usage and clarified that RESNET accreditation is not required, and utilities can request EM&V review and approval of new software.
Residential	Whole house	Smart home energy management system (SHEMS)	No revision.
Residential	Building energy codes	Residential energy code compliance enhancement	Adjusted calculation process to estimate building population.
Residential and nonresidential	Renewables	Residential and nonresidential solar photovoltaics	Eliminated alternate savings method and adjusted premium module type requirements to match PVWatts®. Clarified assumptions to use in PVWatts analysis.
Residential and nonresidential	Renewables	Solar shingles	No revision.
Residential	Renewables	Solar attic fans	No revision.
Nonresidential	Miscellaneous	Behavioral	No revision.

Sector	Measure category	Measure description	11.0 update
Nonresidential	Miscellaneous	Air compressors < 75 hp	No revision.
Nonresidential	Miscellaneous	Nonresidential custom	TRM v11.0 origin.
Nonresidential	Miscellaneous	Nonresidential measurement and verification	Minor clarifications.
Nonresidential	Miscellaneous	Energy storage	Revised measure to be for energy storage, not just thermal energy storage.
Nonresidential	Miscellaneous	Uninterruptible power supply	TRM v11.0 origin.
Residential	Load management	Residential load curtailment	No revision.
Nonresidential	Load management	Nonresidential load curtailment	Updated utility program details (added three winter load management programs). Added guidance on selecting baseline days when there is a tie between the days used to calculate the baseline.

Table 14. Implementation Guidance PY2024 TRM 11.0 Volume 5 Updates by Sector

Sector	Guidance category	11.0 update
Commercial	Project documentation	The guidance in Recommendation #4 was adjusted to reflect updates included in Volume 4, Measure 2.5.4 Nonresidential Measurement and Verification.
Commercial	Incentives and claimed savings	No revisions.
Commercial	NC	No revisions.
Commercial	Design Light Consortium™ (DLC) technical requirements version	This guidance category was removed due to updates provided in Volume 3, Measure 2.1.1 Lamps and Fixtures that provide this guidance.
LI	Income-eligible verification forms	LI income verification forms will be updated in January 2024 once the federal poverty income levels are released for 2/1/2024–1/31/2025.
LI	Audit lists for LI	No revisions.
Cross-sector	Load management programs	No revisions.
Cross-sector	Measurement and verification claimed savings	This guidance category was removed due to updates provided in Volume 4, Measure 2.5.4 Nonresidential Measurement and Verification that provide this guidance.

Sector	Guidance category	11.0 update
Cross-sector	Upstream/midstream program cross-sector savings	This guidance category was removed due to updates provided in multiple measures in Volumes 2 and 3 that provide midstream and upstream guidance.
Cross-sector	Commercial and residential HVAC split systems without AHRI certification	No revisions.
Cross-sector	Data model	No revisions.
LI	Appendix A	LI verification forms will be updated in January 2024 once the federal poverty income levels are released for 2/1/2024–1/31/2025.

EEIP Review Comments

The table below summarizes EEIP review comments on the PY2024 TRM and EM&V responses. Relevant revisions can be found in [blue](#) in the tables above.

Table 15. EEIP PY2024 Review Comments Summary and Responses

Reviewer	Comment summary	EM&V response
Armada Power	The reviewer manufactures a device "that can be retrofitted onto any electric resistance water heater to manage the charging." The reviewer is requesting that the Commission "fully include residential demand response (DR) control devices in the TRM."	The residential load management M&V methodology in Volume 4 is inclusive of all demand reduction technologies. It refers to "load-control device" and does not specify the technology. The M&V methodology can be followed to quantify demand reductions from any residential demand response technology. No TRM change is needed.
Building Science Institute	The reviewer is concerned that utility implementers cannot bring other software tools to the EM&V team for review unless the software is RESNET accredited.	Language was added to clarify that RESNET accreditation is not required, and utilities are allowed to request EM&V review and approval of new software additions.

Reviewer	Comment summary	EM&V response
CLEAResult	<p>The reviewer shared a variety of comments/questions, including: Which LED lamps qualified as <i>specialty</i> versus <i>general service lamps (GSL)</i> for Volume 2.</p>	<p>The <i>GSL</i> measure says that it applies to all lamp types not included in the <i>specialty LED</i> measure. The <i>specialty LED</i> measure defines four lamp configurations that are still considered specialty. We think it is cleaner to define the few specialty exceptions rather than provide a comprehensive list of affected lamp types. However, we have added a statement in the <i>GSL</i> measure that says, "All lamp types not defined in the <i>specialty LED lamps</i> measure should be treated as <i>GSLs</i>."</p>
	<p>Clarification of the eligibility criteria for <i>AC/HP tune-ups</i> when using the prescriptive savings methodology included in Volumes 2, 3, and 4.</p>	<p>Equipment must not have been serviced through a utility program within the previous five years. A utility should be able to provide this information for implementers.</p> <p>Prescriptive versions of this measure are limited to equipment manufactured before 1/1/2023. Savings rely on default EER and HSPF values. Updating the measure to align with the new SEER2 test procedure was not included in the TRM v11 scope and is unlikely to impact installations in 2024. Therefore, this update was delayed until a future TRM update, likely v12. We are not saying that equipment manufactured after this date is inherently ineligible, only that the current deemed savings are not applicable. This language was not added to the M&V version of the measure, which is the measure primarily used by CLEAResult.</p>
	<p>Clarification as to when the ER baseline for the ENERGY STAR <i>HPWH</i> measure in Volume 2 will be updated.</p>	<p>At this point, the DOE has only issued a notice of proposed rulemaking. We plan to add an ER baseline as soon as the federal standard is updated and effective. At that point, we will refer to the existing 2015 standard for ER projects and the new standard for ROB and NC.</p>

Reviewer	Comment summary	EM&V response
	Clarification on when "Default to Zone 2" for the <i>exterior space type</i> should be used for <i>lamps and fixtures</i> included in Volume 3.	The TRM instructs to default to Zone 2 if the space type is unclear. The TRM further states that Zones 1, 2, or 4 should be selected in most cases. Zone 3 can only be used if it can be clearly determined that the space type does not fit into Zones 1, 2, or 4. For clarification, we have updated the language to say, "Default to Zone 2 if the space type cannot be determined...Zone 3 should only be selected if it can be clearly demonstrated that none of the others apply."
	Requesting examples of city zoning drawings and justification write-ups, calculations for <i>exterior space type</i> square footage for <i>lamps and fixtures</i> included in Volume 3.	We do not think examples are appropriate for the TRM. However, these can be requested from Tetra Tech directly so they can be tailored to the specific program design. No changes were made to TRM.
	Requesting examples of documentation required for <i>networked lighting controls</i> in Volume 3.	See previous response.
	Verification of the deemed savings tables values included in the <i>HVAC VFD</i> measures in Volume 3.	We identified that the current peak savings are calculated using a set of top 20 hours that do not filter out weekends. We produced updated sets of top 20 hours for each climate zone to rectify this issue. However, because this change was not identified in the original scope and would affect all applications, it is being held for a future update, likely v12. While the current savings are affected, the effect is minimal because overall demand savings are primarily driven by weekday hours.

Reviewer	Comment summary	EM&V response
Environmental Protection Agency (EPA)	The reviewer shared that the Texas TRM formula for calculation savings using a heat pump water heater as the replacement for electric storage water heaters with tank storage ≥ 55 gallons does not align with national market conditions and undervalues energy savings. The reviewer also shared that the Texas TRM air space requirement for 1,000 cubic feet for HPWHs is higher than the industry standard that changed in 2022.	The language assuming an HPWH baseline for water heaters > 55 gallons was removed. The current federal standard remains the baseline. However, the EM&V team will research a potential market baseline for addition to TRM Volume 5 Implementation Guidance if applicable. The language regarding air space requirements was updated to the industry standard updated in 2022 per the email.
Oncor Electric Delivery	The reviewer is successfully removing electric-resistant heat from multifamily units and is requesting that the proposed eligibility criteria for multifamily installations to exceed code by a higher factor be removed from the TRM.	An ER path for new HVAC equipment meeting the current federal standard was added with verification documentation of the removal of functioning inefficient equipment.
EFI/Tricklestar	The reviewer inquired why multiple ISRs for <i>advanced power strips</i> included in Volume 2 are proposed. The reviewer is requesting that the TRM use one ISR for all program types.	The ISR table was updated to one ISR for all program types using results from Tetra Tech research as part of the 2020 process evaluation for MidAmerican Energy Company.