
TO: Public Utility Commission of Texas and Texas Electric Utilities

FROM: Lark Lee and Tina Yoder, Tetra Tech

SUBJECT: Docket 56768, Texas Technical Reference Manual Version 12.0 Program Year 2025

DATE: November 4, 2024

Maintenance of the statewide Texas Technical Reference Manual (TRM) is one of the primary objectives of the Public Utility Commission of Texas' (PUCT or Commission) evaluation, measurement, and verification (EM&V) for the electric utilities' (utilities) energy efficiency programs. This memo summarizes the Texas Technical Reference Manual Version 12.0 updates to Volumes 1, 2, 3 and 5 for the program year 2025 (PY2025) (PY2025 TRM 12.0). PY2025 TRM 12.0 updates to Volume 4 will be shared at a later date.

There were no comments for these four TRM 12.0 volumes received by Tetra Tech related to the TRM redlines from the stakeholder input process through the Energy Efficiency Implementation Project (EEIP) on or before the end of the stakeholder comment period, October 29, 2024.

TRM Overview

Commission staff, the EM&V team, the utilities, and the utilities' contractors work collaboratively to prioritize and implement updates (referred to collectively as "the TRM Working Group"). Public input for new measures or updates is solicited in the Spring of each program year. Following the TRM Working Group's updates, public input is once again solicited in the Fall after review at the Fall EEIP.

The TRM has five volumes:

Volume 1: TRM Overview and User Guide covers the process for TRM updates, 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.

PY2025 TRM 12.0 Call for Updates

Commission staff issued a call for PY2025 TRM updates on March 12, 2024, following the spring EEIP on February 28. Suggestions were submitted by May 1. Table 1 includes the details of the TRM suggestions incorporated into PY2025 TRM v12.0. Any suggestions not incorporated into PY2025 TRM v12.0 are documented in the TRM tracker repository.¹ In 2023, the South-Central

¹ The TRM Tracker is a TRM Working Group tool used to document the future changes requested to the TRM. Refer to the "Program Year 2025 Texas Technical Reference Manual (TRM) Version 12.0" memo filed on July 1, 2024, in Docket No. 56768.

Partnership for Energy Efficiency as a Resource requested the TRM Working Group assess additional savings for variable speed heat pumps. Due to insufficient data for the PY2024 TRM 11.0 update, Commission staff and the EM&V team formed a Heat Pump Working Group to gather more robust data to inform a possible PY2025 TRM update. On April 9, 2024, the Heat Pump Working Group (HPWG) Kick-off meeting was held. The HPWG participants included manufacturers, heating, ventilation, and air conditioning (HVAC) installers and contractors, energy efficiency organizations, utilities, PUCT, EUMMOT, and EM&V contractors. With the support of the HPWG, the TRM working group developed a variable speed heat pump algorithm, which was incorporated in Volume 4 of PY2025 TRM 12.0 and will be shared at a later date.

Table 1. Stakeholders' Suggestions Incorporated in PY2025 TRM v12.0 Volumes 1,2,3 and 5

TRM volume	Measure	Description	Originator
2	2.5.3 ENERGY STAR® clothes dryer	Added a higher savings tier for heat pump dryers.	TNMP
2	2.5.9 ENERGY STAR® dehumidifiers	Added new measure.	Oncor
2	2.5.10 ENERGY STAR® ventilation fans	Added new measure.	Oncor
2	2.5.10 ENERGY STAR® water coolers	Added new measure.	Oncor
2	2.5.14 ENERGY STAR® electric vehicle supply equipment	Adjusted savings methodology to use a weighted Level 1 and Level 2 baseline.	AEP Texas
3	2.1.1 Lamps and fixtures	Clarified exterior new construction code zone selection guidance, adjusted new construction savings algorithm, updated <i>multiple</i> control type, adjusted non-operational fixture footnote, in-service rate incorporated into retrofit savings algorithm, clarified building type section guidance, and updated midstream building type weighting assumptions.	CenterPoint & Oncor
3	2.2.2 Split & packaged AC/HPs	Updated midstream building type weighting assumptions, defined grade levels for primary and secondary schools, updated early retirement age eligibility and criteria related to downsizing, and noted the new federal standard and compliance date.	TNMP
3	2.2.9 High-volume low-speed fans	Expanded measure to apply to non-agricultural end uses. Incorporated new efficiency metric for large-diameter fans.	El Paso Electric
3	2.3.2 Window treatments	Updated the measure to indicate solar screens must be permanent, fixed, and interior or exterior.	El Paso Electric
3	2.4.3 ENERGY STAR® electric deck ovens	Added measure.	AEP Texas

TRM volume	Measure	Description	Originator
3	2.4.8 Contact conveyor toasters	Added measure.	AEP Texas
3	2.4.9 Radiant conveyor toasters	Added measure.	AEP Texas
3	2.4.11 ENERGY STAR® refrigerated chef bases	Added measure.	AEP Texas
3	2.4.13 ENERGY STAR® induction cooktops	Added measure.	AEP SWEPCO
3	2.4.14 ENERGY STAR® induction soup wells	Added measure.	AEP Texas
3	2.4.18 Hand wrap machines	Added measure.	AEP Texas
3	2.7.15 Water pumps	Added measure.	Oncor

PY2025 TRM 12.0 Updates Summary

PY2025 TRM 12.0 updates and additions made in Volumes 2, 3, and 5 are summarized in Tables 2-6, 7-12, and 13, respectively.

Table 2. Residential PY2025 TRM 12.0 Volume 2 Updates by Measure—Lighting

Measure category	Measure description	Point estimates	Deemed savings tables	Savings algorithm	Calculator	M&V	12.0 update
Lighting	ENERGY STAR® general service LED lamps	–	–	X	–	–	Clarified federal standard. Updated new construction code high-efficacy lamp requirement.
	ENERGY STAR® specialty and directional LED lamps	–	–	X	–	–	Clarified federal standard. Updated new construction code high-efficacy lamp requirement.
	LED nightlights	–	–	X	–	–	Updated baseline wattage assumption and documentation requirements.

Table 3. Residential PY2025 TRM 12.0 Volume 2 Updates by Measure—HVAC

Measure category	Measure description	Point estimates	Deemed savings tables	Savings algorithm	Calculator	M&V	12.0 update
HVAC	Air conditioner or heat pump tune-up	–	–	X	–	–	Updated tune-up checklist to match ENERGY STAR® HVAC Maintenance Checklist.
	Central mini-split air conditioners and heat pumps	–	–	X	–	–	Clarified documentation requirements. Updated EUL and corresponding RUL table.
	Room air conditioners	–	–	X	–	–	No revision.
	Packed terminal heat pumps	–	–	X	–	–	No revision.
	Ground source heat pumps	–	X	X	–	–	Updated algorithms to match coefficient definitions.
	Large-capacity split-system and single-package air conditioners and heat pumps	–	–	X	–	–	Updated baseline efficiency table.
	Evaporative cooling	–	X	–	–	–	No revision.
	ENERGY STAR® connected thermostats	–	X	–	–	–	Updated heating type weighting. Added electric resistance baseline and documentation requirement.
	Smart thermostat load management	–	X	–	–	–	Added guidance for selecting savings methodology for utilities close to fully deploying automated metering infrastructure (AMI). Added guidance on tracking and reporting load management programs separately from energy efficiency programs.
	Duct sealing	–	–	X	–	X	No revision.

Table 4. Residential PY2025 TRM 12.0 Volume 2 Updates by Measure—Building Envelope

Measure category	Measure description	Point estimates	Deemed savings tables	Savings algorithm	Calculator	M&V	12.0 update
Building envelope	Air infiltration	–	X	–	–	X	Clarified application of electric resistance documentation adjustment factor.

Measure category	Measure description	Point estimates	Deemed savings tables	Savings algorithm	Calculator	M&V	12.0 update
	Ceiling insulation	–	X	–	–	–	Clarified application of electric resistance documentation adjustment factor.
	Attic encapsulation	–	X	–	–	–	Clarified application of electric resistance documentation adjustment factor. Updated rounding for infiltration component energy savings.
	Wall insulation	–	X	–	–	–	Clarified application of electric resistance documentation adjustment factor.
	Floor insulation	–	X	–	–	–	Clarified application of electric resistance documentation adjustment factor.
	Duct insulation	–	X	–	–	–	Clarified application of electric resistance documentation adjustment factor.
	Radiant barriers	–	X	–	–	–	Clarified application of electric resistance documentation adjustment factor.
	Cool roofs	–	X	–	–	–	No revision.
	Solar screens	–	X	–	–	–	No revision.
	ENERGY STAR® windows	–	X	–	–	–	Clarified application of electric resistance documentation adjustment factor.
	ENERGY STAR® low-e storm windows	–	X	–	–	–	Clarified application of electric resistance documentation adjustment factor.

Table 5. Residential PY2025 TRM 12.0 Volume 2 Updates by Measure—Domestic Hot Water

Measure category	Measure description	Point estimates	Deemed savings tables	Savings algorithm	Calculator	M&V	12.0 update
Domestic water heating	Water heater installation—electric tankless and fuel substitution	–	–	X	–	–	No revision.

Measure category	Measure description	Point estimates	Deemed savings tables	Savings algorithm	Calculator	M&V	12.0 update
	Heat pump water heaters	–	X	–	–	–	Clarified forthcoming federal standard effective and compliance dates.
	Solar water heaters	–	X	–	–	–	Clarified use of high-efficiency ratings.
	Water heater tank insulation	–	X	–	–	–	Updated ambient temperatures and deemed savings.
	Water heater pipe insulation	–	–	X	–	–	Updated ambient temperatures.
	Faucet aerators	–	–	X	–	–	Updated number of faucets per home.
	Low-flow showerheads	–	–	X	–	–	Updated number of showerheads per home.
	Showerhead temperature-sensitive restrictor valves	–	–	X	–	–	Updated number of showerheads per home and resulting behavioral waste and hot water saved assumptions.
	Tub spout and showerhead temperature-sensitive restrictor valves	–	–	X	–	–	Updated number of showerheads per home and resulting behavioral waste and hot water saved assumptions.
	Water heater temperature setback	–	–	X	–	–	No revision.

Table 6. Residential PY2025 TRM 12.0 Volume 2 Updates by Measure—Appliances

Measure category	Measure description	Point estimates	Deemed savings tables	Savings algorithm	Calculator	M&V	12.0 update
Appliances	ENERGY STAR® ceiling fans	–	–	X	–	–	No revision.
	ENERGY STAR® clothes washers	–	X	–	–	–	Clarified upcoming federal standard. Incorporated latest ENERGY STAR® specification.
	ENERGY STAR® clothes dryers	–	X	–	–	–	Clarified upcoming federal standard. Added heat pump dryer savings tier.

Measure category	Measure description	Point estimates	Deemed savings tables	Savings algorithm	Calculator	M&V	12.0 update
	ENERGY STAR® dishwashers	–	X	–	–	–	Clarified upcoming federal standard. Incorporated latest ENERGY STAR® specification.
	ENERGY STAR® refrigerators	–	–	X	–	X	Updated early retirement age eligibility and weighting using the latest Residential Energy Consumption Survey (RECS) data. Updated resulting early retirement savings tables. Clarified upcoming federal standard.
	ENERGY STAR® freezers	–	X	–	–	–	Updated early retirement age eligibility and weighting using the latest RECS data. Updated resulting early retirement savings tables. Clarified upcoming federal standard.
	Refrigerator/ freezer recycling	X	–	X	–	–	No revision.
	ENERGY STAR® air purifiers	–	X	–	–	–	No revision.
	ENERGY STAR® dehumidifiers	–	X	–	–	–	TRM v12.0 origin.
	ENERGY STAR® ventilation fans	–	X	–	–	–	TRM v12.0 origin.
	ENERGY STAR® water coolers	–	X	–	–	–	TRM v12.0 origin.
	ENERGY STAR® pool pumps	–	–	X	–	–	No revision.
	Advanced power strips	–	X	–	–	–	No revision.
	ENERGY STAR® electric vehicle supply equipment	–	X	–	–	–	Updated savings methodology to use a weighted Level 1 and Level 2 baseline.
	Induction cooking	–	X	–	–	–	No revision.

Table 7. Nonresidential PY2025 TRM 12.0 Volume 3 Updates by Measure—Lighting

Measure category	Measure description	Point estimates	Deemed savings tables	Savings algorithm	Calculator	M&V	12.0 update
Lighting	Lamps and fixtures	–	–	X	X	X	Clarified exterior new construction code zone selection guidance, adjusted new construction savings algorithm, updated "Multiple" control type, adjusted non-operational fixture footnote, in-service rate incorporated into retrofit savings algorithm, clarified building type section guidance, and updated midstream building type weighting assumptions.
	Lighting controls	–	–	X	X	X	Consolidated energy adjustment factor (EAF) and power adjustment factor (PAF) coefficient labels to control adjustment factor (CAF).
	Exterior photocell and time clock repair	–	–	X	X	X	No revision.
	LED traffic signals	–	–	X	X	X	No revision.

Table 8. Nonresidential PY2025 TRM 12.0 Volume 3 Updates by Measure—HVAC

Measure category	Measure description	Point estimates	Deemed savings tables	Savings algorithm	Calculator	M&V	12.0 update
HVAC	Air conditioning and heat pump tune-ups	–	–	X	–	X	Updated tune-up checklist to match ENERGY STAR HVAC Maintenance Checklist.

Measure category	Measure description	Point estimates	Deemed savings tables	Savings algorithm	Calculator	M&V	12.0 update
	Split and packaged air conditioners and heat pumps	–	–	X	X	X	Updated midstream building type weighting assumptions, defined grade levels for primary and secondary schools, updated early retirement age eligibility and criteria related to downsizing, and noted new federal standard and compliance date.
	HVAC chillers	–	–	X	X	X	Updated early retirement age eligibility and criteria related to downsizing, updated midstream building type weighting assumptions, and provided guidance for building types.
	Package terminal air conditioners/heat pumps and room air conditioners	–	–	X	X	X	Updated early retirement age eligibility and criteria related to downsizing and updated midstream building type weighting assumptions.
	Computer room air conditioners	–	–	X	X	–	Added early retirement criteria related to downsizing, updated early retirement, and new construction/replace-on-burnout (ROB) baseline efficiency levels.
	Computer room air handler motor efficiency	–	–	X	X	–	No revision.
	HVAC variable frequency drives	–	X	X	–	–	Savings calculations moved to Excel. Reviewed hours of operations for fans and pumps and using same fan and pump hours referenced in the existing measure.
	Condenser air evaporative pre-cooling	–	–	X	–	X	Minor text edits.

Measure category	Measure description	Point estimates	Deemed savings tables	Savings algorithm	Calculator	M&V	12.0 update
	High-volume low-speed fans	–	–	X	–	–	Expanded measure to apply to non-agricultural end uses. Incorporated new efficiency metric for large-diameter fans.
	Small commercial evaporative cooling	–	X	X	–	–	No revision.
	Small commercial smart thermostats	–	–	X	X	X	Minor footnote correction.

Table 9. Nonresidential PY2025 TRM 12.0 Volume 3 Updates by Measure—Building Envelope

Measure category	Measure description	Point estimates	Deemed savings tables	Savings algorithm	Calculator	M&V	12.0 update
Building envelope	Cool roofs	X	–	X	X	–	No revision.
	Window treatments	X	–	X	X	–	Updated measure to indicate solar screen must be permanent, fixed, and interior or exterior.
	Entrance and exit door air infiltration	–	X	X	–	–	Adjusted savings normalization from per linear foot to per standard door. Updated documentation requirements.

Table 10. Nonresidential PY2025 TRM 12.0 Volume 3 Updates by Measure—Food Service

Measure category	Measure description	Point estimates	Deemed savings tables	Savings algorithm	Calculator	M&V	12.0 update
Food service	ENERGY STAR® combination ovens	–	X	X	–	–	Specified reduced operating schedule for education applications. Aligned deemed savings tables and calculations input assumptions to ENERGY STAR March 2024 update.

Measure category	Measure description	Point estimates	Deemed savings tables	Savings algorithm	Calculator	M&V	12.0 update
	ENERGY STAR® electric convection ovens	–	X	X	–	–	Specified reduced operating schedule for education applications and updated corresponding deemed savings tables.
	ENERGY STAR® electric deck ovens	–	X	X	–	–	TRM v12.0 origin.
	ENERGY STAR® dishwashers	–	X	X	–	–	Specified reduced operating schedule for education applications and updated corresponding deemed savings tables. Added guidance for dual sanitizing dishwashers and updated documentation requirements.
	ENERGY STAR® electric griddles	–	X	X	–	–	Specified reduced operating schedule for education applications and updated corresponding deemed savings tables. Updated griddle size to specify a range of griddle sizes based on normal rounding convention. Other minor text updates.
	ENERGY STAR® electric fryers	–	X	X	–	–	Specified reduced operating schedule for education applications and updated corresponding deemed savings tables.
	ENERGY STAR® electric steam cookers	–	X	X	–	–	Specified reduced operating schedule for education applications and updated corresponding deemed savings tables.
	Contact conveyor toasters	–	X	X	–	–	TRM v12.0 origin.
	Radiant conveyor toasters	–	X	X	–	–	TRM v12.0 origin.
	ENERGY STAR® hot food holding cabinets	–	X	X	–	–	Specified reduced operating schedule for education applications and updated corresponding deemed savings tables.
	ENERGY STAR®	–	X	X	–	–	TRM v12.0 origin.

Measure category	Measure description	Point estimates	Deemed savings tables	Savings algorithm	Calculator	M&V	12.0 update
	refrigerated chef bases						
	ENERGY STAR® ice makers	–	X	X	–	–	Specified reduced operating schedule for education applications and updated corresponding deemed savings tables.
	ENERGY STAR® induction cooktops	–	X	X	–	–	TRM v12.0 origin.
	Induction soup wells	–	X	X	–	–	TRM v12.0 origin.
	Demand controlled kitchen ventilation	–	X	X	–	–	Clarified new construction eligibility, specified reduced operating schedule for education applications, corrected heating interactive effects, updated heating type distribution, and updated corresponding deemed savings tables.
	Pre-rinse spray valves	–	X	X	–	–	Specified reduced operating schedule for education applications.
	Vacuum-sealing and packaging machines	–	X	–	–	–	No revision.
	Hand wrap machines	–	X	–	–	–	TRM v12.0 origin.

Table 11. Nonresidential PY2025 TRM 12.0 Volume 3 Updates by Measure—Refrigeration

Measure category	Measure description	Point estimates	Deemed savings tables	Savings algorithm	Calculator	M&V	12.0 update
Refrigeration	Door heater controls	–	X	X	–	–	No revision.
	ECM evaporator fan motors	–	–	X	–	–	Clarified baseline condition and documentation requirements.
	Electronic defrost controls	–	–	X	–	–	Correct peak factor naming convention.
	Evaporator fan	–	–	X	–	–	No revision.

Measure category	Measure description	Point estimates	Deemed savings tables	Savings algorithm	Calculator	M&V	12.0 update
	controls						
	Night covers for open refrigerated display cases	–	X	X	–	–	No revision.
	Solid and glass door reach-ins	–	–	X	–	–	Minor corrections.
	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	–	–	Updated estimated useful life (EUL) from 5 to 16 years to match recommendations from 2018 Navigant report.

Table 12. Nonresidential PY2025 TRM 12.0 Volume 3 Updates by Measure—Water Heating and Miscellaneous

Measure category	Measure description	Point estimates	Deemed savings tables	Savings algorithm	Calculator	M&V	12.0 update
Water heating	Heat pump water heaters	–	–	X	–	–	Cleaned up equation parameter definitions. Updated building type names to align with TRM Volume 3 naming convention.
	Central domestic hot water controls	–	X	X	–	–	No revision.
	Showerhead temperature sensitive restrictor valves	–	–	X	–	–	No revision.

Measure category	Measure description	Point estimates	Deemed savings tables	Savings algorithm	Calculator	M&V	12.0 update
	Tub spout and showerhead temperature sensitive restrictor valves	–	–	X	–	–	No revision.
Miscellaneous	Variable frequency drives (VFDs) for water pumping	–	X	X	–	–	No revision.
	Premium efficiency motors	–	–	X	–	–	Updated early retirement age eligibility.
	Pump-off controllers	–	X	X	–	–	No revision.
	ENERGY STAR® pool pumps	–	X	X	–	–	Updated baseline condition and deemed savings to reflect current federal standard.
	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	–	–	No revision.
	Steam trap repair and replacement	–	X	X	–	–	Building types realigned in tables.
	Hydraulic gear lubricants	–	–	X	–	–	No revision.
	Hydraulic oils	–	–	X	–	–	No revision.
	Hand dryers	–	X	X	–	–	Updated building type naming convention. Updated peak demand calculation, savings calculation input assumptions, and deemed savings.
	Laser projectors	–	–	X	–	–	No revision.
	Water pumps	–	–	X	–	–	TRM v12.0 origin.

Table 13. Implementation Guidance PY2025 TRM 12.0 Volume 5 Updates by Sector

Sector	Guidance category	12.0 update
Commercial	Project documentation	Updated project documentation to include M&V Plans for programs.
Commercial	Incentives and claimed savings	No revisions.
Commercial	New Construction	Updated code reference.
Low-Income	Income-eligible verification forms	LI income verification forms will be updated in January 2025 once the federal poverty income levels are released for 2/1/2025–1/31/2026.
Low-Income	Audit lists for LI	No revisions.
Cross-sector	Load management programs	No revisions.
Cross-sector	Commercial and residential HVAC split systems without AHRI certification	No revisions.
Cross-sector	Data model	No revisions.
Low-Income	Appendix A	LI verification forms will be updated in January 2025 once the federal poverty income levels are released for 2/1/2025–1/31/2026.