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VIA eFILING

Rosemary Chiavetta, Secretary
Pennsylvania Public Utility Commission
Commonwealth Keystone Building
400 North Street
Harrisburg, PA 17120

**Re: Implementation of the Alternative Energy Portfolio Standards Act
of 2004: Standards for the Participation of Demand Side Management
Resources – Technical Reference Manual 2026 Update
Docket No. M-2023-3044491**

Dear Secretary Chiavetta:

Enclosed please find the **Comments of PECO Energy Company on the Proposed Update to the Technical Reference Manual** (“the Comments”) in the above-captioned proceeding.

As instructed in the 2026 TRM Update Tentative Order, a Word formatted copy of these Comments will be sent via email to Regi Sam at rsam@pa.gov, Tiffany Tran at tiftran@pa.gov and Adam Young at adyoung@pa.gov.

If you have any questions, please do not hesitate to contact me.

Very truly yours,

Jack R. Garfinkle

**BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION**

Implementation of Alternative Energy :
Portfolio Standards Act of 2004: :
Standards for the Participation of : **Docket No. M-2023-3044491**
Demand Side Management Resources – :
Technical Reference Manual 2026 :
Update :

**COMMENTS OF PECO ENERGY COMPANY
ON THE PROPOSED UPDATE TO THE TECHNICAL REFERENCE MANUAL**

Pursuant to the May 9, 2024 Tentative Order entered by the Pennsylvania Public Utility Commission (the “Commission”) in the above-referenced docket, PECO Energy Company (“PECO”) hereby submits comments on the Commission’s proposed 2026 update to its Technical Reference Manual (“TRM”).

I. INTRODUCTION

PECO appreciates the Commission’s efforts to complete an updated Pennsylvania TRM that will serve as a more effective tool for validating savings and providing support for Act 129 goals. PECO strongly agrees with the Commission that the scope of the TRM should be broadened to reflect new energy efficiency and conservation (“EE&C”) measures being implemented by electric distribution companies (“EDCs”) to meet customer demand, and that TRM protocols should appropriately balance savings accuracy and measurement and verification costs. PECO’s general comments in response to the proposed TRM update and key issues identified in the Tentative Order are provided below. Specific, section-by-section comments are attached to this document as Appendix A.

II. GENERAL COMMENTS

A. Savings Estimates Should Broadly Align With Generally Agreed Upon Industry Estimates.

Select measures, such as thermostats and commercial heat pump water heaters, have savings estimates that generally exceed values present in other state TRMs.¹ PECO recommends that the Commission benchmark these measures to ensure that savings estimates are credible so that Act 129 funds are used judiciously to the benefit of customers. Benchmarking will also ensure that savings targets are realistic and appropriate.

B. If PJM Disallows Energy Efficiency Resources From The Base Residual Auction (“BRA”), The Commission Should Consider The Reporting Of Winter Peak Demand As Optional.

There is considerable uncertainty regarding the eligibility of energy efficiency resources in PJM’s BRA in future years. In the event that energy efficiency is no longer eligible for participation in the BRA, the Commission should consider continuing with a summer-only savings target in a potential Phase V of Act 129 and not require characterization of winter peak to simplify program implementation, verification, and reporting.

C. The TRM Should Include Select Measures Found In The TRMs Of Other Jurisdictions.

PECO recommends that the Commission consider incorporating several additional measures in the 2026 TRM. PECO’s recommendations are based on customer demand and review of savings potential in TRMs within other jurisdictions. Additional measures include Residential Insulated Cellular Shades, Residential Kitchen Exhaust Fan (ENERGY STAR spec.), Residential ENERGY STAR Next Generation New Construction Baseline, Residential ENERGY STAR Level 2 (“L2”) Chargers, Residential Energy Recovery Ventilators,

¹ See, e.g., Maryland Technical Resource Manual version 11, available at <https://sites.google.com/view/empowermarylandevaluation/home>.

Commercial and Industrial (“C&I”) Energy Recovery Ventilation, Residential Cool Roofs, and L2 Electric Vehicle Chargers.²

D. The TRM Should Focus On Simplifying Measure Entries.

PECO suggests several recommendations aimed at reducing implementation and evaluation costs by streamlining measure entries that are covered by a single federal and/or ENERGY STAR standard and/or specification. These recommendations are detailed in Appendix A and simplify the number of TRM entries by consolidating ASHP/CAC and Ductless Minisplit measures, as well as Room Air Conditioner (“RAC”) and Window Heat Pump measures.

E. The TRM Should Expand The Use Of Default Assumptions.

PECO suggests several recommendations aimed at reducing implementation and evaluation costs by expanding the use of default assumptions to inform measure savings. These recommendations are detailed in Appendix A and include adding a default In Service Rate (“ISR”) value for eligible residential lighting product and expanding the kit ISR value for certain occupancy sensors.

² See, e.g., 2024 Illinois Statewide Technical Reference Manual for Energy Efficiency version 12.0, available at <https://www.ilsag.info/illinois-statewide-technical-reference-manual-version-12-0/>; New Jersey 2023 Triennial Technical Reference Manual for 2024 Filings, available at <https://njcepfiles.s3.amazonaws.com/OO23030150-Tri2+EE1+%2B+EE2-+Order+Attch+C-+TRM.pdf>.

III. CONCLUSION

PECO appreciates the opportunity to comment on this important matter and believes that the Company's recommended revisions can improve the effectiveness of the Technical Reference Manual.

Respectfully Submitted,



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June 24, 2024

For PECO Energy Company

Appendix A

TRM Volume 1: Overview

1. Refer to 1.3 Applicability of the TRM for estimating Ex Ante (Claimed) Savings
 - 1.1. For upstream and midstream measures, the sales date and installation date can sometimes result in a divergence where the applicable TRM assumptions vary. PECO suggests aligning the TRM version to the sales date for such measures and noting in this section.
2. Refer to 1.4 Definition for Time of Sale
 - 2.1. The "Time of Sale" vintage is only applied to C&I pre-rinse sprayers, but as written seems like it could cover any upstream or midstream measure. Please clarify how the vintage differs from e.g., 2.2.2 midstream HVAC, which uses ROB/NC vintages.
3. Refer to 1.15 Transmission and Distribution System Losses
 - 3.1. Consider updating values in Table 1-4 based on ongoing T&D study.
4. Refer to Appendix A Table 1-8
 - 4.1. The EFLH_heat values in Table 1-8 (both primary and secondary) implicitly assume that the entire heating load is met by efficient ASHP equipment. PECO expects a meaningful number of ASHP installations to include electric backup. This assumption provides no savings benefit to EDCs promoting high efficiency cold climate heat pumps without a need for electric resistance backup over models that do require backup electric heating, which is likely to increase system capacity requirements over time to accommodate peak winter events. PECO suggests differentiating savings for cold climate models from standard ASHPs.

TRM Volume 2: Residential (measure numbers as reflected in the 2026 TRM update documents)

5. Refer to Table 2-2
 - 5.1. The default ISR for residential lighting other than DI has been removed. Although this measure has largely been depreciated due to federal lighting standards, there is potential for exempted products (e.g., linear lighting). PECO suggests retaining the deemed 0.92 ISR for such products.
6. Refer to Table 2-5
 - 6.1. Include the source to the referenced calculators for the updated interactive effects that were updated.
7. Refer to 2.1.2 Occupancy Sensors
 - 7.1. Refer to the first paragraph of the Eligibility section. PECO suggests including exterior occupancy sensors in this measure entry.

- 7.2. Refer to Table 2-6. The Commission should consider applying the kit ISR value of 0.16 for plug-in occupancy models, as is specified for most other occupancy sensor types.
8. Refer to 2.2.1 High Efficiency Equipment: ASHP, CAC, GSHP, PTAC, PTHP
 - 8.1. Refer to the first paragraph of the section. PECO requests that the Commission clarify the distinction between ASHP (2.2.1) and Ductless HP (2.2.3), and if ASHP equipment is required to be ducted. It is recommended that these measures be consolidated to reduce confusion in alignment with federal standards and ENERGY STAR® specifications.
 - 8.2. Refer to the second paragraph of section: “Cooling savings may also be claimed under this measure for quality installation of properly sized new equipment.” The algorithm for kWh for properly sized savings also includes a heating component for ASHP. Therefore, PECO recommends clarifying that both cooling and heating savings may be claimed for properly sized equipment.
 - 8.3. Refer to Source 6. The Commission should update the oversize factor to the recent residential baseline studies rather than the 2012 PA Potential Study, if available.
9. Refer to 2.2.2 High Efficiency Equipment for Midstream Delivery: ASHP, CAC, GSHP, PTAC, PTHP
 - 9.1. Refer to Table 2-15. PECO requests that the Commission clarify the method for weighting the Winter CF value for PECO. Table 1-8 shows a Winter CF value of 0.302 for Climate Zone D and 0.351 for Climate Zone E, resulting in a weighted value of 0.30.
10. Refer to 2.2.3 High Efficiency Equipment: Ductless Heat Pumps with Midstream Delivery Option
 - 10.1. Refer to Source 6. The Commission should consider updating the oversize factor to the recent residential baseline studies rather than the 2012 Pennsylvania Potential Study, if available.
 - 10.2. Refer to the first paragraph. PECO recommends aligning the eligibility criteria for Ductless Mini Split HPs with measure 2.2.1.
 - 10.3. Refer to the second paragraph of the section: “Cooling savings may also be claimed under this measure for quality installation of properly sized new equipment.” The algorithm for kWh for properly sized savings also includes a heating component for ASHP. Therefore, PECO recommends clarifying that both cooling and heating savings may be claimed for properly sized equipment.
11. Refer to 2.2.9 Window Heat Pump
 - 11.1. Consider combining Window Heat Pumps (2.2.9) with Room Air Conditioners (2.2.7). A single ENERGY STAR® specification that covers both product types exists.

- 11.2. Refer to the peak winter demand assumption of 0 kW. PECO suggests characterizing winter demand savings in addition to summer demand savings for this measure.
12. Refer to 2.2.12 ENERGY STAR® Certified Connected Thermostats
 - 12.1. PECO is aware of significant variability for smart thermostat savings across TRMs. For example, the recently issued Maryland TRM v11 applies 368 kWh for a thermostat installed in a home with electric heat and electric cooling, with a smart optimization adder of 84 kWh for thermostat optimization for electric heat for NEST/ECOBEE thermostats. Combined, a smart thermostat in the Maryland TRM receives 452 kWh savings, which is almost half the savings awarded in the draft Phase V TRM. PECO recommends that the Commission reconsider the inputs and assumptions used to inform the smart thermostat savings in the TRM. Alternatively, the Commission should conduct a detailed billing analysis to quantify the benefits of smart thermostats.
 - 12.2. Table 2-52 shows “CAC w/ Electric Furnace” rates of 0-10% across all EDCs, while Table 2-134 (Weather Stripping, Caulking, and Outlet Gaskets measure) assumes a statewide average of 36% electric primary heating fuel. Although these tables are tied to different measures, the results appear incongruous. To the extent there is significant electric heating without ACs, PECO suggests capturing this fraction in the default thermostat savings assumption set.
13. Refer to Table 2-54 Furnace Maintenance
 - 13.1. The default savings are noted with units of kWh per 1 input kBTU/h. The values in the Table 2-54 correspond with outputs from the algorithm and deemed inputs but in units of kWh, regardless of furnace capacity. PECO suggests clarifying this table to indicate these savings should not be multiplied by the input kBTU/h of the furnace.
14. Refer to Table 2-56
 - 14.1. Update reference to Table 2-57 to be “Table 2-57” rather than “Table 2.”
15. Refer to Table 2-59
 - 15.1. Revise reference to Table 2-61 to be “Table 2-61” rather than “Table 2.”
16. Refer to first paragraph of 2.3.5 Water Heater Pipe Insulation
 - 16.1. For Pipe Wrap, PECO recommends including an option for HPWH in addition to electric resistance water heater type.
17. Refer to Table 2-97
 - 17.1. Ensure table labels are formatted consistently i.e., with a dash between the section and the number (e.g., Table 2-97 instead of Table 297).
18. Refer to Table 2-98

- 18.1. Ensure table labels are formatted consistently i.e., with a dash between the section and the number (e.g., Table 2-98 instead of Table 298).
19. Refer to Table 2-104
 - 19.1. Update reference to Table 2-105 to be “Table 2-105” rather than “Table 2.”
20. Refer to Table 2-114
 - 20.1. Update reference to Table 2-115 to be “Table 2-115” rather than “Table 2.”
21. Refer to Table 2-122
 - 21.1. Update reference to Table 2-123 to be “Table 2-123” rather than “Table 2.”
22. Refer to Table 2-125
 - 22.1. Update reference to Table 2-126 to be “Table 2-126” rather than “Table 2.”
23. Refer to 2.6.2 Weather Stripping, Caulking, and Outlet Gaskets
 - 23.1. The algorithm for kWh_cool includes the terms $F_{RAC} \times \%_{elec}$. The default $\%_{elec}$ value of 0.67 appears to exclude RAC based on the baseline study results. This approach appears to discount RAC savings when using the default value, however. PECO suggests the default value include a weighting of the percentage of homes with non-permanent air conditioning systems, reduced by the default F_{RAC} .
24. Refer to section 2.8.3 Photovoltaic (PV) Solar Generation
 - 24.1. PECO suggests aligning this TRM section with the latest Phase IV IMP draft under active revision at the time of the filing of these Comments. Specific comments include allowing the use of the 8760 output from PVWatts to estimate both summer and winter coincident demand savings directly, updating the ETDF factors in Tables 2-177, 2-178, 2-179, and 2-180, clarifying how existing facility usage should be characterized for New Construction buildings, and further clarification on how existing facility usage should be characterized as a cap on production.
 - 24.2. The updated TRM maintains a 15-year cap on measure life based upon the Commission’s interpretation of statutory language addressing the total resource cost test (66 Pa. C.S. §2806.1(m)). PECO notes that this cap prevents the recognition of all lifetime benefits associated with the solar PV measure and urges the Commission to consider whether the 15-year cap could be applied on a weighted average measure basis for an EDC’s Plan in its entirety.

TRM Volume 3: Commercial and Industrial (measure numbers as reflected in the 2026 TRM update documents)

25. Refer to Table 3-3 Lighting Retrofits

25.1. Version 10 of the Mid Atlantic TRM appears to be the appropriate reference for source 6.

26. Refer to Table 3-11 New Construction Lighting

26.1. PECO suggests removing reference to “tradeable” vs. “non-tradable” as this methodology is used by ASHRAE for lighting takeoffs and is not relevant to this methodology for characterizing savings estimates.

27. Refer to 3.2.2 HVAC Systems for Midstream Delivery Eligibility, paragraph 3

27.1. The statement “For non-residential HVAC air source air conditioning, Air Source Heat Pump (ASHP), Packaged Terminal Air Conditioner (PTAC) or Packaged Terminal Heat Pump (PTHP) systems larger than 5.4 tons, there is no minimum efficiency level threshold” seemingly contradicts the minimum efficiencies listed in Table 3-30.

28. Refer to 3.2.3 Electric Chillers paragraph below Table 3-34

28.1. “Part load” should be replaced with “full load” in the following sentence: “For example, if the efficient chiller satisfies Path A and generally performs at part load, the appropriate baseline chiller efficiency is the IPLV value under Path A for energy savings.”

28.2. “Full load” should be replaced with “part load” in the following sentence: “If the efficient chiller satisfies Path B and generally performs at full load, the appropriate baseline chiller efficiency is the full load value under Path B for energy savings.”

29. Refer to 3.2.5 Ductless Mini-split heat pumps- commercial < 5.4 tons

29.1. In Table 3-44 the formulae for HSPF2: PTHP (Replacements): $2.9 - (0.026 \times \text{Cap} / 1,000) \text{ COP}$; PTHP (New Construction): $3.2 - (0.026 \times \text{Cap} / 1,000) \text{ COP}$ seems to contradict the note below Table 3-44 that says “Use $\text{HSPF2} = \text{COP} \times 3.412$ ”. PECO recommends clarifying what assumption should be used for HSPF2 for this measure.

30. Refer to 3.4.1 Heat Pump Water Heaters Table 3-111

30.1. The default savings for this measure are based an average facility area (sq ft) and an average GPY/sq ft. This method implies a single water heater is used per facility, which results in unrealistic savings for large facilities should EDC Data Collection be used. Further, it’s unclear why the default sq ft was increased significantly from the 2021 TRM assumption. PECO recommends recognizing the number of water heaters present at facilities surveyed in the baseline study, if such data is available.

31. Refer to Table 3-221 Variable-Speed Drive Air Compressor

31.1. The symbol for the term Efficiency of compressor motor “ η ” in the algorithm is represented as “ h ” in Table 3-221. PECO suggests aligning the terms to avoid confusion.

32. Refer to section 3.11.6 Photovoltaic (PV) Solar Generation

32.1. PECO suggests aligning this TRM section with the latest Phase IV IMP draft under active revision at the time of the filing of these Comments. Specific comments include allowing the use of the 8760 outputs from PVWatts to estimate both summer and winter coincident demand savings directly, updating the ETDF factors in Tables 3-245, 3-246, 3-247, and 3-248, clarifying how existing facility usage should be characterized for New Construction buildings, and further clarification on how existing facility usage should be characterized as a cap on production.

32.2. The updated TRM maintains a 15-year cap on measure life based upon the Commission’s interpretation of statutory language addressing the total resource cost test (66 Pa. C.S. §2806.1(m)). PECO notes that this cap prevents the recognition of all lifetime benefits associated with the solar PV measure and urges the Commission to consider whether the 15-year cap could be applied on a weighted average measure basis for an EDC’s Plan in its entirety.