**PENNSYLVANIA**

**PUBLIC UTILITY COMMISSION**

**Harrisburg, PA. 17105-3265**

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|  | Public Meeting held August 30, 2012 |
| Commissioners Present: |  |

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| Robert F. Powelson, Chairman |
| John F. Coleman, Jr., Vice Chairman |
| Wayne E. Gardner  James H. Cawley  Pamela A. Witmer |
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| 2012 PA Total Resource Cost (TRC) Test | M-2012-2300653 |
| 2009 PA Total Resource Cost Test | M-2009-2108601 |

**ORDER**

**BY THE COMMISSION:**

Act 129 of 2008, 66 Pa. C.S. § 2806.1, directs the Commission to use a total resource cost (TRC) test to analyze the benefits and costs of the energy efficiency and conservation (EE&C) plans that certain electric distribution companies (EDCs) are required to file. The Pennsylvania TRC Test for Phase I of Act 129 was adopted by Commission order at Docket No. M-2009-2108601 on June 23, 2009 (*2009 PA TRC Test Order*). The Order was refined at the same docket on August 2, 2011 *(2011 PA TRC Test Order)*. On May 25, 2012, by tentative order, we solicited comments on further refinements for the PA TRC Test for Phase II of Act 129. This order makes further refinements to the PA TRC Test for use during Phase II of Act 129 that begins June 1, 2013.

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1. **INTRODUCTION**
2. **Background and History[[1]](#footnote-1)**

Act 129 requires an EDC with 100,000 or more customers to adopt an EE&C plan, subject to approval by the Commission, to reduce electric consumption. For Phase I of Act 129 (Phase I) each participating EDC was required to reduce electric consumption by at least one percent (1%) of the EDC’s expected load for the period from June 1, 2009, through May 31, 2010, adjusted for weather and extraordinary loads. This one percent (1%) reduction was to be accomplished by May 31, 2011. Further, by May 31, 2013, the EDC is required to have reduced its total annual weather-normalized consumption by a minimum of three percent (3%). Also, by May 31, 2013, the EDC is expected to have reduced its peak demand by a minimum of four-and-one-half percent (4.5%) of the EDC’s annual system peak demand in the 100 hours of highest demand, as measured against the EDC’s peak demand during the period from June 1, 2007, through May 31, 2008. Act 129 also addresses energy efficiency (EE) and demand reduction targets from June 1, 2013, forward. 66 Pa. C.S. §§ 2806.1(c)(3) and 2806.1(d)(2).[[2]](#footnote-2)

Act 129 required for Phase I that an analysis of the costs and benefits of each EDC’s EE&C plan, in accordance with a TRC Test, be submitted for approval by the Commission. In particular, Act 129 required an EDC to demonstrate that its plan is cost-effective using the TRC test and that the EDC provided a diverse cross section of alternatives for customers of all rate classes. 66 Pa. C.S. § 2806.1(b)(1)(i)(I). Act 129 defines a TRC Test as “a standard test that is met if, over the effective life of each plan not to exceed 15 years, the net present value of the avoided monetary cost of supplying electricity is greater than the net present value of the monetary cost of energy efficiency conservation measures.” 66 Pa. C.S. § 2806.1(m). Thus, the TRC Test is a critical measuring tool in determining the cost-effectiveness of the EDCs’ EE&C plans.

The purpose of using the TRC Test to evaluate EE&C programs is to track the relationship between the benefits to customers and the costs incurred to obtain those benefits. The TRC Test has historically been a regulatory test. Sections 2806.1(c)(3) and 2806.1(d)(2), as well as the definition of the TRC Test in Section 2806.1(m), provide that the TRC Test be used to determine whether ratepayers, as a whole, received more benefits (in reduced capacity, energy, transmission, and distribution costs) than the implementation costs of the EE&C plans.

In determining how to structure the TRC Test for Phase I, the Commission chose to utilize *The California Standard Practice Manual – Economic Analysis of Demand-Side Programs and Project*[[3]](#footnote-3)as the basis for the PA TRC Test. The PA TRC Test was last revised in 2011 at Docket No. M‑2009-2108601.

Act 129 also requires that the Commission determine if energy efficiency and demand response goals should be established beyond the Phase I goals. 66 Pa. C.S. §§ 2806.1(c)(3) and 2806.1(d)(2). The Commission has determined to continue the EE&C requirements for a second phase, Phase II. Phase II EE&C goals have been established at Docket No. M‑2012‑2289411. Therefore, it was necessary to address the PA TRC Test for Phase II.

As part of the process of addressing the PA TRC Test for Phase II, we proposed TRC Test requirements for Phase II in a tentative order at M-2012-2300653 (May 25, 2012) and solicited comments. Comments were filed by Citizen Power, Inc. (Citizen Power); Duquesne Light Company (Duquesne); FirstEnergy on behalf of Metropolitan Edison Company, Pennsylvania Electric Company, Pennsylvania Power Company, and West Penn Power Company (FirstEnergy); PECO Energy Company (PECO); PPL Utilities Corporation (PPL); Energy Association of Pennsylvania (EAP); Citizens for Pennsylvania’s Future (PennFuture) and Keystone Energy Efficiency Alliance (KEEA), jointly; Northeast Energy Efficiency Partnerships (NEEP) and Pace Energy and Climate Center (Pace), jointly; and EnerNOC, Inc. (EnerNOC). Reply comments were filed by FirstEnergy, PECO, and KEEA, Based on our review of the comments and reply comments, this order sets forth the 2012 PA TRC Test which builds on the 2011 TRC Test and the *California Manual* for the benefit/cost (B/C) analysis of EE&C plans for Phase II.

As determined during Phase I, the *California Manual* does not address all issues specific to Pennsylvania. For this reason, the Commission will continue to explore how best to structure and apply the TRC Test for Pennsylvania. The TRC Test for Phase II will be applicable throughout the course of Phase II, concluding May 31, 2016. However, many issues involved in the EE&C plans, program implementation, and operation of the TRC Test are ongoing in nature, and future updates may be proposed by stakeholders or the Commission as needed.

1. **TRC TEST EXPLAINED**

The PA TRC Test takes into account the combined effects of an EDC’s EE&C plan on both participating and non-participating customers based on the costs incurred by both the EDC and any participating customers. In addition, the benefits calculated for use in the TRC Test include the avoided supply costs, such as the reduction in transmission, distribution, generation, and capacity costs valued at marginal cost for the periods when there is a consumption reduction.[[4]](#footnote-4) The avoided supply costs are calculated using net program savings, *i.e.*, savings net of changes in energy use that would have happened in the absence of the program. The persistence of savings over time is also considered in the net savings.

Further, the costs used in the TRC Test include the costs of the various programs paid by an EDC (or a default service provider) and the participating customers,[[5]](#footnote-5) and reflect any net change in supply costs for the periods in which consumption is increased in the event of load shifting. Thus, for example, equipment, installation, operation and maintenance costs, costs of removal (less salvage value), and administrative costs, regardless of who pays for them, are included.

The results of the TRC Test are expressed as both a net present value (NPV) and a B/C ratio. The NPV is the sum of the discounted values of the net benefits of the EDC’s plan, programs, and measures over a specified period of time, *i.e.*, the expected useful life of the specific energy efficiency measures within the EDC’s programs and plan. The NPV is a measure of the change in the total resource costs due to the program. A discount rate must be established to calculate the net present value. The discount rate for the Pennsylvania TRC Test is the EDC’s weighted average cost of capital. An NPV above zero indicates that the program is a less expensive resource than the supply option upon which the marginal costs are based.

The B/C ratio is the ratio of the discounted total benefits of the energy efficiency program to the discounted total costs over the expected useful life of the energy efficiency measure. The B/C ratio gives an indication of the rate of return of this program to the utility and its ratepayers. A B/C ratio greater than one indicates that the program is beneficial to the utility and its ratepayers on a total resource cost basis. This is critical for evaluating the success of an EDC’s EE&C plans.[[6]](#footnote-6)

1. **TRC TEST TOPICS**
2. **Societal Test as part of the PA TRC Test**
3. Summary of Issue and Proposed Resolution

During Phase I, Pennsylvania did not use the Societal Test as part of the TRC Test.[[7]](#footnote-7) Inclusion of the Societal Test results in a variant or expanded TRC Test analysis that goes beyond the legislative intent of Act 129. In particular, the Societal Test attempts to quantify the change in total resource costs to society as a whole rather than in respect to a particular service territory. Act 129, however, specifically provides that only “monetary” benefits and costs are to be factored into the TRC Test.[[8]](#footnote-8) The Commission’s Tentative Order proposed that the PA TRC Test continue to exclude environmental and societal costs and benefits unless such costs and benefits are otherwise already embedded in the wholesale cost for the generation of electricity.

1. Discussion of Comments and Reply Comments

Citizen Power states that, while it believes that the Societal Test may more accurately capture the benefits and costs of EE&C plans, the TRC Test has worked efficiently to help deliver the benefits for Act 129. Citizen Power Comments at 1. PECO states that it supports the continued exclusion of environmental and societal costs because this exclusion is consistent with the intent of Act 129. PECO Comments at 2.

KEEA/PennFuture urge the Commission to include non-energy impacts (NEIs) in the PA TRC Test. They state that NEIs are real and quantifiable impacts that should be included as “monetary” benefits and costs. NEIs are categorized in terms of those experienced by utilities (*e.g.*, reduced customer arrearages), by efficiency program participants (*e.g.*, improved comfort, health, and safety), and by society (*e.g.*, reduced environmental impacts, health care costs, and national security costs). KEEA/PennFuture aver that the primary rationale for including NEIs in a TRC Test is to ensure internal consistency; in order for the TRC Test to be internally consistent, it must take into account participant benefits associated with EE measures, including non-energy benefits. Further, they state that excluding participant perspective NEIs would skew cost-effectiveness test results against EE which could result in under-investment in EE programs.

KEEA/PennFuture also recommend that the Commission require EDCs to identify all relevant NEIs for PA EE programs, develop quantitative estimates for all quantifiable NEIs, develop methodology for addressing NEIs that are not quantified, and pay particular attention to NEIs that are unique to low-income customers. According to KEEA/PennFuture, EDCs should hire independent contractors to develop the best PA-specific NEI estimates possible. KEEA/PennFuture suggest that the money required to implement their proposal could come from the EDCs’ evaluation, measurement, and verification (EM&V) budgets as a cost of the overall EE effort.

Further, KEEA/PennFuture assert that the Commission has already determined that customer avoided operating and maintenance costs should be included as a TRC benefit even though these costs do not fall under the “avoided monetary cost of supplying electricity” umbrella. They argue that it is inconsistent to allow for operation and maintenance savings but not allow fossil fuel or water savings to count.

KEEA/PennFuture provide examples of other states incorporating NEIs into their cost-effectiveness testing and provides a brief overview of possible methodologies that could be employed to estimate NEI impacts. KEEA/PennFuture acknowledge that NEIs are challenging to measure but to exclude them could cause key effects to be ignored. In sum, KEEA/PennFuture strongly advocate for the incorporation of NEIs in the TRC Test. KEEA/PennFuture Comments at 2-9. In reply comments, KEEA reiterated that PA EE&C programs are disadvantaged by the restrictive definition of the PA TRC Test which is limited only to electric fuels and excludes environmental and societal benefits. KEEA RC at 3.

NEEP/Pace similarly submit that cost-effectiveness screening should measure all quantifiable benefits created for customers by Act 129 EE programs. They commend the Commission’s approach to recognizing benefits in the PA TRC Test, but they believe that it is within the Commission’s authority to include certain quantifiable, non-electric benefits as well. NEEP/Pace aver that Act 129 will provide significant reductions in fossil fuels for space and water heating, as well as significant water savings, and that the Commission should allow EDCs to account for these savings, which are quantifiable in monetary terms and inherent in supplying energy to customers. Additionally, NEEP/Pace note that the TRC Test can be a key tool in calculating cost-effectiveness but request that the Commission consider supplementing the PA TRC Test with a Utility Cost Test (UTC), which focuses on the comparison between avoided supply costs and costs incurred by EE program administrators. NEEP/Pace Comments at 3-5.

In its reply comments, PECO recommends that the Commission reject KEEA/PennFuture’s and NEEP/Pace’s arguments. PECO states that proposals to include NEIs in the PA TRC Test are contrary to Section 2806.1(m) of Act 129 which specifies that only “avoided monetary costs of supplying electricity” are to be factored into the PA TRC Test. PECO continues that values included in the PA TRC Test need to be quantifiable and that it would be very difficult to obtain realistic NEI data for most programs. Further PECO asserts that KEEA/PennFuture do not offer any methodology for measuring impacts of NEIs nor do they provide evidence that such NEI costs and benefits would have a significant impact on TRC calculations. PECO RC at 2.

FirstEnergy also disagrees with KEEA/PennFuture and NEEP/Pace. FirstEnergy states one cannot assume that more programs would qualify for inclusion in an EE&C plan if more benefits are included. Even assuming there are more benefits, FirstEnergy believes that this could create more costs to support such benefits. Each potential benefit would require extensive analysis and the cost and effort of including NEIs in time to be useful for Phase II would far outweigh the benefit of incorporating them into the PA TRC Test. FirstEnergy maintains that there is no indication that there are insufficient cost-effective measures or programs currently available. FirstEnergy further avers that NEEP/Pace and KEEA/PennFuture are essentially asking that the Commission develop a cost-effectiveness test that is a hybrid between a true TRC Test and other tests that include societal benefits. FirstEnergy RC at 2-6.

1. Final Resolution

The Commission agrees with PECO that the proposals to include NEIs are contrary to the language included in Act 129. The statute states that only “avoided monetary costs of supplying electricity” are to be factored into the PA TRC Test. Both KEEA/PennFuture and NEEP/Pace contend that NEIs are quantifiable in monetary terms and inherent in supplying energy to customers and can therefore be included in the TRC Test. The Commission disagrees with this assessment. Even KEEA/PennFuture point out that NEIs are not easily measured.

We agree with FirstEnergy that there has been no showing that the EDCs need NEIs as cost-effective measures. We regard NEIs as subjective benefits. It would take a great deal of cost and effort to determine if their inclusion in the PA TRC Test would improve either the accuracy of the PA TRC Test or the cost-effectiveness of the EE&C plans. We do not find that such additional costs should be covered by an EDC’s EM&V budget as costs of the overall EE effort.

NEIs are contrary to the statutory language pertaining to the exclusion of societal and environmental costs from the PA TRC Test. While we appreciate KEEA/PennFuture’s and NEEP/Pace’s arguments as to why it could be beneficial to include NEIs in the TRC Test, the statute as it is currently written and the Pennsylvania TRC Test as it is currently structured, do not allow for the inclusion of non-energy impacts. Accordingly, the PA TRC Test will not factor in societal costs, environmental costs, or NEIs.

1. **Use of PA TRC Test Assumptions for Other Matters**
2. Summary of Issue and Proposed Resolution

Since PA TRC Test assumptions have to apply to a wide range of measures over a tight time frame, the 2009 and 2011 TRC Test assumptions were not developed to be used in prudence or cost of service inquiries. The Commission did not, however, find that a blanket exclusion was appropriate.[[9]](#footnote-9)

In the Tentative Order, we proposed, for Phase II, the EDCs and other parties continue not to be bound by TRC Test assumptions in prudence, cost of service, or other inquiries. If there are significant differences between the PA TRC Test assumptions and the assumptions or facts at issue in such other proceedings, parties may inquire into the validity of such differences in those, or in the PA TRC Test, proceedings.

1. Discussion of Comments and Reply Comments

KEEA/PennFuture supports the Commission’s position. KEEA/PennFuture Comments at 9. Other stakeholders did not provide comments on this issue.

1. Final Resolution

The Commission acknowledges KEEA/PennFuture’s support of the Commission’s position on this issue. For Phase II, the Commission will maintain the provision that EDCs and other parties will not be bound by PA TRC Test assumptions in prudence, cost of service, or other inquiries. If there are significant differences between the PA TRC Test assumptions and the assumptions or facts at issue in such other proceedings, parties may inquire into the validity of such differences in those, or in the PA TRC Test, proceedings.

1. **Level at Which to Measure PA TRC Test**
2. Summary of Issue and Proposed Resolution

Based on, 66 Pa. C.S. § 2806.1 (b)(1)(I), an EDC is to demonstrate that its EE&C plan is cost-effective using the TRC Test. For Phase I, each EDC’s EE&C plan was evaluated by the entirety of all its programs taken in total, *i.e.*, at the plan level.[[10]](#footnote-10) The overall determination as to whether an EDC’s plan was deemed cost-effective using the PA TRC Test was made at the plan level, and the PA TRC Test was applied at the plan level rather than at the component, program, or measure level. Further, all aspects of an EDC’s plan were included in the PA TRC testing analysis, so each EDC’s plan was evaluated by the entirety of all its programs taken in total. However, during Phase I the Commission did reject programs, included within EE&C plans, in which the ratio of benefits to costs indicated that programs were not an effective use of ratepayer funds.[[11]](#footnote-11), [[12]](#footnote-12)

The Commission proposed in its Tentative Order that, for Phase II, the PA TRC Test should continue to be applied at the plan level. While some programs may not pass the PA TRC Test, as long as all of the programs in an EDC’s EE&C plan taken in total pass the PA TRC Test, then the EDC’s EE&C plan will be deemed cost-effective. However, as was true for Phase I, we reserve the right to reject any program with a low TRC ratio, which indicates the program will not be cost-effective. Further, as was directed in Phase I, we proposed that all EDC plans provide information at the program level in order to facilitate interested parties and the Commission in reviewing the balance of programs that EDCs select for their EE&C plans. [[13]](#footnote-13)

1. Discussion of Comments and Reply Comments

KEEA/PennFuture support the Commission’s proposal to apply the TRC Test at the portfolio or plan level. KEEA/PennFuture Comments at 9. However, KEEA/PennFuture discourage the Commission from choosing to reject any program with a low TRC ratio. KEEA states that this would “obviate the benefits” of a plan approach. KEEA/PennFuture Comments at 10. PECO also supports applying the TRC Test at the plan level but has concerns regarding the Commission retaining the right to reject any program with a low TRC ratio. PECO requests clarification as to how a TRC ratio would be determined to be “low.” PECO requests the Commission to identify a range of TRC ratios that would trigger the Commission’s right to reject a program. PECO Comments at 2.

1. Final Resolution

For Phase II, we will continue to apply the PA TRC Test at the plan level and will continue to reserve the right to reject any program with a low TRC ratio. Accordingly, all EDCs’ plans must contain TRC ratios at the program level.

Additionally, identifying a range of TRC rejection ratios could preclude programs from being submitted and could possibly limit an EDC’s energy savings potential. Further, no methodology was suggested as to how to identify an appropriate range of low ratios. Finally, providing such a range of ratios could also be viewed as an attempt to micromanage the EDCs’ programs. Accordingly, we reject PECO’s request to identify a range of TRC ratios that could trigger program rejection.

1. **Cost-Effectiveness Evaluations and Reporting Results and Timing of PA TRC Reports**
2. Summary of Issue and Proposed Resolution

During Phase I, the EDCs were required to submit TRC Test results annually in their Act 129 final annual reports to ensure that the data set used to identify the savings and costs were complete and that the actual cost-effectiveness of the programs was more accurately determined.[[14]](#footnote-14) EDCs file preliminary and final annual reports. The Commission recognizes that the EDCs’ final Act 129 annual reports include mostly verified energy savings and actual program costs, as opposed to estimated savings and costs.

For Phase II, we proposed that EDCs continue to report their PA TRC Test results annually as a part of their Act 129 final annual reports. Additionally, the TRC ratios for each EDC program and for the plan would be included in the EDCs’ Act 129 final annual report. The TRC ratios would be based upon the latest available program costs and savings.

1. Discussion of Comments and Reply Comments

Stakeholders did not comment on this proposal.

1. Final Resolution

Given that no comments were provided and given that this issue was successfully resolved for Phase I, the Commission directs the EDCs to continue reporting the results of the TRC Test annually as a part of their Act 129 final annual reports. Additionally, TRC ratios for each EDC program and for the portfolio should be included in the EDCs’ Act 129 final annual report. The TRC ratios will be based upon the latest available program costs and savings.

1. **BENEFITS AND COSTS**
2. **Basis of PA TRC Benefits**
3. Summary of Issue and Proposed Resolution

For Phase I, it was determined that the calculation of TRC benefits should be based upon “verified gross” kWh and kW electric savings and that costs should be based on “actual” costs, defined as actual EDC program cost. Basing the calculation of TRC ratios on verified gross kWh and kW electric savings and on actual costs provides us with the most accurate and reliable data on program costs, savings, and cost-effectiveness.[[15]](#footnote-15)

In the Tentative Order, the Commission proposed that the calculation of TRC benefits for Phase II should continue to be based upon “verified gross” kWh and kW electric savings and that costs should continue to be based on “actual” costs, as defined as actual EDC program cost.

1. Discussion of Comments and Reply Comments

This issue was not discussed in comments or reply comments to the TRC Test Tentative Order.

1. Final Resolution

Given that the proposed basis for TRC benefits was successfully implemented for Phase I, the Commission directs the EDCs to continue to base calculations of TRC benefits on “verified gross” kWh and kW electric savings and to continue to base costs on “actual” costs for Phase II.

1. **Maximum 15-Year Measure Life**
2. Summary of Issue and Proposed Resolution

Act 129 limits the evaluation and TRC Test process to consideration of energy-efficiency effective measure lives of 15 years or less. The Commission recognized that EE&C plans may include the provision and installation of measures that may have shorter or longer useful lives than 15 years. However, for the purposes of calculating the PA TRC Test, the definition contained in the statute limits the energy or demand savings benefits of any given measure to a maximum of 15 years even where the measure may have a useful life beyond 15 years. For example, if a high-efficiency product with an expected useful life of 20 years is placed in service as a result of an EDC’s EE&C plan, the annual savings of only the first 15 years will be factored into the benefit/cost analysis under the TRC Test. Accordingly, for the purposes of the TRC Test calculation in Phase I, measures were limited to a maximum of 15 years of savings benefits.[[16]](#footnote-16)

The Commission proposed in its Tentative Order for the Phase II PA TRC Test that, for the purposes of capturing the energy savings in EM&V protocols during Phase II, savings data beyond 15 years (or beyond the term of a particular EE&C plan) should be documented where warranted for possible inclusion in future EE&C plans. Additionally, it was proposed that all TRC calculations for EE&C program measures be allowed to use up to 15 years’ worth of benefits and costs, as applicable to specific program measures, regardless of the year of program implementation.[[17]](#footnote-17)

1. Discussion of Comments and Reply Comments

KEEA/PennFuture state that an “arbitrary cap such as 15 years for the effective useful life of measures significantly reduces the value of measures with longer useful lives.” KEEA/PennFuture Comments at 10. KEEA/PennFuture suggest removing the cap and adjusting effective useful lives as necessary to account for consumer replacement, burn rates, or other factors. KEEA/PennFuture Comments at 10.

FirstEnergy disagrees with KEEA/PennFuture. FirstEnergy states that removing the 15-year cap is contrary to the definition of the PA TRC Test in in Section 2806.1(m) of Title 66, which requires that the PA TRC Test be met “over the effective life of each plan not to exceed 15 years.” FirstEnergy RC at 6-7. FirstEnergy further avers that, even if the cap could legally be removed, it would oppose such a change due to the complexity that would be added as new measure lives would have to be developed; this would require more time than is available to the EDCs to develop and submit their Phase II EE&C plans. FirstEnergy RC at 7.

1. Final Resolution

The Commission concurs with FirstEnergy that removing the 15-year cap is contrary to the definition of the PA TRC Test included in Section 2806.1(m). As discussed previously, for the purposes of calculating the TRC, the statutory definition limits the energy or demand savings benefits of any given measure. Accordingly, for Phase II PA TRC Test calculations, any given measure is limited to a maximum of 15 years of savings benefits.[[18]](#footnote-18)

Further, for the purposes of capturing the energy efficiency savings in EM&V protocols during Phase II, savings data beyond 15 years (or beyond the term of a particular EE&C plan) should be documented where warranted for possible inclusion in future EE&C plans. Additionally, all TRC calculations for EE&C measures are allowed to use up to 15 years’ worth of benefits and costs, as applicable to specific measures, regardless of the year of program implementation.[[19]](#footnote-19)

1. **Definition of Incentives in PA TRC Test for EE Measures**
2. Summary of Issue and Proposed Resolution

For Phase I, “incentive” was defined as a payment made to a program participant by an EDC to encourage the customer to participate in an energy efficiency program and to help offset some, or all, of the participant’s costs to purchase and install an energy efficiency measure. “Incentive” did not include the cost of direct installation programs that did not involve a payment to the participant, as such costs are direct costs, not incentives.[[20]](#footnote-20)

During Phase I, EDCs could include funds paid to customers as a marketing cost or intended to offset participant costs that are difficult to quantify in TRC calculations as either a direct cost or as a proxy for the participant cost.[[21]](#footnote-21)

The Commission proposed in its Tentative Order that incentives be defined the same for Phase II as they were for Phase I.

1. Discussion of Comments and Reply Comments

Stakeholders did not comment on this topic.

1. Final Resolution

Given that this issue was successfully reconciled during Phase I and that no comments were submitted on this issue, we will continue to define “incentives” in Phase II as they were defined for Phase I. Accordingly, funds paid to customers as a marketing cost or intended to offset participant costs that are difficult to quantify, may be included in TRC calculations as either a direct cost or as a proxy for the participant cost.[[22]](#footnote-22)

We see no reason to characterize the cost of direct installation programs that did not involve a payment to the participant as an incentive. Such costs are direct costs, not incentives.[[23]](#footnote-23)

1. **Incentive Payments from an EDC**
2. Summary of Issue and Proposed Resolution

For Phase I, the PA TRC Test recognized the effects of an EE&C plan on both participating and non-participating customers based on costs incurred by the EDC and participating customers. Costs calculated in the PA TRC test include EE&C plan costs whether paid by the EDC or by the participants. Incentive payments from an EDC to a customer were not included in the PA TRC Test because such costs would be a cost to the EDC and a benefit to the customer that would cancel each other out. Incentives paid by EDCs to program participants for EE measures cover part of the incremental cost of the measure. Since the TRC calculation is based on the total incremental measure cost, regardless of what portions are borne by the EDC and the participant, incentive amounts paid to participants are already factored into the incremental cost of acquiring the energy savings. Including incentive payments made to participants in the TRC calculation for EE programs would result in double-counting the EDC’s portion of costs in the TRC calculation.[[24]](#footnote-24)

The Tentative Order proposed that incentive payments in Phase II be handled as they were in Phase I.

1. Discussion of Comments and Reply Comments

This issue was not discussed in comments or reply comments to the TRC Test Tentative Order.

1. Final Resolution

This issue was successfully reconciled during Phase I. None of the stakeholders advocated for a change and no changes were suggested in response to our proposal to continue this provision in Phase II. Accordingly, for Phase II, incentive payments made to program participants will not be included in the PA TRC Test calculation given that incentive amounts paid to program participants are already factored into the incremental cost of acquiring the energy savings. As discussed above, including incentive payments made to program participants in the TRC Test calculation would result in double-counting of the EDC’s portion of costs in the TRC calculation.

1. **Incentive Payments from Sources Outside of Act 129**
2. Summary of Issue and Proposed Resolution

For Phase I, tax credits and other incentive payments from sources outside of the Act 129 programs raised a number of questions. It is possible that some customers may participate simultaneously in Act 1[[25]](#footnote-25) programs and in Act 129 programs giving rise to the possibility that an end-use customer could be a recipient of an incentive/rebate from both Act 1 and Act 129 programs.[[26]](#footnote-26) The amount of incentives that Pennsylvania customers can receive for energy efficiency and conservation measures have expanded and may continue to expand as new programs develop from the implementation of Act 1 and from moneys received through the American Recovery and Reinvestment Act of 2009 (ARRA).[[27]](#footnote-27) During Phase I, the inquiry was whether and how to attribute savings to each program in proportion to the degree of motivation each incentive played in a customer’s decision. The Commission determined that EDCs would be able to fully include a measure’s benefits in the PA TRC Test if any portion of the measure is attributable to Act 129.[[28]](#footnote-28)

For Phase II, the Commission proposed that all incentive payments from sources outside of Act 129, including state and federal tax credits, be considered a reduction in costs for customers participating in said programs and that such incentives should be accounted for in the TRC calculations as a reduction in costs. These incentives, whether they are rebates or tax credits, would reduce the participating customers’ costs, and they should, therefore, be reflected in lower program costs and be factored into an EDC’s TRC Test calculation.[[29]](#footnote-29) Additionally, since Act 129 funding is fixed, any additional funds would be used to supplement, not replace, funds from the EDCs. Finally, it was proposed that, as with Phase I, if an end-use customer is a recipient of an incentive/rebate from an Act 129 program, even if the customer is also a recipient of an outside source incentive or rebate for the same equipment or service, the entire savings of that equipment or service can also be claimed by the EDC for TRC Test purposes.

1. Discussion of Comments and Reply Comments

PPL acknowledges that including non-Act 129 incentives would likely improve a B/C ratio, but requests that the Commission not require EDCs to track such incentives received by an EDC’s customers. PPL proposes that EDCs be allowed the option to determine whether or not the potential increase in the B/C ratio is worth the cost to verify non-act 129 incentives. PPL states that obtaining and verifying information from customers receiving the incentives may be difficult, as customers may be reluctant to provide this information to the EDC or may not have access to it. PPL is also concerned that customers, if required to provide additional information pertaining to other incentives in order to receive Act 129 rebates, may choose not to participate in Act 129 programs; this would limit the savings that EDCs can claim and attribute to Act 129 programs. PPL asks the Commission to allow EDCs the option of applying outside incentives as a reduction of TRC costs. PPL Comments at 5-7.

EAP also avers that EDCs would likely have difficulty obtaining complete information for non-Act 129 incentives. EAP requests that any such reduction to costs based on non-Act 129 incentives be limited to reductions that are reasonably quantifiable (EAP Comments at 3). PECO supports the Commission’s proposal to include in the TRC calculation all non-Act 129 incentive payments as a reduction in costs; however, in light of the potential difficulty for EDCs to obtain reliable cost data on said incentives, PECO also requests that incentive payments to be factored into the TRC Test as reduced costs be limited to those payments that are reasonably quantifiable. PECO Comments at 3.

KEEA agrees with the Commission that non-Act 129 incentives payments should be accounted for in the PA TRC Test calculation. KEEA also agrees with PPL and others that accurately accounting for these incentive payments may be difficult in some cases. KEEA supports PECO and EAP’s suggestion to utilize only quantifiable incentives. As such, KEEA recommends that the Commission apply a standard approach for the inclusion of outside incentives in the TRC Test calculation. KEEA does not agree with PPL that this should be an option allowed to EDCs. KEEA RC at 2.

1. Final Resolution

Outside incentives, whether they are rebates or tax credits, reduce the participating customers’ costs, and they should, therefore, be reflected in lower program costs and be factored into an EDC’s PA TRC Test calculation. We agree with PPL, PECO, KEEA, and EAP that tracking non-Act 129 incentives paid to EDC customers may, however, prove to be difficult as some customers may not be inclined to provide the requested information or may not have access to it. Therefore, we adopt the recommendation of PECO, EAP, and KEEA that the EDCs need only factor in as reductions to cost the non‑Act 129 incentives that are reasonably quantifiable by the EDC. We find that it is in the best interest of the EDCs to include as much information pertaining to outside incentive payments as possible as EDCs will continue to be able to fully include a measure’s benefits in the PA TRC Test if any portion of the measure is attributable to Act 129. We reject PPL’s suggestion that EDCs should have the option of simply excluding outside incentives as a reduction in costs based on the cost of tracking the incentives.

1. **Incremental Costs**
2. Summary of Issue and Proposed Resolution

For Phase I, energy efficiency cost calculations used only the incremental energy efficiency costs and savings. The Commission recognized that the incremental costs and saving will vary depending on the type of energy efficiency device or measure being implemented. In this context, the incremental cost for a device[[30]](#footnote-30) or measure that has reached the end of its useful life is the additional cost incurred to purchase an efficient device or measure over and above the cost of the standard (*i.e.*, less efficient) device or measure. For replacement of a functioning device, incremental cost is the whole amount of the new efficient device or measure (including installation costs) being purchased to replace a still-functioning device or measure. The use of incremental costs provides more accurate calculations for the measures being implemented.[[31]](#footnote-31) For the purpose of defining incremental costs, the Commission referred to the *Guide to Resource Planning with Energy Efficiency, A Resource of the National Action Plan for Energy Efficiency*, Section 4.1 (November 2007) for guidance.[[32]](#footnote-32)

The Tentative Order proposed that, as with Phase I, incremental costs be incorporated where appropriate in the PA TRC Test process and that EDCs use calculations that include incremental costs for Phase II. The Commission will continue to take guidance from Section 4.1 in defining incremental costs,

1. Discussion of Comments and Reply Comments

Citizen Power requests that the Commission consider changing the definition of incremental costs, specifically for replacement of functioning devices. Currently, the cost for replacing functioning devices is the full cost of the device or measure including any installation costs. Citizen Power states that a distinction should be made between an early replacement of functioning devices and a retrofit of functioning devices. Citizen Power recommends that the incremental cost of early replacement measures in Phase II should be the present value of the efficient device (plus installation costs) minus the present value of the standard device (plus installation costs). Citizen Power avers that this approach would recognize the remaining value in the device to be replaced and incentivize the adoption of early replacement measures (Citizen Power Comments at 1‑2).

FirstEnergy disagrees with Citizen Power and asserts that the efforts required to revise the models used to design programs would far outweigh the potential incremental accuracy of the PA TRC Test. FirstEnergy RC at 7.

1. Final Resolution

We are persuaded by FirstEnergy that this change would be overly burdensome for the EDCs to implement and that the burden imposed would not be worth the potential incremental accuracy of the PA TRC Test that may be gained by making this change. Accordingly, the Commission will retain the incremental cost calculation method established for Phase I as described above.

We disagree with Citizen Power that we should require incremental costs to be calculated differently for Phase II than they were for Phase I. We shall not, however, preclude an EDC from using the calculation method prescribed by Citizen Power if they so choose. If this alternate method is chosen by an EDC, the EDC will be required to document, in its EE&C plans as well as in its annual reports, which method it used and the reason for the choice.

1. **Incremental Measure Costs Data**
2. Summary of Issue and Proposed Resolution

During Phase I, an incremental measure cost analysis was conducted to assist the Commission in the planning for a potential Phase II. EDCs used the incremental costs figures and assumptions used in their original 2009 EE&C plans for the implementation of programs. For measure variants not included in the EDCs’ 2009 EE&C plans, the EDCs would use the California PUC’s Database for Energy Efficient Resources (DEER) as the primary source of cost data. The DEER database would also be used to construct cost figures for measure variants and new measures. EDCs would adjust DEER cost values for regional and local conditions using appropriate cost multipliers. Such multipliers would be clarified and included in the EDC’s annual reports. Lastly, EDCs would be permitted to use cost data from local retailers and suppliers if the California DEER database does not provide appropriate values.[[33]](#footnote-33)

In order to improve upon this process, during Phase I, the Commission approved the development of an incremental costs database to assist EDCs in their development of TRC ratio calculations and to promote consistency in TRC calculations. At the time of the writing of this Order, the database has not yet been completed and, thus, will not be available for Phase II planning.[[34]](#footnote-34)

For Phase II, the Tentative Order proposed that EDCs use the Pennsylvania-specific measure cost data described above as an optional resource, given that the database for incremental costs is not complete. The incremental cost data can be used for assessing future energy efficiency goals and the selection of future energy efficiency programs. Additionally, the flexibility to use data from the DEER database could avail EDCs with the capability to use the most appropriate data possible. The Commission proposed to continue to allow EDCs to use DEER data even where there is Pennsylvania-specific measure cost data available. Finally, the Commission proposed that the SWE complete the incremental cost database by December 31, 2012, at which time the EDCs have the option of using the DEER database or the new incremental cost database (or a combination of the two) for future EE&C plan updates.

1. Discussion of Comments and Reply Comments

FirstEnergy agrees with the proposal to utilize the Pennsylvania-specific measure cost database or DEER database for Phase II EE&C plans. FirstEnergy states that DEER and the Pennsylvania-specific measure cost data may not be fully applicable to all program measures and that other references may be more appropriate based on the program design or other unique measure attributes. FirstEnergy requests the flexibility to use other references, such as RS Means (a construction database) or information from local retailers and suppliers where appropriate. FirstEnergy also agrees that the SWE should finalize the Pennsylvania-specific incremental cost database and further suggests that an emphasis be placed on specific guidance regarding the incremental cost for high impact measures. FirstEnergy Comments at 2-4.

PECO agrees with the proposed resolution in the Tentative Order. As with FirstEnergy, PECO requests the flexibility to use the best available local cost data if the DEER database or SWE incremental cost database do not provide appropriate values. PECO Comments at 3-4.

PPL requests clarification on the source of Pennsylvania specific measure cost data. PPL suggests that “Pennsylvania specific measure cost data” mean the same sources of incremental costs that each EDC currently uses for Phase I or uses for their Phase II EE&C plan. PPL Comments at 7.

1. Final Resolution

We recognize that an EDC’s EE&C plan may include measures which are not adequately addressed by either the SWE incremental cost database or by the DEER database. The Commission agrees with PECO that it is appropriate to allow EDCs to gather the best available local cost data if appropriate values are not provided in the SWE database of incremental measure costs or in the DEER database. If an EDC determines that a reference other than DEER or the SWE incremental cost database will provide the most appropriate incremental cost data, then EDCs are to use the supplemental resource and follow the protocol for reporting DEER multipliers established in the 2011 PA TRC Test Order[[35]](#footnote-35). An EDC should clarify the source of the incremental cost data and why it was deemed most appropriate for the program measure in its annual report. The SWE will then review the EDC annual reports and apprise the Commission on the appropriateness of the reference and the incremental measure cost data gathered.

In response to PPL’s request for clarification on the Pennsylvania-specific measure cost data, we refer to the 2011 PA TRC Test Order.[[36]](#footnote-36) The Commission approved the development of an incremental costs database. The SWE is responsible for creating and distributing this database to the EDCs for use. While this is not the interpretation suggested by PPL, EDCs will have the flexibility to choose between values in the new SWE incremental costs database, adjusted values from the DEER database, or the values currently used for program planning and cost-effectiveness testing. EDCs will be expected to document, in their annual reports, the source of incremental cost data as well as document the reason for choosing that source.

**H. Avoided Costs of Supplying Electricity**

1. Summary of Issue and Proposed Resolution

Phase I methodology entails the use of a maximum 15- year period for calculating avoided electricity supply costs that is broken down into three segments of five years.

The first 5-year segment, years’ one through five, uses the NYMEX PJM futures price points at a 50% on-peak and 50% off-peak ratio. This may be further adjusted to reflect historical EDC-specific usage characteristics by customer and rate class. The prompt month is established as two months prior to the filing date.

The second 5-year segment, years six through ten, uses NYMEX Natural Gas futures prices. The natural gas futures prices are converted into a wholesale energy price through the use of a spark price spread calculation. [[37]](#footnote-37) Similar to the first five years, the second 5- year segment uses a prompt-month two months prior to the filing date. Continuing, the heat rate used for the spark price spread calculation is established based on the Energy Information Administration’s (EIA’s) 2010 Annual Energy Outlook (AEO). The heat rate is to be adjusted annually, at the start of each new planning cycle, to reflect updated EIA AEO assumptions. The Mid-Atlantic zone is the specific measure, which will be converted to cents/kWh using 3412 BTUs/kWh.

The third 5-year period, years 11 through 15, uses the EIA’s AEO projections. An estimate from the PJM Regional Transmission Organization’s (RTO’s) Reliability Pricing Model (RPM) capacity price is also included, broken down into a cents/kWh value.

In our Tentative Order, we proposed that the avoided electricity supply costs for Phase II be calculated in the same manner that was utilized for Phase I.

1. Discussion of Comments and Reply Comments

PECO submits that it generally does not take issue with the Commission’s recommendation to continue using the same methodology for Phase II avoided electric supply costs projections as were used in Phase I, but it seeks clarification on certain issues and offers a number of recommended refinements to the Phase I calculation methodology. PECO Comments at 4.

First, PECO seeks permission to use NYMEX PJM PECO Zone futures, to the extent they are available, for the first 5-year segment of calculations. PECO asserts that to the extent the specific EDC zonal futures prices are not available, it will use the EDC Zone to PJM Western Hub ratio for the proximate months available to adjust the PJM Western Hub price for delivery to the specific EDC zone. PECO Comments at 6.

Second, PECO asks the Commission for permission to use the spark price spread calculation for the final year of the first 5-year segment, year five. Specifically, PECO requests that:

[T]he Commission confirm that it would be acceptable to calculate the spark price spread by multiplying the NYMEX gas futures price for the last year of the first five-year period by a heat rate (expressed in terms of BTU/kWh) recommended by the Commission, dividing by 1,000, and then subtracting the resultant value from the PECO Zone energy price for the last year of the first five-year period”

PECO Comments at 6 and 7.

Third, PECO recommends refining the spark price spread calculation methodology. Specifically, PECO recommends that the Commission allow the use of separate heat rates for on and off-peak periods. PECO proposes to use the heat rate of a conventional combustion turbine for on-peak periods and the heat rate of a conventional gas/oil combined cycle unit for off-peak periods. PECO avers that the use of a combined cycle heat rate for off-peak periods is appropriate because conventional combustion turbines are less likely to set the market-clearing price during such periods. PECO submits that if the Commission should reject this proposed refinement, then it requests that the Commission confirm that the appropriate heat rate to use for both on and off-peak periods is the heat rate for a conventional combustion turbine. PECO Comments at 7.

Additionally, PECO opines that the currently proposed procedures to use the EIA AEO projections of energy supply costs for the third 5- year segment, years 11 through 15, may be problematic and could potentially be improved upon. PECO therefore recommends that the Commission adopt the spark price spread methodology used for the second 5-year segment, years six through ten, as the methodology for the third 5-year segment. PECO contends that using the same methodology for the second and third 5-year segments serves several benefits. First, PECO submits that this proposal will simplify the calculations by requiring the use of one less data source. Second, PECO states that this proposal will decrease the chance of internal inconsistencies in the forecast because all 15 years will be based on NYMEX benchmarks, as opposed to having a split in sources from the NYMEX in year ten to the AEO in year 11. Third, PECO elaborates that the infrequent update of the AEO compounds this potential for inconsistencies as the version of the AEO used may not reflect market circumstances at the time of the calculation. Last, PECO states that NYMEX pricing relates to precise delivery points while AEO pricing relates to a broad area, specified as the Middle Atlantic Region. PECO submits that this difference can result in inconsistencies due to delivery locations. PECO Comments at 8-9.

As a contingency, PECO submits that if the Commission rejects its proposal to use the same methodology for the third 5-year segment as that used for the second 5-year segment, that the Commission confirm that it would be acceptable to use EIA AEO’s Middle Atlantic natural gas prices applicable to “Electric Power.” Specifically, PECO proposes to calculate the energy price in the PECO zone for years 11 through 15 by multiplying the EIA AEO natural gas price for that year by the same heat rate used to calculate the PECO Zone energy prices for each of the years in the second 5-year period and adding the same spark price spread used to calculate the PECO Zone energy prices for each year of the second 5-year period. .PECO Comments at 9.

KEEA/PennFuture “endorse” the approach outlined by Synapse in a soon-to-be-published report, “Best Practices for Energy Efficiency Screening.” KEEA/PennFuture submit that this report recommends methodologies that fully capture the range of avoided capacity, energy, transmission, and distribution costs. KEEA/PennFuture Comments at 10.

1. Final Resolution

The Commission finds PECO’s proposal to harness the availability of specific EDC zone futures prices is prudent given that the zonal futures prices already account for delivery and therefore eliminate the need for EDCs to adjust the benchmark PJM Western Hub price. Accordingly, we direct all EDCs to use EDC-zone-specific futures market pricing to the extent such specific zonal futures are available. In the event that specific EDC futures market-indicators are not available, the EDC may default to the original methodology of adjusting the PJM Western Hub futures indicators based on historical basis differentials, as described further in the summary component in Section K of this Order.

The Commission also finds that the use of proximate month EDC zone to PJM Western Hub ratios is a prudent methodology for adjusting PJM Western Hub prices when specific zonal futures are not available. Accordingly, we will direct EDCs to use such ratios in their electricity supply avoided costs calculations. Again, in the event that such EDC-zone specific futures indicators are not available to a specific EDC, that EDC may default to the originally proposed basis differential methodology, as described in the summary component in Section K of this Order.

All EDCs must maintain the use of a 50% on-peak and 50% off-peak ratio for 24/7 futures adjustment regardless of which methodology the EDC uses for the first 5-year segment energy price calculations.

Given the decreased liquidity of NYMEX PJM futures for delivery four to five years in the future when compared to the liquidity of NYMEX natural gas futures for delivery in the same time frame, the Commission agrees with PECO’s proposal to use the spark price spread methodology for year 5 of the first five-year segment, as elaborated in PECO’s comments, and we, therefore, direct the EDCs to use this methodology.

The Commission finds that PECO’s proposal to refine the spark price spread calculation by using separate heat rates for on and off-peak periods, namely the heat rate of an nth-of-a-kind conventional combustion turbine for on-peak periods and an nth-of-a–kind conventional gas/oil combined cycle turbine for off-peak periods, is a viable reform that may provide more precise projections than the current methodology of simply using a single heat rate. Accordingly, the Commission directs the EDCs to use this methodology.

PECO also proposes to use the spark price spread methodology based on NYMEX futures or AEO natural gas cost projections to calculate energy costs for the third 5-year segment instead of using the EIA AEO energy cost projections. The methodology proposed by PECO to calculate the cost of energy in years 11 through 15 is not without logic, as it provides for a consistency in energy projections from years 5 through 15. With that understood, we direct EDCs to calculate energy costs for the third 5-year segment using the spark price spread methodology based on either NYMEX futures or AEO natural gas cost projections, as PECO suggests, rather than require use of the AEO energy cost projections as originally proposed. To the extent NYMEX natural gas futures prices are not available in years 11 through 15, the EDC(s) may use the natural gas price projections within the EIA AEO in the spark price calculations for years 11 through 15.

The Commission agrees with KEEA/PennFuture on the principles of appropriately capturing capacity, energy, transmission, and distribution costs. However, KEEA/PennFuture do not provide any specific recommendation for modification to the currently proposed methods for calculating such costs. Rather, KEEA/PennFuture endorse a report that was not released at the time its comments were issued. Consequently, the Commission will not make any modifications to its proposals based on the comments submitted by KEEA/PennFuture.

Accordingly, the Commission directs the EDCs to proceed with their avoided cost calculations for the PA TRC Test as detailed above. In any instance in which an EDC did not use the newly amended methodology but, instead, reverted to a historical methodology, the Commission will require the EDC to document, in its Phase II EE&C plan and in its annual reporting, which methodology was used and to provide sufficient explanation as to why it was used in place of the newly established methodology.

1. **Transmission Distribution and Capacity Costs**
2. Summary of Issue and Proposed Resolution

The PA TRC Test for Phase I provided that transmission prices, as set by the FERC, to the EDC zone, were included; as were EDC distribution rates. The PA TRC Test for Phase I also permitted the inclusion of the PJM RTO’s RPM capacity price. To the extent known, generally accepted ancillary service rates were also included. For program years five through ten, the Commission permitted the use of the Bureau of Labor Statistics’ Electric Power Generation Transmission Distribution (GTD) sector price index (BLS factor: NAICS 221110) as a proxy rate of escalation of transmission, distribution, capacity, and ancillary service costs.

The Tentative Order proposed to retain the same methodology as used for Phase I for calculating transmission, distribution, and capacity costs.

1. Discussion of Comments and Reply Comments

PECO submits that, consistent with the Commission’s directive, it will use capacity prices cleared in PJM’s RPM auctions for the years in which such data is available. For years in which the PJM capacity prices are not available up through year 10, PECO proposes to apply the 5-year rolling annual compound rate of growth of the BLS factor as a proxy for the rate of escalation of capacity costs. PECO contends that since there is no known source for capacity prices in years 11 through 15, it should be permitted to calculate such costs using the same escalation rate in order to determine capacity prices for years 11 through 15. PECO requests that the Commission confirm whether its proposed approach is acceptable, and if not, PECO requests that the Commission provide a description of an acceptable approach. PECO Comments at 10.

Similar to its proposed method for calculating capacity costs in the final five-year segment, years 11 through 15, PECO proposes to use the 5-year rolling annual compound rate of growth of the BLS factor calculate prices for transmission, distribution, and ancillary services in years 11 through 15. PECO avers that this is necessary since there is no known public source for transmission, distribution, and ancillary services costs for years 11 through 15. PECO requests that the Commission confirm whether its proposed approach is acceptable, and, if not, PECO requests that the Commission provide a description of an acceptable approach. PECO Comments at 10.

1. Final Resolution

First, the Commission finds PECO’s proposal to use the 5-year rolling average of the BLS factor as the rate of escalation for transmission, distribution, capacity, and ancillary service costs is appropriate, as a five year time period represents a significant sample of time. Accordingly, the Commission will endorse the use of a 5-year rolling average for the BLS factor.

Second, the Commission directs PECO and other EDCs to use the BLS factor to escalate PJM RPM capacity price in years 11 through 15.

Last, the Commission directs PECO and other EDCs to use the BLS factor to escalate the transmission, distribution, and ancillary services costs in years 11 through 15.

**J. End-Use Adjustments**

1. Summary of Issue and Proposed Resolution

During Phase I, it was appropriate to use end-use profiles for energy efficiency programs rather than overall rate class profiles. When device specific profiles were not available, the use of class averages was acceptable. In our Tentative Order, the Commission proposed to continue this practice for Phase II.

1. Discussion of Comments and Reply Comments

PECO states that it supports the Commission’s proposal to continue using end-use profiles, to the extent available, for energy efficiency programs. PECO avers that such methodology improves the accuracy of TRC calculation results. PECO comments at 12.

1. Final Resolution

We encountered no issues with this method in Phase I and received no negative comments or alternate proposals relative to its use for Phase II. Further, PECO supports using end-use profiles. Accordingly, we will continue to require use of end-use profiles, when available, for energy efficiency programs. When device specific profiles are not available, the use of the class average is acceptable.

1. **Locational, Temporal, and Zonal Differences**
2. Summary of Issue and Proposed Resolution

In Phase I, EDC zonal basis adjustments were to be made based on the *2008 PJM State of the Market* report data “Zonal real-time, simple average LMP[[38]](#footnote-38) (dollars per MWh).”[[39]](#footnote-39) The basis adjustment to the natural gas prices in years six through ten for utilities west of the Susquehanna River was the basis differential between the Henry Hub as the source and TETCO M-3 as the destination. The basis adjustment to the natural gas prices in years six through ten for utilities east of the Susquehanna River was the basis differential between the Henry Hub as the source and Transco Zone 6 as the destination. [[40]](#footnote-40)

Recent *State of the Market Reports* no longer provide this exact indicator. However, similar indicators are available. Specifically, the Zonal real-time load weighted LMP is available.[[41]](#footnote-41) In the Tentative Order, we proposed to adopt this indicator as the derivative for calculating EDC basis adjustments and proposed that the same guidance, as modified by use of the zonal real-time load weighted LMP, for Phase I be applied in Phase II.

1. Discussion of Comments and Reply Comments

Stakeholders provided no comments on this section of the Tentative Order. However, comments related to this topic were provided by PECO in Section H.

1. Final Resolution

As described in Section H above in this Order, the Commission has endorsed PECO’s proposal to use proximate month EDC zone to PJM Western Hub ratios to adjust PJM Western Hub prices when specific zonal futures are not available. EDCs will no longer use the historical basis differential listed in the PJM State of the Market Report for locational adjustments. However, if an EDC does not have the forward indicators required by PECO’s proposed methodology, the EDC may use the historical basis adjustment methodology as originally proposed in this proceeding.

Accordingly, the Commission directs the EDCs to proceed with their basis adjustments for the PA TRC Test as detailed above. In any instance in which an EDC did not use the newly amended methodology but, instead, reverted to the historical methodology, the Commission will require the EDC to document, in its Phase II EE&C plan and in its annual reporting, which methodology was used and to provide sufficient explanation as to why it was used in place of the newly established methodology.

1. **Inclusion or Exclusion of Customer Avoided Operating and Maintenance Costs in the PA TRC Calculation**
2. Summary of Issue and Proposed Resolution

Phase I required that reduced costs for equipment and labor be treated as benefits that are quantifiable and measurable and that customer avoided operating and maintenance costs should be included as benefits in the TRC calculation. For Phase I, the Commission permitted EDCs to include customer-avoided operating and maintenance costs, to the extent quantifiable, in their TRC calculations. However, in cases where such costs were challenging to quantify, or unquantifiable, the Commission permitted EDCs to omit such costs from TRC calculations. The Commission acknowledged that omitting such costs would cause the B/C ratio to be undervalued. However, the Commission affirmed that providing such flexibility appropriately balances the concerns of the parties with the ability of the TRC to present program benefits.[[42]](#footnote-42)

For Phase II, the Tentative Order proposed to continue to include avoided operating and maintenance costs, to the extent quantifiable, in EDCs’ TRC calculations while offering the flexibility to omit said costs if they are not quantifiable.

1. Discussion of Comments and Reply Comments

KEEA/PennFuture and PECO both agree with the proposal for including or excluding customer avoided operating and maintenance costs in the TRC Test calculation based on the ability to quantify the costs. KEEA/PennFuture Comments at 11; PECO Comments at 12.

1. Final Resolution

This provision caused no issues in Phase I. PECO and KEEA/PennFuture support maintaining the Phase I provisions. No alternative provisions were proposed. Given the support provided for this proposal and given that this issue was effectively resolved during Phase I, EDCs will continue to include avoided operating and maintenance costs, to the extent quantifiable, in their TRC Test calculations for Phase II. EDCs will continue to have the flexibility to omit costs that are not quantifiable.

1. **Avoided Costs in Benefit/Cost (B/C) Ratios in Approved EE&C Plans**
2. Summary of Issue and Proposed Resolution

The primary issue is whether EDCs should use the latest available forecast of avoided costs or use their previously filed vintage forecasts of avoided costs for determining the TRC of new programs and for determining the TRC of a portfolio of existing programs. Consistent with our prior PA TRC Test Orders, during Phase I avoided costs figures included in TRC calculations of previously approved EE&C programs or measures did not need to be updated by present or future avoided cost figure revisions or updates. When calculating and reporting the overall PA TRC Test plan results in the EDCs’ Act 129 annual reports, the EDCs used the vintage of avoided cost forecasts applicable for each program at the time the program was approved. EDCs used the latest available or most current forecast of avoided cost when filing new programs. [[43]](#footnote-43)

The Tentative Order proposed that EDCs continue using the vintage of avoided cost forecasts applicable for each program at the time the program was approved and current costs for new programs. All new EE&C plans filed for Phase II would use the latest available forecast of avoided costs. Any new programs included in updates to EDCs’ EE&C plans would use the latest available forecast of avoided costs. Existing Phase I programs carried over to a Phase II plan would use the vintage of avoided cost forecasts applicable for the programs when they were initially approved.

1. Discussion of Comments and Reply Comments

PECO supports the proposal regarding which avoided cost to use, asserting that it “strikes the proper balance between the burden associated with the use of new avoided cost figures for new programs and the usage of accurate and up-to-date avoided costs figures to improve the accuracy of TRC calculations.” PECO Comments at 13.

FirstEnergy generally supports the avoided cost proposal but is concerned about minor plan changes. FirstEnergy states that, given the Phase II targets and the time frames in which to achieve said targets, it is essential that EDCs be able to perform minor changes in a timely manner. FirstEnergy urges the Commission to clarify that a new PA TRC Test is not necessary for minor plan changes made to previously approved EE&C plans. In the alternative, FirstEnergy asserts that the PA TRC Test for minor modifications should be based on forecasts used at the time the program being modified was originally approved. FirstEnergy asserts that using different forecasts each time an approved program is modified to calculate the TRC Test could prove to be administratively burdensome. FirstEnergy Comments at 5-6.

1. Final Resolution

We will address the proper use of avoided cost vintages as well as whether an EDC must perform a PA TRC Test for minor changes. In our Phase II Implementation Order[[44]](#footnote-44) we addressed minor plan changes, providing that:

EDCs must file sufficient documentation to support the proposed minor EE&C plan change, to include, but not limited to, the affected pages of the plan, a redlined version of the affected pages and an explanation of how the proposed minor changes affect the previously approved plan. We again note that the Commission is responsible for analyzing the cost and benefit of each plan submitted in accordance with our approved TRC Test.

Phase II Implementation Order at 93.

The question of whether minor plan changes in Phase II would require a PA TRC Test is addressed and resolved in the Phase II Implementation Order. We require PA TRC Test information for each change because we have the authority to reject any program with a low TRC ratio. Having determined therein that a PA TRC Test will be necessary for even minor plan changes, this is not the proceeding to revisit that conclusion. This proceeding determines how to calculate the PA TRC Test, not whether one is required. Accordingly, we must reject FirstEnergy’s suggestion that a PA TRC Test not be applied for minor changes.

Having determined that a PA TRC Test is required for any change to an EE&C plan, we need to strike a balance between the potential benefit of increased accuracy that might be gained by using the most accurate and up-to-date avoided costs as they become available as compared to the burden and potential confusion of changing the value of the avoided costs each time a change is made.

We find that using the vintage of avoided cost forecasts applicable for each program at the time the program was approved throughout the life of that program is appropriate and gives us a means to compare the program’s results over time. Existing Phase I programs carried over to the original Phase II plan will use the vintage of avoided cost forecasts applicable for said programs when they are initially approved for Phase II. Using the latest available forecast of avoided costs for new programs included in updates to EDCs’ Phase II EE&C plans responds to the dynamic nature of energy efficiency and conservation planning.

Accordingly, EDCs shall use the latest available forecast of costs when developing their initial Phase II plans and, thereafter, only for new programs.

By this determination, we do not want to preclude an EDC from using current avoided cost information if that is practicable for the EDC. However, an EDC cannot pick and choose when to use vintage avoided cost and when to use current avoided cost. If an EDC wishes to implement a methodology, it must clearly delineate its choice and the reasons for that choice.

1. **Fuel Switching**

a) Summary of Issue and Proposed Resolution

*i)* **PA TRC Inputs for Fuel Switching**

Phase I PA TRC Test orders adopted the fuel switching provisions set forth in the Fuel Switching Working Group (FSWG) Staff Report.[[45]](#footnote-45) In addition, the Commission adopted the use of the 2002 California Manual as a guide for defining the benefits and costs that should be included in the TRC Test for fuel switching programs. Further, it was determined that other fuel source substitution programs should also use the 2002 California Manual as a guide in the B/C analysis of each proposed program.

For purposes of the PA TRC Test, increased fuel costs have been defined as the NYMEX gas costs for the first 10 years and the EIA gas cost projections thereafter.

For Phase I, where new extensions or installations were required to serve natural gas or other fuels such as oil or propane, the cost of any infrastructure upgrades or installations, regardless of who bore the cost, were included as incremental costs for energy efficient measures associated with alternative fuels. However, only extensions or installations directly attributable to fuel switching due to Act 129 measures were to be included in the TRC calculation.[[46]](#footnote-46)

*ii)* **Fuel Switching Appliance Efficiency**

The FSWG Staff Report, at pages 12 and 13, documents attempts to reach consensus on the minimum efficiency rating for new equipment involved in a fuel switching program. In the report, staff recommended that guidance be provided to determine efficiency standards for any equipment involved in a fuel switching program. We determined for Phase I that only equipment earning the EPA’s ENERGY STAR performance rating should be eligible for inclusion in EE&C fuel switching plans. This provision is, however, only applicable to fuel switching proposals where EPA ENERGY STAR performance rated equipment is available for installation.[[47]](#footnote-47)

The Tentative Order proposed that this same guidance for fuel switching inputs and appliance efficiency be followed for Phase II.

1. Discussion of Comments and Reply Comments

PECO believes that technical matters such as minimum efficiency ratings or other eligibility requirements for new equipment involved in fuel switching programs would be best handled by the Technical Working Group and requests that the Commission limit its directives pertaining to fuel switching programs to defining the fuel switching benefits and costs that should be included in the PA TRC Test. PECO Comments at 13.

1. Final Resolution

We recognize the need to address technical matters such as minimum efficiency ratings or other eligibility requirements for new equipment involved in fuel switching. As such, we affirm our Phase I directive that only equipment earning EPA’s ENERGY STAR performance rating should be the minimum standard allowable for inclusion in EE&C fuel switching plans. At this point, there are no fuel switching measures proposed for  which there is no ENERGY STAR equipment. If a fuel switching measure is proposed for which there is no ENERGY STAR equipment, stakeholders would be able to request that staff convene a technical working group[[48]](#footnote-48) to address a minimum standard and provide recommendations to the Commission.

Further, while we appreciate PECO’s comments regarding limiting directives for fuel switching programs in this Order, we will not impose such limitations at this time. Accordingly, The Commission maintains its position that the same guidance for fuel switching inputs and appliance efficiency as provided for in Phase I be retained in Phase II.

1. **Compliance with AEPS Act**[[49]](#footnote-49) **and Carbon Issues**
2. Summary of Issue and Proposed Resolution

During Phase I, the costs of compliance with the AEPS Act, which are known and knowable, were included in the TRC Test, but carbon reduction expenses were to be excluded (unless a legislative change dictates otherwise).[[50]](#footnote-50),[[51]](#footnote-51)

The Tentative Order proposed that the cost of compliance with the AEPS Act be applicable to all the power “avoided” and be considered an avoided cost for Phase II. Additionally, it was proposed that carbon reduction expenses continue to be excluded, unless a legislative change dictates otherwise.

1. Discussion of Comments and Reply Comments

KEEA/PennFuture claim that enhanced energy efficiency in Pennsylvania will increasingly lead to more avoided costs associated with anticipated regulation and that avoided environmental compliance and other related costs should be considered a benefit in the PA TRC Test. Further, KEEA/PennFuture state that new regulations are scheduled to come into effect within the period under consideration for Phase II that will impose predictable, quantifiable costs that could be incorporated into an avoided cost calculation. KEEA/PennFuture Comments at 11. KEEA additionally argues that energy efficiency screening should account for all current and anticipated costs of complying with environmental regulations. KEEA continues that these compliance costs will be passed on to ratepayers and as such should be included as avoided costs in the PA TRC Test. KEEA RC at 3.

NEEP/Pace also note that customers stand to gain from avoided environmental compliance costs for new federal air pollution and carbon rules for power plants. NEEP/Pace encourages the Commission to “recognize the avoided environmental compliance benefits of energy efficiency investments and ensure that those are adequately accounted for in the future.” NEEP/Pace Comments at 4.

PECO states that a reduction in electric consumption will reduce an EDC’s costs of complying with Pennsylvania’s AEPS requirements. PECO plans to determine avoided AEPS compliance costs by multiplying the projected reduction in required alternative energy credits (AECs) by the estimated unit costs of such credits for all types required. In order to estimate the unit costs of AECs for years in which AECs are unavailable, PECO proposes to apply a 5-year rolling annual compound rate of growth in the BLS index as the annual AEC price escalation rate. PECO requests confirmation that this approach is consistent with the Commission’s proposal or description of an appropriate alternate method. PECO Comments at 11.

1. Final Resolution

The Commission acknowledges KEEA/PennFuture’s and NEEP/Pace’s comments but reiterates that the costs of compliance with the AEPS Act, which are known and knowable, are to be included in the TRC Test calculation. Carbon reduction expenses will be excluded, however, until such time as legislation is passed that dictates otherwise. Current legislation does not dictate otherwise, therefore, carbon reduction expenses will continue to be excluded.

The Commission finds that PECO’s proposed methodology for determining avoided AEPS compliance costs is prudent. We find that this methodology is consistent with other avoided cost calculation methodology described previously in this order. No disagreement for this methodology was provided in reply comments to this order. Accordingly, we direct EDCs to utilize the methodology, as provided by PECO and described above, for calculating avoided AEPS compliance costs for Phase II.

1. **LOW INCOME PA TRC TEST CALCULATION GUIDANCE**
2. **Low-Income Energy Savings**
3. Summary of Issue and Proposed Resolution

Through Program Year 2 of Phase I, six EDCs reported low-income savings from participation in general residential programs,[[52]](#footnote-52) but the associated costs were not explicitly reported in the EDC annual reports. Instead, the costs were reported with the respective general residential programs. In order to offer transparency and consistency, the Tentative Order proposed a framework for reporting costs for the portion of low-income savings attributable to general residential programs for a potential Phase II of Act 129.

In 2010, the Act 129 Low-Income Working Group concluded that including, under the low-income sector umbrella, energy savings resulting from low-income population participation in general residential programs could be used “to gauge the effectiveness of programs for low-income households and serve as a basis for recommendations to make adjustments to those programs.”[[53]](#footnote-53) In other words, there are likely participants that meet the Act 129 low-income criteria who elect to participate in non-low-income-specific programs. Including these savings as part of the low-income sector savings provides a gauge of how Act 129 programs are impacting the low-income population.

The Working Group determined that “estimated baseline low-income household usage data can be used as a tool for comparing the projected consumption reductions with the actual percentage of total energy usage attributable to low-income households.”[[54]](#footnote-54) For Phase I, Penn State University Census Data and EDC-provided data on low-income accounts and usage were utilized to determine the percentage of total consumption attributable to the low-income population in each service territory.

For Phase II, the Commission proposed that the percentage of confirmed low-income customers, as reported annually by EDCs in the Universal Service Report[[55]](#footnote-55), be used as the proxy for estimating low-income savings from non-low-income residential programs. The usage data from the Low-Income Working Group Report are based on dated data and a conglomeration of sources whereas the Universal Service Report data are considered more accurate because Universal Service Report is updated annually by the EDCs.

1. Discussion of Comments and Reply Comments

PPL states that the method proposed differs from their previously Commission-approved method. PPL and the Commission agreed that PPL would use its annual impact evaluation surveys to determine low-income participation in each non-low-income residential program. PPL reasons that the proposed approach is not accurate or appropriate. The rationale is that the Universal Service Report includes only confirmed low-income customers but does not include customers who meet low-income criteria yet have not participated in a PPL Electric low-income program, payment assistance or have not been income-qualified by PPL Electric. PPL maintains that there are a large percentage of unconfirmed low-income customers and therefore the proposed method will exclude those customers and significantly understate the percentage of low-income customers. PPL Comments at 8 and 9.

PPL also argues that regardless of the source, it is not appropriate to use a single percentage to estimate low-income participation in all general residential programs. PPL reasons that participation is likely to be dictated by initial measure cost. PPL asserts that measures with low initial costs would be expected to have higher low-income participation than those measures with high costs and that applying a single percentage to all programs would be arbitrary and likely to provide inaccurate results, PPL Comments at 10.

PPL further notes that the method proposed by the Commission is inconsistent with the Commission’s proposal for Low Income Costs and Benefits Reporting. PPL interprets the statement, “the proportion of savings derived from low-income-specific versus general residential will be explicitly stated” in this section as flexibility to determine the method used to estimate low-income savings in non-low-income programs. PPL recommends either surveying participants in each non-low-income program or using a single allocation factor (for each EDC) specified by the Commission, based on the estimated percentage of all residential households that are at or below 250 percent of the Federal Poverty Level from census data or another source, be used to estimate low-income participation in non-low-income programs. PPL Comments at 11.

EAP argues that the methodology employed in Phase I, which relied partly on Penn State University Census data, provides a more accurate estimate of the number of low-income customers who are likely to participate in non-low-income programs. EAP contends that census data, which reflects the low-income population in each service territory, together with verified EDC low-income account and usage data offers the most accurate basis for estimating the percentage of low-income customers who will participate in non-low-income programs. EAP states that the proposed Universal Service Report method underreports that number of low-income households in a service territory. Those customers that do not participate in LIURP or CAP but in a non-low-income Act 129 program would therefore go unreported. EAP at 3 and 4.

EAP avers that the methodology employed in Phase I of Act 129 more fairly and accurately estimated the percentage of low-income customers participating in non-low-income Act 129 residential programs and that this method should continue to be used in Phase II to determine both the value of low-income savings and whether an EDC’s efforts to meet the proposed additional mandate to obtain 4.5 percent of residential consumption savings from the low-income sector is cost-effective. EAP Comments at 4.

KEEA supports using the approach proposed in the Tentative Order for estimating low-income savings from non-low-income programs. KEEA recognizes that PPL’s approach does make sense but asserts that the Universal Service Report approach is preferred for at least one year to establish confidence in the participation rate, ensure consistency across all EDC calculations, and to avoid over-estimation of low income participation in non-low-income programs. Further, according to KEEA, EAP’s recommendation to use census data will overestimate participation because low-income households do not participate in energy efficiency programs at the same rates as non-low-income households due to a lack of funding to invest in efficient products. KEEA RC at 2- 3.

1. Final Resolution

The Commission is requiring standardization from the EDCs to determine low-income savings in non-low-income programs and how to report those savings in an effort to offer consistency and transparency. During Phase I, the EDCs used various methods to report low-income savings, making it difficult for the Commission to determine the benefits and costs of low-income savings reported from non-low-income programs. The Tentative Order intended to ensure that EDCs explicitly state in annual reports the percentage of low-income savings derived from general residential programs (non-low-income residential programs).

After reviewing stakeholder suggestions, we have reconsidered using Universal Service Report data for estimating low-income savings from non-low-income residential programs. After considering other recommendations from the comments, we agree with PPL’s recommendation to survey participants in each residential program instead of utilizing the Universal Service Report data.

Accordingly, the EDCs will estimate low-income savings from non-low-income programs using a survey method approved by the SWE. EDCs shall draft modifications to their annual impact evaluation surveys to capture and determine low-income participation in each non-low-income residential program and to submit the modifications to the SWE for approval. Once approved by the SWE, the EDCs will conduct the survey and compile the data annually. We find this approach is consistent with the low-income cost and benefit reporting requirements as detailed in the following section.

1. **Low-Income Benefits and Costs Reporting**
2. Summary of Issue and Proposed Resolution

Costs associated with low-income energy savings from general residential programs are not explicitly reported in the EDC annual reports but instead are included, undifferentiated, as part of the respective general residential programs’ reporting. Only costs associated with low-income-specific programs are reported.

The Commission proposed for Phase II that EDCs report the following in their annual reports in addition to what is currently reported:

1. Low-income savings, including savings from non-low-income residential programs, in the “Overview of Portfolio” section. The proportion of savings derived from low-income-specific versus non-low-income residential will be explicitly stated and all applicable tables in this section will include a similar delineation.
2. The “Portfolio Results by Sector” low-income section will similarly delineate and sum to a sector total.
3. The “Portfolio Results by Program” portion of the annual report will include a new section that estimates costs and benefits and calculates a TRC Test for low-income savings from general residential programs. A footnote should indicate how costs are estimated.
4. The “Portfolio Results by Program” portion of the annual report will include a new section that sums costs and benefits from low-income-specific and non-low-income residential. A TRC Test result for the low-income sector will be calculated.
5. Discussion of Comments and Reply Comments

FirstEnergy recommends that the Commission eliminate the requirement that EDCs include as part of their annual reports an estimate of the benefits, costs, and PA TRC Test results for low-income savings from participation in general residential programs. FirstEnergy notes that, absent the need to incur additional costs to administer the program for the low-income sector, the TRC Test would result in the same ratio for both general residential and low-income participants in these programs. Second, absent any sophisticated cost tracking and EM&V, the allocation of costs and benefits from low-income participation in general residential programs would be an estimate and any TRC Test information would not have any statistical accuracy. FirstEnergy recommends that cost-effectiveness determination should be done at the program level, with both low-income and general residential data included together because the results would better reflect the actual costs and benefits of providing a program to multiple customer types. First Energy Comments at 6 and 7.

PPL recommends that the requirement for a TRC Test for low-income savings from participation in general residential programs be revised to include language that directs EDCs to note in their annual reports how benefits and costs are estimated, whether fixed costs are included, and a note that costs and benefits are estimates and should be used for informational purposes only. PPL indicates that such language would help readers understand that this TRC Test is based on estimates and is not precise. PPL Comments at 12.

PPL does not agree with the Commission’s proposal to require a separate PA TRC Test for the low-income sector that reports on the costs and benefits of the low-income-specific programs and low-income participation in general residential programs. PPL indicates that the B/C ratio will always be the same for the low-income and non-low-income portions of a general residential program because the costs and benefits are the same for every participant, regardless of income. Second, PPL noted that separate PA TRC Tests are not required for any other customer sector. PA TRC Tests are only required for programs and the EE&C plans. PPL contends that requiring PA TRC Tests sectors would necessitate significant additional work by EDC evaluators and that it will be very difficult to allocate fixed program costs to sectors. PPL Comments at 12 and 13.

1. Final Resolution

The Commission agrees with FirstEnergy’s recommendation to eliminate the requirement that EDCs include TRC Test results for low-income savings from participation in non-low-income residential programs as part of their annual reports. The Commission agrees, in part, with FirstEnergy’s interpretation that the TRC Test would result in the same ratio for both non-low-income residential and general residential participants in these programs. The Commission also agrees with FirstEnergy’s statement that allocation of costs and benefits from low-income participation in residential programs would be an estimate; however, the Commission clarifies that this estimate based on an approved surveying method in Phase II will be necessary if the EDCs are going to attribute savings from non-low-income residential programs toward meeting the 4.5% low-income target in Phase II. In other words, if EDCs are going to count the estimated savings from non-low-income residential programs toward their low-income targets, they will have to also attribute the costs associated with those savings.

Accordingly, the Commission agrees with PPL’s recommendation that additional language should be included in EDCs’ annual reports pertaining to low-income savings from participation in non-low-income residential programs. The SWE will provide EDCs with a table in their annual report template for Phase II that can be populated with the estimated savings and costs attributed to the savings. This table will note that benefits and costs are estimates and will not be used for compliance purposes.

Finally, the Commission agrees with PPL that a TRC Test for the low-income sector should not be required as no other sector has to calculate a TRC Test beyond the program level. The Commission does require, however, that TRC Tests continue to be calculated for all low-income programs and all residential programs.

In sum, the Commission requires that the EDCs provide benefit and cost data for both low-income and estimated non-low-income residential program savings in their annual reports. However, the Commission does not require a separate PA TRC Test calculation for the low-income sector.

1. **NET-TO-GROSS ADJUSTMENTS**
2. **Net-to-Gross (NTG) Adjustments to Savings**
3. Summary of Issue and Proposed Resolution

As discussed in the Phase II Implementation Order, a common consideration for determining the cost-effectiveness of energy efficiency programs is whether adjustments to gross energy savings should be made through the use of a Net-to-Gross (NTG) ratio. A NTG adjustment would adjust the cost-effectiveness results so that the results would only reflect those energy efficiency gains that are attributed to, and are a direct result of, the energy efficiency program in question.[[56]](#footnote-56) For Pennsylvania, the adjustment would reflect only those savings attributable to Act 129 programs. A NTG adjustment would give evaluators an estimate of savings achieved as a direct result of program expenditures by removing savings that would have occurred absent a conservation program.

At the beginning of Phase I of Act 129, there was an absence of data specific to Act 129 programs, and the Commission chose not to require NTG adjustments for the first program year. The *2011 TRC Test Order* directed EDCs to conduct NTG research; to collect data necessary to determine the NTG ratio for their programs, and to apply the ratio when determining the cost-effectiveness of future modifications of existing programs.[[57]](#footnote-57) The results of this research were to be reported to the SWE and utilized by the EDCs to determine when a measure or program should be removed from the EE&C portfolio because it is no longer cost-effective. For Phase I, any NTG research that was completed was used only for program design and implementation; it was not used to adjust the gross verified energy savings that are used for compliance purposes.

The Commission proposed that NTG adjustments be treated the same way for Phase II as they have been treated during Phase I. Specifically, the Commission proposed that NTG research be used to direct Act 129 program design and implementation, but not for compliance purposes. There is no requirement in Act 129 that mandates that savings be determined on a net basis. The Commission thereby proposed that EDCs continue to use net verified savings in their TRC test for program planning purposes and proposed that compliance in Phase II be determined using gross verified savings.

In its Tentative Order, the Commission requested that any and all comments pertaining to NTG issues, although a TRC-related issue, be addressed at the Phase II Implementation Order docket. The reason for this request was due to the Commission recognition that, although the NTG issue was previously considered within the context of the TRC test, the use of NTG adjustments is an overarching policy issue that had the capacity to impact compliance targets.

1. Discussion of Comments and Reply Comments

Most stakeholders commented on NTG at the Phase II Implementation Order docket.

NEEP/Pace commended the Commission’s proposal to use gross savings for the purposes of compliance with the Act 129 savings targets stating that will provide greater certainty to the EDCs regarding compliance as they design programs. NEEP/Pace Comments at 3.

1. Final Resolution

This topic was thoroughly covered in the Phase II Implementation Order. Accordingly, EDCs will continue to use net verified savings in their TRC test for program planning purposes and compliance in Phase II will be determined using gross verified savings.

1. **DEMAND RESPONSE**

## Inclusion of Demand Response

* 1. Summary of Issue and Proposed Resolution

In the Tentative Order, we stated that comments related to demand response programs should be provided in the Energy Efficiency and Conservation Implementation proceedings at Docket No. M-2012-2289411. Specifically, because the Commission did not propose to set any peak demand reduction targets for the proposed three-year Phase II EE&C program period, we did not deem it necessary to address demand response with regard to the PA TRC Test at this time. Additionally, the Commission stated that, if a decision is made to require peak demand reductions, and if revisions to the PA TRC Test are deemed necessary due to a new demand response structure, then we would issue for comment a revised PA TRC Test that includes demand response.

* 1. Discussion of Comments and Reply Comments

EnerNOC provides extensive comments related to the TRC Test’s addressing of demand response. EnerNOC points out a number of areas where they believe changes need to be made to better evaluate the cost-effectiveness of demand response programs. EnerNOC provides its own analyses regarding the cost-effectiveness of the demand response programs in the Duquesne, PECO, PPL, and West Penn Power service territories. EnerNOC states that its results indicate that, as demand response programs ramp up, they tend to become more cost-effective and that, by 2015, all the demand response programs taken together hypothetically, are cost-effective. EnerNOC Comments at 6 and 7. EnerNOC also states that the TRC Test currently does not consider the avoided costs of new transmission and distribution (T&D) infrastructure and that, as such, the EDCs have significantly undercounted the benefits associated with the avoided T&D investments resulting from Act 129 programs. EnerNOC Comments at 7 and 8. EnerNOC avers that the requirement that the EDCs treat 100% of demand response implementation costs, including customer incentives, as program marketing or participant enablement costs is an inappropriate treatment of costs and is not consistent with industry practice. EnerNOC proposes that a 50% treatment of the customer incentives as a transfer payment would be appropriate for the demand response aggregator programs. EnerNOC Comments at 10 and 11. EnerNOC states that the TRC Test should include capacity benefits from future PJM auctions and they provide an estimate of the total net present value of benefits that would accrue to each of the EDCs from lowered capacity costs. EnerNOC Comments at 12 and 13.

In its reply comments, KEEA expresses support of a consistent approach for counting avoided T&D costs which would more accurately reflect an important benefit that energy efficiency and demand response programs provide to ratepayers. KEEA RC at 4.

In its reply comments, FirstEnergy notes the comments of EnerNOC and recommends that any modifications to the TRC Test surrounding demand response programs be deferred until after a determination of the cost-effectiveness of Act 129 demand response programs is made. FirstEnergy RC at 7. FirstEnergy also states that, while EnerNOC may believe that the EDCs incorrectly interpreted the Commission’s direction regarding the treatment of avoided T&D costs for the TRC Test, those calculations were part of litigated cases in which the Commission approved each EDC’s EE&C plan. FirstEnergy RC at 8. FirstEnergy recommends that the SWE take into account (and that the Commission allow for the thorough vetting with all interested parties) EnerNOC’s comments regarding the treatment of demand response implementation costs as program marketing or participant enablement costs. FirstEnergy RC at 8. Finally, with regard to EnerNOC’s assertion that the inclusion of capacity benefits from future PJM auctions would make demand response programs cost-effective, FirstEnergy states that it is virtually impossible to evaluate the impact demand response programs may have on future prices, especially given the fact that the PJM auctions are for delivery years three years into the future. FirstEnergy RC at 8 and 9.

In its reply comments, PECO similarly states that the inclusion of demand response programs in the PA TRC Test is inappropriate until the SWE completes its Demand Response Study and determines the cost-effectiveness of Phase I demand response programs. PECO RC at 4. With regard to avoided T&D costs, PECO states that it has taken into account avoided T&D investments in its filings with the Commission. Additionally, PECO intends to include the avoided T&D costs in its final report to be submitted at the conclusion of the Phase I demand response performance period. PECO RC at 5. Lastly, PECO recommends that the Commission disregard EnerNOC’s proposal that a 50% treatment of the customer incentives as a transfer payment would be appropriate for the demand response aggregator programs. PECO states that it agrees with the Commission that demand response customer incentives can be used as an estimate for transaction costs, but states that a reasonable proxy would be 75%. PECO RC at 6.

NEEP/Pace believe that the determination of cost-effectiveness should measure all quantifiable benefits created for customers by the Act 129 EE&C Programs, including wholesale price suppression benefits. NEEP/Pace state that the reductions in demand for electricity result in savings as consumers use less kilowatt-hours (kWh) on a volumetric basis and also put downward pressure on wholesale market prices. NEEP/Pace further state that reduced load forecasts from EE&C investments lower the amount of capacity load serving entities must procure, thereby generating additional savings from reduced capacity prices. NEEP/Pace urge the Commission to explore mechanisms by which these savings can be accounted for and incorporated into the TRC. NEEP/Pace Comments at 3 and 4.

In its reply comments, PECO opposes NEEP/Pace’s recommendation to explore ways to incorporate alleged wholesale market price suppression benefits into the TRC Test because the adoption of programs that are not economic on their own could have long-term detrimental effects on competitive electricity markets. This could discourage merchant electricity suppliers and their investors from entering the market and could encourage their exit from the market. PECO further states that the proposals set forth by NEEP/Pace contain several other flaws. PECO avers that any price suppression effect may be short-lived because a reduction in market prices would make it less economical for electricity suppliers to remain in, or enter, the market. PECO states that this would encourage such suppliers to exit, or not enter, the market, resulting in an offsetting and upward effect on wholesale market prices. Additionally, PECO states that quantifying the extent of any such price suppression would be overly complex and potentially arbitrary because supply and demand curves are unknown and vary across EDCs. PECO states that the EDCs should be permitted to continue excluding such factors in its TRC Test for Phase II. PECO RC at 2-3.

FirstEnergy also disagrees with NEEP/Pace’s proposed inclusion of price suppression benefits in the TRC Test. FirstEnergy states that it is unclear how such benefits would be identified or supported. With regard to capacity costs, FirstEnergy states that the specific shape of the PJM supply and demand curves generally are not released. FirstEnergy avers that there would be little or no impacts on wholesale market prices if the impacts caused by the demand reduction fall on a flat part of the supply and demand curves. FirstEnergy believes that any projected impacts on wholesale market prices would be speculative. Also, FirstEnergy asserts that environmental-related cost impacts generally are reflected in forecasted wholesale prices that are generally used to calculate avoided costs. FirstEnergy believes the inclusion of these cost impacts in the TRC test could result in a double-counting of benefits. FirstEnergy RC at 4.

* 1. Final Resolution

In our Phase II Implementation Order,[[58]](#footnote-58) we excluded peak demand reduction targets for Phase II of Act 129. Specifically, we stated that Act 129 is clear that a determination of the cost-effectiveness of demand response programs within the Act 129 EE&C Program must be made before the Commission may set any additional peak demand reduction targets. As such, we will await the results of the SWE’s Demand Response Study before proposing a demand response program for Act 129. We also allowed the EDCs to voluntarily propose cost-effective residential demand response programs, such as direct load control, in their Phase II EE&C Plans.[[59]](#footnote-59) As such, we find it necessary to address the cost-effectiveness comments of the stakeholders related to demand response programs.

We addressed EnerNOC’s comments regarding the avoided costs of T&D infrastructure resulting from the Act 129 EE&C Program in the Phase II Implementation Order. [[60]](#footnote-60) We stated that no party had provided the Commission with a Pennsylvania-specific determination of the avoided marginal T&D costs resulting from demand response programs and, as such, in the Phase II Implementation Order, we found EnerNOC’s comments unpersuasive.

However, while we are not persuaded that current demand response programs are cost-effective utilizing EnerNOC’s proposed calculations for avoided marginal T&D costs, we agree with EnerNOC that the inclusion of avoided marginal T&D costs within the PA TRC calculation for residential demand response programs may be appropriate. We will not, however, prescribe a specific PA TRC calculation method at this time. Such avoided costs may be included in the PA TRC calculations for any proposed residential demand response programs.

Another issue addressed in comments was the potential price suppression resulting from demand response programs. While we find that parties did not supply adequate information to quantify any potential wholesale market price suppression benefits, we agree with NEEP/Pace that the inclusion of such price suppression benefits within the TRC calculation for residential demand response programs may be appropriate. However, due to the lack of quantifiable information regarding such suppression in prices, we will not prescribe a specific PA TRC calculation method at this time. Such benefits may be included in the PA TRC calculations for any proposed residential demand response programs. We strongly encourage the EDCs and stakeholders to review the potential for wholesale market price suppression due to residential demand response measures.

We also reiterate the statement made in the Phase II Implementation Order that, should the SWE’s demand response study result in cost-effective demand response programs for future phases of Act 129, we will issue a tentative order proposing a PA TRC methodology for such demand response programs. Should this order be issued, we encourage all interested parties to submit comments regarding the treatment of demand response in the TRC Test.

1. **TRC TEST FORMULAE FOR USE IN PENNSYLVANIA**

The definitions and formulae to be used in Pennsylvania-specific TRC testing for Phase II are set forth in Appendix A to this order. The definitions and formulae have been adapted from the *California Manual* without further specific attribution.

1. **CONCLUSION**

The Phase II Implementation Order established the second phase of the energy efficiency and conservation program that requires EDCs with at least 100,000 customers to adopt and implement cost‑effective plans to reduce energy consumption and peak demand within this Commonwealth, pursuant to Act 129. The Phase II Implementation Order set the required consumption reductions for each EDC, as well as guidelines for implementing the second phase of the energy efficiency and conservation program. This order now adopts the 2012 PA TRC Test to be used to evaluate EE&C programs pursuant to Act 129 for Phase II EE&C plans. The full text of comments and reply comments may be found on the Commission’s Act 129 information web page; [[61]](#footnote-61)

**THEREFORE,**

**IT IS ORDERED:**

1. That the 2012 Pennsylvania Total Resource Cost Test be used for evaluating energy efficiency and conservation programs during Phase II of Act 129, consistent with this Order.

2. That a copy of this Order be served upon the Office of Consumer Advocate, the Office of Small Business Advocate, the Commission’s Bureau of Investigation and Enforcement, all jurisdictional electric distribution companies subject to the Energy Efficiency and Conservation Program requirements at M-2012-2289411, and all parties who commented on the Tentative Order.

3. That the Secretary shall deposit a notice of this Order with the Legislative Reference Bureau for publication in the *Pennsylvania Bulletin.*

4. That this Order be published on the Commission’s public website.

5. That the contact person for technical issues related to this Order and the 2012 Pennsylvania Total Resource Cost Test for Phase II of Act 129 is Laura Fusare Edinger, Bureau of Technical Utility Services, 717‑783-1555 or [ledinger@pa.gov](mailto:ledinger@pa.gov). The contact person for legal and process issues related to this Order and the 2012 PA TRC for Phase II of Act 129 is Louise Fink Smith, Law Bureau, 717‑787‑5000 or [finksmith@pa.gov](mailto:finksmith@pa.gov).



**BY THE COMMISSION**

Rosemary Chiavetta

Secretary

(SEAL)

ORDER ADOPTED: August 30, 2012

ORDER ENTERED: August 30, 2012

**Appendix A**

The definitions and formulae to be used for the

Pennsylvania-specific TRC test, consistent with Act 129 of 2008,

are set forth in this Appendix.

The definitions and formulae in this Appendix are taken from

pages 10 – 12, 15-17, and 22 of the

2002 *California Standard Practice Manual* (CA SPM)[[62]](#footnote-62)

without further specific attribution.

**TRC Formulae**

The formulae for the net present value (NPVTRC), the benefit/cost ratio (BCRTRC), and the levelized costs (LCTRC) are:

|  |  |  |
| --- | --- | --- |
| NPVTRC | = | BTRC – CTRC |
| BCRTRC | = | BTRC/CTRC |
| LCTRC | = | LCRC/IMP |

The BTRC, CTRC, LCRC, and IMP terms are defined as follows. The first summation in the BTRC equation should be used for conservation and load management programs. For fuel substitution programs, both the first and second summations should be used.

#### The utility avoided cost terms (UACt, UICt, ,and UACat) are determined by costing period to reflect time-variant costs of supply:

|  |  |  |
| --- | --- | --- |
| *UACat* | = | Use *UACt* formula but with marginal costs and costing periods appropriate for the alternate fuel utility. |

**Glossary of Terms**

|  |  |  |
| --- | --- | --- |
| ∆DNit |  | Reduction in net demand in costing period *i* in year *t* |
| ∆ENit |  | Reduction in net energy use in costing period *i* in year *t* |
| BCRTRC | = | Benefit/cost ratio of total costs of the resource |
| BTRC | = | Benefits of the program |
| CTRC | = | Costs of the program |
| D | = | Interest rate (discount) |
| E | = | Discounted stream of system energy sales (kWh or therms) or demand sales (kW) for first year customers. |
| Et | = | System sales in kWh, kW, or therms for first year customers |
| I | = | Number of periods of a participant’s participation |
| IMP | = | Total discounted lead impacts of the program |
| Kit | = | 1 when ∆EGit or ∆DGit is positive (*i.e.*, a reduction) in costing period *i* in year *t*, and 0 (zero) otherwise |
| LCRC | = | Total resource costs used for levelizing |
| LCTRC | = | Levelized cost per unit of the total cost of the resource (cents/kWh for conservation programs; $/kWh for load management programs) |
| MC:Dit |  | Marginal cost of demand in costing period *i* in year *t* |
| MC:Eit |  | Marginal cost of energy in costing period *i* in year *t* |
| NPVTRC | = | Net present value of total costs of the resource |
| PACat | = | Participant avoided costs in year t for the alternate fuel devices (*i.e.*, costs of devices not chosen) |
| PCN | = | Net participant costs; in PA, the costs of the end-user customer (participating or non-participating) |
| PRCt | = | Program administrator costs in year *t*; in PA, the EDC |
| TCt | = | Tax credits year t |
| UACat | = | Utility avoided supply costs for the alternate fuel in year *t* |
| UACt | = | Utility avoided supply costs in year *t* |
| UICt | = | Utility increased supply costs in year *t* |

**Appendix B**

**List of Acronyms**

AEO: Annual Energy Outlook

B/C: Benefit/Cost

BLS: Bureau of Labor and Statistics

California Manual: 2002 California Standard Practice Manual

CFL: Compact Fluorescent Light bulb

DR: Demand Response

EDC: Electric Distribution Company

EE: Energy Efficiency

EE&C: Energy Efficiency and Conservation

EIA: Energy Information Administration

EM&V: Evaluation, Measurement, and Verification

FSWG: Fuel Switching Working Group

GTD: Generation, Transmission, and Distribution

NPV: Net Present Value

NTG: Net-to-Gross

Phase I: Act 129 from June 1, 2009 through May 31, 2013

Phase II: Act 129 from June 1, 2013 through May 31, 2016

PJM: The regional transmission organization (RTO) covering, *inter alia*, Pennsylvania

PUC: Public Utility Commission

RPM: Reliability Pricing Model

RTO: Regional Transmission Organization

SWE: Statewide Evaluator

T&D: Transmission and Distribution

TRC: Total Resource Cost

1. *See* M-2009-2108601 for an extended history of the use of the TRC Test in Pennsylvania. [↑](#footnote-ref-1)
2. Section 2806.1(c)(3) provides that, based on a review to be concluded by November 30, 2013, if “the commission determines that the benefits of the program exceed the costs, the commission shall adopt additional incremental reductions in consumption.” Section 2806.1(d)(2) provides that, based on a review to be concluded by November 30, 2013, if “the commission determines that the benefits of the plans exceed the costs, the commission shall set additional incremental requirements for reduction in peak demand for the 100 hours of greatest demand or an alternative reduction approved by the Commission.” [↑](#footnote-ref-2)
3. *The California Standard Practice Manual – Economic Analysis of Demand‑Side Programs and Projects*, July 2002, p. 18. *See* <http://www.calmac.org/events/SPM_9_20_02.pdf>. [↑](#footnote-ref-3)
4. The Commission will look at avoided supply costs such as the reduction in forecasted zonal wholesale electric generation prices, ancillary services, losses, generation capacity, transmission capacity, and distribution capacity. [↑](#footnote-ref-4)
5. In this regard, we hereby clarify that the TRC test will use the *incremental* costs of services and equipment. This matter is discussed in more detail below in the segment addressing incentive payments from an EDC. [↑](#footnote-ref-5)
6. The explicit formulae for use in Pennsylvania are set forth in Appendix A of this order. *See* *California Manual* (at 18‑19) for the underlying methodology to calculate the NPV and B/C ratio of the TRC test. [↑](#footnote-ref-6)
7. *See* *2009 PA TRC Test Order,* Docket No. M-2009-2108601 (June 23, 2009), page 5. [↑](#footnote-ref-7)
8. 66 Pa. C.S. § 2806.1(m). [↑](#footnote-ref-8)
9. *See* *2009 PA TRC Test Order*, pages 5-6. [↑](#footnote-ref-9)
10. *See* *2009 PA TRC Test Order*, pages 8-9. [↑](#footnote-ref-10)
11. *See Petition of Duquesne for Approval of its EE&C and DR Plan*, Docket No. M-2009-2093217 (October 27, 2009), at 100-101. [↑](#footnote-ref-11)
12. *See Petition of PECO Energy Company for Approval of its Act 129 Energy Efficiency and Conservation Plan,* Docket No. M-2009-2093215 (October 28, 2009), p. 51. [↑](#footnote-ref-12)
13. *See* *2009 PA TRC Test Order*, pages 8-9. [↑](#footnote-ref-13)
14. *See* *2011 PA TRC Test Order,* Docket No. M-2009-2108601 (August 2, 2011) at 48-49. [↑](#footnote-ref-14)
15. *See* *2011 PA TRC Test Order*, pages 33-34. [↑](#footnote-ref-15)
16. *See* *2009 PA TRC Test Order*, pages 19-20. [↑](#footnote-ref-16)
17. Any savings manifested up to 15 years from the start of a program measure should be included in the TRC calculations regardless of when the program measure was installed. Rejecting such a proposal would allow EDCs to include only benefits manifested during the 15-year period starting at the beginning of Act 129 plans. Such a restriction would burden EDCs to provide cost-effective EE&C programs in the latter years of Act 129 plans, as the passage of time would inevitably restrict allowable TRC benefits. [↑](#footnote-ref-17)
18. *See* *2009 PA TRC Test Order*, pages 19-20. [↑](#footnote-ref-18)
19. Any savings manifested up to 15 years from the start of a program measure should be included in the TRC calculations regardless of when the program measure was installed. Rejecting such a proposal would allow EDCs to include only benefits manifested during the 15-year period starting at the beginning of Act 129 plans. Such a restriction would burden EDCs to provide cost-effective EE&C programs in the latter years of Act 129 plans, as the passage of time would inevitably restrict allowable TRC benefits. [↑](#footnote-ref-19)
20. *See* *2011 PA TRC Test Order*, page 36. [↑](#footnote-ref-20)
21. *See* *2011 PA TRC Test Order*, pages 35-36. [↑](#footnote-ref-21)
22. *See* *2011 PA TRC Test Order*, pages 35-36. [↑](#footnote-ref-22)
23. *See* *2011 PA TRC Test Order*, page 36. [↑](#footnote-ref-23)
24. *See* *2009 PA TRC Test Order*, page 21. [↑](#footnote-ref-24)
25. The Alternative Energy Investment Act, 64 Pa. C.S. §§ 1515, *et seq.*, Act 1 of 2008 (Act 1), provides incentives including grants, loans, rebates, and tax credits for individuals, businesses, nonprofit economic development organizations, and political subdivisions. Incentives are provided for energy efficiency measures, energy conservation measures, and alternative energy generators. Act 1 programs are administered by the Pennsylvania Department of Environmental Protection, the Pennsylvania Department of Community and Economic Development, the Pennsylvania Treasury Department, and the Pennsylvania Housing and Finance Agency. [↑](#footnote-ref-25)
26. *See* *2009 PA TRC Test Order*, pages 21-25. [↑](#footnote-ref-26)
27. American Recovery and Reinvestment Act of 2009 (ARRA). *See* <http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=111_cong_bills&docid=f:h1enr.pdf>. [↑](#footnote-ref-27)
28. *See* *2009 PA TRC Test Order*, pages 24-25. [↑](#footnote-ref-28)
29. *See* *2011 PA TRC Test Order*, page 17. [↑](#footnote-ref-29)
30. Our use of the terms “equipment” and “device” in this sense are generally interchangeable and stem from the use of both terms in the NAPEE Guide. For purposes of PA TRC testing, the terms are interchangeable; in practice “equipment” would suggest something that has multiple components such as an HVAC system, and “device” would be a thing such as a light bulb, a refrigerator, or a specific component of a system such as a programmable thermostat. [↑](#footnote-ref-30)
31. *See* *2009 PA TRC Test Order*, pages 30-31. [↑](#footnote-ref-31)
32. National Action Plan for Energy Efficiency (NAPEE) (2007). *Guide to Resource Planning with Energy Efficiency*. Prepared by Price, Snuller, *et al.*  Energy and Environmental Economics, Inc. [www.epa.gov/eeactionplan](http://www.epa.gov/eeactionplan). [↑](#footnote-ref-32)
33. *See* *2011 PA TRC Test Order*, pages 30-33. [↑](#footnote-ref-33)
34. *See* *2011 PA TRC Test Order*, page 33. [↑](#footnote-ref-34)
35. *See* *2011 PA TRC Test Order*, page 33 [↑](#footnote-ref-35)
36. *See* *2011 PA TRC Test Order*, page 33 [↑](#footnote-ref-36)
37. “Spark price spread” refers to the difference between the price of electricity sold by a generator and the price of the fuel used to generate it, adjusted for equivalent units. The spark price spread can be expressed in $/MWh or $/MMBTUs (or other applicable units). To express in $/MWh, the spread is calculated by multiplying the price of gas, for example (in $/MMBtu), by the heat rate (in Btu/KWh), dividing by 1,000, and then subtracting from the electricity price (in $/MWh). The heat rate is defined as the ratio of energy inputs used by a generating facility expressed in BTUs (British Thermal Units), to the energy output of that facility expressed in kilowatt-hours. *See* <http://moneyterms.co.uk/spark-spread/>. [↑](#footnote-ref-37)
38. Locational marginal pricing. [↑](#footnote-ref-38)
39. <http://www.monitoringanalytics.com/reports/PJM_State_of_the_Market/2008/2008-som-pjm-volume2-sec2.pdf>, page 52. [↑](#footnote-ref-39)
40. *See* *2009 PA TRC Test Order*, pages 17-18. [↑](#footnote-ref-40)
41. http://www.monitoringanalytics.com/reports/PJM\_State\_of\_the\_Market/2011/2011-som-pjm-volume2-sec10.pdf. [↑](#footnote-ref-41)
42. *See* *2011 PA TRC Test Order*, pages 37-39. [↑](#footnote-ref-42)
43. *See* *2011 PA TRC Test Order*, pages 39-40. [↑](#footnote-ref-43)
44. Phase II Implementation Order,page 93. [↑](#footnote-ref-44)
45. *See Staff Report* at <http://www.puc.state.pa.us/electric/Act129/Fuel_Switching.aspx>. [↑](#footnote-ref-45)
46. *See* *2011 PA TRC Test Order*, pages 27-29. [↑](#footnote-ref-46)
47. *See* *2011 PA TRC Test Order*, pages 29-30. [↑](#footnote-ref-47)
48. The technical working group would be comprised of representatives from EDCs, Commission staff, and other interested entities for the purpose of encouraging discussion of technical issues related to the evaluation, measurement, and verification of savings programs to be implemented pursuant to Act 129. [↑](#footnote-ref-48)
49. Alternative Energy Portfolio Standards Act, 73 P.S. §§ 1648.1-1648.8. [↑](#footnote-ref-49)
50. Carbon costs legislation does not yet exist and, thus, carbon “costs” and the costs of compliance with carbon legislation are not known or knowable and will not be considered to be “avoided” costs. [↑](#footnote-ref-50)
51. *See* *2009 PA TRC Test Order*, page 19. [↑](#footnote-ref-51)
52. General residential programs defined as non-low-income residential programs applicable to the low-income population. Exclusions include programs with high costs of participation and low participation rates such as whole-house comprehensive programs. [↑](#footnote-ref-52)
53. Report of the Act 129 Low-Income Working Group, Docket No. 2009-2146801 (March 19, 2010), page 3. [↑](#footnote-ref-53)
54. Report of the Act 129 Low-Income Working Group, page 7. [↑](#footnote-ref-54)
55. Report on 2010 Universal Service Programs & Collections Performance of the Pennsylvania Electric Distribution Companies & Natural Gas Companies. April 2010. http://www.puc.state.pa.us/general/publications\_reports/pdf/EDC\_NGDC\_UniServ\_Rpt2010.pdf [↑](#footnote-ref-55)
56. National Action Plan for Energy Efficiency (2008). *Understanding Cost-Effectiveness of Energy Efficiency Programs: Best Practices, Technical Methods, and Emerging Issues for Policy-Makers*. Energy and Environmental Economics, Inc. and Regulatory Assistance Project. [www.epa.gov/eeactionplan](http://www.epa.gov/eeactionplan). [↑](#footnote-ref-56)
57. *See 2011 TRC Test Order*, pages 25-26. [↑](#footnote-ref-57)
58. *See* Phase II Implementation Order. [↑](#footnote-ref-58)
59. Phase II Implementation Order, page 42. [↑](#footnote-ref-59)
60. Phase II Implementation Order, page 39. [↑](#footnote-ref-60)
61. <http://www.puc.state.pa.us/electric/Act_129_info.aspx>. [↑](#footnote-ref-61)
62. *The California Standard Practice Manual – Economic Analysis of Demand‑Side Programs and Projects*, July 2002, p. 18. *See* <http://www.calmac.org/events/SPM_9_20_02.pdf>. [↑](#footnote-ref-62)