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|  | **PENNSYLVANIA**  **PUBLIC UTILITY COMMISSION**  **Harrisburg, PA 17120** |  |

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|  | Public Meeting held October 29, 2020 |
| Commissioners Present: |  |

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| Gladys Brown Dutrieuille, Chairman | | |  |
| David W. Sweet, Vice Chairman | | |  |
| John F. Coleman, Jr. | | |  |
| Ralph V. Yanora | | |  |
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| Implementation of the Alternative Energy Portfolio Standards Act of 2004: Standards for the Participation of Demand Side Management Resources – Technical Reference Manual 2021 Update | M-2019-3006867 |

**2021 TRM UPDATE amendment Tentative Order**

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**BY THE COMMISSION:**

As we stated in the Phase IV Implementation Order,[[1]](#footnote-2) the Pennsylvania Public Utility Commission (Commission) will continue to utilize the Technical Reference Manual (TRM) to help fulfill the evaluation process requirements in the Alternative Energy Portfolio Standards Act (AEPS Act) as well as the energy efficiency and conservation program (EE&C Program) requirements in Section 2806.1 of the Pennsylvania Public Utility Code, 66 Pa. C.S. § 2806.1. In addition, we noted that the 2021 TRM would be applicable for the entirety of Phase IV, but reserved the right to implement a mid‑phase TRM update if needed.[[2]](#footnote-3) We last updated the TRM on August 8, 2019, prior to issuing the Phase IV Implementation Order.[[3]](#footnote-4) In that Order, we stated that “[i]f the Commission adopts a Phase IV of the EE&C Program, the Commission will allow for optional updates to keep the TRM aligned with updates to keep the TRM aligned with updates to codes and standards that occur during the phase.”[[4]](#footnote-5) With this Order, the Commission issues, for comment, several revisions to the 2021 TRM to ensure that the TRM is up to date and better aligns with the Phase IV EE&C Program, as adopted in the Phase IV Implementation Order.

In this Order, the Commission proposes several modifications primarily focused on peak demand savings for existing residential and commercial and industrial (C&I) measures in the 2021 TRM ([Section A](#_Existing_Residential_EE&C) and [Section B](#_Existing_C&I_EE&C) of this Order). The Commission proposes updates to three existing residential measures ([Section A](#_Existing_Residential_EE&C)) and two existing

non-residential measures ([Section B](#_Existing_C&I_EE&C)). [Section C](#_Removed_Residential_EE&C) of this Order lists one residential measure that the Commission proposes to remove from the 2021 TRM.

# BACKGROUND

On April 11, 2019, the Commission issued for comment the proposed 2021 Technical Reference Manual that would be used for a potential Phase IV of the EE&C Program.[[5]](#footnote-6) As indicated above, on August 8, 2019, the Commission issued the 2021 TRM Update Final Order. On September 24, 2020, the Commission issued a 2021 TRM errata, correcting approximately fifty minor errors that had little or no impact on savings estimates or program administration.[[6]](#footnote-7)

Following the Commission’s release of the Errata to the 2021 TRM in September 2020, the SWE, in collaboration with the program evaluation group (PEG)[[7]](#footnote-8) and staff from the Commission’s Bureau of Technical Utility Services (TUS), reviewed the 2021 TRM with a focus on measures that were not assigned peak demand savings. The focus is due to the establishment of peak demand savings goals in the Phase IV Implementation Order, which was adopted after the adoption of the 2021 TRM.[[8]](#footnote-9) The Commission proposes several changes for consideration for inclusion in the 2021 TRM. With the adoption of this Tentative Order, the Commission seeks comments on the proposed amendments to the 2021 TRM. The proposed amendments to the 2021 TRM and its associated Appendices can be found on the Commission’s website at

<http://www.puc.pa.gov/filing_resources/issues_laws_regulations/act_129_information/technical_reference_manual.aspx>. A notice of the adoption of this Tentative Order and the proposed amendments to the 2021 TRM will be published in the *Pennsylvania Bulletin.*

# DISCUSSION

The proposed improvements are focused on incorporating peak demand savings for all applicable measures in the 2021 TRM. In addition, the proposed changes include a limited number of improvements to algorithms and key parameters, accounting for new ENERGY STAR specifications and removal of a redundant residential measure. These proposed changes are intended to make the 2021 TRM a more effective and professional tool for validating energy and peak demand savings and providing support for the Act 129 goals.

The major goals of the proposed modifications are as follows:

1. To incorporate peak demand savings for all applicable measures in the 2021 TRM;
2. To improve existing calculation methods;
3. To incorporate an updated ENERGY STAR specification into an existing measure; and
4. Remove a redundant measure.

Below is a summary list of the changes proposed to the 2021 TRM.

1. Updates to three existing residential EE&C measure protocols.
2. Updates to two existing C&I EE&C measure protocols.
3. Removal of one existing residential EE&C measure protocol.

Below, we will discuss in more detail the more significant proposed changes and updates. Minor administrative changes will not be discussed.

## Existing Residential EE&C Measure Protocols and Processes

The following sections describe the proposed clarifications and modifications to existing residential measure protocols:

### Section 2.2.11 – ENERGY STAR Certified Connected Thermostats[[9]](#footnote-10)

#### Inclusion of Peak Demand Savings

The Commission proposes a revision of this measure to include peak demand savings. The existing protocol notes that connected thermostats are expected to save energy during off-peak hours and assigns no peak demand savings to the measure. This assumption was flagged by stakeholders in the Phase IV Implementation Order[[10]](#footnote-11) considering the decision to establish energy efficiency peak demand reduction compliance targets for Phase IV of Act 129. The Act 129 peak demand definition of 2pm to 6pm on non-holiday weekdays June through August encompasses approximately 260 of the warmest hours of the year, so it seems unlikely that connected thermostats could generate the cooling energy savings assumed in the 2021 TRM without some overlap with these peak hours. Additionally, the SWE’s review of connected thermostat evaluations currently in-progress suggests that statistically significant cooling savings do occur between 2pm and 6pm on summer weekdays.

Absent Pennsylvania-specific research or a comprehensive publicly available regional study on the cooling savings factor during the Act 129 peak period, the Commission proposes a simplified assumption that the cooling percent savings factor during the system peak period is 50% of the overall average cooling percent savings factor (ESF­cool). This 50% assumption mirrors the Illinois TRM. In addition to a new peak demand savings algorithm, the Commission proposes inclusion of a default statewide peak demand savings table with kW/yr values by program, baseline thermostat, and HVAC system type.

#### Creation of an Upstream Delivery Path

The Commission proposes the addition of an HVAC System Type Shares by EDC for Upstream Program Delivery table to this measure to facilitate the calculation of savings in an upstream program delivery model. When EDCs offer upstream point‑of‑sale rebates with participating retailers, it may not be feasible to gather the HVAC system type. The HVAC system type and heating fuel governs several aspects of the current measure calculation assumptions. The proposed table is based on data collected by the SWE in performance of the 2018 Residential Baseline Study[[11]](#footnote-12) and provides the shares of homes with air source heat pumps, central air conditioning with electric furnace, and central air conditioning with gas heat, by EDC. For simplicity, we propose grouping other fossil fuels such as propane and fuel oil with natural gas heat.

### Section 2.7.3 – Home Energy Reports[[12]](#footnote-13)

#### Algorithm Modifications

This measure partitions energy savings measure via regression into first-year savings, which are used for compliance with the EE&C Program targets, and lifetime savings, which are used in the Total Resource Cost (TRC) Test calculations.[[13]](#footnote-14) The Commission notes that the algorithms in the 2021 TRM exhibit an issue beginning in year four of program delivery where savings measured at the meter are assigned to neither first-year nor lifetime savings. The proposed solution involves adding a new term that captures the first-year savings average treatment effect (FYSATEy) net of persistent impacts from prior years. Separating this term from the average treatment effect, measured via billing analysis (ATEy), helps to clearly delineate the calculation’s incremental compliance savings from the persistent savings attributable to prior program years.

The Commission proposes several modifications to the algorithms section of the measure to calculate the new FYSATEy term and utilize it in the equations for incremental first-year kWh savings and lifetime kWh savings. Additionally, separate equations are proposed for incremental first-year savings from exposure in year three, year four, and year five and beyond. The difference in these three equations is the number of years of persistent savings considered in the summation subtracted from ATEy.

#### Peak Demand Savings Clarification

Considering the establishment of peak demand savings targets for the EDCs in Phase IV of the EE&C Program, the Commission proposes adding a fifth entry to the list of technical and policy considerations. The proposed language clarifies that Home Energy Reports are expected to produce peak demand savings that contribute toward Phase IV compliance targets and refers readers to the detailed guidance in the Pennsylvania Evaluation Framework.[[14]](#footnote-15) The proposed text goes on to note that the peak demand savings calculation logic follows the kWh savings algorithms.

### Section 2.8.1 – Variable Speed Pool Pumps[[15]](#footnote-16)

The Commission proposes revisions to this algorithm due to the release of a new version of the Savings Calculator for ENERGY STAR Certified Inground Pool Pumps on May 5, 2020 that has been updated to version 2.0 of the ENERGY STAR specification for pool pumps. The current algorithm is based on a calculator developed in 2013 for version 1.0 of the ENERGY STAR specification.

The new algorithm converts assumptions about turnover rate, pool volume and pump size into variables to accommodate changes in the version 2.0 calculator. References to a source of pool pump power demand data from the California Energy Commission (CEC) dated 2008 that is inaccessible, have been removed, and the defaults derived from this source have been replaced with the values from the ENERGY STAR calculator. These values are 20% larger on average than those from the CEC. The higher default demand combined with a 15% reduction in default runtime for single speed heat pumps, a new ENERGY STAR standard, and changes to the calculation mechanism result in an 8% increase in default kWh savings and a 54% increase in default peak demand savings. Two main factors are responsible for the increase in peak demand savings, the larger default single speed pump demand previously mentioned and the version 2.0 calculator maintains the same number of daily turnovers post upgrade (2), whereas the previous calculator and current algorithm assumes a single turnover within twelve hours once per day for variable speed systems.

## Existing C&I EE&C Measure Protocols

The following sections describe clarifications and modifications to the C&I measure protocols.

### Section 3.9.3 – Advanced Power Strips[[16]](#footnote-17)

#### Algorithm Modification

The Commission proposes providing additional content to the algorithms and supporting tables to allow for the calculation of peak demand savings. This content includes additional formulae, parameter inputs, and default savings. Specifically, the algorithm section will include peak demand savings-specific algorithms for both Tier 1 and Tier 2 Advanced Power Strips (APS) with each including a new ERPpeak parameter. Additional parameters will include an estimated demand load factor for office workstations, which represent the assumed load being managed by the APS, as well as ERPpeak parameter values for various load scenarios. The Tier 1 APS ERPpeak parameters are presumed to be zero percent based on the assumption that the master socket of a Tier 1 APS will be active as workstations are operational during the peak coincident period. The Tier 2 APS ERPpeak parameters will have various levels of impact based on the presumed initial load of the workstation. Finally, the update will provide default demand savings based on the ERPpeak parameters and assumed workstation load. All new parameter values included in the update will be cited from the same sources as those used to define energy savings.

### Section 3.9.5 – Server Virtualization[[17]](#footnote-18)

#### Algorithm Modification

The Commission proposes revising the algorithms and supporting parameters. These revisions are intended to address inconsistencies within the existing algorithm. The proposed revisions would amend the value of server utilization factors and introduce distinct server idle power values. Specifically, the algorithms will include distinct idle power values when calculating energy load for both the base and efficient case scenarios. Additionally, the existing algorithms would be revised to align the efficient case load with the efficient case utilization factor and the base case load with the base case utilization factor. Moreover, we propose amending the server utilization parameter factors to reflect values based on assumed utilizations for single application servers and virtualized servers. This departs from the previous server utilization factors which varied based on the number of processors present in the server. These revisions to the utilization factors are based on additional review by the SWE, which could not validate the basis of server utilization factors to be dependent on the number of processors present in the server as assumed in the existing measure configuration. The proposed revisions omit the need for several sources in the existing measure configuration.

## Removed Residential EE&C Protocols

### Section 2.6.6 – Residential Window Repair[[18]](#footnote-19)

The Commission proposes removal of this measure from the 2021 TRM. While the measure is expected to save energy during peak hours, it assigns no peak demand savings to the measure and is redundant with Section 2.6.2 – Weather Stripping, Caulking, and Outlet Gaskets, which does include peak demand savings. The Commission maintains that the Residential Window Repair should be removed while Weather Stripping, Caulking and Outlet Gaskets should be preserved to ensure consistency in savings calculations among EDCs. Section 2.6.2 has several advantages over 2.6.6:

1. It is a broader measure.
2. It includes peak demand savings.
3. It references newer data sources.
4. Savings are capped at 400 kWh per project. Projects above 400 kWh/year require use of Section 2.6.1 – Air Sealing, which is a more rigorous calculation method.

## Removed C&I EE&C Measure Protocols

The Commission proposes to remove any C&I EE&C measure protocols from the 2021 TRM.

# CONCLUSION

With this Tentative Order, the Commission seeks comments on the proposed amendments to the 2021 TRM. This Tentative Order represents the Commission’s continuing efforts in establishing a comprehensive TRM with a purpose of supporting both the AEPS Act and the EE&C Program provisions in Section 2806.1 of the Pennsylvania Public Utility Code, 66 Pa. C.S. § 2806.1. We look forward to receiving comments from interested stakeholders regarding the proposed changes to the 2021 TRM; **THEREFORE,**

**IT IS ORDERED:**

1. That the proposed 2021 Technical Reference Manual Update Amendment be issued for comment.

2. That a copy of this Tentative Order be served upon all electric distribution companies, the Office of Consumer Advocate, the Office of Small Business Advocate, the Commission’s Bureau of Investigation and Enforcement, the Pennsylvania Department of Environmental Protection and all parties who commented on the prior 2021 Technical Reference Manual Update.

3. That the Law Bureau deposit a notice of this Tentative Order and proposed amended 2021 version of the Technical Reference Manual with the Legislative Reference Bureau for publication in the *Pennsylvania Bulletin*.

4. That interested parties shall have 30 days from the date the notice of this Tentative Order is published in the *Pennsylvania Bulletin* to file written comments referencing Docket Number M-2019-3006867 with the Pennsylvania Public Utility Commission, electronically through the Commission’s e‑file System.

5. That interested parties shall have 50 days from the date the notice of this Tentative Order is published in the *Pennsylvania Bulletin* to file written reply comments referencing Docket Number M-2019-3006867 with the Pennsylvania Public Utility Commission, electronically through the Commission’s e‑file System.

6. That a Word formatted copy of all comments and reply comments shall be electronically mailed to Regi Sam at [rsam@pa.gov](mailto:rsam@pa.gov). Attachments may not exceed three megabytes.

7. That this Tentative Order, the proposed amended 2021 version of the Technical Reference Manual, and all filed comments and reply comments related to this Tentative Order be published on the Commission’s website at <http://www.puc.pa.gov/filing_resources/issues_laws_regulations/act_129_information/technical_reference_manual.aspx>.

8. That the contact person for technical issues related to this Tentative Order and the proposed amended 2021 version of the Technical Reference Manual is Regi Sam, Bureau of Technical Utility Services, [rsam@pa.gov](mailto:rsam@pa.gov). The contact person for legal and process issues related to this Tentative Order and the proposed amended 2021 version of the Technical Reference Manual is Adam Young, Law Bureau, [adyoung@pa.gov](mailto:kribrown@pa.gov).

**BY THE COMMISSION,**

Rosemary Chiavetta

Secretary

(SEAL)

ORDER ADOPTED: October 29, 2020

ORDER ENTERED: October 29, 2020

1. *Energy Efficiency and Conservation Program*, Implementation Order, at Docket No. M‑2020‑3015228, entered June 18, 2020 (Phase IV Implementation Order) at 97-100. [↑](#footnote-ref-2)
2. *Id*. at 98. [↑](#footnote-ref-3)
3. *Implementation of the Alternative Energy Portfolio Standards Act of 2004: Standards for the Participation of Demand Side Management Resources – Technical Reference Manual 2021 Update*, 2021 TRM Update Final Order, Docket No. M‑2019‑3006867 (2021 TRM Update Final Order I). [↑](#footnote-ref-4)
4. *Id*. at 1. [↑](#footnote-ref-5)
5. *See, Implementation of the Alternative Energy Portfolio Standards Act of 2004: Standards for the Participation of Demand Side Management Resources – Technical Reference Manual 2021 Update*, Tentative Order at Docket No. M-2019-3006867, entered April 11, 2019. [↑](#footnote-ref-6)
6. *See, Implementation of the Alternative Energy Portfolio Standards Act of 2004: Standards for the Participation of Demand Side Management Resources – Technical Reference Manual 2021 Update*, September 24, 2020, Secretarial Letter at Docket No. M‑2019‑3006867. [↑](#footnote-ref-7)
7. The PEG is chaired by staff of the Commission’s Bureau of Technical Utility Services and is comprised of representatives from the EDCs and the SWE for the purpose of encouraging discussion of EDC program-specific issues and associated evaluation, measurement and verification. [↑](#footnote-ref-8)
8. See *Phase IV Implementation Order* at page 80. <http://www.puc.pa.gov/pcdocs/1666981.docx> and *2021 TRM Update Final Order* <http://www.puc.pa.gov/pcdocs/1631001.docx> [↑](#footnote-ref-9)
9. *See* Section 2.1.11 – ENERGY STAR Connected Thermostats of the 2021 TRM Errata Update, page 48. [↑](#footnote-ref-10)
10. *See*’ Phase IV Implementation Order at 99. [↑](#footnote-ref-11)
11. *See* <http://www.puc.pa.gov/Electric/pdf/Act129/SWE-Phase3_Res_Baseline_Study_Rpt021219.pdf> [↑](#footnote-ref-12)
12. *See* Section 2.7.3 – Home Energy Reports of the 2021 TRM, page 187. [↑](#footnote-ref-13)
13. *See* Section A.5 of the 2021 TRC, page 21. [↑](#footnote-ref-14)
14. See Pennsylvania Evaluation Framework. May 8, 2018. <http://www.puc.pa.gov/Electric/pdf/Act129/SWE_PhaseIII-Evaluation_Framework050818.pdf>. Pages 111-133 [↑](#footnote-ref-15)
15. *See* Section 2.8.1 – Variable Speed Pool Pumps of the 2021 TRM, page 191. [↑](#footnote-ref-16)
16. *See* Section 3.9.3 – Advanced Power Strips of the 2021 TRM, page 246. [↑](#footnote-ref-17)
17. *See* Section 3.9.5 – Server Virtualization of the 2021 TRM, page 253. [↑](#footnote-ref-18)
18. *See* Section 2.6.6 – Residential Window Repair of the 2021 TRM, page 171 [↑](#footnote-ref-19)