**PENNSYLVANIA**

**PUBLIC UTILITY COMMISSION**

**Harrisburg, PA. 17105-3265**

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|  | Public Meeting held May 24, 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 | |
|  | |
| Implementation of Act 129 of 2008 –  Total Resource Cost (TRC) Test -2012 | Docket Nos.  M-2012-2300653  M-2009-2108601 |
| Phase II of Act 129 |
|  |

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**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)*. Before us are proposed adjustments to the PA TRC Test for use for the proposed Phase II of Act 129, that, if approved, would begin June 1, 2013.

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

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-a-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 approved 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 provide 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 an 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.

Relative to the proposed Phase II, 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). Phase II goals have been proposed at Docket No. M‑2012‑2289411. Should the Commission determine that we will proceed with Phase II, it will be necessary to address the cost/benefit measurement for Phase II. In order to allow for adequate planning for the proposed Phase II, the Commission has chosen to put forth this Order which builds on the 2011 TRC Test and the *California Manual* for the cost-benefit analysis of EE&C plans for the proposed 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 the proposed Phase II would be applicable throughout the course of Phase II, potentially 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, cost 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 benefit-cost ratio (B/C ratio). The NPV is the discounted value of the net benefits of this test over a specified period of time, *i.e.*, the expected useful life of the energy efficiency measure. The NPV is a measure of the change in the total resource costs due to the program. An NPV above zero indicates that the program is a less expensive resource than the supply option upon which the marginal costs are based. 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.

The B/C ratio is the ratio of the discounted total benefits of the 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.[[6]](#footnote-6) The explicit formulae for use in Pennsylvania are set forth in Appendix A of this order.

1. **TRC TEST TOPICS**
2. **Societal Test as part of the TRC**
3. Discussion

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 TRC 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. 66 Pa. C.S. § 2806.1(m).

1. Proposed resolution

Therefore, for a potential Phase II, the Commission proposes that Pennsylvania’s version of the TRC 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. **Use of TRC Test Assumptions for Other Matters**
2. Discussion

Since 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, believe that a blanket exclusion was appropriate.[[8]](#footnote-8)

1. Proposed resolution

The Commission proposes that for a potential 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 TRC Test assumptions and the assumptions or facts at issue in such other proceedings, parties may enquire into the validity of such differences in those, or in the TRC Test, proceedings.

1. **Level at Which to Measure TRC**
2. Discussion

Act 129 requires that an EDC’s EE&C plan provide measures for customers of all rate classes, 66 Pa. C.S. § 2806.1(b)(1)(I)), and establishes specific requirements for inclusion of low-income programs, 66 Pa. C.S. § 2806.1(b)(1)(G), and government programs, 66 Pa. C.S. § 2806.1(b)(1)(B), in an EDC’s EE&C plan. Based on Section 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, otherwise noted as the plan level.[[9]](#footnote-9) The overall determination as to whether an EDC’s plan was deemed cost-effective using the TRC Test was made at the plan level, and the 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 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 the benefits to costs indicated that programs were not an effective use of ratepayer funds.[[10]](#footnote-10) [[11]](#footnote-11)

1. Proposed resolution

Should there be a Phase II, the Commission proposes that the TRC Test continue to be applied at the plan level. While some programs may not pass the TRC Test, as long as all of the programs in an EDC’s EE&C plan taken in total pass the TRC Test, then the EDC’s EE&C plan will be deemed cost-effective. However, as was true for Phase I, the Commission reserves the right to reject any program with a low TRC ratio, indicating the program will not be cost-effective. Further, as was directed in Phase I, the Commission proposes 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. [[12]](#footnote-12)

1. **Cost-Effectiveness Evaluations and Reporting Results and Timing of TRC Reports**
2. Discussion

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. During Phase I, the EDCs were directed 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.[[13]](#footnote-13)

1. Proposed resolution

If Phase II is approved, the Commission proposes that EDCs continue to report the results of the TRC Test annually as a part of their Act 129 final annual reports. Additionally, the TRC ratios for each EDC program and for the portfolio should 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. **BENEFITS AND COSTS**
2. **Basis of TRC Benefits**
3. Discussion

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.[[14]](#footnote-14)

1. Proposed resolution

The Commission proposes that for a potential Phase II the calculation of TRC benefits 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. **Maximum 15-Year Measure Life**
2. Discussion

Act 129 limits the evaluation and TRC Test process to consideration of energy-efficiency effective measure lives of 15 years or less. The Commission recognizes 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 TRC, 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 cost/benefit analysis under the TRC Test. Accordingly, for the purposes of the TRC Test calculation, any given measure is limited to a maximum of 15 years of savings benefits.[[15]](#footnote-15)

1. Proposed resolution

It is proposed that, as with Phase I, for the purposes of capturing the energy or demand savings in evaluation, measurement, and verification (EM&V) protocols during the proposed 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 is proposed that all TRC calculations for EE&C program measures are 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.[[16]](#footnote-16)

1. **Definition of Incentives in TRC for Energy Efficiency Measures**
2. Discussion

For Act 129 thus far, “incentive” has been 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.

It was determined for Phase I that, in the case where funds paid to customers are a marketing cost or are intended to offset participant costs that are difficult to quantify, EDCs may include the funds in the TRC calculations as either a direct cost or as a proxy for the participant cost.[[17]](#footnote-17)

For Phase I, “incentive” did not include the cost of direct installation programs that did not involve a payment to the participant. The Commission determined that such costs are direct costs, not incentives.[[18]](#footnote-18)

1. Proposed resolution

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

1. **Incentive Payments from an EDC**
2. Discussion

For Phase I, the TRC Test had to take into account the effects of an EE&C plan on both participating and non-participating customers based on costs incurred by the EDC and participating customers. In the first TRC Test proposal, the Commission proposed and subsequently approved that costs calculated in the TRC test would include EE&C plan costs whether paid by the EDC or by the participants. Incentive payments from an EDC to a customer would not be included in the 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 energy efficiency 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 program participants are already factored into the incremental cost of acquiring the energy savings. Including incentive payments made to program participants in the TRC calculation for energy efficiency programs would result in double-counting of the EDC’s portion of costs in the TRC calculation.[[19]](#footnote-19)

1. Proposed resolution

The Commission proposes that incentive payments in a potential Phase II are handled as they were in Phase I, as documented above.

1. **Incentive Payments from Sources Outside of Act 129**
2. Discussion

For Phase I, the issue of how to handle tax credits and other incentive payments from sources outside of the Act 129 programs in the TRC Test was unclear. This TRC Test Order seeks to clarify this issue for the proposed Phase II.

The Commission acknowledged, for example, that it is possible that some customers may participate simultaneously in Act 1[[20]](#footnote-20) programs and in Act 129 programs. This situation gives 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.[[21]](#footnote-21) 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).[[22]](#footnote-22)

A corresponding issue that arose during Phase I was how to then 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 TRC Test if any portion of the measure is attributable to Act 129.[[23]](#footnote-23)

1. Proposed resolution

Should the Commission proceed with Phase II, we propose 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.[[24]](#footnote-24) Additionally, since Act 129 funding is fixed, any additional funds will be used to supplement, not replace, funds from the EDCs. Finally, we propose 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, we propose that the entire savings of that equipment or service can also be claimed by the EDC for TRC Test purposes.

1. **Incremental Costs**
2. Discussion

The Commission determined for Phase I that energy efficiency cost calculations should use only the incremental energy efficiency costs and savings. The Commission recognizes that the incremental costs and saving will vary depending on the type of energy efficiency device or measure being implemented. In this context, incremental cost for a device[[25]](#footnote-25) 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. The use of incremental costs will provide more accurate calculations for the measures being implemented.[[26]](#footnote-26)

1. Proposed resolution

The Commission proposes that, as with Phase I, incremental costs are incorporated where appropriate in the TRC Test process and that EDCs are to use calculations that include incremental costs for a potential Phase II. For the purpose of defining incremental costs, the Commission would continue to look to Section 4.1 of the Guide to Resource Planning with Energy Efficiency, A Resource of the National Action Plan for Energy Efficiency, November 2007, for guidance.[[27]](#footnote-27)

1. **Incremental Measure Costs Data**
2. Discussion

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.[[28]](#footnote-28)

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.[[29]](#footnote-29)

1. Proposed resolution

For a potential Phase II, the Commission proposes 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 Commission acknowledges that the flexibility to use data from the DEER database could avail EDCs with the capability to use the most appropriate data possible. Therefore, the Commission will continue to allow EDCs to use DEER data even where there is already Pennsylvania-specific measure cost data available. Finally, the Commission proposes that the statewide evaluator 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.

### Avoided Costs of Supplying Electricity

1. Discussion

For Phase I, the Commission specified that the 15‑year period for calculating avoided electricity supply costs would be broken into three segments of five years each. The Commission elected to retain three five-year periods, concluding that three five-year periods more accurately reflect the predictive process. The nature and number of predictions change the farther out on the 15-year timeline that one goes. Using three periods allows for taking better advantage of known conditions relative to future uncertainty.

1. Proposed resolution

#### The Commission proposes that avoided electricity supply costs for a potential Phase II be calculated in the same manner that was utilized for Phase I. As with Phase I, we propose that the fifteen-year period for calculating avoided electricity supply costs be broken into three segments of five years each.[[30]](#footnote-30)

#### Should Phase II be approved, for the first five years, the wholesale electric generation prices as reflected in the NYMEX PJM futures price will be used. This will be adjusted to reflect both on- and off-peak prices on a 50% on- and 50% off-peak basis. This may be further adjusted to reflect historical EDC-specific usage characteristics by customer, and rate, class. For Phase I, we specified that the NYMEX “prompt month” be used, two months prior to the filing date, for use in the first five-year period calculations.

The second five-year period will use the NYMEX Natural Gas futures price. [[31]](#footnote-31) The natural gas futures price will be converted into an estimated wholesale energy price through the use of a spark price spread[[32]](#footnote-32) calculation. Further, we will adopt a timeline similar to the one used for the first five years. That is, we shall use the NYMEX prompt month, two months prior to the filing date. As a rule, this date is about one day prior to the electric close. Additionally, we shall adopt the heat rate used in the Energy Information Administration (EIA) Annual Energy Outlook (AEO) for 2010.[[33]](#footnote-33) This will be adjusted annually, at the start of each new planning cycle, to reflect the updated EIA AEO assumptions. We shall also specify the Mid‑Atlantic zone as the measure, which will be converted to cents/kWh by using 3412 BTUs/kWh.

The third five-year period will use the US EIA’s Annual Energy outlook projections. An estimated price for the PJM RTO’s RPM capacity price will also be included, broken down into a cents/kWh value.

### Transmission, Distribution, and Capacity Costs

#### Discussion

#### The TRC Test for Phase I provided that transmission prices, as set by FERC, to the EDC zone were included; as were EDC distribution rates. The Commission approved including an estimated price for the PJM RTO’s RPM[[34]](#footnote-34) capacity price, broken down into a cents/kWh value. Generally accepted ancillary service rates were to be included to the extent known.[[35]](#footnote-35)

#### Proposed resolution

For a potential Phase II, the Commission proposes that EDCs, as with Phase I, continue to use the historical average annual growth rate of the Bureau of Labor Statistics’ Electric Power GTD sector price index (BLS factor: [NAICS 221110](http://data.bls.gov/PDQ/servlet/SurveyOutputServlet?series_id=PCU221110221110)[[36]](#footnote-36)) as a proxy for the rate of escalation of transmission, distribution, capacity, and ancillary service costs between the end of the fourth program year and the beginning of the EIA AEO in year 11.

1. **End-Use Adjustments**
2. Discussion

During Phase I, it was decided that it is appropriate to use end-use profiles for an energy efficiency program, rather than general overall rate class profiles.[[37]](#footnote-37)

1. Proposed resolution

The Commission proposed to continue this practice for a potential Phase II. EDCs should therefore use device-specific profiles if available. If not, the EDC should use the class average.[[38]](#footnote-38)

1. **Locational, Temporal, and Zonal Differences**
2. Discussion

The Commission decided for Phase I that 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[[39]](#footnote-39) (dollars per MWh).”[[40]](#footnote-40) Further, for Phase I, the Commission provided for a basis adjustment to the natural gas prices in years six through ten, using the basis differential between the Henry Hub as the source and TETCO M-3 as the destination for utilities west of the Susquehanna and Transco Zone 6 as the destination for utilities east of the Susquehanna. [[41]](#footnote-41)

1. Proposed resolution

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.[[42]](#footnote-42)  As such, we will adopt this indicator as the derivative for calculating EDC basis adjustments. The Commission proposes that the same guidance, as modified by use of the zonal real-time lard weighted LMP, for Phase I be applied for a potential Phase II.

1. **Inclusion or Exclusion of Customer Avoided Operating and Maintenance Costs in the TRC Calculation**
2. Discussion

The TRC for Phase I proposed that reduced costs for equipment and labor be treated as benefits that are quantifiable and measurable and proposed 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 may be challenging to quantify, or unquantifiable, the Commission permitted EDCs to omit such costs from TRC calculations. The Commission acknowledged that omitting such costs will cause the benefit/cost 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.[[43]](#footnote-43)

1. Proposed resolution

Should Phase II be approved, the Commission proposes 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. **Avoided Costs in the Benefit/Cost Ratios in Approved EE&C Plans**
2. Discussion

Previous TRC Test Orders have addressed the issue of what type of avoided cost data EDCs should use for determining the TRC of new programs and for determining the TRC of a portfolio of existing programs. The primary issue was whether or not EDCs should use the latest available forecast of avoided costs or previously filed vintage forecasts of avoided costs. For Phase I, the Commission allowed EDCs to use the latest available or most current forecast of avoided cost when filing new programs. Avoided costs figures included in TRC calculations of previously approved EE&C program plans did not need to be updated by present or future avoided cost figure revisions or updates. When calculating and reporting the overall portfolio TRC Test ratio in EDC Act 129 annual reports, the EDCs would use the vintage of avoided cost forecasts applicable for each program at the time the program was approved.[[44]](#footnote-44)

1. Proposed resolution

The Commission desires to strike a balance between using the most accurate and up-to-date avoided costs and using the avoided costs in effect at the time a program plan is approved. Therefore, the Commission proposes that EDCs continue to proceed in a potential Phase II as they did in Phase I; use the vintage of avoided cost forecasts applicable for each program at the time the program was approved. In so doing, all new EE&C plans filed for Phase II should use the latest available forecast of avoided costs. Any new programs included in updates to EDCs' EE&C plans should use the latest available forecast of avoided costs. Existing programs included in the original Phase II plan will use the vintage of avoided cost forecasts applicable for said programs when they were initially approved.

1. **Fuel Switching**

a) Discussion

**TRC Inputs for Fuel Switching**

Previous TRC test orders adopted the fuel switching provisions as 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 benefit/cost analysis of each proposed program.

For purposes of the TRC Test in PA, 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, the following was applicable; 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)

**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. Therefore, the Commission 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. However, it was noted that this provision is only applicable to fuel switching proposals where there is EPA ENERGY STAR performance rated equipment available for installation.[[47]](#footnote-47)

1. Proposed resolution

The Commission proposes that this same guidance for fuel switching inputs and appliance efficiency be followed for a potential Phase II.

1. **Compliance with AEPS Act**[[48]](#footnote-48) **and Carbon Issues**
2. Discussion

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 such).[[49]](#footnote-49) [[50]](#footnote-50)

1. Proposed resolution

The Commission proposes that, as was true for Phase I, the cost of compliance with the AEPS Act is applicable to all the power “avoided” and, therefore, would be considered an avoided cost for a potential Phase II. Additionally, carbon reduction expenses will continue to be excluded, unless a legislative change dictates otherwise.

1. **LOW INCOME TRC TEST CALCULATION GUIDANCE**
2. **Low-Income Energy Savings**
3. Discussion

Through Program Year 2 of Phase I, six EDCs reported low-income savings from participation in general residential programs,[[51]](#footnote-51) 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 Commission is offering 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.”[[52]](#footnote-52) In other words, there are likely participants that meet the Act 129 low-income criteria that 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.”[[53]](#footnote-53) 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.

1. Proposed resolution

Should the Commission decide to proceed with Phase II, the Commission proposes that the percentage of confirmed low-income customers, as reported annually by EDCs in the Universal Service Report[[54]](#footnote-54), be used as the proxy for estimating low-income savings from non-low-income 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. **Low-Income Costs and Benefits Reporting**
2. Discussion

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.

1. Proposed resolution

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

1. Low-income savings, including savings from general residential programs, in the “Overview of Portfolio” section. The proportion of savings derived from low-income-specific versus general 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 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 general residential low-income. A TRC Test result for the low-income sector will be calculated.
5. **NET-TO-GROSS ADJUSTMENTS**
6. **Net-to-Gross (NTG) Adjustments to Savings**
7. Discussion

As discussed in the *Energy Efficiency and Conservation Program Tentative Implementation Order* at Docket Number M‑2012‑2289411, 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. An 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.[[55]](#footnote-55) For Pennsylvania, the adjustment would reflect only those savings attributable to Act 129 programs. An 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. Three common factors, among others, addressed through the NTG adjustment are “free riders,” “take-back effect,” and “spillover effect,” sometimes referred to as “free drivers.”[[56]](#footnote-56)

The primary discussion pertaining to NTG is whether or not NTG adjustments should be used to determine compliance and/or targets, or whether or not it is more appropriate to use NTG solely for program design and planning. If NTG adjustments are made that result in reductions to claimed savings because of those free riders and take-back effects that are not cancelled out by spillover effects, then EDCs would have to implement additional reduction measures to meet the mandated reduction targets. The EDCs would incur additional program costs to implement the additional reduction measures. However, with the implementation of additional reduction measures, there may be the potential for incremental reductions in the future cost of wholesale power, which could benefit all customers.

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 (i.e. to determine whether or not an EDC met its mandated Act 129 reduction targets).

1. Proposed resolution

At this time, many EDCs have only completed preliminary NTG research, and a full year of NTG research data will not be available until the EDCs’ Phase I Program Year 3 Final Annual Reports are submitted (November 15, 2012). As such, the Commission lacks Pennsylvania-specific data to support an adjustment to NTG. Due to the lack of Pennsylvania-specific NTG research data, the Commission proposes that NTG adjustments be utilized the same way for the proposed Phase II as they were during Phase I. Specifically, the Commission proposes 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 hereby proposes that EDCs continue to use net verified savings for program planning purposes and gross verified savings to determine compliance with savings targets for a potential Phase II.

Although this is an issue that was previously considered within the context of the TRC test, the Commission recognizes that the use of NTG adjustments is an overarching policy issue that could be impactful of targets. Due to the implications for meeting targets, the Commission has decided that the NTG would best be included in the *Energy Efficiency and Conservation Program Tentative Implementation Order*, Docket No. M‑2012‑2289411 entered on May 11, 2012. Therefore, any and all comments pertaining to NTG issues, although a TRC-related issue, should be provided for that proceeding.

1. **DEMAND RESPONSE**
2. **Inclusion of Demand Response**

As was stated in the Energy Efficiency and Conservation Program Tentative Implementation Order, the Commission’s interpretation of subsection (d)(2) of Act 129, 66 Pa. C.S. § 2806.1(d)(2), is that, in order to prescribe specific peak demand reduction targets for subsequent phases of Act 129, the demand response programs must be proven to be cost-effective. In order to determine the cost-effectiveness of current and potential future demand response programs, the Commission directed the SWE to complete a demand response study.[[58]](#footnote-58) Specifically, the Commission’s *March 4, 2011 Secretarial Letter* at Docket No. M-2012-2289411 directed the SWE to collect data and documentation from the EDCs to aid in performing an analysis of the cost-effectiveness of compliance with the current legislative demand response requirements and of potential improvements to the demand response program design. This study will not be completed until late 2012, after the current peak demand reduction program is completed.

The Commission has not, therefore, proposed to set any peak demand reduction targets for the proposed three-year Phase II EE&C program period. Additionally, the Commission has not yet determined if we will choose to implement demand response programs for Phase II or potential subsequent phases of Act 129. If the decision is made to implement demand response programs, and if revisions to the TRC Test are deemed necessary due to a new demand response structure, then a revised TRC Test would be issued for comment that includes demand response.

Although demand response was previously addressed within the context of the TRC test, the Commission recognizes that the inclusion or exclusion of demand response programming is an overarching policy issue. Therefore, the topic of demand response programming has been included in the *Energy Efficiency and Conservation Program Tentative Implementation Order*. Therefore, comments pertaining to including demand response programs in Phase II, although also a TRC-related issue, should be provided for that proceeding.

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

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

1. **CONCLUSION**

With this Tentative Order, the Commission seeks comments on the proposed PA TRC Test for Phase II. This Tentative Order represents the Commission’s efforts to establish a comprehensive TRC test with the purpose of evaluating the EE&C Programs pursuant to Act 129. Comments to this Tentative Order should reflect the identical topical numbering references as used herein. If your comments do not address a particular topic, please include the notation that that you are not commenting on that particular topic. If you are raising new topics, please do so after you have addressed the topics raised in this Tentative Order. This Tentative Order and filed comments will be made available to the public on the Commission’s Act 129 Information web page; [[59]](#footnote-59) **THEREFORE,**

**IT IS ORDERED:**

1. That the Pennsylvania Total Resource Cost Test for Phase II be issued for comment.

2. That a copy of this Tentative Order be served upon the Office of Consumer Advocate, the Office of Small Business Advocate, the Bureau of Investigation and Enforcement, all jurisdictional electric distribution companies, all licensed electric generation suppliers, the Pennsylvania Department of Environmental Protection, and all parties who commented on the *20011 Pennsylvania Total Resource Cost Test Order*, Docket No. M‑2009-2108601 entered on August 2, 2011.

3. That a copy of this Tentative Order be published in the *Pennsylvania Bulletin.*

4. That interested parties may file comments on or before twenty (20) days after publication in the *Pennsylvania Bulletin* on or before June 29, 2012, whichever is later. Reply comments are due on or before ten (10) days after comments are due or July 9, 2012, whichever is later. An original and three (3) copies of the comments shall be filed referencing Docket No. M-2012-2300653 with the Pennsylvania Public Utility Commission, Attention: Secretary, P.O. Box 3265, Harrisburg, PA 17105-3265.

5. That comments and reply comments be electronically mailed in Microsoft Word document format to Laura Fusare Edinger at [ledinger@pa.gov](mailto:ledinger@pa.gov) and Louise Fink Smith at [finksmith@pa.gov](mailto:finksmith@pa.gov). Attachments may not exceed three megabytes.

6. That this Tentative Order, the proposed Pennsylvania Total Resource Cost Test for Phase II of Act 129, and all filed comments and reply comments related to this Tentative Order be published on the Commission’s website.

7. That the contact person for technical issues related to this Tentative Order and the proposed 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 Tentative Order and the proposed 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: May 24, 2012

ORDER ENTERED: May 25, 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)[[60]](#footnote-60)

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

California Manual: 2002 California Standard Practice Manual

CFL: Compact Fluorescent Light bulb

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

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

RTO: Regional Transmission Organization

SWE: Statewide Evaluator

TRC: Total Resource Cost

1. *See* Docket No. M-2009-2108601 for an extended history of Phase I. [↑](#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. *See* the Appendix of this order. *See*, *also*, *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. *See* *2009 PA TRC Test Order*, pages 5-6. [↑](#footnote-ref-8)
9. *See* *2009 PA TRC Test Order*, pages 8-9. [↑](#footnote-ref-9)
10. *See Petition of Duquesne Light Company for Approval of its Energy Efficiency and Conservation and Demand Response Plan, Approval of its Recovery of its Costs through a Reconcilable Adjustment Clause and Approval of Matters Relating to the Energy Efficiency and Conservation Plan Order*, Docket No. M-2009-2093217 (October 27, 2009), pages 100-101. [↑](#footnote-ref-10)
11. *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-11)
12. *See* *2009 PA TRC Test Order*, pages 8-9. [↑](#footnote-ref-12)
13. *See* *2011 PA TRC Test Order,* Docket No. M-2009-2108601 (August 2, 2011), pages 48-49. [↑](#footnote-ref-13)
14. *See* *2011 PA TRC Test Order*, pages 33-34. [↑](#footnote-ref-14)
15. *See* *2009 PA TRC Test Order*, pages 19-20. [↑](#footnote-ref-15)
16. 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-16)
17. *See* *2011 PA TRC Test Order*, pages 35-36. [↑](#footnote-ref-17)
18. *See* *2011 PA TRC Test Order*, page 36. [↑](#footnote-ref-18)
19. *See* *2009 PA TRC Test Order*, page 21. [↑](#footnote-ref-19)
20. 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 Economic Development, the Pennsylvania Treasury Department, and the Pennsylvania Housing and Finance Agency. [↑](#footnote-ref-20)
21. *See* *2009 PA TRC Test Order*, pages 21-25. [↑](#footnote-ref-21)
22. 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-22)
23. *See* *2009 PA TRC Test Order*, pages 24-25. [↑](#footnote-ref-23)
24. *See* *2011 PA TRC Test Order*, page 17. [↑](#footnote-ref-24)
25. 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 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-25)
26. *See* *2009 PA TRC Test Order*, pages 30-31. [↑](#footnote-ref-26)
27. 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-27)
28. *See* *2011 PA TRC Test Order*, pages 30-33. [↑](#footnote-ref-28)
29. *See* *2011 PA TRC Test Order*, page 33. [↑](#footnote-ref-29)
30. *See* *2009 PA TRC Test Order*, pages 9-12. [↑](#footnote-ref-30)
31. Instead of EIA’s AEO electric price projections or the NYMEX electric futures/NYMEX PJM electric generation futures price. [↑](#footnote-ref-31)
32. “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-32)
33. *See* <http://www.eia.gov/forecasts/aeo/electricity_generation.cfm>. [↑](#footnote-ref-33)
34. Reliability Pricing Model, for capacity pricing. [↑](#footnote-ref-34)
35. *See* *2009 PA TRC Test Order*, pages 13-15. [↑](#footnote-ref-35)
36. <http://data.bls.gov/PDQ/servlet/SurveyOutputServlet?series_id=PCU221110221110>.  This escalator is widely accepted in the industry and financial markets; it is energy-industry-specific, readily ascertainable, and easy to use.  Like its more familiar counterparts, the BLS’ Consumer Price Index (CPI) and the Producer Price Index (PPI), it will produce expected values of future market variables within reasonable limits.  [↑](#footnote-ref-36)
37. *See* *2009 PA TRC Test Order*, page 17. [↑](#footnote-ref-37)
38. For example, CFLs are typically used during the night rather than during the day, yet overall residential usage profiles can be heavy during the day due to air conditioning and cooling load. [↑](#footnote-ref-38)
39. Locational marginal pricing. [↑](#footnote-ref-39)
40. <http://www.monitoringanalytics.com/reports/PJM_State_of_the_Market/2008/2008-som-pjm-volume2-sec2.pdf>, page 52. [↑](#footnote-ref-40)
41. *See* *2009 PA TRC Test Order*. 17-18. [↑](#footnote-ref-41)
42. http://www.monitoringanalytics.com/reports/PJM\_State\_of\_the\_Market/2011/2011-som-pjm-volume2-sec10.pdf. [↑](#footnote-ref-42)
43. *See* *2011 PA TRC Test Order*, pages 37-39. [↑](#footnote-ref-43)
44. *See* *2011 PA TRC Test Order*, pages 39-40. [↑](#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. Alternative Energy Portfolio Standards Act, 73 P.S. §§ 1648.1-1648.8. [↑](#footnote-ref-48)
49. 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-49)
50. *See* *2009 PA TRC Test Order*, page 19. [↑](#footnote-ref-50)
51. 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-51)
52. Report of the Act 129 Low-Income Working Group, Docket No. 2009-2146801 (March 19, 2010), page 3. [↑](#footnote-ref-52)
53. Report of the Act 129 Low-Income Working Group, page 7. [↑](#footnote-ref-53)
54. 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-54)
55. 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-55)
56. The concept of free riders is that a number of customers may take advantage of rebates or cost savings available through conservation programs even though they would have installed the efficient equipment on their own. Take-back effect occurs if customers use the reduction in bills/energy to increase their energy use to be more comfortable or for convenience. Spillover is the opposite of the free-rider effect, where customers adopt efficiency measures because they are influenced by program-related information and marketing efforts, although they do not actually participate in the program. NTG adjustments for free riders and take-back effects result in the subtraction of claimed energy savings whereas spillover effects NTG adjustments result in an addition of claimed energy savings. [↑](#footnote-ref-56)
57. *See 2011 TRC Test Order*, pages 25-26. [↑](#footnote-ref-57)
58. *See Energy Efficiency and Conservation,* Secretarial Letter, (*March 4, 2011 Secretarial Letter*) at Docket No. M-2008-2069887, served March 4, 2011 [↑](#footnote-ref-58)
59. <http://www.puc.state.pa.us/electric/Act_129_info.aspx>. [↑](#footnote-ref-59)
60. *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-60)