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December 27, 2010

E-FILE

Rosemary Chiavetta
Secretary
Pennsylvania Public Utility Commission
Commonwealth Keystone Building
400 North Street, 2nd Floor North
P.O. Box 3265
Harrisburg, PA 17105-3265

RE: Implementation of the Alternative Energy Portfolio Standards of 2004: Standards for the Participation of Demand Side Management Resources - Technical Reference Manual 2011 Update - Docket No. M-00051865

Dear Secretary Chiavetta:

Enclosed please find the original Comments of PPL Electric Utilities Corporation in the above-referenced proceeding.

Copies have been provided to the persons in the manner indicated on the certificate of service.

Respectfully Submitted,


David B. MacGregor

DBM/jl

Enclosures

cc: Honorable James H. Cawley
Honorable Wayne E. Gardner
Honorable Robert F. Powelson
Honorable Tyrone J. Christy
Honorable John F. Coleman, Jr.
Kriss E. Brown, Law Bureau
Greg Shawley, CEEP

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A PENNSYLVANIA PROFESSIONAL CORPORATION

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**BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION**

Implementation of the Alternative Energy Portfolio Standards of 2004: Standards for the Participation of Demand Side Management Resources- Technical Reference Manual 2011 Update : : Docket No. M-00051865

**COMMENTS OF
PPL ELECTRIC UTILITIES CORPORATION**

TO THE PENNSYLVANIA PUBLIC UTILITY COMMISSION:

I. INTRODUCTION

By Tentative Order entered November 24, 2010, the Public Utility Commission (“Commission”) requested comments on the proposed 2011 update of the Commission’s Technical Reference Manual (“TRM”).¹ The Tentative Order invites comments from interested parties on several changes and additions to the 2010 version of the TRM.²

PPL Electric Utilities Corporation (“PPL Electric” or the “Company”) has actively participated in all of the proceedings instituted by the Commission to implement Act 129 of 2008, 66 Pa.C.S. § 2806.1 (“Act 129”). The Company appreciates this opportunity to comment on the Commission’s proposed revisions to the TRM. PPL Electric has organized its comments into two sections: (1) technical comments on the specific modifications that the Commission proposes to make in the 2011 version of the TRM; and (2) factual, legal and policy arguments in opposition to the Commission’s proposal that electric distribution companies (“EDCs”) be

¹ *Implementation of the Alternative Energy Portfolio Standards Act of 2009: Standards for the Participation of Demand Side Management Resources – Technical Reference Manual Update*, Order entered November 24, 2010, at Docket No. M-00051865. (“Tentative Order”).

² *Implementation of the Alternative Energy Portfolio Standards Act of 2009: Standards for the Participation of Demand Side Management Resources – Technical Reference Manual Update*, Order entered June 8, 2010, at Docket No. M-00051865. (“2010 TRM”).

required to apply these 2011 TRM proposals to their existing 2009—2013 Energy Efficiency & Conservation plans (“EE&C plans”).

II. EXECUTIVE SUMMARY

The proposed 2011 TRM update should be substantially revised and in any event should not be applied to current Commission-approved EE&C plans. In particular, the proposed reduction in compact fluorescent light bulb (“CFL”) hours of use (“HOU”) from 3.0 to 1.9 hours, has simply no substantial, credible evidence to support the proposed revision. The Tentative Order relies upon a recent California study and a U.S. Department of Energy (“DOE”) study to support this change. The factual situation in California is fundamentally different from Pennsylvania, and there is no credible basis upon which to simply apply the results of that study to PPL Electric. Similarly, the recent DOE study relies on the same California study and on a 2002 DOE study that relied on 1996 data from Oregon and Washington. This information in this study is out of date and again relies on data from geographic areas that are not comparable to Pennsylvania. Results of studies from other states show far higher burn rates for CFLs than California and thereby refute the validity of applying the California analysis to other geographic areas. The Commission itself, in the 2009 TRM update, has specifically recognized that it is not appropriate to rely on data from other states to change CFL burn times in Pennsylvania.

In addition, PPL Electric presents in these comments the results of a PPL Electric specific study which shows that the CFL HOU should, if anything, be increased, and certainly not decreased. The Company’s study found the HOU for all CFLs in the five main rooms of the home was 3.8 hours.

Of equal importance, the Tentative Order, for the first time, purports to not only update the TRM but also to require EDCs to amend their existing Commission-approved EE&C Plans to reflect the proposed TRM revisions. This proposal should be rejected for several reasons.

First, as a factual matter, and as explained in detail below, adoption of the Tentative Order and the unilateral amendment of PPL Electric's EE&C Plan would have a devastating impact on PPL Electric because it would seriously jeopardize the Company's ability to comply with Act 129 compliance requirements and expose it to very substantial potential civil penalties. The Tentative Order acknowledges that applying the TRM update to amend existing EE&C Plans will require "the deployment of additional measures to meet statutorily mandated targets." Tentative Order, p. 5. Given the very prescriptive nature of Act 129, *i.e.*, specific and mandatory conservation requirements, specific and mandatory compliance dates, a hard cap on spending, and the need to develop revised plans and obtain Commission approval thereof in response to the TRM update, it is very unlikely that PPL Electric will be able to comply with Act 129 if the Tentative Order is adopted.

Second, the Tentative Order's purported application of the TRM update to unilaterally amend EE&C Plans is procedurally flawed. The TRM, as repeatedly described by the Commission, is a "guidance" document. It is not a regulation or other binding requirement and cannot have the force of law unless and until it is integrated into a formal amendment to an EE&C Plan. Act 129, Section 703(g)³ of the Public Utility Code, and the Commission's own prior orders clearly establish the procedures required to amend an EDC's EE&C Plan.⁴ The Commission's Tentative Order inappropriately and unlawfully seeks to bypass these procedural requirements and should not be adopted.

Third, PPL Electric specifically and appropriately relied on the 2009 TRM to develop its four-year EE&C Plan. The assumptions in the 2009 TRM, including the deemed savings for

³ The Commission "may...after notice and opportunity to be heard...rescind or amend any order made by it." 66 Pa.C.S. § 703(g).

⁴ *Petition of PPL Electric Utilities Corporation for Approval of its Energy Efficiency and Conservation Plan*, Order entered October 26, 2009, Docket No. M-2009-2093216.

CFLs (based on 3 hours of use per day per CFL), were central and critical to PPL Electric's EE&C Plan. The changes reflected in the 2011 TRM update would seriously jeopardize PPL Electric's ability to comply with the conservation requirements of Act 129 and expose PPL Electric to potentially significant civil penalties. The effect of the Tentative Order would be to retroactively change PPL Electric's approved EE&C Plan, would adversely affect its substantive rights and therefore would be unlawful. Even if construed as applying prospectively only, the Tentative Order would be unlawful under established principles of detrimental reliance and equitable estoppel.

Fourth, for all of the reasons set forth in these Comments, it would be extremely poor public policy to revise PPL Electric's EE&C Plan in mid-course and thereby seriously jeopardize its ability to comply with the law and be subjected to potentially substantial civil penalties. On these facts, such action would clearly constitute an abuse of administrative agency discretion, would violate PPL Electric's substantive due process rights and result in a taking of property without just compensation.

PPL Electric is not opposed to adding energy conservation measures to the TRM or to TRM updates which are supported by credible evidence. These updates provide important guidance and provide opportunities for PPL Electric to implement measures already in its approved EE&C Plan (but not previously in the TRM) or for PPL Electric to propose changes to its EE&C Plan, both of which will enhance savings to customers and provide more efficient use of customer supplied funds to achieve Act 129 compliance. PPL Electric, however, is opposed and cannot support fundamental and unsupported changes to the deemed savings calculations for conservation measures in the middle of the execution of a Commission-approved EE&C plan which may effectively prevent it from complying with the law. The appropriate course here is to

adopt valid and well supported changes to the TRM and make it clear that they will not apply to already approved plans.

III. BACKGROUND

The energy conservation provisions of Act 129 are unusually prescriptive. They establish mandatory minimum demand and energy conservation reduction requirements; they establish mandatory non-discretionary deadlines for compliance with these requirements; they establish a hard cost cap on the amount each EDC can spend on energy conservation programs; the programs must be cost effective under a total resource cost test; and they impose civil penalties of \$1 million to \$20 million for non-compliance.

Act 129 requires EDCs with at least 100,000 customers to adopt an EE&C plan, approved by the Commission, to reduce electric consumption by at least one percent (1%) of its expected consumption for June 1, 2009 through May 31, 2010. 66 Pa.C.S. § 2806.1(b) and (c). This one percent (1%) reduction is to be accomplished by May 31, 2011. By May 13, 2013, the total annual weather-normalized consumption is to be reduced by a minimum of three percent (3%). Also, by May 31, 2013, peak demand is to be reduced by a minimum of four-and-a-half percent (4.5%) of the EDC's annual system peak demand in the 100 hours of highest demand, measured against the EDC's peak demand during the period of June 1, 2007 through May 31, 2008. 66 Pa.C.S. § 2806.1(d).

EDC EE&C plans are four-year programs designed to achieve these statutory conservation and peak load reduction requirements, by specified dates, within the specified cost cap. Section 2806.1(g) of Act 129 requires that the total cost of any EDC EE&C Plan not exceed two percent (2%) of the EDC's total annual revenues as of December 31, 2006. 66 Pa.C.S. § 2806.1(g). Section 2806.1(f)(2) of Act 129 provides that an EDC that fails to achieve the reductions in energy consumption and peak demand within the statutory time frames shall be

subject to a civil penalty of not less than \$1,000,000 and not exceed \$20,000,000. 66 Pa.C.S. § 2806(f)(2). This section further provides that any penalty paid by an EDC shall not be recoverable from ratepayers. *Id.* Moreover, if an EDC fails to achieve its required reductions in consumption, responsibility to achieve the reductions is transferred to the Commission. 66 Pa.C.S. § 2806.1(f)(2)(ii).

Act 129 requires an EDC to demonstrate that its plan is cost-effective using a total resource cost test (“TRC”) approved by the Commission.⁵ 66 Pa.C.S. § 2806.1(a)(3). In implementing this requirement, the Commission determined to use the TRM that was originally developed by the Commission pursuant to the Pennsylvania Alternative Energy Portfolios Standards Act.⁶ Specifically, the Commission “initiate[d] a process to update and expand the TRM to provide for additional energy efficient technologies, under Docket No. M 00051865.” *Implementation Order*, p. 13. In order to monitor and verify data collection, quality assurance and the results of each EDC’s EE&C Plan, in the first quarter of 2009 the Commission initiated a process to update and expand the TRM. In addition, the Commission stated “[t]hereafter, the Commission will periodically review and initiate the process to update the TRM as needed. Any such updates will be prospective in nature and applicable to measures undertaken after final approval of any TRM changes.” *Implementation Order*, p. 14.

By Order entered June 1, 2009, the Commission approved the 2009 version of the TRM (“2009 TRM”).⁷ In approving the 2009 TRM, the Commission noted that, “the TRM will provide vital guidance to EDCs in developing their EE&C plans.” 2009 TRM Order, p. 9,

⁵ *In re: Implementation of Act 129 of 2008 – Total Resource Cost (TRC) Test (TRC Test Order)* (Order entered June 23, 2009), Docket No. M-2009-2108601.

⁶ *Energy Efficiency and Conservation Program Implementation Order*, Order entered on January 16, 2009, at Docket No. M-2008-2069887, pp. 13-14. (“*Implementation Order*”)

⁷ *Implementation of the Alternative Energy Portfolio Standards Act of 2009: Standards for the Participation of Demand Side Management Resources – Technical Reference Manual Update*, Order entered June 1, 2009, at Docket No. M-00051865. (“2009 TRM Order”).

(emphasis added). Consistent with the Commission's statement, PPL Electric relied upon the 2009 TRM as guidance to develop its EE&C Plan.

On July 1, 2009, PPL Electric filed its EE&C plan with the Commission in compliance with Section 2806.1 (b)(1)(i) of Act 129 and the Commission's January 16, 2009 *Implementation Order*. PPL Electric's EE&C Plan includes a broad portfolio of energy efficiency, conservation practices and peak load reductions, and energy education initiatives. PPL Electric's portfolio of programs is designed to provide customer benefits and to meet the energy saving and peak load reduction goals set forth in Act 129, all within the cost cap imposed by Act 129. These programs are the key components of a comprehensive electric energy efficiency initiative designed to achieve the 1,146,000 MWh of reduced energy consumption and 297 MW of peak demand reductions required by Act 129.

As approved by the Commission, PPL Electric's 2009-2013 EE&C Plan was required to include measures and programs to achieve PPL Electric's calculated electricity consumption and peak load reduction targets of:

- 1% energy savings by 2011, which is 382,000 MWh;
- 3% energy savings by 2013, which is 1,146,000 MWh; and
- 4.5% peak load reduction by September 30, 2012, which is 297 MW.

In addition, consistent with Section 2806.1(g), PPL Electric's Commission-approved 2009-2013 EE&C Plan is designed to comply with the designated expenditure cap of 2% of 2006 Annual Revenues for each year of the four-year plan, which equates to an average of approximately \$61.5 million per year for four program years and approximately \$246 million for the entire EE&C Plan period.

As noted above, the Commission updated and amended the TRM to fulfill the evaluation process requirements contained in Act 129. *Implementation Order*, p. 13. Consistent with the

Commission's Implementation and 2009 TRM orders, PPL Electric relied on the 2009 TRM as guidance to develop its 2009-2013 EE&C Plan, including the residential CFL and Appliance Recycling programs. PPL Electric's EE&C Plan states that, "[s]avings for most measures in the Plan are drawn from the Commission's TRM." PPL Electric EE&C Plan, p. 41.

PPL Electric's EE&C plan proceeding was a fully-litigated proceeding and included the participation by statutory advocates, the Department of Environmental Protection, customer group and potential competitive service providers ("CSPs") and other interested parties. The Company's EE&C plan filing was approved by the Commission on October 26, 2009 ("2009-2013 EE&C Plan").⁸ The 2009 TRM was used by the Commission in evaluating and ultimately approving PPL Electric's 2009-2013 EE&C Plan.

In its *Implementation Order*, the Commission requires EDCs to submit an annual report documenting the effectiveness of their EE&C Plans, the measurement and verification of energy savings, and the evaluation of cost-effectiveness of expenditures. By Secretarial Letter dated June 24, 2010, the Commission directed EDCs to submit their 2010 Act 129 annual report by September 15, 2010. Further, the Commission noted in its order approving PPL Electric's EE&C Plan, that because the Company's Commission-approved 2009-2013 EE&C Plan was approved by Commission order, procedures for rescission and amendment of Commission orders must be followed to amend the order and to assure due process for all affected parties. PPL Electric EE&C Plan Order, pp. 91-92, 66 Pa.C.S. § 703(g) (Notice and opportunity to be heard are required prior to rescinding or amending previously approved Commission orders). Consistent with the Commission's directives, PPL Electric filed its annual report on September 15 and a petition requesting Commission approval to make certain modifications to its EE&C

⁸ *Petition of PPL Electric Utilities Corporation for Approval of its Energy Efficiency and Conservation Plan*, Order entered October 26, 2009, Docket No. M-2009-2093216.

Plan. PPL Electric's petition was subject to an evidentiary hearing and the Administrative Law Judges' Recommended Decision was issued on December 17, 2010.

On November 24, 2010, the Commission issued a Tentative Order proposing modifications to the 2010 version of the TRM. The Commission's 2011 TRM update states that the order "discusses the significant proposed changes contained in the proposed 2011 version of the TRM." Tentative Order, p. 5. Included in the Commission's proposed TRM changes are changes to the savings calculation or measure eligibility requirements for residential CFLs, refrigerator/freezer retirement, other energy conservation measures, and proposed additions to the TRM. *Id.* Further, these revisions, if approved by the Commission, will require EDCs to implement these changes in their currently effective EE&C plans. *Id.* The Commission notes in its Tentative Order that, "[t]he lowering of the deemed savings may require the deployment of additional measures to meet statutorily mandated targets." *Id.*

As discussed more fully below, the proposed modifications to the CFL and refrigerator/freezer deemed savings calculations, and other proposed modifications, clarifications and corrections detailed in the Commission's 2011 TRM update, if approved, would substantially impact PPL Electric's EE&C Plan and seriously jeopardize the Company's ability to meet its Act 129 obligations. For example, if the Commission were to adopt the proposed reduction in burn hours for CFLs from 3.0 hours to 1.9 hours, a 40 % decrease, the estimated energy savings for CFLs will also decrease 40%. If that change were to become effective in program year 3 (June 1, 2011) as currently proposed, it would decrease projected savings in the Company's CFL program by approximately 74,000 MWh/yr (40% of the 186,000 MWh/yr projected CFL savings in program years 3 and 4) with no associated reduction in program costs (the same number of CFLs will be distributed as planned but the resultant savings will be 40%

less). The 74,000 MWh/yr of reductions are equivalent to 6% of the Company's total energy savings compliance target and 12% of the energy savings for the final 2 program years. These are very significant percentages, which if adopted, may effectively preclude PPL Electric from complying with Act 129.

IV. PPL ELECTRIC'S TECHNICAL COMMENTS ON THE 2011 TRM UPDATE

In this section, PPL Electric will provide specific technical comments on the proposed modifications contained in the proposed 2011 TRM. As noted above, the Commission undertakes an annual review and update of the TRM. PPL Electric supports this process, as it provides necessary guidance to EDCs in identifying new measures that may be added to their existing EE&C plans through established procedures and provides needed clarifications and corrections. Further, the continued updating of the TRM serves to provide the EDCs with a useful tool in preparing for possible future EE&C plans following the conclusion of their existing programs. However, as addressed in Section V below, PPL Electric, for a variety of factual, legal and policy reasons, opposes the immediate and unilateral application of these modifications to its 2009-2013 EE&C Plan.

In this section, PPL Electric has organized its technical comments as follows:

- A. Comments on Proposed TRM Modifications to CFLs and Refrigerator/Freezer Recycling
- B. Comments on proposed addition of measures to the TRM.
- C. Comments on proposed other modifications, clarifications and improvements to the TRM.

A. PROPOSED MODIFICATIONS TO CFL AND REFRIGERATOR AND FREEZER RECYCLING PROGRAMS

1. 2011 TRM Proposed Modifications

The Commission's Tentative Order releasing the proposed TRM for comments, "discusses the significant proposed changes contained in the proposed 2011 version of the

TRM.” Tentative Order p. 3. These proposals include revising the baseline data for certain residential CFL lighting and refrigerator/freezer retirement measures. Tentative Order, p. 5. Specifically, the proposed 2011 TRM would reduce the deemed daily hours of operation for the residential CFL measure from 3.0 hours in the 2010 TRM⁹ to 1.9 hours in the proposed 2011 TRM update, a reduction of approximately 40%. In support of this change, the Tentative Order relies on a 2010 study.¹⁰ *Id.* In addition, the proposed 2011 TRM would reduce the refrigerator/freezer retirement measure’s annual energy consumption savings from 1,728 kWh in the 2010 TRM to 1,659 kWh, and would add several restrictions to measure eligibility (recycled appliance must be at least 10 years old, cannot be primary appliance, and cannot be replaced with a new appliance). The Commission’s proposed changes to the refrigerator/freezer retirement kWh savings proposed, and presumably the measure eligibility restrictions purportedly “reflect actual data obtained by the EDCs and their contractors, rather than the average of the results from past studies that was used for the 2010 TRM.” *Id.*

In proposing these changes the Commission recognizes that, “[t]he lowering of the deemed savings may require the deployment of additional measures to meet statutorily mandated targets.” *Id.* However, the Commission asserts that the changes are necessary “to ensure that the ratepayers are getting the energy savings, and the associated energy market effects, they are paying for.” *Id.* The Commission requests comments to assess the “tradeoff” between the proposed revisions to the CFL and the refrigerator/freezer retirement kWh and “the possibility

⁹ See Table 4-3 on page 26 of the 2010 TRM at <http://www.puc.state.pa.us/electric/Act129/TRM.aspx>.

¹⁰ On December 17, 2010, the Commission issued an Errata where, for the first time, it references footnote 6-Efficiency Vermont Technical Reference User Manual (July 2008) to support the 1.9 HOU for CFLs. This is somewhat surprising since the Vermont TRM specifies 3.4 HOU for CFLs. The Commission may have intended, but did not, cite to footnote 7- United States Department of Energy, Energy Star CFL Market Profile: Data Trends and Market Insights, prepared by D&R International, September 2010, which suggests 1.9 HOU. The September 2010 DOE study references two other studies (1) a KEMA (2010) “Results from California’s Residential Lighting Metering Study”, a study of the CFL market in California and (2) a 2002 DOE study – US Lighting Market Characterization, Volume 1, a study that relied on lighting values from a 1996 study conducted in Oregon and Washington.

that such adjustments may require greater market penetration to meet mandated goals.” Tentative Order, p. 5.

a. CFL Hours of Use

The Company strongly objects to the 1.9 hour burn time proposed for residential CFLs (reduced from 3.0 to 1.9 hours) for several reasons. In support of the Company’s position, attached as Appendix I to these comments is a verified report by PPL Electric’s independent evaluator, The Cadmus Group (“Cadmus”), addressing this issue. (“Cadmus Report”). Following is a summary of the technical deficiencies in the Commission’s proposal to modify the CFL hours of use (“HOU”) calculation in the 2011 TRM:

The recommended value (1.9 hours per CFL) was based upon the DOE’s September 2010 CFL market profile (prepared by D&R International). This document, in turn, cites:¹¹

- A study of the CFL market in California published by KEMA in February 2010.¹² (The 2010 KEMA study is discussed below.)
- DOE’s lighting market characterization published in 2002, prepared by Navigant Consulting.

While the 2010 KEMA study for California Public Utilities Commission (“CPUC”) study appears to be reasonably designed (it included the metering of CFLs and incandescent lamps in 1,200 households), it is not reasonable or appropriate to apply the California hours of use (HOU) value to Pennsylvania because of the following fundamental differences between California and Pennsylvania that clearly and significantly impact CFL HOU:

- CFL Saturation and Market Transformation/Maturity. The California utilities have some of the longest running CFL programs in the country, and as a result, California has a significantly higher saturation of CFLs than many others states, including Pennsylvania.

¹¹ See: D&R International, 2010.

¹² See: KEMA, 2010.

It is well-established that as CFL saturation increases and market transformation progresses, consumers who have already installed CFLs in high-use sockets begin installing CFLs in a greater variety of locations in the home, including locations with fewer hours of use. Therefore, the average HOU for all CFLs in a house will tend to decrease as saturation increases. Applying the results of a study from a higher saturation state to determine deemed savings from use of CFLs in a lower saturation state is clearly inappropriate. Cadmus Report, p. 3.

- Geography. The CPUC lighting evaluation does not account for annual differences in cloud cover.¹³ It is axiomatic that artificial light is used more extensively in regions experiencing less natural light. California has more annual sunshine than many other regions of the country, including Pennsylvania. Cadmus Report, p. 2. Indeed, on average, the major cities in California experience 38 percent more annual sunshine than the major cities in Pennsylvania. *Id.*
- Electricity Pricing. All else equal, a higher cost of electricity will likely cause consumers to use less and more efficient lighting and all else equal would result in fewer hours of use in states with higher retail electric rates. Residential electricity prices in California are 18% to 50% higher than Pennsylvania, which would tend to decrease hours of all lighting, including CFLs.
- Customer Behaviors and Environmental Awareness/Consciousness. Customers in different states or parts of the United States may have different levels of awareness or commitment to environmental issues, including energy conservation. In contrast to Pennsylvania EDC CFL programs that began in 2010, the California's EDCs have some

¹³ Metering for the CPUC study was conducted in the three major IOUs' service areas (PG&E, SCE, and SDG&E); the study did not include any metering in California's northern, i.e., darker and wetter, counties.

of the longest-running CFL programs in the country. California EDCs began promoting CFLs to their residential customers in 1989. Over that time, California has experienced significant increases in consumer awareness of CFLs, CFL availability, and per-household CFL sales, as well the potential effects of these programs in stimulating the supply of and lowering product prices. Cadmus Report, p. 3.

As set forth above, the California study has limited application to Pennsylvania and the Commission should not rely upon it to substantially modify the deemed savings calculations used by Pennsylvania EDCs.

The second study referenced in the 2010 DOE report is a 2002 DOE study.¹⁴ This study also has no application to Pennsylvania. The residential lighting values used in this study were from a 1996 study led by Tacoma Public Utilities (TPU), sponsored by the Bonneville Power Administration. The study relied on metered data to characterize general lighting use in the residential sector Oregon and Washington. The 2002 DOE study itself demonstrates its limitations and why its results cannot be transferred to other states:

- "...the database does not provide information on the type of fluorescent lamps installed."
- "The TPU study data, because it is isolated to one small region of the country and covers a period of only several months, poses an even more serious limitation when extrapolating to the rest of the country than does the XenCAP database [used in the non-residential analysis]."¹⁵

The lack of data relative to the types of fluorescent lamps installed and the limited scope of the data from Oregon and Washington are two significant flaws in the DOE study and undermine its use to support changes to the deemed savings calculations in Pennsylvania. For the reasons set forth above, the proposed changes in hours of use of CFLs in Pennsylvania based on a California study and a 2002 DOE study based on 15-year old data from a small region in the northwest

¹⁴ See: Navigant Consulting, 2002.

¹⁵ Navigant, 2002, p. 16.

United States is clearly inappropriate and should not be adopted without substantial further analysis and a Pennsylvania-specific study.

Importantly, the Company's own recent market research indicates that a 1.9 HOU for CFLs in PPL Electric's service territory is not appropriate. In program year 1, the Company's Act 129 independent evaluator (The Cadmus Group) conducted Act 129 telephone surveys with 352 residential customers. Respondents were asked to report the number of CFLs installed in each room. This survey found the Company's customers installed CFLs most frequently in higher use areas, *i.e.*, bedrooms, living rooms, kitchens, family rooms and bathrooms. These results are quite different from the conclusions reached in the DOE Report. The DOE report found that customers did not necessarily install CFLs in higher use sockets, further suggesting there are different customer behaviors in different states.

In addition, the Company also conducted a separate CFL study through the Company's consumer panel with 363 residential respondents participating. This study found an average of 4.6 hours use in kitchens (in kitchens, 32% of the sockets were using CFLs), and 4.7 hours of use in family rooms (where 35% of the sockets were using CFLs), and 2.2 hours of use in bedrooms (where 35% of the sockets were using CFLs). The average HOU for all CFLs in the five main rooms of the home was 3.8 hours. These HOU are self-reported by the customer and may not be conclusive until confirmed through a more quantitative light logging study. However, the preliminary results clearly show that the Company's customers are installing CFLs in higher use sockets and that the average HOU substantially exceeds the 3.0 HOU in the company's current EE&C Plan. At a minimum, these studies conclusively demonstrate that there is no current factual basis to apply the 1.9 HOU number from the 2010 DOE market profile to PPL Electric's service territory.

Recent studies from other states further support the conclusion that 1.9 HOU for CFLs is not appropriate for Pennsylvania:

- A 2009 GDS Associates study conducted in New England (with 657 installed meters) found an average of 2.8 HOU for CFLs.¹⁶
- Vermont Energy Investment Corporation's draft document for Ohio specified 2.85 hours of use per day for residential CFLs.
- NEEP's 2010 TRM specifies 2.77 hours per day.
- Vermont Energy Investment Corporation's February 19, 2010 Technical Reference Users Manual for Vermont specifies 3.4 hours of use per day.

For the reasons explained above, further analysis would be required to determine if these conclusions are applicable to Pennsylvania. Hours of use in other states can vary depending on demographics, cloud cover, market maturity, electricity prices, customer awareness and environmental consciousness, and the study method (surveys, logging, etc.). However, these studies clearly demonstrate that it is inappropriate to rely solely on the recent DOE study.

Moreover, this conclusion also is consistent with this Commission's own precedent. Specifically, the Commission has previously rejected requested changes to the CFL HOU based in the TRM where the request was based solely on data from other states.¹⁷ For example, in the Commission's 2009 TRM update, Lawrence Berkeley National Laboratory ("LBNL") recommended a reduction in the hours of use for compact fluorescent lighting ("CFL") from 3.4 hrs/day to 2.0 hrs/day. The Energy Association of Pennsylvania and PECO Energy Company recommended against reducing TRM hours of use for CFLs because LBNL's recommendation

¹⁶ NMR, RLW Analytics, GDS Associates. *Residential Lighting Markdown Impact Evaluation*. Prepared for Markdown and Buydown Program Sponsors in Connecticut, Massachusetts, Rhode Island, and Vermont. January 2009.

¹⁷ 2009 TRM Order, p. 6.

was not based on data gathered in Pennsylvania. 2009 TRM Order, p. 6. The Commission rejected LBNL's recommendation to reduce the TRM hours of use for CFLs to 2.0 hrs/day. *Id.*

PPL Electric acknowledges the benefit of ensuring that the TRM is kept current.¹⁸ However, the Company does not support the proposed modification to 2011 TRM based on the results of the DOE report that relies heavily on a study completed in California. The Company suggests that the Pennsylvania EDCs conduct a statewide lighting study (logging of hours for CFLs in each specific EDC) to determine the most realistic estimated CFL burn hours for Pennsylvania by December 31, 2011. As an alternative, the Commission can coordinate this statewide lighting study, funded by the EDCs, using the same funding and cost collection mechanisms as the Statewide Evaluator contract. The results of that study would be used to determine the HOU value (or a different HOU value for each year) for residential CFLs effective June 1, 2013. Completing a Pennsylvania-specific CFL HOU study by December 31, 2011 will provide enough time for EDCs to incorporate new CFL savings assumptions in potential future EE&C Plans for post-6/1/13.

2. Refrigerator/Freezer Retirement and Recycling

The Company also does not agree with the proposed changes to refrigerator/freezer retirement and recycling TRM protocol (Section 2.23). Similar to the CFL burn hours discussion, deemed savings per refrigerator/freezer should remain constant for the duration of the EE&C Plan (until 5/31/13). Changes to savings should become effective with the next version of Act 129 EE&C (6/1/13) to allow sufficient time for EDCs to adjust programs.

Regardless of the effective date as discussed above, the Company does not agree with the updated savings estimate proposed in the 2011 TRM. The 2011 TRM references the

¹⁸ As explained below in Section V, PPL Electric does object to the Commission's proposal to apply the change to the deemed savings calculation for residential CFLs to the Company's 2009-2013 EE&C Plan.

Refrigerator Retirement Savings Calculator¹⁹ on the ENERGY STAR website for the updated savings estimate of 1,659 kWh. The calculator, which aggregates appliance sizes (e.g., 19.0 – 21.4 cubic feet) and ages (e.g. 1993-2000), is an end-user (consumer) tool meant to provide end users with general guidance and information about energy usage and it is not designed as a professional evaluation resource. Specifically, the calculator lacks the detail needed to accurately evaluate an entire appliance program. In addition, no information is provided as the source of the energy savings estimates used by the calculator.

The Company believes the best approach to determining energy savings associated with an appliance recycling program is a statewide (possibly with EDC-specific results) *in situ* metering study since it relies on participating appliances used in customer's homes. Where an *in situ* metering study is not included in an evaluation plan and budget, the Company recommends basing the savings estimate on one of the most robust available appliance consumption databases. Specifically, the Company recommends the California Energy Commission's database.²⁰ It should be noted that the database utilizes time of manufacture consumption data to reflect degradation in the refrigerator's performance over time and it relies on energy consumption estimates determined using Department of Energy testing protocol. Both add uncertainty, and the latter – as detailed in the cited CPUC report – has been shown to overestimate savings relative to *in situ* metering, given its inability to account for environmental and usage factors.

In addition to changing the deemed savings value for refrigerator/freezer recycling, the 2011 TRM proposes to add the following measure eligibility requirements:

- The refrigerator/freezer must be at least 10 years old

¹⁹ <http://www.energystar.gov/index.cfm?fuseaction=refrig.calculator>

²⁰ http://www.energy.ca.gov/appliances/database/historical_excel_files/2009-03-01_excel_based_files/Refrigeration/

- The refrigerator/freezer must be a secondary unit that is not replaced

The Company does not support those changes because they will restrict participation by customers, potentially reduce energy savings, and are generally impractical to implement. Customers will not necessarily know the age of their refrigerator/freezer, would not always determine it correctly (before pick-up), or would not be willing to look it up (on the label or the ENERGY STAR database) before pick-up. Therefore, customers will likely schedule a pick-up with the appliance recycling contractor only to find out at pick-up that the unit is not eligible. This will inconvenience and frustrate customers, and will likely result in complaints to the EDCs and to the Commission.

There is no feasible way for the Company's independent evaluator or Statewide Evaluator to verify the reported age of the refrigerator without conducting ride-along site visits with the appliance recycling CSP. Those ride-along site visits would be costly, could be viewed negatively by customers, *i.e.*, "why does PPL Electric pay 3 or 4 people to come to my house to pick-up one refrigerator?", and provide limited benefits.

Also, removing a 9 year old refrigerator/freezer does have savings, albeit not as much as an older refrigerator. The Company does not want to discourage customers from recycling a refrigerator that is less than 10 years old. Therefore, it is more prudent to offer incentives for customers to remove and properly recycle any vintage refrigerator rather than have it land-filled, sold in the secondary market, or unnecessarily remain connected to the grid until it is old enough to be recycled. To the extent that a large number of relatively new refrigerators are recycled, those results will be reflected in future TRM savings estimates.

Finally, the appliance recycling CSP may not be able to determine if a refrigerator/freezer was a secondary or primary unit. For example, the customer installs a new refrigerator on

Monday, moves the old one to the garage at the same time, and arranges pick-up of the old refrigerator (for recycling) for the next day. The old refrigerator appears to be “secondary” unit (for 1 day) when, in effect, it was replaced with a new one the day before. Even if the customer reports it as a secondary unit, there is no way for the appliance recycling CSP, the EDC, or the EDC’s independent evaluator to verify this fact.

In addition, the intended purpose of Section 2.29 (Energy Star Refrigerator/Freezer Retirement) is unclear and it appears to duplicate Section 2.23 (Refrigerator/Freezer Retirement and Recycling).

For the reasons set forth above, PPL Electric opposes the proposed modifications contained in the 2011 TRM update to the refrigerator/freezer program.

B. EE&C MEASURES ADDED TO THE TRM

The Company supports the Commission’s efforts to add new measures to the TRM and has some technical comments to improve these new measures. The proposed new measures are not presently in the 2010 TRM but are already included in one or more EDC’s programs or EDCs may choose to add these measures in the future. Adding these measures to the TRM provides clear direction, uniformity and certainty on how their savings are determined, and provides more savings opportunities for consumers. If these measures are not added to the TRM, savings would have to be estimated using custom measure protocols or these measures could not be offered to customers, thereby reducing the savings opportunity for consumers. Those custom measure protocols would be unnecessarily complex with more costly (for the Company and for the customer who may have to install metering) evaluation, measurement, and verification methods than those required for “standard” measures in the TRM. The custom protocols would also take much longer to approve and process, likely delaying customer’s implementation of

EE&C measures or projects. Therefore, the Company supports adding the following measures to the TRM, but does provide limited comments on certain measures:

- Electric clothes dryer with moisture sensor. No comments.
- Efficient electric water heater. No comments.
- Electroluminescent night light. No comments.
- Furnace whistle. No comments.
- Heat pump water heater. The table in the TRM should be clarified as follows

(changes shown in black line):

Measure Name	Heat Pump Water Heaters
Target Sector	Residential Establishments
Measure Unit	Water Heater
Unit Energy Savings	2,202 kWh for 2.3 Energy Factor , 1,914 kWh for 2.0 Energy Factor
Unit Peak Demand Reduction	0.202 kW for 2.3 Energy Factor 0.175 kW for 2.0 Energy Factor
Measure Life	14 years

- Home audit conservation kits. The in-service rate for CFLs provided to residential customers with a home audit conservation kit should be the same as the in-service rate for residential CFLs specified under the “Residential Lighting” section of the TRM -- 84%, not via EDC information gathering which is unnecessarily costly.
- LED night light. No comments.
- Low-flow faucet aerator. Clarify this measure applies to kitchens and bathrooms.
- Programmable thermostat. No comments.

- Room air conditioner retirement. Delete “The hypothetical nature of this measure implies a significant amount of risk and uncertainty in the energy and demand impact estimates” from the end of the first paragraph below the first table. In the “Algorithms” section, the following sentence needs a reference (footnote) after the word “in” (shown in bold below): “The energy and demand impacts are based on corrected ENERGY STAR calculator EFLH values for the ES Room AC measure as shown **in**, and ...” In addition, in Table 2-19, remove references to “lowest EFLH” and “highest EFLH” since no other table in the TRM points out the lowest and highest values in the table.
- Smart strip plug outlets. No comments.
- Residential whole house fans. Add the following table, which is helpful to EDCs, CSPs, and Trade Allies who read the TRM. This type of summary table is currently included in some other TRM measures. The Company suggests adding similar tables to all TRM measures:

Measure Name	Whole house fan
Target Sector	Residential Establishments
Measure Unit	Whole House Fan
Unit Energy Savings	Varies by location (187 kWh/yr to 232 kWh/yr)
Unit Peak Demand Reduction	0 kW
Measure Life	15 years

- Solar water heaters. No comments.
- Water heater pipe insulation. No comments.

- Ductless mini-split heat pumps. The Company recommends several improvements, clarifications, and corrections to the proposed protocol. The Company's proposed changes are reflected in blackline and attached as Appendix 2 to these Comments.
- Fuel switching- electric hot water heater to gas. No comments.
- Fuel switching- heat pump water heater to gas. No comments.
- Fuel switching- electric heat to gas heat. No comments.
- Ceiling and wall insulation. For Residential (ceiling/attic insulation): Table 2-33:
 - 1) Change SEER_{ac} Default to 10;
 - 2) Change SEER_{ASHP} Default to 10
 - 3) Change HSPF_{ASHP} Default to 6.8

Source is Minimum Federal Standard for new Central Air Conditioners/Heat Pumps between 1990 and 2006

These changes conform the SEER and HSPF baselines to the same defaults used for residential programmable thermostats, which assume installation in older homes.

- Refrigerator/freezer recycling with replacement. Clarify that this protocol applies only for programs in which the EDC picks up an old refrigerator, replaces it with a new one, then recycles the old one, or to EDC-sponsored turn-in events. Otherwise, there is no assurance the old unit is properly recycled. This is consistent with the requirements of the room air conditioner recycling (with replacement) protocol.
- Energy Star Televisions. No comments.
- Anti-sweat heater controls. No comments.

- High efficiency refrigerator cases. No comments.
- High efficiency evaporator fan motors for walk-in refrigerator cases. No comments.
- Energy Star office equipment. No comments.
- Beverage machine controls. No comments.
- High efficiency ice machines. No comments.

The Company notes that the savings protocols for the additional measures listed above were established through the Commission's TRM Technical Working Group. That process was collaborative, interactive and effective. The Company recommends that all proposed additions and changes to the TRM use the same TRM Technical Working Group process. Some of the changes proposed for the 2011 (example: reducing the CFL hours of operation and changes to the Appliance Recycling protocol) did not utilize the TRM Technical Working Group. The Company strongly believes that there is no reason for "some" of the measures to use the TRM Technical Working Group while others do not, especially if the TRM Technical Working Group is effective.

C. OTHER MODIFICATIONS, CLARIFICATIONS, AND CORRECTIONS TO THE TRM

To the extent that the Company is able to accommodate and absorb modifications, clarifications and corrections made in subsequent TRM updates, the Company will voluntarily do so. However, the Company's ability to do so will be based upon its ability to implement such changes but remain within the budget and program constraints of its existing EE&C Plan and its ability to continue to meet its Act 129 obligations. However, all of these items should utilize the TRM Technical Working Group process so EDCs can understand the rationale for the changes and work collaboratively with the Statewide Evaluator and

Commission staff to determine if these changes are warranted in light of their impacts on programs.

The “minor” changes proposed in the 2011 TRM appear to be well intentioned. However, as currently proposed, some of these minor modifications, corrections and clarifications will reduce savings, impose additional measure eligibility requirements that will restrict participation by customers, and will require EDCs to change various implementation systems and processes (marketing material, communication to customers and trade allies, tracking systems, rebate application forms, etc.). Individually and collectively these types of changes in the 2011 TRM increase cost and require significant effort by the Company, Conservation Service Providers (“CSPs”), and its evaluation contractors to implement. That additional effort can distract the Company, CSPs, and evaluation contractors from focusing on more important issues that are critical to the success of Act 129 programs and EDC compliance. Therefore, the Company does not support the implementation of these changes until the Company’s next EE&C plan (post-June 1, 2013).

a. Commercial Lighting and TRM Appendix C

Below are PPL Electric’s comments relative to the Commercial Light and TRM Appendix C set forth in the proposed 2011 TRM update:

- Section 3.2, Lighting Equipment Improvements, Quantifying Annual Hours of Operation: PPL Electric recommends consolidating Tables 3-1 through 3-5 into a single table. Currently, there is duplication and conflicting information across Tables. Consolidating these tables will alleviate much of the customer confusion selecting the correct usage group and EFLH. Appendix 3 includes an example of how these tables could be consolidated and includes suggestions for consistency with ASHRAE’s categories. If not consolidated, Table 3-2 needs a citation for the source data.
- The TRM states that manufacturer’s cut sheets can be used if fixture wattages differ by more than 10% from the wattage table. However, the Pennsylvania Lighting Form’s instructions state 15% in one place and 10% in another.

- In the section titled “Projects with connected load savings less than 50kW”, the table number referenced in the sentence “For lighting projects with savings less than 50 kW, stipulated whole building hours of use will be used as shown below in Table 3-4” is incorrect. It should be Table 3-5.
- Table 3-6 (Interactive Factors and Other Lighting Variables) should define temperature ranges for space types (cooled space, freezer spaces, medium-temperature refrigerated spaces, high-temperature refrigerated spaces). Otherwise, those terms are too subjective.
- Reference #7 in Table 3-7 (Assumptions for LED Traffic Signals) is incorrect.
- The 2011 TRM proposes adding an optional method for determining the baseline for new construction lighting (the “building type” method). The Company supports adding this as an optional method.
- Building types were added to Table 3-5 for lighting equivalent full load hours and coincidence factors. The Company supports this change because it results in less “customized” building types. This change will require a revision to the Company’s tracking system.
- Lighting fixture codes should be added for linear reactor ballast and super constant wattage autotransformer ballast for metal halide lighting.
- On the Pennsylvania Lighting Form, there is no way to generate a fixture code for the ES or ES/LL lamps.
- The Company supports the addition of LED lighting as an eligible measure.
- The Company supports the revised procedures for conducting due diligence for the confirmation of the lighting baseline.
- The Company does not support any of the proposed Hours of Use for Usage Groups for Lighting table (Table 3-2) that have fewer hours than Table 6-6 in the existing TRM. For reasons discussed previously, these types of changes should become effective after June 1, 2013.
- The Company supports the TRM change that allows the use of vendor/implementer electronic lighting audit tools (other than the Pennsylvania Lighting Form) for documented baseline and new fixtures.

In addition to the comments above, the Commission requested comments on how the TRM should account for Federal legislation and regulations that prohibit the production and sale of less efficient lighting, ballast efficacy standards that do not allow the manufacture and sale of magnetic ballasts after July 2010, and regulations that prohibit the production and sale of 4-foot

and 8-foot T12 lamps after July 2010. The Company does not support implementing these changes before June 1, 2013 for reasons previously discussed. The new standards and regulations should be the basis for establishing minimum eligibility requirements for new light fixtures eligible for EDC Act 129 rebates and for determining the baseline for lighting retrofits after June 1, 2013.

The new standards and regulations should affect only one side of the savings calculation before May 31, 2013 – the wattage of the replacement light (the qualifying efficient measure), not the other side -- the wattage of the baseline light. Baselines for lighting retrofits should continue to be based on the actual light fixture the customer is replacing during the remaining time of this 4-year EE&C planning cycle, not based on a change in lighting regulations that becomes effective during the term of the current EE&C Planning cycle, even if the old lamp type, *i.e.*, T12s, are no longer available in the market or from the customer's inventory.

The TRM that is in effect for post-2013 should include some type of “phase-in/phase-out” method that addresses new standards, consumer's inventories of the obsolete lighting, and the remaining life of existing lamps and fixtures. The Company recommends utilizing the Commission's TRM Technical Working Group to develop recommendations that would become effective June 1, 2013 and could be incorporated in EDCs' EE&C Plans for the post-2013 planning period.

For lighting retrofit projects with changes in connected load < 20 kW, the Company supports the proposed change that allows customer's self-certification of the baseline conditions. This will reduce the Company's evaluation costs, including site visits that are costly and somewhat intrusive to customers.

b. Motors Spreadsheet

The TRM motors spreadsheet (Appendix D of the TRM) adds a requirement to determine the full load kW of each motor (in addition to the peak load kW that was in the current TRM). This will require changes to the Company's marketing material, rebate application forms, and tracking systems.

The instructions and glossary sections of the motors spreadsheet were not updated to reflect changes in the TRM. For example, table numbers were changed in the TRM but not renumbered in the motor spreadsheet instructions. The coincidence factor for duplex motors decreased from 0.74 to 0.37 in the TRM and on the motors spreadsheet but the glossary (a worksheet in the motors spreadsheet) was not updated. The Company does not know if changing the coincidence factor to 0.37 is a more accurate estimate of savings, but the Company notes that this will decrease peak load reductions from motors. The definition for Load Factor is inconsistent between Section 3.3.2, 3.4.2, and Appendix D.

c. Chillers

The Company supports these changes. These changes add chiller categories not in the previous TRM, increasing savings opportunities for consumers.

d. C&I and Residential HVAC baselines

PPL Electric offers the following comments on the proposed changes to the C&U HVAC baselines in the 2011 TRM:

- C&I HVAC baseline efficiencies increased for air source heat pumps and central air conditioners. The Company believes this change is intended to reflect the new IECC requirements, adopted in Pennsylvania on 1/1/10. The Company understands these HVAC equipment measures assume replacement at burnout, and so the baseline should be dictated by current code/standards. This change will reduce savings, require changes to rebate applications, reduce eligible units and make it more difficult for customers to participate, require changes to marketing information, and require changes to the tracking system. Therefore, this change should become effective June 1, 2013.

- Tables 3-22, 3-26, and 3-56 (Cooling and Heating EFLH) should add Allentown for consistency with locations in other tables.
- Section 2.1, Electric HVAC, Note that Ground Source Heat Pumps only applies to systems < 5.4 tons. Add reference to Section 3.6 under commercial for larger systems.
- Section 3.6.1, HVAC Systems, Algorithms, Heat Pump: does not give conversion from COP to HSPF and EER to SEER, which would be needed for GSHP and GWSHP < 65,000 BTU. In the residential equations, this is GSER and GSOP. This section should be revised to simply include a footnote referring to the residential equations for GSHPs of that size.
- Section 3.6.2, HVAC Systems, Definition of Terms, Table 3-21:
 - Water Source Heat Pumps: Use ASHP baseline instead.
 - Ground Water Source Heat Pumps: Use ASHP baseline instead.
 - Ground Source Heat Pumps: Use ASHP baseline instead.

For the GSHP, the proposed baseline is inconsistent with the residential sector where the baseline is an air-source heat pump. It is PPL Electric's position that the GSHP is not the appropriate baseline because the incentive is not designed to promote a higher-efficiency GSHP, it is designed to promote a GSHP instead of an air-source heat pump.

- The definition of CAPY (capacity) for residential and C&I central air conditioners and air source heat pumps (ducted and ductless) should be clarified to state if it is the cooling capacity, the heating capacity, or the average of the cooling and heating capacity. Presently, it is the cooling capacity. If changed, the Company will need to change its rebate application forms, tracking system, and will need to request additional information from the customer.

V. THE 2011 TRM UPDATE IMPROPERLY REQUIRES PL ELECTRIC TO REVISE ITS PREVIOUSLY APPROVED EE&C PLANS

As addressed above, PPL Electric has identified a number of technical issues related to several of the proposed changes in the 2011 TRM and has explained why these proposals should not be adopted and if they are adopted, should not apply until after the conclusion of the Company's 2009-2013 EE&C Plan. However, in addition to updating the TRM, the Tentative Order also purports to unilaterally amend PPL Electric's Commission-approved EE&C Plan to reflect these TRM changes. For the reasons explained below, the purported amendment of

approved EE&C plans through the TRM updating process is procedurally and substantively flawed and would be extremely poor public policy.

If approved by the Commission, certain modifications included in the 2011 TRM update would substantially modify the deemed savings calculations and/or implementation aspects of existing measures in PPL Electric's EE&C plan. It is clear from the Commission's Tentative Order, that these are changes that the Commission is requiring EDCs to make to their Commission-approved 2009-2013 EE&C plans. In requiring EDCs to make these changes, the Commission is improperly revising the EDC's current Commission-approved EE&C plans. As discussed above, PPL Electric relied upon the Commission's 2009 TRM to develop its EE&C Plan. The Commission used the 2009 TRM to evaluate and approve PPL Electric's 2009-2013 EE&C Plan. If the Commission now requires that PPL Electric modify the deemed savings calculations and other operating components of existing EE&C Plan measures and programs, it will seriously jeopardize the Company's ability to meet its Act 129 obligations.

It is important to note that PPL Electric is not contending that its EE&C Plan cannot be changed in any way once it is approved by the Commission. Indeed, several of the proposed modifications contained in the proposed 2011 TRM update are useful and appropriate, and PPL Electric can incorporate them without formally changing its approved EE&C Plan. Other proposed changes will be included in a petition for modification of the EE&C Plan, if such a petition is necessary. PPL Electric's concern is with the misuse of the TRM update process to unilaterally amend existing approved EE&C Plans without adequate process, without substantial evidence, and in a manner that will seriously impact its ability to meet its Act 129 obligations and potentially subject it to significant civil penalties.

Section A below first describes the potential impact on PPL Electric if certain portions of the 2011 TRM update are applied to its existing EE&C Plan. Sections B and C then summarize the principal factual, legal and policy flaws in purporting to use the TRM updating process to amend an EDC's existing Commission-approved EE&C plan.

A. IMPACT OF PROPOSED 2011 TRM MODIFICATIONS ON PPL ELECTRIC EE&C PLAN

If the proposed changes to the deemed savings for CFLs and refrigerator/freezer retirements are approved and applied to the Company's existing 2009-2013 EE&C Plan, the Commission would substantially change the energy saving estimates/assumptions used by PPL Electric to develop its EE&C Plan and relied upon by the Commission to approve the plan.²¹ In addition, these changes, if applied to the Company's 2009-2013 EE&C Plan, would have a cascading effect on the Company's plan and would likely shift costs between customer sectors and/or between programs (within a customer sector), thus requiring a formal change to the Company's EE&C Plan. If the Commission were now to require that PPL Electric make substantial changes to the underlying estimates/assumptions for deemed savings relied upon by the Company and the Commission in approving PPL Electric's 2009-2013, such action at this late juncture would jeopardize the Company's ability to meet its Act 129 obligations.

For example, if the Commission were to adopt the proposed 40% reduction in burn hours for CFLs (from 3.0 hours to 1.9 hours), the energy savings for CFLs will also decrease by 40%. If that change becomes effective in program year 3 (June 1, 2011) as currently proposed, it would decrease projected savings in the Company's CFL program by approximately 74,000

²¹ For purposes of this section of the comments, PPL Electric focuses its arguments on the major revisions proposed by the Commission in its Tentative Order. As identified above in Section III, the Company also opposes other aspects of the 2011 TRM update that, if applied to PPL Electric's 2009-2013 EE&C Plan, would adversely affect its ability to comply with Act 129. However, the Company has not had sufficient time to quantify the impacts of these other proposed modifications. The Company reserves its right to challenge the legal sufficiency of the Commission's purported requirement that PPL Electric modify its Commission-approved 2009-2013 EE&C Plan to incorporate these other changes.

MWh/yr (40% of the 186,000 MWh/yr projected CFL savings in program years 3 and 4) with no associated reduction in program costs (the same number of CFLs will be distributed as planned but the resultant savings will be 40% less). The 74,000 MWh/yr of reductions are equivalent to 6% of the Company's total energy savings compliance target and 12% of the energy savings for the final 2 program years. These are significant percentages, particularly given the cost cap which restricts PPL Electric from spending money to achieve additional replacement savings. This proposed change, in and of itself, seriously jeopardizes the Company's ability to meet its Act 129 obligations.

PPL Electric's EE&C Plan is a four-year program designed to achieve statutorily required reduction targets and with a capped budget by which to achieve these targets. The proposed reductions in deemed savings contained in the 2011 TRM update would substantially alter the Company's estimated savings from its CFL and refrigerator/freezer retirement programs. PPL Electric is midway through implementing its 2009-2013 EE&C Plan. To respond to this fundamental change to its EE&C Plan at this late juncture the Company would need to evaluate whether it could make up the lost savings, under its existing budget constraints, over the course of the next year in a half by:

- Increasing saturation in its current CFL and refrigerator/freezer retirement programs. For example, reducing CFL savings by 40% in program years 3 and 4 would require sales of approximately 1.5 million additional CFLs at an additional (unbudgeted) cost of \$4.5 million that would be borne by residential customers. To maintain its total EE&C Plan budget cap, the Company would have to reduce expenditures in another program(s) by \$4.5 without reducing savings in that other program(s). That scenario is likely not possible. If that scenario was possible, it would shift costs between programs and/or between customer sectors, thereby requiring the Company to formally change its EE&C Plan and submit it to the Commission for approval. A process that will likely take 3 to 6 months before the Company can implement that change. Given that time, it is unlikely that these changes would be designed, approved, and implemented in time to achieve the necessary savings to meet its current Act 129 obligations.
- Identifying, developing, seeking Commission approval and implementing new measures and/or significant changes to programs in its EE&C Plan to make-up for the 74,000

MWh/yr reduced savings from the CFL program. Again, that would likely shift costs between programs and/or between customer sectors, thereby requiring the Company to formally change its EE&C Plan and submit it to the Commission for approval. A process that will likely take 3 to 6 months before the Company can implement that change. Given that time, it is unlikely that these changes would be designed, approved, and implemented in time to achieve the necessary savings to meet its current Act 129 obligations.

Neither of these options appears to be feasible due to Act 129: (1) budgetary constraints; (2) procedural requirements; (3) the significant time to design and implement the changes (including renegotiating CSP contracts, modifications to tracking systems, changes to marketing material, informing customers and trade allies, etc.); and (4) the limited time to achieve the necessary savings (June 2011 to 2013). Act 129 requires that the total cost of each EDC's EE&C plan not exceed two percent (2%) of the EDC's total annual revenues as of December 31, 2006. PPL Electric's total cost of its EE&C Plan is \$246 million. PPL Electric cannot spend additional funds to make up for subsequent TRM changes that result in reducing its expected program/measure savings.

In the unlikely event that PPL Electric were able to identify revisions to its existing programs and/or develop new programs/measures in an attempt to offset the lost savings generated by the proposed 2011 TRM update, the Company would not be able to implement such changes prior to receiving Commission approval to make such adjustments. Upon review of the potential impact of the proposed changes to the deemed savings associated with CFL and refrigerator/freezer retirement programs contained in the 2011 TRM Update, PPL Electric has determined that applying these changes to its 2009-2013 EE&C Plan would jeopardize the Company's ability to meet its Act 129 obligations.

Again, if PPL Electric fails to achieve the statutorily set reduction targets, it potentially would be subject to a non-recoverable civil penalty ranging between \$1,000,000 and \$20,000,000. If PPL Electric fails to achieve its required reductions in consumption,

responsibility to achieve the reductions are transferred to the Commission. 66 Pa.C.S. § 2806.1(f)(2)(ii). It is inappropriate for the Commission, through a subsequent update of the TRM, to retroactively and fundamentally alter the assumptions/estimates relied upon by PPL Electric to develop its Commission-approved 2009-2013 EE&C Plan.

B. PROCEDURAL INFIRMITIES TO IMPOSING 2011 TRM MODIFICATIONS TO UNILATERALLY REVISE PPL ELECTRIC'S 2009-2012 EE&C PLAN

1. 2011 TRM Update Cannot Be Used To Revise the Deemed Savings Calculations in PPL Electric's Commission-approved 2009-2013 EE&C Plan

As detailed above, the Commission's 2011 TRM update substantially modifies the deemed savings calculations for the CFL and refrigerator/freezer retirement programs. In its Tentative Order, the Commission noted that "[t]he lowering of the deemed savings may require the deployment of additional measures to meet statutorily mandated targets." 2011 TRM Tentative Order, p. 5. Therefore, the Commission is now apparently requiring PPL Electric to modify the deemed savings for these programs in its Commission-approved 2009-2013 EE&C Plan. As explained below, the Commission may not rely on the 2011 TRM update to require PPL Electric to modify its Commission-approved 2009-2013 EE&C Plan.

The TRM can be one of five things: (1) a statute; (2) a regulation; (3) statement of policy; (4) guideline; or (5) an interpretation. First, the TRM is not a statutory requirement to which PPL Electric is bound. Act 129 does not require PPL Electric to comply with the Commission's TRM. Instead, PPL Electric's compliance with Act 129 stems from the consumption and peak load reduction requirements set by Act 129. It was based upon these statutory obligations that PPL Electric developed and the Commission approved the Company's 2009-2013 EE&C Plan. Act 129 provides that the Commission is to conduct an annual evaluation of PPL Electric's EE&C Plan. However, the Commission must evaluate the

Company's EE&C Plan based upon the TRM relied upon by the Company to develop its Commission-approved plan.

Second, the TRM is not a regulation but, instead, is a document intended by the Commission to provide "vital guidance" and facilitate EDCs in adopting and implementing EE&C plans to meet the requirements of Act 129. The TRM update is not being adopted via formal rulemaking process and is not a regulation. To the extent that the TRM is considered a regulation, which would be binding upon all Pennsylvania EDCs, it is not being adopted pursuant to the *Commonwealth's Documents Law* 71 P.S. §§ 745.1-745.12; 45 P.S. §§ 1102-1602, and, therefore is invalid as a regulation. *Northwestern Youth Services v. Commonwealth Department of Pub. Welfare*, 1 A.3d 988, 992-993 (Pa. Cmwlth. 2010).

Third, if the TRM is considered a statement of policy, it does not establish a binding norm and cannot be used to revise an approved EE&C Plan. "The critical distinction between a substantive rule and a general statement of policy is the different practical effect that these two types of pronouncements have in subsequent administrative proceedings.... A properly adopted substantive rule establishes a standard of conduct which has the force of law.... A general statement of policy, on the other hand, does not establish a 'binding norm'.... A policy statement announces the agency's tentative intentions for the future." *Pennsylvania Human Relations Commission v. Norristown Area School District*, 473 Pa. 334, 350, 374 A.2d 671, 679 (1977) (citation omitted). Thus, if the TRM is a statement of policy, it does not have the full force and effect of law and cannot be employed to unilaterally revise approved EE&C plans.

Fourth, if the TRM is considered a guideline it is not binding. A guideline is "[a] document, other than an adjudication, interpretation or regulation, which announces the policy an agency intends to implement in future rulemakings, adjudications or which will otherwise guide

the agency in the exercise of administrative discretion. The document may not amend, repeal or suspend a published regulation or otherwise effectively circumscribe administrative choice, but shall establish a framework within which an agency exercises administrative discretion.” 1 Pa. Code § 1.4.

Fifth, if the TRM is considered an interpretation, it is also non-binding. An interpretation is, “[a] statement of policy, other than a guideline, which is issued by an agency without reliance upon express or implied rulemaking authority, or which is issued by an agency which does not have express or implied rulemaking authority with regard to the matters covered by the document. The document may not amend, repeal or suspend a published regulation. If it is unclear whether an agency intended to rely upon rulemaking authority in adopting a document, a document with substantial impact upon the public shall be classified as a regulation, rather than an interpretation.” 1 Pa. Code § 1.4.

As the TRM is neither a statute nor a regulation, it cannot require PPL Electric to modify its existing Commission-approved EE&C Plan. Moreover, to the extent that the TRM is a statement of policy, a guideline or an interpretation, it does not establish a binding requirement that the Company must implement the proposed changes in its 2009-2013 EE&C Plan. Therefore, if the Commission approves the 2011 TRM update, as proposed, it may not require EDCs to modify their existing EE&C plans. Instead, the 2011 TRM will serve as vital guidance to the EDCs in identifying potential modifications to their current Commission-approved EE&C plans and/or preparing their next EE&C plan. In either case, EDCs will seek Commission approval to make such changes via a separately filed petition and to the extent necessary, the development of an evidentiary record.

2. The 2011 TRM Cannot Be Used To Modify PPL Electric's Commission-approved 2009-2013 EE&C Plan

It is clear from the Commission's Tentative Order that if the proposed 2011 TRM update is approved, EDCs are required to implement the revised deemed savings calculations for the residential CFL and refrigerator/freezer programs, as well as several other changes, beginning on June 1, 2011. Tentative Order, p. 5. Despite the Commission's purported view that the June 1, 2011 date makes these changes "prospective" in nature, requiring EDCs to apply these 2011 TRM modifications to their current plans is a retroactive modification of the EDC's Commission-approved 2009-2013 EE&C plans.

As detailed in Section IV above, PPL Electric relied upon the Commission's 2009 TRM to develop its current plan. Similarly, the Commission relied upon the 2009 TRM to evaluate PPL Electric's EE&C Plan. Further, the deemed savings calculations for the residential CFL and refrigerator/freezer retirement programs were fundamental components used by PPL Electric to develop and by the Commission to approve the Company's 2009-2013 EE&C Plan. It is an improper retroactive modification of PPL Electric's Commission-approved 2009-2013 EE&C Plan for the Commission to now, through a TRM update, modify the calculations used to develop and approve PPL Electric's 2009-2013 EE&C Plan, even if only applied to the remaining two years of the current plan.

Regardless of whether the TRM update is considered a statute, a regulation, a statement of policy, a guideline or an interpretation, it cannot be retroactively applied to PPL Electric's Commission-approved 2009-2013 EE&C Plan. "Statutory construction rules apply equally to the interpretation of administrative regulations." *Wheeling-Pittsburgh Steel Corp. v. Department of Environmental Protection*, 979 A.2d 931, 937 (Pa. Cmwlth. 2009). *See also Riley v. Workers'*

Compensation Appeal Board (DPW/Norristown State Hosp.), 997 A.2d 382, 390 (Pa. Cmwlth. 2010).

Section 1926 of the Statutory Construction Act of 1972, 1 Pa.C.S. § 1926, provides that “[n]o statute shall be construed to be retroactive unless clearly and manifestly so intended by the General Assembly.” Additionally, a change in a statute may be retroactively applied where it is merely procedural and does not alter any substantive rights. *Montgomeryville Airport, Inc. v. Workmen’s Compensation Appeal Board (Weingrad)*, 541 A.2d 1187 (Pa. Cmwlth. 1988). A substantive right is implicated when the retroactive application of a statute imposes new legal burdens on past transactions. *McCormick v. Workers’ Compensation Appeal Board (City of Phila.)*, 734 A.2d 473 (Pa. Cmwlth. 1999). On the other hand, procedural changes establish the method for enforcing a right but have no bearing on whether a party has a legal entitlement to relief under the facts as they exist in a particular case. *Id.* at 477.

It is a well-established rule of statutory construction that statutes, other than those affecting procedural matters, must be construed prospectively except where the legislative intent that they shall act retrospectively is so clear as to preclude all question as to the intention of the legislature. *Farmers National Bank & Trust Co. v. Berks County Real Estate Co.*, 333 Pa. 390, 5 A.2d 94 (1939). This principle has been promulgated as law by our legislature in 1 Pa.C.S. § 1926, which provides:

No statute shall [be] construed to be retroactive unless clearly and manifestly so intended by the General Assembly.

This rule has been applied to the regulations of administrative agencies. See *Jenkins Unemployment Compensation Case*, 162 Pa. Superior Ct. 49, 56 A.2d 686 (1948). It is also axiomatic that administrative agencies may adopt retroactive regulations so long as they do not destroy vested rights, impair contractual obligations, or violate the principles of due process of

law and *ex post facto* laws. *Ashbourne School v. Department of Education*, 403 A.2d 161 (Pa. Cmwlth. 1979).

The proposed changes to the 2011 TRM and the requirement that these changes be applied retroactively to PPL Electric's Commission-approved 2009-2013 EE&C Plan are not merely procedural in nature. As addressed above, the Commission's proposed modifications to the CFL and refrigerator/freezer deemed savings calculations contained in the 2011 TRM update will substantially impact PPL Electric's 2009-2013 EE&C Plan and jeopardize the Company's ability to meet its Act 129 requirements. Moreover, these changes will impair and interfere with PPL Electric's expectations/obligations under its previously approved 2009-2013 EE&C Plan. It is improper for the Commission now, through an update to the TRM, to retroactively require PPL Electric to modify critical elements of its 2009-2013 EE&C Plan and, if applied, would seriously jeopardize its ability to meet its Act 129 requirements.²²

3. Requiring PPL Electric to modify its 2009-2013 EE&C Plan to comply with the 2011 TRM violates the Public Utility Code and Ignores the Commission's *Implementation Order* and *PPL Electric's 2009-2013 Order*

As addressed above, the TRM was intended by the Commission to provide guidance to the EDCs in developing and implementing their EE&C plans. However, as proposed in the tentative Order, the Commission is requiring that EDCs in June 2011 to implement revised deemed savings calculations for residential CFL and refrigerator/freezer measures as well as other implementation aspects of the current 2009-2013 EE&C plans. Therefore, through the

²² In addition, even if construed as applying prospectively only, the Tentative Order would be unlawful under established principles of detrimental reliance and equitable estoppel. As discussed above, PPL Electric reasonably relied upon the Commission's *Implementation Order* and its 2009 TRM to serve as a guidance document in preparing its 2009-2013 EE&C Plan. Further, since receiving Commission approval of its 2009-2013 EE&C Plan in October 2009, PPL Electric has implemented its Commission-approved EE&C Plan consistent with the terms approved by the Commission, including the deemed savings calculations for the residential CFL and Appliance Recycling programs to evaluate and monitor the operation of its EE&C Plan. The proposed modifications to the deemed savings calculations for these two programs and requiring that be applied beginning in June 2011 would give rise to claims in equitable estoppel and detrimental reliance.

2011 TRM, the Commission seeks to modify the means by which the EDCs' compliance with Act 129 will be measured. The TRM does not set the standards by which EDC compliance with Act 129 is determined. It is intended to provide guidance to the EDCs in developing and implementing their EE&C plans. Instead, EDC compliance is determined based upon an evaluation of the results of its Commission-approved EE&C plan and whether the EDC has met its prescribed Act 129 obligations. The Commission's proposal to require EDC compliance with the 2011 TRM violates the Public Utility Code for the reasons set forth below.

a. Amending PPL Electric's Commission-approved 2009-2013 EE&C Plan via 2011 TRM violates 66 Pa.C.S. § 703(g)

Section 703(g) of the Public Utility Code provides that the Commission "may...after notice and opportunity to be heard...rescind or amend any order made by it." 66 Pa.C.S. § 703(g). A party under 703(g) must be provided notice and an opportunity to be heard on the change in a previous order. *Armstrong Telecommunications, Inc., Petitioner v. Pennsylvania Public Utilities Commission*, 835 A.2d 409, 419 (Pa Cmwlth 2003). Therefore, the Commission is required to provide notice of its intent to rescind or amend its October 26, 2009 order approving PPL Electric's EE&C Plan. In addition, by its Act 129 *Implementation Order* and its order approving PPL Electric's EE&C Plan, the Commission established the process by which EDC EE&C plans will be evaluated and modified. However, by its proposed requirement that EDCs modify their Commission-approved 2009-2013 EE&C plans based on the 2011 TRM update, the Commission is ignoring Section 703(g) and the process it has established for EDCs to modify their EE&C plans.

Specifically, the Commission's *Implementation Order* requires EDCs to submit an annual report documenting the effectiveness of their EE&C Plans, the measurement and verification of energy savings, and the evaluation of cost-effectiveness of expenditures. In addition, the

Commission requires EDCs to file petitions to modify their current EE&C plans. Specifically, in PPL Electric's EE&C Plan order, the Commission stated in pertinent part:

Because the EDC's Act 129 Plan will be approved by Commission Order, procedures for rescission and amendment of Commission orders must be followed to amend that Order and to assure due process for all affected parties. See 66 Pa.C.S. § 703(g)(relating to fixing of hearing: rescission and amendment of orders). Accordingly, if the EDC believes that it is necessary to modify its Act 129 Plan, the EDC may file a petition requesting that the Commission rescind and amend its prior Order approving the plan. See 52 Pa. Code § 5.41 (relating to petitions generally) and 5.572 (relating to petitions for relief).

The EDC's petition should explain the specific reasons supporting its requested modifications to its approved plan, i.e., the shifting of funds between programs or customer classes, the discontinuation of a program, etc. The petition should also contain a request to modify its cost recovery mechanism. Evidence supporting the modification of the plan and the cost recovery mechanism shall be submitted with the petition.

Petition of PPL Electric Utilities Corporation for Approval of its Energy Efficiency and Conservation Plan, Docket No. M-2009-2093216 (Order Entered October 26, 2009) at 91- 92.

Consistent with the Commission's orders, PPL Electric filed its 2010 Act 129 annual report on September 15, 2010. Concomitantly, pursuant to Section 703(g), the Company filed a petition requesting Commission approval to make certain modifications to its EE&C Plan. PPL Electric's petition was subject to an evidentiary hearing and the Administrative Law Judges' Recommended Decision was issued on December 17, 2010.

Despite the Commission approved process to evaluate EDC EE&C plans and the statutorily required method to amend these plans, by its Tentative Order, it is evident that the Commission is attempting to bypass these processes and its own determination that Section 703(g) applies to EE&C plan revisions. By its Tentative Order, the Commission now seeks to modify the EDCs' previously approved EE&C plans through its 2011 TRM update. For example, the Commission seeks to require PPL Electric to apply revised CFL and

refrigerator/freezer deemed savings calculations to its Commission-approved 2009-2013 EE&C Plan. As discussed above, by its Tentative Order the Commission is bypassing the processes it established in its prior orders relative to amendments to EDC EE&C plans.

The Commission has not previously stated its intent to amend or rescind the Commission-approved EE&C plans through the TRM process. Indeed, for this first time in the 2011 TRM update, the Commission is purportedly requiring EDCs to make substantial modifications to their previously approved EE&C plans in a TRM update. Therefore, PPL Electric was not provided with adequate notice of the Commission's intent to modify its Commission-approved 2009-2013 EE&C plan through a TRM update. It is improper for the Commission to address a change to a prior order in a separate proceeding. *Armstrong Telecommunications, Inc., Petitioner v. Pennsylvania Public Utilities Commission*, 835 A.2d 409, 419 (Pa Cmwlth 2003).

b. Section 2806.1(b)(2) of Act 129 Establishes the Process for the Commission to Follow to Direct a Modification to a Company's Commission-approved

A Commission requirement that PPL Electric utilize the proposed modifications contained in the 2011 TRM Tentative Order in evaluating the effectiveness of its 2009-2013 EE&C Plan would effectively require the Company to revise its EE&C Plan to reduce the estimated savings for the residential CFL and refrigerator/freezer retirement programs and attempt to make up for the lost savings. It is improper for the Commission to direct PPL Electric to modify its Commission-approved 2009-2013 EE&C Plan via the general 2011 TRM update.

Section 2806.1(b)(2) of Act 129 establishes the procedure by which the Commission may direct an EDC to modify or terminate any part of an approved EE&C plan. 66 Pa.C.S. § 2806.1(b)(2). Section 2806.1(b)(2) of Act 129 requires the Commission, prior to directing an EDC to modify its EE&C plan, to first make a determination that a measure in an EDC's EE&C

Plan will not achieve the required reductions in consumption, prior to directing an EDC to modify or terminate any part of its approved EE&C Plan. In proposing amendments to the TRM relative to the CFL programs, the Commission has cited to a DOE study that references CFL programs in California and Oregon and Washington.

The Commission has not evaluated PPL Electric's Commission-approved 2009-2013 EE&C Plan. The Commission has made no evidentiary findings relative to the operation of PPL Electric's current plan or the effectiveness of its existing CFL and Appliance Recycling Programs. The Commission may not rely on a general order like the 2011 TRM update to avoid the necessity of requiring substantial evidence to support its action in a particular case. *Aizen v. Pennsylvania Public Utility Commission*, 60 A.2d 443, 449. (Pa. Super. 1948). Absent the Commission undertaking an independent analysis of PPL Electric's 2009-2013 EE&C Plan and the development of record evidence, the 2011 TRM update may not serve as the basis by which the Commission may direct PPL Electric to modify its 2009-2013 EE&C Plan.²³

4. The Commission's proposed modifications to the 2011 TRM are not supported by substantial evidence

The Commission, by its own admission, is proposing substantial changes to the TRM that will, if applied to PPL Electric's 2009-2013 EE&C Plan, require PPL Electric to make significant changes to its Commission-approved 2009-2013 EE&C Plan in order to meet its Act 129 obligations. Tentative Order, p. 5. However, as detailed in Section III above, the proposed modifications to deemed savings calculations for the residential CFL and refrigerator/freezer

²³ In addition to the claims stated herein, adoption of the Tentative Order, PPL Electric will have claims arising from the Fifth and Fourteenth Amendments to the United State Constitution, and Article I, §§ 1 and 10 of the Pennsylvania Constitution. The Commission's apparent requirement that the modifications to the TRM be applied by the EDCs to their 2009-2013 EE&C plans form the basis for claims of a regulatory taking, and violation of the guarantee of substantive and procedural due process.

measures, as well as many other aspects of the 2011 TRM update, are not supported by substantial evidence.

In an administrative proceeding, any finding of fact necessary to support a determination by an administrative agency must be based upon substantial evidence. *Met-Ed Indus. Users Group v. Pa. P.U.C.*, 960 A.2d 189, 193 n.2 (Pa. Cmwlth. 2008) (citing 2 Pa.C.S. § 704). In order to satisfy the substantial evidence test, factfinding must be based exclusively on the evidence admitted to the record in the proceeding. *Kyu Son Yi v. State Board of Veterinary Medicine*, 960 A.2d 864, 870-871 (Pa. Cmwlth. 2008) (holding that extra-record evidence cannot sustain an adjudication). Substantial evidence is such relevant evidence as a reasonable mind might accept as adequate to support a conclusion. *Borough of E. McKeesport v. Special/Temporary Civil Serv. Comm'n*, 942 A.2d 274, 281 (Pa. Cmwlth. 2008). Substantial evidence must be “more than a scintilla and must do more than create a suspicion of the existence of the fact to be established.” *Kyu Son Yi*, 960 A.2d at 874 (citation omitted).

The lack of substantial evidence to support several of the proposed modifications to 2011 TRM update changes is exemplified by the proposal to modify the CFL hours of use on the basis of a study based upon California CFL programs and a 2002 DOE study. Further, as detailed above, PPL Electric challenges the validity of the studies relied upon by the Commission to support its proposed modifications as there is significant doubt as to the applicability of this study to Pennsylvania and the EDC EE&C plans. Therefore, if the Commission were to apply this change to PPL Electric’s 2009-2013 EE&C Plan, it would do so without substantial evidence to support such a finding.

C. USE OF THE 2011 TRM UPDATE TO UNILATERALLY AMEND PPL ELECTRIC'S 2009-2013 EE&C PLAN IS POOR PUBLIC POLICY, AN ABUSE OF AGENCY DISCRETION AND THEREFORE UNLAWFUL

In addition to the issues identified and discussed above, the Commission's proposed requirement that PPL Electric modify its previously approved EE&C Plan based upon the 2011 TRM update would be poor public policy, and an abuse of agency discretion. As addressed above, by its Tentative Order, the Commission seeks to require EDCs to apply the proposed 2011 TRM modifications related to deemed savings calculations as well as other implementation related aspects to the EDCs' current Commission-approved EE&C plans. These proposed modifications are significant changes and, if required, will seriously jeopardize PPL Electric's ability to meet its Act 129 obligations. As shown above, the basis by which the Commission seeks to apply these modifications to PPL Electric's 2009-2013 EE&C Plan are technically flawed and procedurally deficient.

By requiring PPL Electric to apply the flawed changes contained in the 2011 TRM update to PPL Electric's 2009-2013 EE&C, the Commission is, in essence, changing the rules of the game at half-time. Consistent with the Commission's *Implementation Order*, PPL Electric relied upon the 2009 TRM to guide it in developing its 2009-2013 EE&C plan. Critical to the development of PPL Electric's EE&C Plan, as well as the Commission's approval of the plan, were the deemed savings calculations and implementation aspects approved by the Commission in its 2009 TRM. Since receiving Commission approval for its 2009-2013 EE&C Plan, PPL Electric has adhered to its Commission-approved EE&C Plan and in so doing has employed extensive efforts and spent considerable money to implement the plan in order to meet its Act 129 obligations.

By its proposed 2011 TRM update and its purported requirement that the EDCs apply modifications to the remaining two years of the EE&C Plan, the Commission will significantly

alter the rules that guided PPL Electric and the Commission relative to PPL Electric's 2009-2013 EE&C Plan. This is particularly inappropriate given the unusually prescriptive and non-discretionary provisions of Act 129, which establish mandatory usage reduction targets, mandatory compliance dates, and a strict limitation on expenditures. In addition, Act 129 provides for the potential for significant civil penalties ranging between \$1,000,000 and \$20,000,000. Following a full evidentiary proceeding, the Commission approved the Company's EE&C Plan on October 26, 2009. On these facts, for the Commission to now, through a general order updating the TRM, require the Company to substantially modify its EE&C Plan with just two years remaining on the program, and without substantial evidence is an abuse of discretion²⁴ and is poor public policy.

PPL Electric does not oppose the Commission's annual review and updating of the TRM. However, it is PPL Electric's position that the Commission may not require that subsequent revisions to the TRM be applied to previously approved EE&C plans without following established procedures and where the proposed revisions will seriously jeopardize an EDC's ability to comply with Act 129.

VI. SHOULD THE COMMISSION ADOPT THE PROPOSED 2011 TRM MODIFICATIONS, IT SHOULD CONSIDER ALTERNATIVE APPLICATIONS OF THE MODIFICATIONS

If Commission adopts the proposed modifications contained in the 2011 TRM and decides to apply these modifications as updates to EDC EE&C plans, PPL Electric recommends that the Commission consider alternative approaches to applying these modifications.

Specifically, PPL Electric recommends that:

²⁴ An abuse of discretion occurs when the judgment is manifestly unreasonable, where the law is not applied, or where the record shows that the action is a result of partiality, prejudice, bias, or ill will. *Payne v. W.C.A.B. (Elwyn, Inc.)*, 928 A.2d 377, 379 (Pa. Cmwlth. 2007). An abuse of discretion also "occurs when the findings are not supported by substantial evidence in the record." *Coal Gas Recovery, L.P. v. Franklin Twp. Z.H.B.*, 944 A.2d 832, 838 (Pa. Cmwlth. 2008).

- If adopted, the 2011 TRM update should not become effective until the EDC's next 4-year program cycle; or
- If the Commission adopts the 2011 TRM update and determines that the 2009-2013 EDC EE&C Plans are to be evaluated based upon these standards, EDC's should not be subject to civil penalties for not meeting their Act 129 obligations based upon the lost savings associated with the 2011 TRM modifications; or
- If the Commission adopts the proposed modifications contained in the 2011 TRM update and the Commission determines that the 2009-2013 EDC EE&C Plans, PPL Electric respectfully requests a waiver from the requirement to comply with the 2011 version of the TRM from June 1, 2011 through May 31, 2013.

Although PPL Electric does not waive its stated technical and legal objections to the proposed modifications to the 2011 TRM, it presents these alternatives for the Commission's consideration. Each of the above alternatives would result in the Commission's TRM being modified as proposed in the 2011 TRM Tentative Order. However, these alternatives would provide either the Commission or PPL Electric with the flexibility necessary to avoid either the application of these modifications to the Company's 2009-2013 EE&C Plan or the imposition of a civil penalty on PPL Electric for its failure to meet its Act 129 obligations due to the identified modifications.

As detailed in these comments, if the identified changes to the CFL, refrigerator/freezer recycling, and other measures are applied to PPL Electric's 2009-2013 EE&C Plan, these changes will substantially impact PPL Electric's EE&C Plan and jeopardize its ability to meet its Act 129 obligations. Should PPL Electric not be able to meet its Act 129 obligations, it would be subject to potential civil penalty ranging between \$1,000,000 and \$20,000,000 and the Commission would be placed in the position of taking over responsibility of the Company's EE&C Plan to achieve the required reductions in consumption.

VII. CONCLUSION

As stated above, the Commission's proposed 2011 TRM update is both technically and procedurally flawed and should be revised. Accordingly, PPL Electric respectfully request that the Commission modify the proposed 2011 TRM update consistent with the PPL Electric's comments.

Respectfully submitted,



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Date: December 27, 2010

Attorneys for PPL Electric Utilities Corporation

**BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION**

Implementation of the Alternative Energy :
Portfolio Standards of 2004: Standards for : Docket No. M-00051865
the Participation of Demand Side :
Management Resources- Technical :
Reference Manual 2011 Update :

**VERIFIED STATEMENT
OF
M. HOSSEIN HAERI**

1. I am M. Hossein Haeri, PhD., and I am employed by The Cadmus Group, Inc. as a principal. My business address is 720 SW Washington Street, Portland, OR 97205. I am responsible for leading the Utility Planning and Assessment practice area within The Cadmus Group's Energy Services Group. I have a doctoral degree in regional science from the School of Urban Studies and Planning at Portland State University, and a Bachelor's degree in social science research from the University of Oregon. I have 25 years of experience in the energy utility industry in various capacities, including providing technical advice and planning consultation to energy utilities on matters related to resource planning, load forecasting, load research, market assessment, energy efficiency, demand response, portfolio assessment, and performance measurement.

2. The purpose of this Verified Statement is to provide support for the Comments of PPL Electric Utilities Corporation filed in Docket No. M-00051865 on December 27, 2010.

Compact Fluorescent Lamps Hours Of Use

3. The average daily hours of use (HOU) for compact fluorescent lamps (CFLs) is a key variable in calculating savings from replacing incandescent light bulbs with CFLs. The Technical Reference Manual (TRM), adopted by the Pennsylvania Public Utility Commission (PA PUC) in Docket No. M-000051865 and issued on May 28, 2009, establishes 3.0 HOU as a deemed value for calculating energy and peak load reduction savings toward Pennsylvania Act 129 EDC saving targets.

4. PPL Electric developed energy and demand savings estimates for its 2009–2013 CFL Campaign, using the deemed 3.0 HOU value. Given the CFL Campaign is a significant contributor to PPL Electric’s (and other Pennsylvania EDCs’) Act 129 Energy Efficiency and Conservation (EE&C) plan(s), any adjustment to assumptions concerning HOU for CFLs will likely have important implications for PPL Electric’s ability to meet Act 129 energy-saving targets.

5. On November 19, 2010, the Statewide Evaluator (SWE) recommended a revision to HOU for CFLs, lowering it to 1.9 from the deemed level of 3.0. Later, on December 17, 2010, the PA PUC issued Errata that referenced two documents as the source for the 1.9 HOU:

- A. U.S. Department of Energy’s (DOE) September 2010 CFL market profile.¹ This document, in turn, cites:
 - A study of the CFL market in California published by KEMA in February 2010.² (The 2010 KEMA study is discussed further below.)

¹ See, D&R International, Ltd. Energy Star CFL Market Profile: Data Trends and Market Insights. Prepared for the U. S. Department of Energy, September 2010.

² See, KEMA, Inc. (The Cadmus Group, Prime Contractor). *Final Evaluation Report: Upstream Lighting Program, Volume 1*. Prepared for California Public Utilities Commission, Energy Division, February 8, 2010 (KEMA, 2010).

- DOE's lighting market characterization published in 2002.³ The residential lighting values used in this study were from a 1996 study led by Tacoma Public Utilities (TPU), sponsored by the Bonneville Power Administration. The study relied on metered data to characterize general lighting use in the residential sector Oregon and Washington. The 2002 DOE study itself states reasons why the results of the TPU study may not be applicable specifically to CFLs and be transferable to other states. These are:

“...the database does not provide information on the type of fluorescent lamps installed. We examined those records and placed them in other categories based on our judgment.”

“The TPU study data, because it is isolated to one small region of the country and covers a period of only several months, poses an even more serious limitation when extrapolating to the rest of the country than does the XenCAP database [used in the non-residential analysis].”⁴

- B. A July 2008 study by Efficiency Vermont. Contrary to the Errata citation, however, this study reports 3.4 HOU.⁵

6. This document summarizes results of other relevant research on the subject of CFL HOU to provide a better perspective on the SWE's recommendation for such significant downward adjustment and whether using the 1.9 HOU value in Pennsylvania is justifiable.

7. In the 2009 TRM, the PA PUC cited the ENERGY STAR CFL calculator, sponsored by the U.S. Environmental Protection Agency (EPA) and DOE, as the 3.0 HOU assumption's source. A widely used, publically available tool from the ENERGY STAR Website, the

³ See, Navigant Consulting, Inc. *U.S. Lighting Market Characterization, Volume I: National Lighting Inventory and Energy Consumption Estimate*. Prepared for U. S. Department of Energy, Office of Energy Efficiency and Renewable Energy Building Technologies Program, September 2002 (Navigant Consulting, 2002).

⁴ Navigant, 2002, p. 16.

⁵ The July 2008 Efficiency Vermont study referenced in the Errata does not appear to be publicly available. However, excerpts from what appears to be an updated version of the study are available from: http://www.veic.org/ResourceLibrary/VEIC_Resources_on_Program_Evaluation.aspx (see Efficiency Vermont. Technical Reference User Manual (TRM): Measure Savings Algorithms and Cost Assumptions. February 9, 2010. Available from: <http://www.veic.org/Libraries/Resumes/TechManualEVT.sflb.ashx>. Accessed December 21, 2010.) For the residential sector, the report shows 1,241 operating hours per year for CFLs. This is equivalent to 3.4 HOU per day (computed as 1,241 HOU/year ÷ 365 days/year).

ENERGY STAR CFL calculator computes lifetime energy and cost savings for incandescent-to-CFL replacements.⁶

8. In addition to the ENERGY STAR calculator, HOU values have been researched and reported in a number of recent and forthcoming studies in other state jurisdictions. Table 1 summarizes the results of these studies.⁷

Table 1. Summary of Recent CFL Studies with Reported HOU Values

Author	Publication Date	Geographic Region Covered	HOU
The Cadmus Group	Forthcoming	Illinois	2.74 (preliminary)
The Cadmus Group	Forthcoming	Maryland	2.98 (preliminary)
KEMA, Inc. (The Cadmus Group, Prime Contractor)	February 8, 2010	CA (PG&E, SCE, and SDG&E service areas)	1.9
Nexus Market Research, Inc. et. al.	January 20, 2009	CT, MA, RI, VT	2.8
Northwest Regional Technical Forum	April 6, 2010	Pacific Northwest	2.32
Vermont Energy Investment Corporation	Forthcoming	Ohio	2. ⁸⁵ (preliminary)

9. As shown, HOU estimates range from 1.9 in a KEMA study for California to 2.98 in a forthcoming study by Cadmus in Maryland.

10. The average HOU proposed by the SWE's corresponds with the lowest value reported in these studies. In my judgment, there are a number of technical and market-related reasons why the 1.9 value may not be applicable to conditions in Pennsylvania. These include:

- A. **Average annual sunshine:** Artificial light is used more extensively in regions experiencing less natural light. California has more annual sunshine than many other

⁶ See: http://www.energystar.gov/index.cfm?fuseaction=find_a_product.showProductGroup&pgw_code=LB.

⁷ See KEMA, 2010. Nexus Market Research, Inc., RLW Analytics, Inc., and GDS Associates, *Residential Lighting Markdown Impact Evaluation*, Prepared for Markdown and Buydown Program Sponsors in Connecticut, Massachusetts, Rhode Island, and Vermont, January 20, 2009. Northwest Regional Technical Forum, <http://www.nwcouncil.org/energy/rtf/measures/Default.asp>, accessed December 14, 2010. Vermont Energy Investment Corporation. *DRAFT State of Ohio Energy Efficiency Technical Reference Manual, Including Predetermined Savings Values and Protocols for Determining Energy and Demand Savings*, Prepared for the Public Utilities Commission of Ohio, August 6, 2010.

regions of the country, including Pennsylvania. Table 2 shows the average annual sunshine (as percent of maximum) for major cities in California and Pennsylvania. The data indicate 38 percent higher sunshine for the listed cities in California (75 percent) than those in Pennsylvania (53 percent) on average.

Table 2. Annual Percent Possible Sunshine for Cities in California and Pennsylvania⁸

State	City	Annual % Average Possible Sunshine
California	Redding	88%
	Fresno	79%
	Sacramento	78%
	Los Angeles County	73%
	San Diego	68%
	San Francisco	66%
Pennsylvania	Harrisburg	58%
	Philadelphia	56%
	Allentown	53%
	Avoca (near Wilkes-Barre)	51%
	Pittsburgh	45%

- B. **Customer demographics and environmental awareness:** Demographic variables, particularly income and education, as well as customer awareness of and concern about environmental issues, have been found to predict CFL usage.⁹
- C. **Electricity prices:** The retail price of electricity can be a driver in energy-efficiency program participation and adoption of energy efficiency measures. Electric rates in California have historically been higher than the national average.
- D. **History of utility-sponsored CFL programs and regional maturity of the CFL market:** California IOUs have some of the longest-running CFL programs in the country: they have promoted the use of CFLs to their residential customers since 1989. Over that time, California has experienced significant increases in consumer awareness of CFLs, CFL availability, and per-household CFL sales, as well the potential effects of these programs in stimulating the supply of and lowering product prices.¹⁰ Pennsylvania's CFL programs, in contrast, were launched in 2010.
- E. **Market saturation and location of CFLs in the home:** As shown in the California study cited by the SWE, the first several CFLs purchased by households, are typically installed

⁸ See, National Oceanic and Atmospheric Administration. Ranking of Cities Based on % Annual Possible Sunshine. <http://www.ncdc.noaa.gov/oa/climate/online/ccd/pctposrank.txt>. Accessed December 20, 2010.

⁹ See, The Cadmus Group, KEMA, Itron, Inc., Nexus Market Research, and A. Goett Consulting. *Compact Fluorescent Lamps Market Effects Final Interim Report*. Prepared for California Public Utilities Commission, Energy Division, May 15, 2009 (The Cadmus Group, 2009).

¹⁰ See, The Cadmus Group, KEMA, Itron, Inc., Nexus Market Research, and A. Goett Consulting. *Compact Fluorescent Lamps Market Effects Final Report*. Prepared for California Public Utilities Commission, Energy Division. April 12, 2010 (The Cadmus Group, et. al., 2010).

in higher-use areas within a house; as CFL saturation in a home increases, the average CFL HOU tends to decline.¹¹ California homes have a higher CFL saturation rate than do homes in states with lower market saturations of CFL like Pennsylvania. For example, in 2008 (before Pennsylvania's CFL programs were launched), CFL saturation Pennsylvania homes was 29 percent. In the same year, California had a 35 percent saturation of CFLs.¹²

11. The comparatively high HOUs found in the Maryland, Ohio, New England, and Illinois studies are attributable to the factors listed above as well. In these regions there are: less annual sunshine than in California, different electricity pricing, newer CFL programs and therefore less transformed CFL markets, and different demographic make-ups.

12. Given the wide range of HOU values shown in Table 1, there does not appear to be any one value that is universally applicable to all areas of the United States. Furthermore, I am not aware of any existing models or algorithms that can be used to accurately estimate a CFL HOU for a given region. In the absence of an "off the shelf" value, a Pennsylvania-based, statewide, research and data acquisition effort would be the best way to develop the value that is appropriate for Pennsylvania.

13. The ENERGY STAR calculator currently is under revision, and, at the time of this writing, the HOU for the revised calculator has yet to be finalized. Until an updated ENERGY STAR calculator is released, the calculator available through ENERGY STAR's Website continues to assume 3.0 HOU.

14. In my judgment, it is appropriate to periodically refine the deemed values in a TRM as new and better information becomes available from local evaluations. However, making mid-course changes that dramatically alter the outcomes of an EDC's approved EE&C plan is

¹¹ See, KEMA, 2010.

¹² Saturations are for CFLs in medium screw-base sockets. See, The Cadmus Group, et. al., 2010.

unreasonable. Any such change should, more appropriately, be made at the end of a planning cycle and, more importantly, only if they are based on irrefutably superior data.

**BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION**

Implementation of the Alternative Energy	:	
Portfolio Standards of 2004: Standards for	:	
the Participation of Demand Side	:	Docket No. M-00051865
Management Resources – Technical	:	
Reference Manual 2011 Update	:	

VERIFICATION

I, M. Hossein Haeri, PhD., being duly sworn according to law, depose and state that I am employed by The Cadmus Group, Inc. as a principal, having a doctoral degree in regional science from the School of Urban Studies and Planning at Portland State University, and a Bachelor's degree in social science research from the University of Oregon, have 25 years of experience in the energy utility industry in various capacities, including providing technical advice and planning consultation to energy utilities on matters related to resource planning, load forecasting, load research, market assessment, energy efficiency, demand response, portfolio assessment, and performance measurement; that I am authorized to make this verification on behalf of PPL Electric Utilities Corporation; and that the facts set forth in Appendix 1 are true and correct to the best of my knowledge, information and belief; and that I expect to be able to prove the same at any hearing hereof. I understand that the statements herein are made subject to the penalties of 18 Pa.C.S. § 4904 relating to unsworn falsification to authorities.

Date: December 22, 2010



M. Hossein Haeri, PhD.

1.1 Ductless Mini-Split Heat Pumps

Measure Name	Ductless Heat Pumps
Target Sector	Residential Establishments
Measure Unit	Ductless Heat Pumps
Unit Energy Savings	
Unit Peak Demand Reduction	
Measure Life	15

ENERGY STAR ductless "mini-split" heat pumps (DHP) utilize high efficiency SEER/EER and HSPF energy performance factors of 14.5/12 and 8.2, respectively, or above. This technology typically converts an electric resistance home into an efficient single or multi-zonal ductless heat pump system.

Deleted: Homeowners have choice to install an ENERGY STAR qualified model or a standard efficiency model.

Eligibility

This protocol documents the energy savings attributed to ductless mini-split heat pumps with energy efficiency performance of 14.5/12 SEER/EER and 8.2 HSPF or greater with inverter technology.¹ The baseline heating system could be an existing electric resistance heating, a lower-efficiency ductless heat pump system, a ducted heat pump, electric furnace, or a non-electric fuel-based system. The baseline cooling system can be either a standard efficiency heat pump system, central air conditioning system, or room air conditioner. In addition, this could be installed in a new construction or addition. For new construction or addition applications, the baseline assumption is a standard-efficiency ductless unit. The DHP systems could be installed as the primary heating system for the house or as a secondary heating or cooling system for a single room.

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Algorithms

The savings depend on three main factors: baseline condition, usage (primary or secondary heating system), and the capacity of the indoor unit.

The algorithm is separated into two calculations: single zone and multi-zone ductless heat pumps. The savings algorithm is as follows:

Single Zone:

$$\Delta kWh = \Delta kWh_{cool} + \Delta kWh_{heat}$$

$$\Delta kWh_{heat} = CAPY/1000 \times (1/HSPF_b - 1/HSPF_e) \times EFLH \times LF$$

$$\Delta kWh_{cool} = CAPY/1000 \times (1/SEER_b - 1/SEER_e) \times EFLH \times LF$$

$$\Delta kW_{peak} = CAPY/1000 \times (1/EER_b - 1/EER_e) \times CF$$

Deleted: Note, that if the customer did not have a cooling system installed prior, there may be a negative cooling energy impact.[†]

[†] The measure energy efficiency performance is based on ENERGY STAR minimum specification requirements as specified in ARHI and CEE directory for ductless mini-split heat pumps. Ductless heat pumps fit these criteria and can easily exceed SEER levels of 16 or greater.

Multi-Zone

ΔkWh = $\Delta kWh_{cool} + \Delta kWh_{heat}$

ΔkWh_{heat} = $[CAPY/1000 \times (1/HSPFb - 1/HSPFe) \times EFLH \times LF]_{ZONE1} +$
 $[CAPY/1000 \times (1/HSPFb - 1/HSPFe) \times EFLH \times LF]_{ZONE2} +$
 $[CAPY/1000 \times (1/HSPFb - 1/HSPFe) \times EFLH \times LF]_{ZONE n}$

ΔkWh_{cool} = $[CAPY/1000 \times (1/SEERb - 1/SEERe) \times EFLH \times LF]_{ZONE1} +$
 $[CAPY/1000 \times (1/SEERb - 1/SEERe) \times EFLH \times LF]_{ZONE2} +$
 $[CAPY/1000 \times (1/SEERb - 1/SEERe) \times EFLH \times LF]_{ZONE n}$

ΔkW_{peak} = $[CAPY/1000 \times (1/EERb - 1/EERe) \times CF]_{ZONE1} + [CAPY/1000$
 $\times (1/EERb - 1/EERe) \times CF]_{ZONE2} + [CAPY/1000 \times (1/EERb -$
 $1/EERe) \times CF]_{ZONE n}$

Deleted: Note, that if the customer did not have a cooling system installed prior, there may be a negative cooling energy impact.¶

Definition of Terms

CAPY = The cooling or heating (at 47F) capacity of the indoor unit, given in BTUH as appropriate for the calculation

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EFLH = Equivalent Full Load Hours – If the unit is installed as the primary heating or cooling system as defined in Table 2-25, the EFLH will use the EFLH primary hours listed in Table 2-24. If the unit is installed as a secondary heating or cooling system, the EFLH will use the EFLH secondary hours listed in Table 2-24.

Deleted: ; that is, in a living room or large room of the house

Deleted: be equivalent to those for a central heating system

Deleted: be equivalent to a room unit (ie. for cooling, equivalent to a room AC system)

HSPFb = Heating efficiency of baseline unit

HSPBe = Efficiency of the installed DHP

SEERb = Cooling efficiency of baseline unit

SEERe = Efficiency of the installed DHP

EERb = Energy Efficiency Ratio of the baseline unit

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EERe = Energy Efficiency Ratio of the efficient unit

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LF = Load factor

Table Error! No text of specified style in document.-1: DHP – Values and References

Component	Type	Values	Sources
CAPY	Variable		AEPS Application; EDC Data Gathering
EFLH primary	Fixed	Allentown Cooling = 784 Hours Allentown Heating = 2,492 Hours Erie Cooling = 482 Hours Erie Heating = 2,901 Hours Harrisburg Cooling = 929 Hours Harrisburg Heating = 2,371 Hours Philadelphia Cooling = 1,032 Hours Philadelphia Heating = 2,328 Hours Pittsburgh Cooling = 737 Hours Pittsburgh Heating = 2,380 Hours Scranton Cooling = 621 Hours Scranton Heating = 2,532 Hours Williamsport Cooling = 659 Hours Williamsport Heating = 2,502 Hours	1
EFLH secondary	Fixed	Allentown Cooling = 243 Hours Allentown Heating = 1,671 Hours Erie Cooling = 149 Hours Erie Heating = 2,138 Hours Harrisburg Cooling = 288 Hours Harrisburg Heating = 1,681 Hours Philadelphia Cooling = 320 Hours Philadelphia Heating = 1,565 Hours Pittsburgh Cooling = 228 Hours Pittsburgh Heating = 1,670 Hours Scranton Cooling = 193 Hours Scranton Heating = 1,806 Hours Williamsport Cooling = 204 Hours Williamsport Heating = 1,750 hours	2, 3
HSPFb	Fixed	Standard DHP: 7.7 Electric resistance: 3.413 ASHP: 7.7 Electric furnace: 3.242 <u>No existing or non-electric heating: use standard DHP: 7.7</u>	4, 6

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Component	Type	Values	Sources
SEERb	Fixed	DHP, ASHP, or central AC: 13 Room AC: 11 <u>No existing cooling for primary space: use DHP, ASHP, or central AC: 13</u> <u>No existing cooling for secondary space: use Room AC: 11</u>	5, 6, 7
HSPFe	Variable	Based on nameplate information. Should be at least ENERGY STAR.	AEPS Application; EDC Data Gathering
SEERe	Variable	Based on nameplate information. Should be at least ENERGY STAR.	AEPS Application; EDC Data Gathering
CF	Fixed	70%	8
EERb	Fixed	= (11.3/13) X SEERb for DHP or central AC = 9.8 room AC	5,9
EERe	<u>Variable</u>	<u>Based on nameplate information. Should be at least ENERGY STAR.</u>	<u>AEPS Application;</u> <u>EDC Data Gathering.</u>
LF	Fixed	25%	10

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Sources:

1. US Department of Energy, ENERGY STAR Calculator. Accessed 3/16/2009. From Pennsylvania's Technical Reference Manual.
2. Secondary cooling load hours based on room air conditioner "corrected" EFLH workpaper that adjusted the central cooling hours to room AC cooling hours: see Section 2.12 Room AC Retirement measure.
3. Secondary heating hours based on a ratio of HDD base 68 and base 60 deg F. The ratio is used to reflect the heating requirement for secondary spaces is less than primary space as the thermostat setpoint in these spaces is generally lowered during unoccupied time periods.
4. COP = 3.413 HSPF for electric resistance heating. Electric furnace efficiency typically varies from 0.95 to 1.00 and thereby assumed a COP 0.95 = 3.242.
5. Federal Register, Vol. 66, No. 14, Monday, January 22, 2001/Rules and Regulations, p. 7170-7200.
6. Air-Conditioning, Heating, and Refrigeration Institute (AHRI); the directory of the available ductless mini-split heat pumps and corresponding efficiencies (lowest efficiency currently available). Accessed 8/16/2010.
7. SEER based on average EER of 9.8 for room AC unit. From Pennsylvania's Technical Reference Manual.
8. Based on an analysis of six different utilities by Proctor Engineering. From Pennsylvania's Technical Reference Manual.
9. Average EER for SEER 13 unit. From Pennsylvania's Technical Reference Manual.

Deleted: by "Approved Interim PA TRM Protocol for Room AC Recycling", August 2010

Deleted: load

Deleted: of central cooling hours to room cooling hours multiplied by the central heating hours

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10. The load factor is used to account for inverter-based DHP units operating at partial loads. The value chosen was to align savings to be comparable to what is seen in other jurisdictions, including: personal communication with Bruce Manclark, Delta-T, Inc. who is working with Northwest Energy Efficiency Alliance (NEEA) on the Northwest DHP Project <http://www.nwductless.com/>, and the results found in the "Ductless Mini Pilot Study" by KEMA, Inc., June 2009. The need for this adjustment is partially to account for part load conditions and partly because the EFLH used are based on central ducted systems which may be somewhat overestimating actual usage patterns for baseboard systems.

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Definition of Heating Zone

Definition of primary and secondary heating systems depends primarily on the location where the source heat is provided in the household, and shown in Table Error! No text of specified style in document.-2.

Table Error! No text of specified style in document.-2: Heating Zones

Component	Definition
Primary Heating Zone	Living room Dining room House hallway Kitchen areas <u>Family Room</u> <u>Recreation Room</u>
Secondary Heating Zone	Bedroom Bathroom Basement Storage Room Office/Study <u>Laundry/Mudroom</u> <u>Sunroom/Seasonal Room</u>

Deleted: /Recreation Room

Deleted: Add-on room

Measure Life

According to an October 2008 report for the CA Database for Energy Efficiency Resources, a heat pump's lifespan is **15 years**.²

Evaluation Protocols

The most appropriate evaluation protocol for this measure is verification of installation coupled with assignment of stipulated energy savings. A sample of pre and post metering is recommended to verify heating and cooling savings.

² DEER values, updated October 10, 2008. Various sources range from 12 to 20 years, DEER represented a reasonable mid-range. http://www.deeresources.com/deer0911planning/downloads/EUL_Summary_10-1-08.xls