**PENNSYLVANIA**

**PUBLIC UTILITY COMMISSION**

**Harrisburg, PA. 17105-3265**

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|  | Public Meeting held June 11, 2015 |
| Commissioners Present: |  |

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| Gladys M. Brown, Chairman |
| John F. Coleman, Jr., Vice Chairman |
| James H. CawleyPamela A. WitmerRobert F. Powelson |
|  |
| 2016 Total Resource Cost (TRC) Test  | M-2015-2468992 |

**ORDER**

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**BY THE COMMISSION:**

 Pursuant to Act 129 of 2008, 66 Pa. C.S. § 2806.1, we are implementing a third phase of energy efficiency and conservation (EE&C) plans that certain electric distribution companies (EDCs) are required to file. *See* *Phase III Implementation Order*, Docket M-2014-2424864. Act 129 directs the Commission to analyze the benefits and costs of the EE&C plans. Our March 11, 2015 *2016 TRC Test Tentative Order* at this docket set out for comments a proposed 2016 TRC Test. This Order finalizes the specific refinements to the 2016 TRC Test for use in Phase III, which will begin June 1, 2016.

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

Act 129 required an EDC with 100,000 or more customers to adopt an EE&C plan, subject to approval by the Commission, to reduce electric consumption. Act 129 also required an analysis of the benefits and costs of each EDC’s initial EE&C plan, in accordance with a TRC test. In particular, Act 129 required an EDC to demonstrate that its plan was 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). The initial EE and Demand Response (DR) plans were designated Phase I of Act 129 (Phase I) and ran through May 31, 2013. The TRC Test for Phase I of Act 129 was adopted by Commission order at Docket No. M‑2009‑2108601 on June 23, 2009 (*2009 TRC Test Order*). The TRC Test was refined at the same docket on August 2, 2011 *(2011 TRC Test Order)*.

For Phase II of Act 129, June 1, 2013, to May 31, 2016, the Commission adopted three-year consumption reduction requirements, pursuant to Section 2806.1(c)(3) of Act 129, consistent with the recommendation of the Phase II Statewide Evaluator (SWE).[[2]](#footnote-2) The Phase II goals vary by EDC based on the specific mix of program potential, acquisition costs and funding available under the 2% limitation stipulated by Act 129.[[3]](#footnote-3) On August 30, 2012, at Docket No. M‑2012-2300653 *(2013 TRC Test Order),* the Commission established the TRC Test parameters for Phase II.[[4]](#footnote-4) There were no DR requirements in Phase II. Thus, there were no TRC Test provisions for DR for Phase II. The Commission, however, directed the SWE to study the cost-effectiveness of current and potential future demand response programs. On November 1, 2013, the SWE’s *Act 129 DR Study* was released.[[5]](#footnote-5)

Relative to Phase III, Act 129 requires that the Commission determine if further EE and DR goals should be established beyond the Phase II goals. 66 Pa. C.S. §§ 2806.1(c)(3) and 2806.1(d)(2). On October 23, 2014, the Commission issued a Secretarial Letter[[6]](#footnote-6) at M-2014-2424864 advising stakeholders that proposed Phase III goals would be addressed at that docket and that proposed TRC test matters for Phase III would be addressed at this docket. The Phase III *Secretarial Letter* specifically solicited comments on societal benefits and periodic review and updating of TRC test methodology.

 Comments to the *Secretarial Letter* were individually filed by the Energy Association of Pennsylvania (EAP) and by four EDCs: Duquesne Light Company (Duquesne); FirstEnergy Service Company, on behalf of Metropolitan Edison Company, Pennsylvania Electric Company, Pennsylvania Power Company, and West Penn Power Company (FirstEnergy); PECO Energy Company (PECO); and PPL Electric Utilities Corporation (PPL). Comments were also filed by the Office of Consumer Advocate (OCA); several industrial-users groups[[7]](#footnote-7) (collectively, Industrials); the Joint Commenters[[8]](#footnote-8); the Coalition for Affordable Utility Services and Energy Efficiency in Pennsylvania (CAUSE-PA); Demand Response Supporters (DR Supporters); Energy Efficiency for All (EEFA); the Home Performance Coalition (HPC); the Keystone Energy Efficiency Alliance (KEEA); the Pennsylvania State University (Penn State); and The City of Philadelphia (City) . The comments of these stakeholders were duly considered in formulating the proposed 2016 TRC Test put forth in the *2016 TRC Test Tentative Order*.

On February 27, 2015, the SWE’s *EE Market Potential Study*[[9]](#footnote-9) relative to a potential Phase III was released.

On February 27, 2015, the SWE’s *DR Potential Study*[[10]](#footnote-10) was released. The SWE collected data and documentation from EDCs to aid in performing an analysis of the cost-effectiveness of compliance with current legislative DR requirements and of potential improvements to the DR program design.

On March 11, 2015, Act 129 Phase III EE and DR goals were proposed at Docket No. M‑2014-2424864 by tentative order. In conjunction with that order, the March 11, 2015 *2016 TRC Test Tentative Order* at this docket proposed to build on the 2013 TRC Test used in Phase II and the *California Standard Practice Manual*[[11]](#footnote-11)(*2002 CSPM*)for the benefit/cost analysis of EE&C plans for Phase III. The tentative orders were served on all affected EDCs and other known interested stakeholders. Notice of the tentative orders and of a stakeholder meeting was published in the *Pennsylvania Bulletin*.

On April 8, 2015, the Commission held the stakeholder meeting in Harrisburg to provide stakeholders with, *inter alia*, the opportunity for a question-and-answer session with the SWE relative to its EE market potential and DR potential studies cited in the *2016 TRC Test Tentative Order*.

 Duquesne; FirstEnergy; PECO; PPL; CAUSE-PA; the Joint Commenters and the Natural Resources Defense Council (collectively, Joint Commenters/NRDC)[[12]](#footnote-12); Home Performance Coalition (HPC) and Keystone Energy Efficiency Alliance (KEEA), collectively, HPC/KEEA[[13]](#footnote-13); The Pennsylvania State University (Penn State),[[14]](#footnote-14) and James Freihaut, Ph.D.,[[15]](#footnote-15) filed comments. PECO and Prof. Freihaut raised new matter in comments.

 Duquesne; FirstEnergy; PPL; the Industrials[[16]](#footnote-16); the Joint Commenters/NRDC and KEEA (collectively Joint Commenters/NRDC/KEEA[[17]](#footnote-17); and Citizen Power, Inc. (Citizen Power) filed reply comments.

The Phase III EE and DR provisions are being adopted at Docket No. M‑2014‑2424864 in conjunction with the entry of this Order. Having determined to proceed with Phase III, this Order finalizes the benefit/cost measurement provisions for Phase III.[[18]](#footnote-18)

**II. TRC Test Explained**

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 EDC’s EE&C plan. The basic TRC test has historically been a regulatory test. It is not a static, one-size-fits-all tool. It can incorporate different factors and evaluate variables in different ways as determined by the jurisdictional entity using it.

Pennsylvania has tailored a basic TRC test to evaluate EDC progress in meeting the requirements of Act 129. In determining how to structure the TRC test for Phase I and Phase II, the Commission chose to use the *2002 CSPM* as the basis for the initial TRC Test in Pennsylvania. The Commission also referenced cost-effectiveness information published by the National Action Plan for Energy Efficiency (NAPEE).[[19]](#footnote-19) These resources are also relevant to the 2016 TRC Test adopted herein. Additionally, we have relied on the recommendations of the SWE and considered the comments and reply comments of the stakeholders. As determined during Phase I and Phase II, the *2002 CSPM* does not address all issues specific to Pennsylvania. For this reason, the Commission has continued to explore how best to structure and apply B/C testing for Pennsylvania.[[20]](#footnote-20)

The purpose of using a 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. Sections 2806.1(c)(3) and 2806.1(d)(2), as well as the definition of the TRC test in Section 2806.1(m) of Act 129, provide that a 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 Pennsylvania, the 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 in Pennsylvania 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. Avoided supply costs, depending on the mandate in a given jurisdiction, can be calculated using either gross or net program savings. In Pennsylvania, we historically looked at avoided supply costs from the perspective of gross program savings.

Further, the costs used in the TRC Test in Pennsylvania include the costs of the various programs paid by an EDC (or a default service provider) and the participating customers,[[21]](#footnote-21) 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. We did not propose to change this provision for Phase III.

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.[[22]](#footnote-22) The explicit formulae for use in Pennsylvania are set forth in Appendix A of this Order. The Appendix A reflects a modification to the formulae as compared to what was proposed in the *2016 TRC Tentative Order* for Phase III. The modifications will be discussed below.

The 2016 TRC Test adopted herein is intended to be applicable throughout the course of Phase III, concluding May 31, 2021. 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.

**III. Societal Test And Benefits From Avoided Costs of Fossil Fuel and Water – Changes from Phase II**

 **(a) Summary of Issue and Proposed Resolution**

During Phases I and II, Pennsylvania did not use the Societal Test as part of the TRC Test. The statute as it is currently written and the TRC Test as it is currently structured will not allow for inclusion of societal, environmental, non-energy impacts (NEIs), or non-electric aspects.

Additionally, pursuant to our prior TRC Test Orders, non-electric benefits from savings of water and fossil fuels such as propane, natural gas, and oil were not factored into the TRC Test. Under our prior interpretation, we concluded that the statutory language did not require the inclusion of these items in the TRC Test. *See 2013 TRC Test Order* at 8‑9.

The *2016 TRC Test Tentative Order* proposed to continue to exclude societal costs, environmental costs, NEIs, or other non-electric elements into the 2016 TRC Test, including the continued exclusion of benefits from the avoided costs of fossil fuels and water.

 **(b) Comments and Reply Comments**

We have summarized the comments and reply comments on these points into two broad categories. The first category deals with which B/C test to use and whether to factor in additional components, with a focus on benefits from avoided fossil fuel and water costs. The second category deals with certain non-energy benefits derived from low income energy efficiency programming, specifically including decreased universal service program costs and reduced uncollectible expenses.

**(1) Benefits from Fossil Fuel and Water Avoided Costs:** PPL recommends leaving the TRC methodology the same as in Phase II for three reasons: (1) methodologies should be consistent across EE&C phases to allow for the comparison of program performance; (2) the methodology used for compliance should be consistent with the methodology used in the SWE’s *EE Market Potential Study*; and (3) many of the non-electric benefits are difficult to verify and would be burdensome for the customer to identify, calculate, and provide to the EDC. PPL Comments at 4-5 PPL RC at 3.

While PPL does not recommend or support their inclusion, PPL believes that Act 129 does not prohibit the inclusion of Operating and Maintenance (O&M) benefits, such as reduced fossil fuel use or water costs, into the TRC test calculations related to such measures as insulation, weatherization, or other related programs. PPL Comments at 4. Moreover, PPL believes that the inclusion of O&M costs related to fuel switching measures is different because the switch from electric to gas or fossil fuels to gas needs to be converted to British Thermal Unit (BTU) basis and such costs are easily quantifiable. PPL Comments at 5.

The Joint Commenters/NRDC also note that Act 129 permits alternative tests besides the TRC test after 2013. Joint Commenters/NRDC Comments at 3-8. The Joint Commenters/NRDC state that Act 129 does not prohibit the inclusion of O&M benefits such as fossil fuel and water savings, arguing that it is inconsistent to allow for inclusion of O&M savings, but not to allow for fossil fuel and water savings to count. The Joint Commenters/NRDC assert that NEIs are a matter of interpretation because Act 129 does not define “monetary costs.” If the Commission includes fossil fuel and water savings, then it is inconsistent to continue to exclude non-energy benefits. Joint Commenters/NRDC Comments at 3-8.

 HPC/KEEA cite to HPC’s coordination with the National Efficiency Screening Project (NESP), a national group of stakeholders dedicated to promoting best practices in cost-effectiveness screening. They maintain that NESP’s Resource Value Framework (RVF) is a new approach to developing and implementing cost-effectiveness tests. HPC/KEEA Comments at 3. HPC/KEEA assert that costs that are not yet embedded but which can reasonably be expected to become embedded should be considered a utility-system cost for TRC test purposes. HPC/KEEA Comments at 3. If the full range of costs are not accounted for, TRC test results will be inaccurate. By excluding non-energy impacts while including full cost, the TRC test has included costs that are not energy related. HPC/KEEA recommend that the Commission reduce “consideration of the total consumer payment, such that the [2016 TRC T]est accounts only for the proportion of the participant’s total payment that is relevant specifically to energy benefits.” HPC/KEEA Comments at 4. They further assert that there is a strong rationale for inclusion of non-electric energy benefits in the TRC Test and that other states make this inclusion. These benefits are clearly energy-related and can be easily monetized. A TRC test that does not consider these benefits is not providing an accurate comparison of the full set of benefits against the full set of costs to ratepayers. HPC/KEEA Comments at 5.

 In reply comments, the Joint Commenters/NRDC/KEEA agree with PPL that it is desirable to compare program performance across the multiple phases, but they assert that including O&M benefits such a reduced fossil fuel or water costs will help ensure that the 2016 TRC Test accurately reflects the real benefits consumers are seeing. Joint Commenters/NRDC/KEEA RC at 1-2. The Joint Commenters/NRDC/KEEA assert that the Commission should simply remove the O&M benefits from the calculations to see how Phase III compares to the previous phases that did not include O&M benefits and then add the O&M benefits back in to see how the change would have impacted the TRC test ratios. Joint Commenters/NRDC/KEEA RC at 1-2.

The Joint Commenters/NRDC/KEEA also agree that the 2016 TRC Test methodology should to be consistent with the methodology used in the SWE’s *EE Market Potential Study* so that benefits are not overstated or understated. They maintain, however, that including O&M benefits will not affect the market potential. The inclusion would merely show the real impact the Act 129 program has had on consumers. Joint Commentators/NRDC/KEEA RC at 2-3.

Further, the Joint Commenters/NRDC/KEEA agree with PPL that many of the non-electric benefits such as water reductions, productivity, and quality-of-life issues are difficult to verify and would be burdensome for the customer to identify, calculate, and provide to the EDC but maintain that the additional effort to verify these items is outweighed by the benefits of more accurate results and is better than assuming such benefits do not exist. In addition, they state that the HPC/KEEAs comments address the issue of verifying benefits. Based on a 2011 survey, twelve states include non-energy benefits. Seven of those states include water and fuel savings. Some of these states use a percentage-based adder to account for non-energy benefits, usually amounting to 10 percent. Adders are designed to capture or internalize such externalities. They assert that that a 10 % adder would be reasonable for the 2016 TRC Test. Joint Commenters/NRDC/KEEA RC at 3-4.

The Joint Commenters/NRDC/KEEA also support the option provided by HPC/KEEA that, instead of adding in non-energy benefits, the Commission reduce consideration of the total consumer payment, such that the 2016 TRC Test would account only for the proportion of the participant’s total payment that is relevant specifically to energy benefits. This option would address the Commission’s and PPL’s concerns about the cost and difficulty of verifying non-energy benefits. Joint Commenters/NRDC/KEEA RC at 5.

Citizen Power also supports the position that the TRC Test should include non-energy benefits to ratepayers as well as the proposition that alternatives to the TRC Test are allowed under Act 129. Citizen Power RC at 2.

In their reply comments, the Industrials state that the Commission should reject the request to include non-energy benefits in the TRC Test. The exclusion of non-monetary benefits is consistent with the General Assembly’s intent. The Industrials urge the Commission to reaffirm its initial conclusion that only monetary benefits will be evaluated and not non-monetary benefits. Industrials RC at 2‑3.

In its reply comments, FirstEnergy strongly recommends that the Commission not factor societal costs, environmental costs, or non-energy impacts into the 2016 TRC Test. FirstEnergy recommends against adding assumptions to the 2016 TRC Test that would exaggerate avoided costs in assessing program cost effectiveness. FirstEnergy RC at 2-3.

**(2) Universal service program benefits:** CAUSE-PA asserts that the Commission’s interpretation of savings calculation in the proposed 2016 TRC Test does not align with the language in the statute. CAUSE-PA asserts that consideration of certain non-energy benefits derived from low income energy efficiency programming, specifically including decreased universal service program costs and uncollectible expenses, is contemplated by Act 129 and fits within the definition of the TRC Test. Inclusion of these additional savings components will better ensure that the enhanced whole-home and direct install programming requirements are able to be achieved. The cost of providing universal service programs and managing uncollectible accounts present a quantifiable portion of the overall cost to a household to procure electricity. But the implementation of effective energy efficiency and conservation program has the potential to significantly decrease the cost of universal service programs and uncollectible accounts which are passed through to ratepayers. According to CAUSE-PA, it is not only appropriate to include these avoided costs in the TRC Test, it is a statutorily required necessity to include them. CAUSE-PA Comments at 2-6.

 In its reply comments, Citizen Power supports CAUSE-PA’s recommendation that the 2016 TRC Test should be expanded to include consideration of reductions in the costs of Universal Service Programming and uncollectible accounts. These savings should be included because they are monetary benefits to residential customers and they are quantifiable. This results in a more accurate determination of the costs and benefits of a particular EE program or project. Citizen Power RC at 1.

The Joint Commenters/NRDC/KEEA also support CAUSE-PA’s assertion that consideration of certain non-energy benefits derived from low income energy efficiency programming, specifically including decreased universal service program costs and uncollectible expenses, is contemplated by Act 129 and fits squarely within the definition of the TRC test. Joint Commenters/NRDC/KEEA RC at 6.

 In its reply comments, PPL states that the costs of providing universal service programs and managing uncollectible accounts should not be included in the TRC calculations. PPL notes that CAUSE-PA provides no analysis for its conclusion that the costs of providing universal service programs and managing uncollectible accounts are “quantifiable” and can be reduced by implementing effective EE&C programs. Without any analysis or data from CAUSE-PA to support this claim, PPL does not see the potential benefit of including the costs of providing universal service programs and managing uncollectible accounts in the TRC calculation. PPL RC at 2. I

 FirstEnergy disagrees with comments that the alleged decreased cost of uncollectable accounts related to universal service programming should be included in the measurement of the avoided costs. FirstEnergy RC at 2-3.

 **(c) Final Resolution**

We note some agreement and disagreement among the stakeholders. FirstEnergy strongly recommends that the Commission not factor societal costs, environmental costs or non-energy impacts into the TRC Test. PPL recommends leaving the TRC test methodology the same as in Phase II. The Industrials support the Commission’s initial conclusion that only monetary benefits will be evaluated. However, many of the other non-EDC stakeholders disagree and aver that the TRC test calculations should include in some manner at least some non-energy benefits. We have concluded, as explained above, to continue to use a TRC test. Except as specifically detailed below with respect to the benefits of avoided costs of fossil fuels and water, we will not include non-electric benefits as part of the 2016 TRC Test.

**(1) Avoided Fossil Fuel and Water Costs:** In comments, the Joint Commenters/NRDC assert that Act 129 does not prohibit the inclusion of O&M benefits such as fossil fuel and water savings, arguing that it is inconsistent to allow inclusion of O&M savings but not to allow fossil fuel and water savings to count. The Joint Commenters/NRDC also assert that Act 129 does not define “monetary costs.” Joint Commenters/NRDC Comments at 4. In reply comments, the Joint Commenters/NRDC/KEEA assert that including O&M benefits such as reduced fossil fuel or water costs will help ensure that the 2016 TRC Test accurately reflects the real benefits consumers are seeing. Joint Commenters/NRDC/KEEA RC at 1-2. While we do not agree with the characterization of fossil fuel and water savings as O&M costs, we find that these parties are correct in asserting that including fossil fuel and water savings as avoided costs in the 2016 TRC Test is consistent with our inclusion of other quantifiable cost savings, such as O&M savings.

 The Joint Commenters/NRDC/KEEA maintain that including these other benefits will not affect the market potential but would merely show the real impact the Act 129 program has had on consumers. Joint Commenters/NRDC/KEEA RC at 2-3. We find that these parties are correct only to the extent that they are asserting that revising the 2016 TRC Test protocol will not diminish the EE program potential calculated by the SWE’s *EE Market Potential Study*. We do conclude, however, that factoring in, as avoided costs, the savings from fossil fuel and water may enhance the cost effectiveness of certain comprehensive programs, consistent with our stated objectives.

 Comments have also demonstrated that inclusion of water and fossil fuel avoided costs is consistent with practices in other states. Based on a 2011 survey, twelve states include some form of non-energy benefits. Seven of those states include water and fossil fuel savings. Some of these states use a percentage-based adder to account for non-energy benefits, usually amounting to 10 percent. Adders are designed to capture or internalize such externalities. Joint Commenters/NRDC/KEEA posit that a 10% adder would be reasonable for the 2016 TRC Test. Joint Commenters/NRDC/KEEA RC at 3-4. While we are not supportive of a general adder, we find that it is appropriate to include all reasonably quantifiable savings associated with water and fossil fuel avoided costs in the 2016 TRC Test calculations.

PPL believes that Act 129 does not *prohibit* the inclusion of O&M benefits, and reduced fossil fuel use or water costs, into the TRC test calculations related to such measures as insulation, weatherization, or other related programs. PPL Comments at 4. We have agreed on the issue of O&M costs. We already permit the inclusion of O&M savings costs *for replaced equipment*, to the extent quantifiable, in the TRC test calculations as an offset to plan measure costs. As noted by the Joint Commenters/NRCC, Act 129 does not define “monetary costs,” so whether or not reasonably monetized fossil fuel and water avoided costs associated with an EE measure are contrary to statutory language is a matter of interpretation. For these reasons, we shall allow the inclusion of fossil fuel and water cost savings in the 2016 TRC Test. This inclusion, however, does not impact the electricity reduction measurement associated with these measures.

PPL, however, points out that such benefits may be difficult to measure. PPL Comments at 5. In response to this concern, we specify that the 2016 TRC Test calculation shall include such benefits only to the extent reasonably quantifiable. It should be noted that increased operating fossil fuel cost *expense* is already factored into fuel switching TRC test protocols, so the reflection of fossil fuel cost *benefits* should not be unreasonably difficult to estimate.

**(2) Universal service program benefits, in particular, and the Societal Test, in general:** In all other respects and consistent with our prior TRC Test orders, we will continue to use a TRC test for Phase III without societal test modifications. We shall not include societal costs, environmental costs, NEIs, or other non-electric elements into the 2016 TRC Test except to the extent discussed above relative to quantifiable benefits from fossil fuels and water avoided costs. We will not presume or factor in non-energy benefits from such sources as decreased universal service program costs or reduced uncollectible expenses.

**IV. 2016 TRC Test Topics Which Continue In Large Measure Unchanged from Prior Phases**

**A. Use Of TRC Test Assumptions For Other Matters**

 **(a) Summary of Issue and Proposed Resolution**

For Phase III, consistent with our determination in the *2013 TRC Test Order*, the Commission proposed to maintain the provision that EDCs and other parties will not 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 would still be able to inquire into the validity of such differences in those proceedings or in the TRC Test proceedings. *See 2013 TRC Test Order* at 10.

 **(b) Comments and Reply Comments**

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

 **(c) Final Resolution**

For Phase III, the Commission will maintain the provision that EDCs and other parties will not be bound by the 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 inquire into the validity of such differences in those proceedings or in the EE&C/TRC Test proceedings.

**B. Level At Which To Measure TRC Test**

 **(a) Summary of Issue and Proposed Resolution**

For Phase III, consistent with our determination in the *2013 TRC Test Order*, the Commission proposed to continue applying the TRC Test at the plan level and will continue to reserve the right to reject any program with a low TRC test ratio. Consequently, all EDCs’ plans would be required to provide TRC test ratios at the program level.

 **(b) Comments and Reply Comments**

PPL requests clarification as to whether DR and EE must both be cost-effective on their own for compliance, or whether only the total EE&C portfolio (EE and DR combined) must be cost effective. PPL Comments at 5.

In reply comments, the Industrials assert that the applicable test must be performed separately for DR and EE on a going-forward basis. Although Phase I included statutorily-mandated DR and EE goals, the statute establishes separate tests to determine whether cost-effective additional goals are feasible after Phase I. *See* 66 Pa. C.S. §§ 2806.1(c)(3) and 2806.1(d)(2). As a result, the TRC compliance should be measured separately going forward in any phase for which there will be DR or EE goals. Re-bundling the two for purposes of applying the TRC tests in subsequent phases is inconsistent with the separate treatment of each potential goal under the statute after Phase I. Industrials RC at 2.

 **(c) Final Resolution**

We agree with the Industrials that the TRC EE and DR compliance should be measured separately going forward in any phase for which there will be DR or EE goals and that bundling the two for purposes of applying the TRC tests in subsequent phases is inconsistent with the separate treatment of each potential goal.

Therefore, in response to PPL’s request for clarification, and for Phase III, compliance will be measured separately going forward in any phase for which there will be DR or EE goals. The Commission will continue to reserve the right to reject any program with a low TRC test ratio. All EDCs’ plans are required to provide TRC ratios at the program level separately for EE and DR goals.

**C. Cost-Effectiveness Evaluations And Reporting Results And Timing Of TRC Test Reports**

**(a) Summary of Issue and Proposed Resolution**

For Phase III, consistent with our determination in the *2013 TRC Test Order,* we proposed to direct EDCs to continue reporting the results of their TRC tests annually as a part of their Act 129 final annual reports. Additionally, we would require the TRC test ratios for each EDC program and for the portfolio to be included in the EDCs’ Act 129 final annual report. The TRC test ratios would be based upon the latest available program savings and costs and the latest costs approved in the EDC’s EE&C plan*. See 2013 TRC Test Order* at 13.

 **(b) Comments and Reply Comments**

Stakeholders did not comment on this topic.

 **(c) Final Resolution**

Given that no comments were provided and given that this issue was successfully resolved for Phase I and II, the Commission directs the EDCs to continue reporting the results of their TRC tests annually as a part of their Act 129 final annual reports. Additionally, TRC test 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.

**D. Maximum 15-Year Measure Life**

 **(a) Summary of Issue and Proposed Resolution**

As established in Act 129 and as calculated under prior TRC tests, any given measure is limited to a maximum of 15 years[[23]](#footnote-23) of savings benefits. All TRC test calculations for EE&C measures have been allowed to use up to 15 years’ worth of benefits and costs, as applicable to specific measures, regardless of the year of program implementation. *See 2013 TRC Test Order* at 15-16. The Commission proposed no changes in its Tentative Order to this provision.

 **(b) Comments and Reply Comments**

HPC/KEEA state that failure to consider the full life of energy conservation measures reduces the accuracy of the TRC Test. They recommend leveraging studies by other states with similar climate conditions and housing stock to develop appropriate measure lives for at least the most significant energy conservation measures. HPC/KEEA Comments at 5.

In its reply comments, FirstEnergy disagrees with HPC/KEEA that the use of actual measure lives is a “best practice approach” and that Pennsylvania should therefore use studies from other states instead of a 15-year maximum. FirstEnergy recommends against extending the maximum measure life beyond 15 years. Average measure lives of programs based on prior plans are actually fewer than 15 years. Moreover, beyond the short term, the uncertainty of measure lives for certain measures increases substantially. FirstEnergy RC at 3.

 **(c) Final Resolution**

For the purpose of calculating the TRC Test, the statutory definition limits the savings benefits of any given measure to a maximum of 15 years. None of the stakeholders have asserted any basis consistent with Act 129 that would substantiate a deviation.

Accordingly, for Phase III, all 2016 TRC Test calculations for EE&C measures are limited to a maximum of 15 years’ worth of benefits and costs, as applicable to specific measures, regardless of the year of program implementation.

**E. Definition Of “Incentives” In TRC Test For Energy Efficiency Measures**

 **(a) Summary of Issue and Proposed Resolution**

As established in Phase I and II, funds paid to customers as a marketing cost or intended to offset participant costs that are difficult to quantify could be included in the TRC test calculations as either a direct cost or as a proxy for the participant cost. *See 2013 TRC Test Order* at 17. The Commission proposed no changes to this position.

 **(b) Comments and Reply Comments**

Stakeholders did not comment on this topic.

 **(c) Final Resolution**

Given that the issue was successfully reconciled during Phase I and II and that no comments were submitted on this issue, we will continue to define “incentives” in Phase III as they were defined in Phase II. Funds paid to customers as a marketing cost or intended to offset participant costs that are difficult to quantify may be included in the 2016 TRC Test calculations as either a direct cost or as a proxy for the participant cost. The costs of direct installation programs that do not involve a payment to the participant are not incentives; such costs continue to be categorized as direct costs, not incentives.

**F. Incentive Payments From An EDC**

 **(a) Summary of Issue and Proposed Resolution**

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 Test calculation would result in double-counting of the EDC’s portion of costs in the TRC Test calculation. *See 2013 TRC Test Order* at 18. Consistent with Phase I and Phase II, incentive payments from an EDC made to program participants would continue to be excluded in the TRC Test calculation for Phase III. The Commission proposed no changes to this position.

 **(b) Comments and Reply Comments**

This issue was not discussed in comments or reply comments to the *2016 TRC Test Tentative Order*.

 **(c) Final Resolution**

This issue was successfully reconciled in Phase I and Phase II. None of the stakeholders advocated for a change, and no changes were suggested in response to our proposal to continue this provision in Phase III. Accordingly, for Phase III, incentive payments made to program participants will not be included in the 2016 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 2016 TRC Test calculation would result in double-counting of the EDC’s portion of costs in the 2016 TRC Test calculations.

**G. Incentive Payments From Sources Outside Of Act 129**

 **(a) Summary of Issue and Proposed Resolution**

Outside incentives, whether they are rebate or tax credits, reduce the participating customers’ costs, and they should be reflected in lower program costs and be factored into an EDC’s TRC Test calculation. EDCs have been able to fully include a measure’s benefits in the TRC Test if any portion of the measure is attributable to Act 129. Tracking non-Act 129 incentives paid to EDC customers could prove to be difficult as some customers may not be inclined to provide the requested information or may not have access to it. EDCs need only factor in as reductions to cost the non-Act129 incentives that are reasonably quantifiable by the EDC. *See 2013 TRC Test Order* at 21. EDCs would not be able to treat outside incentives as a reduction in costs based on the cost of tracking the incentives. The Commission proposed no changes to this position.

 **(b) Comments and Reply Comments**

Stakeholders did not comment on this topic.

 **(c) Final Resolution**

Given that this issue was successfully reconciled in Phase II and no comments were submitted, the Commission will continue to factor outside incentives, whether they are rebate or tax credits, into an EDC’s 2016 TRC Test calculation. EDCs should continue to include as much information pertaining to outside incentive payments as possible as they continue to be able to fully include a measure’s benefits in the 2016 TRC Test if any portion of the measure is attributable to Act 129. EDCs cannot treat outside incentives as a reduction in costs based on the cost of tracking the incentives.

**H. Incremental Costs**

 **(a) Summary of Issue and Proposed Resolution**

In Phase II, we retained the incremental cost calculation method established for Phase I but allowed an EDC to use an alternate calculation method that would recognize the remaining value in a device to be replaced if the EDC so chose. *See 2013 TRC Test Order* at 23-24. This incentive has prompted the adoption of some early replacement measures. The Commission proposed no changes for Phase III. EDCs would continue to have the option to use an alternate calculation method and would still be required to document, in their EE&C plans as well as in their annual reports, which method is used and the reason for the choice.

 **(b) Comments and Reply Comments**

This issue was not discussed in comments or reply comments to the *2016 TRC Test Tentative Order*.

 **(c) Final Resolution**

Given that this issue was successfully reconciled in prior phases and no comments were submitted, we will continue to use the incremental cost calculation method in Phase III as it was used in Phase II. Furthermore, EDCs are allowed to use an alternate calculation method that would recognize the remaining value in a device to be replaced if the EDC so chose. EDCs are required to document, in their EE&C plans as well as in their annual reports, which method is used and the reason for the choice.

**I. End-Use Adjustments**

 **(a) Summary of Issue and Proposed Resolution**

In both prior phases, we required use of end-use profiles, when available, for energy efficiency programs. When device specific profiles were not available, the use of class average was acceptable. The Commission proposed no changes for Phase III.

 **(b) Comments and Reply Comments**

This issue was not discussed in comments or reply comments to the *2016 TRC Test Tentative Order*.

 **(c) Final Resolution**

This issue was successfully reconciled in Phase I and Phase II. None of the stakeholders advocated for a change and no changes were suggested in response to our proposal to continue this provision in Phase III. Accordingly, for Phase III, we require the use of end-use profiles, when available, for energy efficiency programs. When device-specific profiles are not available, the use of class average will be acceptable.

**J. Inclusion Or Exclusion Of Customer Avoided Operating And Maintenance (O&M) Costs In The 2016 TRC Test Calculations**

 **(a) Summary of Issue and Proposed Resolution**

In Phase I & II, EDCs were able to include avoided O&M costs[[24]](#footnote-24) for replaced equipment, to the extent quantifiable, in their TRC test calculations. EDCs had the flexibility to omit costs that are not quantifiable. The Commission did not see a reason to propose a change to this provision for Phase III.

 **(b) Comments and Reply Comments**

Stakeholders did not comment on this topic.

 **(c) Final Resolution**

Act 129 is a single-fuel program, where target compliance is based on electricity savings. It does not mandate, for example, non-electric fuel or water cost savings. EDCs design their EE programs to get electric savings through reduced consumption and their DR programs to more closely align demand with supply. Given that no comments were provided and given that this issue was successfully resolved for Phase I and Phase II, the Commission directs the EDCs to continue to include avoided O&M costs *for replaced equipment*, to the extent quantifiable, in their 2016 TRC Test calculations. EDCs will continue to have the flexibility to omit costs that are not quantifiable.

**K. Avoided Costs In Benefit/Cost (B/C) Ratios In Approved EE&C Plans**

 **(a) Summary of Issue and Proposed Resolution**

At the beginning of each new phase, there will be programs carried over from the prior phase and new programs. Additionally, during a phase there may be new programs added or existing programs changed. For Phase II, we required TRC test information for each change and each new program in an EE&C plan. We considered 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 concluded that 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 would be appropriate and would give us a means to compare the program’s results over time. *See 2013 TRC Test Order* at 39-41. An EDC could, however, use current avoided cost information for a carried-over program if that were practicable for the EDC. If an EDC wished to implement a current-cost methodology for a carried-over program, it was required to clearly delineate its choice and the reasons for that choice in its plan; the EDC was not permitted merely to pick and choose when to use vintage avoided cost and when to use current avoided cost. *See 2013 TRC Test Order* at 39-41.

Thus, existing Phase I programs carried over at the beginning of an EDC’s Phase II plan could use either the vintage of avoided cost forecasts applicable for said programs when they were initially approved in Phase I or the then-current avoided cost forecasts when they were re-approved for Phase II. The choice had to be clearly delineated and justified in the Phase II plan and was subject to Commission approval.

New programs approved at the beginning of Phase II or in updates to Phase II plans used the latest available forecast of avoided costs in order to respond to the dynamic nature of EE&C planning. *See 2013 TRC Test Order* at 39-41.

The Commission proposed no changes for Phase III.

 **(b) Comments and Reply Comments**

This issue was not discussed in comments or reply comments to the *2016 TRC Test Tentative Order*.

 **(c) Final Resolution**

Because we have the responsibility and authority to consider whether to reject any program with a low TRC test ratio, we require TRC test information regarding new and carried-over programs. Given that this issue was successfully reconciled in Phase II, and no comments were submitted in this proceeding, we find that continuing to use the vintage of avoided cost forecasts applicable for each program at the time the program was approved throughout the life of that program within a given phase would be appropriate and would give us a means to compare the program’s results over time.

Using the latest available forecast of avoided costs for new programs included at the beginning of, or in updates to, a Phase III plan will respond to the dynamic nature of EE&C planning. Therefore, EDC’s are required to use the latest available forecast of costs when developing new programs for Phase III plans.

Relative to programs carried over from a prior phase, we shall preserve the option for an EDC to choose whether to use the vintage of avoided cost forecasts applicable for said programs when they were initially approved for the prior phase or the then-current avoided cost forecasts at the time of re-approval for the new phase. An EDC may use current avoided cost information for a carried-over program if that is practicable for the EDC, if the EDC clearly delineates and justifies that choice in it plan, and if the Commission approves the choice in approving the plan. An EDC is not permitted to merely pick and choose when to use vintage avoided cost and when to use current avoided cost.

**L. Fuel Switching**

 **(a) Summary of Issue and Proposed Resolution**

In Phase I and Phase II, it was determined that only equipment earning an ENERGY STAR performance rating from the United States Environmental Protection Agency (EPA) met the minimum standard allowable for inclusion in EE&C fuel switching plans. If a fuel switching measure were proposed for which there were no ENERGY STAR equipment, stakeholders would be able to request that staff convene a technical working group to address a minimum standard and provide recommendations for our consideration. Increased fossil fuel consumption resulting from the switch to the alternate equipment was factored into TRC Test as a cost in both prior phases. The benefit/cost analysis of fuel switching measures would continue to take into account the increase in costs for the new fuel that will be used as well as the reduction in costs of the old fuel. The Commission did not see a reason to change this provision.

 **(b) Comments and Reply Comments**

Stakeholders did not comment on this topic.

 **(c) Final Resolution**

This issue was successfully reconciled in Phase I and Phase II. None of the stakeholders advocated for a change and no changes were suggested in response to our proposal to continue this provision in Phase III. Accordingly, for Phase III, only equipment earning EPA’s ENERGY STAR performance rating meets the minimum standard allowable for inclusion in EE&C fuel switching plans. If a fuel switching measure is proposed for which there is no ENERGY STAR equipment, stakeholders are able to request that staff convene a technical working group[[25]](#footnote-25) to address a minimum standard and provide recommendations for our consideration.

Increased fossil fuel consumption resulting from the switch to the alternate equipment is to be factored into the 2016 TRC Test as a cost as it was done in the prior two phases. The benefit/cost analysis of fuel switching measures continues to take into account the increase in costs for the new fuel that will be used as well as the reduction in costs of the old fuel.

**M. Compliance With Alternative Energy Portfolio Standards Act Of 2004 (AEPS Act) And Carbon Issues**

 **(a) Summary of Issue and Proposed Resolution**

In Phase I and Phase II, we required that the costs of compliance with the AEPS Act[[26]](#footnote-26) which are known and knowable be included in the TRC Test calculation. The cost was applicable to all the power “avoided.” However, any carbon-related reduction expense not currently included was to be excluded until such time as legislation is passed that dictates otherwise. There has been no change in the legislation. Further, for Phase II, it was noted that a reduction in electric consumption would reduce an EDC’s costs of complying with the AEPS requirements. *See 2013 TRC Test Order* at 44-45.

As an alternative, however, we allowed EDCs 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, we allowed EDCs to apply a 5‑year rolling annual compound rate of growth in the Bureau of Labor Statistics (BLS) index as the annual AEC price escalation rate. *See 2013 TRC Test Order* at 44-45. We did not see a reason to propose a change to this methodology or to eliminate the alternative for calculating avoided AEPS compliance costs for Phase III.

 **(b) Comments and Reply Comments**

This issue was not discussed in comments or reply comments to the *2016 TRC Test Tentative Order*.

 **(c) Final Resolution**

Given that this issue was successfully reconciled in Phase I and Phase II, and no comments were submitted, we will continue to require that the costs of compliance with the AEPS Act which are known and knowable be included in the TRC Test calculation. The cost was applicable to all the power “avoided.” Any carbon-related reduction expense not currently included will continue to be excluded until such time as legislation is passed that dictates otherwise. A reduction in electric consumption would reduce an EDC’s costs of complying with the AEPS requirements.

We will continue to allow EDCs 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, we will continue to allow EDCs to apply a 5‑year rolling annual compound rate of growth in the BLS index as the annual AEC price escalation rate.

**N. Low-Income Energy Savings**

 **(a) Summary of Issue and Proposed Resolution**

In Phase II, we required 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. EDCs were required annually to estimate and compile low-income savings from non-low-income programs using their annual impact evaluation surveys to capture and determine low-income participation in each non-low-income residential program. The SWE had to sign off on the survey tool. *See 2013 TRC Test Order* at 49‑50. The Commission did not see a reason to change this provision for Phase III.

 **(b) Comments and Reply Comments**

Stakeholders did not comment on this topic.

 **(c) Final Resolution**

Given that this issue was successfully reconciled in Phase II, and no comments were submitted, we will not require a TRC test for the low-income sector as no other sector has to calculate a TRC test beyond the program level. We do require, however, that TRC tests continue to be calculated for all low-income-specific programs and for all standard residential programs. As outlined in our *Phase III Implementation Order*, EDCs are not allowed to claim savings from low-income customer participation in standard residential programs towards the Phase III 5.5% low-income carve-out. EDCs may only claim savings from low-income-specific residential programs towards the 5.5% carve-out. EDCs may additionally count savings from multifamily housing programs (including master-metered commercial customers) if the EDCs can verify the occupants are low-income customers but only to the extent of the low-income occupancy rate. For example, if 60% of the usage in the building is for verified low-income customers, only 60% of the savings can be counted toward the low-income carve out. The rest is either residential (if individually metered) or commercial (if master-metered) savings.[[27]](#footnote-27) Therefore, EDCs must provide benefit and cost data for low-income-specific-program savings in their annual reports. The SWE will provide EDCs with a table in the annual report template for Phase III that is to be populated with the estimated savings and costs attributed to the savings, noting specifically that benefits and costs are estimates and are not to be used for compliance purposes.

**O. Low-Income Benefits And Costs Reporting**

 **(a) Summary of Issue and Proposed Resolution**

For Phase II, we eliminated the Phase I 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. However, we noted that calculating this estimated savings based on an approved survey method in Phase II would be necessary if an EDC wanted 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 were counting the estimated savings from non-low-income residential programs toward their low-income targets, they would have also to attribute the costs associated with those savings. We required explanations in the EDCs’ annual reports pertaining to the calculation of low-income savings from participation in non-low-income residential programs. The SWE provided EDCs with a table in their annual report template for Phase II that was to be populated with the estimated savings and costs attributed to the savings, noting specifically that benefits and costs are estimates and are not be used for compliance purposes. We did not require a TRC test for the low-income sector as no other sector has to calculate a TRC Test beyond the program level. We did require, however, that TRC tests continue to be calculated for all low-income programs and all residential programs. We required that EDCs provide benefit and cost data for both low-income and estimated non-low-income residential program savings in their annual reports. *See 2013 TRC Test Order* at 52-53. We did not see a reason to propose a change to this approach for Phase III.

 **(b) Comments and Reply Comments**

This issue was not discussed in comments or reply comments to the *2016 TRC Test Tentative Order*.

 **(c) Final Resolution**

Given that this issue was successfully reconciled in Phase II, and no comments were submitted, we will not require a TRC Test for the low-income sector as no other sector has to calculate a TRC Test beyond the program level. We do require, however, that TRC tests continue to be calculated for all low-income programs and all residential programs and that EDCs provide benefit and cost data for both low-income and estimated non-low-income residential program savings in their annual reports. The SWE will provide EDCs with a table in their annual report template for Phase III that is to be populated with the estimated savings and costs attributed to the savings, noting specifically that benefits and costs are estimates and are not be used for compliance purposes.

**V. Benefits And Costs – Changes from Phase II**

**A. Avoided Generation, Transmission, And Distribution (G, T, & D) Costs**

 **(a) Summary of Issue and Proposed Resolution**

During Phase I and Phase II, the Commission directed EDCs to use transmission prices, as set by the Federal Energy Regulatory Commission (FERC), and fully-loaded EDC distribution rates to monetize the reductions achieved by EE&C programs. Both of the values were set on an energy basis ($/mWh). *See 2013 TRC Test Order* at 33-34.

In the Tentative Order, the Commission proposed a revision to the prior approach for several reasons. (1) Distribution rates include fixed costs such as taxes, land value for siting of infrastructure, and utility rate operations and rate of return. Many of these costs are not avoidable regardless of the magnitude of the energy reduction. Only the variable components of the distribution are avoidable through conservation. (2) Valuing transmission and distribution on an energy basis posits that there are no transmission and distribution benefits from demand response program which reduce system load during critical hours, but typically do not achieve any net energy savings over a program year.

The Commission noted that the transmission and distribution (T&D) systems must be built to maintain reliability at the highest loads of the year. Growth in peak load is what drives avoidable T&D expenditures by Pennsylvania EDCs. Consequently, the Commission proposed for Phase III to use the T&D avoided costs ($/kW-year) calculated by the SWE. It was thought that this would more closely reflect the factors that affect Pennsylvania EDCs. For Program Year 8 that starts on June 1, 2016, EDCs would use the starting values of T&D avoided costs per kW-year that are listed in Table 1-3 of the SWE’s 2015 *DR Potential Study*.

 **(b) Comments and Reply Comments**

 PPL states that the Commission does not specify how the EDCs should determine the avoided cost of electricity (*i.e.*, energy benefits) and recommends that the same method outlined in the *2012 TRC Test Order* at 27-32 be used for Phase III. PPL Comments at 6.

 FirstEnergy agrees with the Commission that the avoided T&D values should be based on an avoided demand basis as opposed to an avoided energy basis. However, the methodology that was used to calculate avoided T&D was overly simplistic and did not take into account several key considerations, as evidenced by the results presented in the SWE Table 1-3 of the 2015 *DR Potential Study*. In arriving at the final recommended results for FirstEnergy, the SWE did not reduce the forecast of T&D investments to account for investments related to variable costs only. FirstEnergy alleges that the SWE’s methodology incorrectly used only five years of load growth. Such a relatively narrow snapshot in time can be heavily skewed in one direction or the other based on unique circumstances at each EDC regarding their T&D investments and load calculations. T&D investments made over a period of five years are intended for load growth of a much longer time horizon, and, therefore, using only five years overstates the avoided T&D values. FirstEnergy proposes that the EDC’s work with the SWE to refine the initial values presented in SWE Table 1-3. This effort could be reasonably completed in time for the Phase III planning process, would provide more appropriate avoided T&D costs, and would result in more realistic TRC results. FirstEnergy Comments at 2-4.

 PECO asserts that in 2014 it conducted a study of its T&D avoided costs over a ten-year period (2014-2023). The values in SWE Table 1-3 of the 2015 *DR Potential Study* differ from those in PECO’s study, and the SWE has not explained the basis for this variance. PECO believes that it should be permitted to utilize the values from its own T&D avoided costs study instead of those provided in Table 1-3. PECO Comments at 1-2.

 **(c) Final Resolution**

 In Phase III, the EDCs will base T&D avoided costs on the calculation approach and data used by the SWE in its 2015 *DR Potential Study.* Section 2.8.2 of the *DR Potential Study* provides a thorough description of the methodology used by the SWE to develop the forecast of T&D avoided costs for each of the seven EDCs.

 The T&D systems must be built to maintain reliability at the highest loads of the year. Growth in peak load is what drives avoidable T&D expenditures by Pennsylvania EDCs. Consequently, the Commission has decided to use the T&D avoided costs ($/kW-year) calculated by the SWE. This will more closely reflect the T&D costs that are load growth related. For Program Year 8 that starts on June 1, 2016, EDCs will use the starting values of T&D avoided costs per kW-year that are listed in Table 1-3 of the 2015 *DR Potential Study*. For years following 2016, the values for T&D avoided costs per kW/year for each EDC will be obtained by escalating the starting value for each EDC for 2016 listed in Table 1-3 of the *DR Potential Study* by the BLS annual escalation rate factor calculated based on the annual rate of change in this index for the period June 2010 through June 2015.

 We agree with PPL that we did not specify how the EDCs should determine the avoided cost of electricity. We find that PPL’s recommendation that the same methodology outlined in the *2012 TRC Test Order* be used for Phase III is an appropriate resolution.

 We do not agree with FirstEnergy’s assertion that the SWE improperly accounted for investments related to variable costs. First, the SWE did reduce the EDC’s forecasts of total T&D expenditures so that the T&D expenditure forecasts only included load growth related T&D costs (and not total T&D costs). Second, the SWE correctly used five (5) years of future load growth for the avoided T&D cost calculations because the SWE was only examining five (5) years of future T&D expenditures. If the SWE had done otherwise, there would have been a mis-match of load growth related T&D expenditure data and load growth data.

 PECO’s argues that its results and the SWE’s results do not match and that the SWE has not explained the basis for this variance. We directed the SWE to review the alleged discrepancy. The SWE has examined this issue and characterizes the difference between the SWE estimate of PECO’s T&D avoided costs per kW/year and the PECO T&D avoided cost estimate as miniscule. The SWE average value for T&D avoided costs per kW/year for 2014 to 2018 for PECO is $49.27. PECO’s average T&D avoided cost value for the same five-year period is $48.30, a difference of $0.97 or less than 1.97% lower. The SWE traces that the difference to a slight difference in the electric load growth forecast used in the denominators of the respective calculations. We agree with the SWE characterization and forecast. We are not persuaded that using PECO’s figures would make a material difference.

 Because the SWE used a consistent methodology and consistent data sources to calculate T&D avoided costs per kW/year for each of the seven EDCs and because the difference in the SWE and PECO T&D avoided costs is very small, all EDCs shall use the starting T&D avoided-cost numbers for 2016 in Table 1-3 of the *2015 DR Potential Study* as the starting value for T&D avoided costs in 2016 for Phase III. These values shall then be escalated by the BLS escalation rate described earlier in this Order.

 **B. Incremental Measure Costs Data**

**(a) Summary of Issue and Proposed Resolution**

An incremental measure costs analysis was conducted during Phase I to assist the Commission in the planning of Phase II. EDCs used the incremental cost figures and the assumptions articulated in their EE&C plans for the implementation of programs. For measure variants not included in the EDCs EE&E plans, EDCs used the California PUC’s Database for Energy Efficient Resources (DEER)[[28]](#footnote-28) as the primary source of cost data. The DEER database was also to be used to construct cost figures for measure variants and new measures. EDCs adjusted DEER cost values for regional and local conditions using appropriate cost multipliers. Such multipliers were to be clarified and included in the EDC’s annual report. Lastly, EDCs were permitted to use cost data from local retailers and suppliers if the California DEER database does not provide appropriate values. *See 2013 TRC Test Order* at 24-26.

In order to improve upon this process, the Commission directed the SWE to develop an incremental costs database to assist EDCs in their development of TRC test ratio calculations and to promote consistency in TRC test calculations. The incremental costs database was completed by the SWE on February 19, 2013. For Phase II, EDCs used the Pennsylvania specific measure costs database described above as an optional resource, given that the database for incremental measure costs was not complete. *See 2013 TRC Test Order* at 26.

We have recognized that incremental measure costs data can be used for assessing future energy efficiency goals and the selection of future energy efficiency program. Additionally, the flexibility to use data from the DEER database could avail EDCs with the capability to use the most appropriate data possible. *See 2013 TRC Test Order* at 26.

We proposed that incremental measures costs data be defined in Phase III the same as they were for Phase II. EDCs would, however, 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. Thus, for Phase III, an EDC would be able use DEER data even where there is already Pennsylvania-specific measure cost data available. EDCs would be expected to document, in their annual reports, the source of incremental measure costs data as well as document the reason for choosing that source. EDCs would not be able to switch between cost data sources for the same measure; once a source is chosen for valuing a particular measure, that source would be used throughout Phase III absent express recommendation by the SWE and express approval from the Commission for a change.

 **(b) Comments and Reply Comments**

 FirstEnergy recommends flexibility to choose between values in the SWE incremental costs database, adjusted values from the DEER database, or the values currently used for program planning and cost-effectiveness testing. FirstEnergy believes that EDCs should also have the option to continue using current methodology to determine the most accurate incremental measure cost. Currently, in the annual reporting process, FirstEnergy’s independent evaluator uses a program participant evaluation sample based on actual reported data to determine incremental measure costs. The advantage of this methodology is that a representation of customers’ actual cost data is used, as opposed to a database wherein the measure cost date may become stagnant over time, or that may not reflect customers’ actual cost for other reasons, such as geographic differences and supplier quantity discounts. Furthermore, FirstEnergy requests the flexibility to determine the source of incremental measure level cost at the measure level. FirstEnergy Comments at 4.

 In its reply comments, Duquesne agrees with FirstEnergy’s comments and the proposal in the *2016 TRC Test Tentative Order* and asserts that the incremental measure costs data should be defined in the same manner as in Phase II. Duquesne RC at 2.

 **(c) Final Resolution**

 In response to FirstEnergy’s and Duquesne’s comments, we shall adopt the proposal that EDCs have the option to use the incremental cost values in the new SWE incremental costs database or to use the adjusted values from the DEER database or to continue to use current methodology to determine the incremental measure cost. The current methodology can be used under the condition that an EDC selecting this option would use the values currently used for program planning and cost effectiveness testing.

 Thus, incremental measures costs data will be defined for Phase III as they were for Phase II. EDCs would, however, have the flexibility to choose between the values in the new SWE incremental costs database, the adjusted values from the DEER database, or the values currently used for program planning and cost-effectiveness testing.

**C. Transmission, Distribution, And Capacity Costs**

 **(a) Summary of Issue and Proposed Resolution**

The TRC Test for Phase II provided that transmission prices, as set by the FERC, to the EDC zone, were included, as were EDC distribution rates. The 2013 TRC Test also permitted the inclusion of the PJM RTO’s RPM[[29]](#footnote-29) capacity price. For program years five through ten, the Commission permitted the use of the BLS Electric Power Generation Transmission Distribution (GTD) sector price index (BLS factor: NAICS[[30]](#footnote-30) 221110) as proxy rate for escalation of transmission, distribution, capacity, and ancillary service costs. For years in which the PJM capacity prices were not available up through year ten, the Commission approved the use of a 5-year rolling average of the BLS factor as the rate of escalation for transmission, distribution, capacity, and ancillary service costs, as a five-year time period represents a significant sample of time. *See 2013 TRC Test Order* at 33.

The Commission directed all EDCs to use the rolling average BLS factor to escalate the PJM RPM capacity price, the transmission, distribution, and ancillary service costs in years eleven through fifteen. EDCs were instructed to use 60 months in their calculations. *See 2013 TRC Test Order* at 34.

For Phase III, we proposed to use the T&D avoided costs ($/kW-year) calculated by the SWE. We also proposed that the 60-month calculation period for the BLS factor would begin in July 2010 and end in June 2015. We further proposed to continue to use the rolling average BLS factor to escalate the PJM RPM capacity prices in years four through twenty and to escalate the T&D costs in years two through twenty. This distinction in time spans would be a clarification from prior TRC test orders.

The *2016 TRC Test Tentative Order* noted that EDCs have not chosen to factor avoided ancillary service costs into the TRC test in the previous phases. We noted that prior TRC Test orders provided that EDCs also use the rolling average BLS factor to escalate their ancillary service costs. We have not seen any EDC address ancillary service costs in this fashion. In fact, we have not seen any EDC attempt to quantify or monetize avoided ancillary service costs in Phase I or Phase II. We, therefore, proposed to eliminate this provision relative to ancillary service costs for Phase III.

 **(b) Comments and Reply Comments**

 PECO requests clarification regarding the proposed calculation period because the time period from the July 2010 BLS index value to the June BLS index 2015 value is 59 months, not 60 months. Furthermore, PECO requests confirmation that we intended to recommend a calculation period beginning with the June 2010 BLS index value and ending with the June 2015 BLS index value. If this is not correct, PECO requests that the Commission provide additional detail regarding its intended calculation period. PECO requests confirmation, that it would be acceptable to use the “preliminary” June 2015 index value provided by the Bureau of Labor Statistics if the final value is not available at the time of the calculation of the escalation rate. PECO Comments at 2-3.

 In addition, PECO requests confirmation that the assumed capacity price should be set equal to the “Zonal Capacity Price” as reported by PJM. PECO requests clarification on whether the assumed capacity price for a given delivery year should be set equal to: (1) the Base Residual Auction capacity price; or (2) the most recently reported capacity price (at the time of avoided cost calculation) which reflects both the Base Residual Auction capacity price and possibly one or more Incremental Auction [[31]](#footnote-31) capacity prices. PECO Comments at 3.

 PECO agrees with the proposal that the rolling average BLS factor should be used to escalate the PJM RPM capacity prices and T&D costs when necessary. In particular, for T&D costs, PECO believes that the escalation factor should be employed when a value is needed for a year that is beyond the scope of the EDC’s then-current long-range plan, which, in PECO’s case, looks forward five years. PECO Comments at 2-3.

 There were no comments in response to the proposal to change the provisions relative to ancillary service costs for Phase III.

 **(c) Final Resolution**

While conducting the 2015 potential studies, the SWE noted that the resulting escalation factor is very sensitive to the start month and end month used in the calculation. Thus, it is beneficial to establish exactly which month to start and end on for Phase III EE&C plan purposes.

 In response to PECO’s request for clarification, regarding the time period from the July 2010 BLS index value to the June BLS index 2015 value being 59 months, and not 60 months, the Commission agrees that the standard practice when calculating the annual rate of change in a price index is to compute the percent change of the index in a given month to the index level for the same month in the prior year. Thus, to measure the historical rate of change in a monthly price index over a five-year period, one would compare the current level of the index to the index in the same month from five years ago.

 Therefore, we shall adopt PECO’s recommendation that the calculation period begins with the June 2010 BLS index value and ends with the June 2015 BLS index value. Similarly, we agree with PECO’s proposal to utilize a preliminary index value for June 2015 in the event that the BLS has not issued a final June 2015 value at the time avoided cost calculations are performed.

 Regarding PECO’s request for confirmation that the assumed capacity price should be set equal to the “Zonal Capacity Price” as reported by PJM, we direct that EDCs to use the “Preliminary Zonal Capacity Price” column of the Base Residual Auction (BRA) Results spreadsheet[[32]](#footnote-32) published by PJM following each BRA. PECO should use the values for ‘PECO’ zone. PPL should use the values for ‘PL’ zone. Metropolitan Edison Company should use the values for ‘METED’ zone. Pennsylvania Electric Company should use the values for ‘PENLC’ zone. West Penn Power should use the values for ‘APS’ zone. Penn Power should use the values for ‘ATSI’ zone. Duquesne should use the values for ‘DLCO’ zone.

 PECO has asked for clarification on whether the assumed capacity price for a given delivery year should be set equal to: (1) the Base Residual Auction capacity price; or (2) the most recently reported capacity price (at the time of avoided cost calculation) which reflects both the Base Residual Auction capacity price and possibly one or more Incremental Auction [[33]](#footnote-33) capacity prices. We conclude that EDCs shall use option #1 – the Base Residual Auction price as this is when the majority of generation capacity resources are secured for a delivery year and provides the most accurate estimate of the cost savings attributable to DSM offerings that reduce peak demand.

Accordingly, for Phase III, EDCs shall use the T&D avoided costs ($/kW-year) calculated by the SWE. The 60-month calculation period for the BLS factor will begin in June 2010 and end in June 2015. EDCs shall to use the rolling average BLS factor to escalate the PJM RPM capacity prices in years four through twenty and to escalate the T&D costs in years two through twenty. This distinction in time spans is a clarification from prior TRC test orders.

Furthermore, EDCs shall use the BRA capacity price for a given delivery year.

 Lastly, EDCs were permitted to, but have not, factored avoided ancillary service costs into the TRC test as an avoided cost in the previous phases. While we proposed to eliminate ancillary services benefits as an avoided cost in TRC test calculations and no one objected, we have determined that such a change is not necessary. Although ancillary services benefits from avoided ancillary costs are not directly proportional to generation capacity and were not included in the SWE potential studies, Act 129 programs may have ancillary benefits due to reductions in PJM’s allocation of ancillary services costs. Further, PJM operates the Synchronized Reserve and Regulation[[34]](#footnote-34) ancillary markets that demand side resources can participate in on equal footing to generation resources. Thus, ancillary markets could provide additional revenues for Act 129 resources. Accordingly, ancillary services benefits, to the extent that an EDC choses to quantify or monetize such avoided costs, may be escalated by the BLS factor and factored into the TRC test calculations for Phase III.

**D. Locational, Temporal, And Zonal Differences**

 **(a) Summary of Issue and Proposed Resolution**

In Phase II, EDC zonal basis adjustments were to be made by using the proximate month EDC zone to PJM Western Hub ratios to adjust PJM Western Hub prices when specific zonal futures are not available, as described in Section C. However, if an EDC did not have the forwarded indicators, the EDC could use the historical basis adjustment methodology as used in Phase I. The basis adjustments to the natural gas prices were to be made in years five through fifteen. EDCs were directed to document in their EE&C Plans and in their annual reporting, which methodology was used and to provide sufficient explanation as to why a given method was chosen. *See 2013 TRC Test Order* at 35. For Phase III, we proposed to use the same zonal basis adjustment methodology but to extend the 15-year period to twenty years.

 **(b) Comments and Reply Comments**

 PECO states that as of the filing date of these comments, the most recently reported NYMEX futures prices would not be sufficient to calculate all of the energy basis adjustments needed for the TRC Test. PECO anticipates that sufficient futures price data will also not be available at the time the actual energy basis adjustments will need to be calculated for the TRC Test. Specifically, PECO believes that NYMEX futures prices for the PECO Zone may not be reported for all of the twenty-four calendar (monthly on-peak/off-peak) periods. As a result, PECO would be unable to calculate basis factors (PECO Zone price / PJM Western Hub price) for some of the twenty-four calendar periods using NYMEX futures price data.[[35]](#footnote-35) PECO Comments at 3-4.

 PECO seeks clarification from the Commission regarding the specific calculation methodology to be utilized in this situation, understanding that the Commission has prescribed the application of “the historical basis adjustment methodology as used in Phase I.”[[36]](#footnote-36) Citing the *2009 TRC Test Order*, PECO notes that the Commission provided for “EDC zonal basis adjustments made based on the *PJM State of the Market* report data ‘Zonal real-time, simple average LMP ([$/mWh]).’”[[37]](#footnote-37) PECO further notes that in the *2013 TRC Test Order*, the Commission recognized that recent *PJM State of the Market Reports* no longer provide this exact data but instead provide “Zonal real-time load weighted LMP” data. Furthermore, the *2013 TRC Test Order* allowed for the use of “Zonal real-time load weighted LMP” data to calculate the basis adjustments when sufficient NYMEX futures data is not available.[[38]](#footnote-38) PECO Comments at 4-5.

PECO requests that the Commission confirm that the following specific basis adjustment calculation methodology is acceptable for Phase III:

1. For any of the 24 calendar (monthly on-peak/off-peak) periods in which sufficient NYMEX futures price data is available to calculate energy basis adjustments, the basis adjustments shall be calculated using the NYMEX futures price data.
2. For any of the 24 calendar (monthly on-peak/off-peak) periods in which sufficient NYMEX futures price data is not available to calculate energy basis adjustments, PECO may use real-time, load-weighted, average LMP data from the most recent *PJM State of the Market Report*. For example, the *2014 PJM State of the Market Report* provides four relevant real-time, load-weighted, average LMPs: 2014 PECO Zone, 2014 PJM Western Hub, 2013 PECO Zone, and 2013 PJM Western Hub. If the *2014 PJM State of the Market Report* is the most recent *PJM State of the Market Report* at the time of the calculation, the basis factor for any given monthly on-peak or off-peak period (in which sufficient NYMEX futures price data is not available to calculate basis adjustments) may be calculated as the average of two ratios: [(2014 PECO Zone)/(2014 PJM Western Hub)] and [(2013 PECO Zone)/(2013 PJM Western Hub)].

If the Commission finds that PECO’s proposal is not consistent with the Commission’s proposed resolution, then PECO requests that the Commission provide a detailed description of a different approach that is acceptable. PECO Comments at 3-6.

 **(c) Final Resolution**

 The Commission recognizes the potential for inconsistent availability of NYMEX futures prices at the zonal level for purposes of calculating adjustment factors to apply to Western Hub prices. We believe the methodology proposed by PECO is a practical workaround in such a situation and approve its use by any EDC that: (1) wishes to adjust Western Hub prices, but (2) does not have zone-specific futures prices to base an adjustment factor on for a given month. EDCs electing this approach shall so specify in their EE&C plans. If an EDC does not elect the PECO alternative, the provisions specified in the Tentative Order will apply.

**VI. Net-To-Gross (NTG) Adjustments**

**A. Basis Of TRC Test Benefits**

**(a) Summary of Issue and Proposed Resolution**

In Phase I and Phase II, EDCs were required to report verified gross savings and actual costs. Compliance calculations regarding TRC test benefits were based on “verified gross” kWh and kW electric savings and costs were based on “actual” costs. *See 2013 TRC Test Order* at 14. It has been suggested, however, that because EDCs use net savings for planning purposes, they should be required to also report net program savings. We saw no need to change the requirement that EDCs report verified gross savings and actual costs. Compliance calculations regarding TRC test benefits would continue to be based on verified gross kWh and kW electric savings, and costs would continue to be based on actual costs for Phase III. We proposed that EDCs report the net savings and how such savings are calculated. Thus, EDCs would report TRC test ratios in EE&C plans two ways: (1) Based on projected gross savings and (2) Based on projected net savings. We did not envision that this additional reporting of net program savings would impact the TRC Test for Phase III. In Phase III EDC Annual Reports, however, all TRC test ratios would continue to be based only on verified gross savings.

**(b) Comments and Reply Comments**

This issue was not discussed in comments or reply comments to the *2016 TRC Test Tentative Order*.

 **(c) Final Resolution**

For Phase III, EDCs shall report verified gross savings and actual costs. Compliance calculations regarding TRC test benefits will be based on “verified gross” kWh and kW electric savings and costs will be based on “actual” costs. Because EDCs use net savings for planning purposes, they shall also report net program savings. The requirement that EDCs report verified gross savings and actual costs will not change. Compliance calculations regarding TRC test benefits will continue to be based on verified gross kWh and kW electric savings, and costs will continue to be based on actual costs for Phase III. During Phase III, EDCs shall report the net savings for each program and the total portfolio of programs and describe how such net savings are calculated. In addition, EDCs shall report TRC test ratios in Phase III EE&C plans two ways: (1) Based on projected gross savings and (2) Based on projected net savings. We do not envision that this additional reporting of net program savings would impact the 2016 TRC Test results for Phase III for compliance purposes. In Phase III EDC Annual Reports, however, all TRC test ratios will continue to be based only on verified gross savings.

1. **Net-To-Gross (NTG) Adjustments To Savings**

This issue was considered within the context of the TRC Test in Phase I and Phase II. For Phase II, the Commission mandated that EDCs calculate the NTG ratio as they did in Phase I and that they continue to use **net** verified savings in the TRC Test for program planning purposes. The Commission further mandated that compliance in Phase II would be determined using **gross** verified savings. *See Phase II Implementation Order* at 82.

The use of NTG adjustments is an overarching policy issue that could affect whether an EDC reaches its targets. Due to the implications for meeting targets, the Commission has decided for Phase III that the discussion of NTG adjustments to savings will be addressed in the Phase III Implementation proceeding at Docket No. M‑2014‑2424864. If resolution of those issues would impact use of the 2016 TRC Test, we will subsequently call for comments in our further review of that impact.

1. **Factoring Free Riders And Spillover Into TRC Test Calculations**

**(a) Summary of Issue and Proposed Resolution**

Free riders (and spillover) were ignored in the TRC Test for Phase I and Phase II because the basis was gross savings, not net savings (where “net” means “net of free riders.”) The Commission is aware that the inclusion of costs for incentives for free riders in the calculation of a TRC test was addressed by the California Public Utilities Commission in the *2007 Clarification Memo.*[[39]](#footnote-39) The *2007 Clarification Memo* clarified how incentives to free riders should be treated in a TRC test to address a free rider cost advantage to rebate programs relative to direct install programs. The clarification is that incentives for free riders should be treated as a cost. EDCs in Pennsylvania have noted that the calculation of the TRC test using net savings for direct installation programs should exclude equipment costs attributable to free riders.

We did not propose to alter how the TRC Test using net savings is calculated for program planning purposes in Phase III. The SWE’s *EE Market Potential Study* for Phase III does not take into account the *2007 Clarification Memo* or other comments from EDCs on the application of equipment costs or incentives for free riders. We recognized, however, that this may put direct install programs at a disadvantage relative to rebate programs. We proposed that EDCs be required to provide evidence of any such difference in their program filings, so that the Commission can consider whether direct install programs are disadvantaged.

**(b) Comments and Reply Comments**

 PPL believes that the Commission should adopt PPL’s alternative method for accounting for NTG in the 2016 TRC Test, which PPL outlined in Exhibit 1 attached to its comments. PPL states that the Commission’s recommended approach is based on the method described in the *2007 Clarification Memo.* That method removes from TRC calculations the associated benefits and only the incentive portion of the incremental installed measure cost. PPL asserts that this inflates the TRC costs by treating a portion of the incentives as administrative costs. Although this formulation creates more parity between the TRC calculations for direct install programs and rebate programs, it incorrectly reduces the rebated program TRC B/C ratio rather than correctly accounting for the measure costs under a direct install scenario. According to PPL, this treatment contradicts the underlying rationale of the TRC test. Furthermore, the formulation ignores that, in the absence of the program, from a TRC point of view, those participants are considered free-riders who would have had to pay the entire incremental cost of the installed measure, including what is covered by the utility incentives. Moreover, this treatment of NTG, and the lower TRC that it yields, results in understating the value of savings from certain energy efficiency measures and programs. PPL proposes an alternative method for accounting for NTG in the 2016 TRC Test to more accurately reflect the underlying principles of the TRC Test. PPL’s alternative would also factor in spillover. PPL Comments at 7 and Exhibit 1.

 In its reply comments, Duquesne agrees with PPL’s comments that the Commission’s proposed approach for factoring the NTG ratio in the calculation of the TRC is flawed. The proposed approach incorrectly reduces the TRC B/C ratio for the rebate program rather than correctly accounting for the measure costs under a direct install scenario. The treatment of NTG and the lower TRC yield results in an understatement of the value of savings from certain energy efficiency measures and programs. Duquesne agrees with PPL’s assertion and supports the methodology outlined by PPL in Exhibit 1 of its comments. Duquesne RC at 2-3.

The Joint Commenters/NRDC/KEEA also support PPL’s alternative method for accounting for NTG in the 2016 TRC Test. Joint Commenters/NRDC/KEEA RC at 5.

 **(c) Final Resolution**

Free rider participant costs would have occurred even in the absence of a program and are not part of net program costs. We agree with PPL and Duquesne that costs which would have occurred regardless of the program should not be included in the TRC test calculation. Spillover, the opposite of the free rider effect, occurs when customers adopt measures because they are influenced by program-related information and marketing efforts although they do not actually participate in the program. For Phase III, upon consideration of PPL’s and Duquesne’s comments, and after consultation with the SWE, we shall adjust the formulae in Appendix A relative to free riders and spillover. Accordingly, we shall not use the *2007 Clarification Memo* as was proposed in the *2016 TRC Test Tentative Order.*

The PPL alternative method ensures that the direct install and rebate programs treat incentives and free riders the same way, unlike the original method in the *2002 CSPM*. However, the PPL alternative removes the value of participant costs in the TRC test calculations, as those costs would have occurred in the absence of the program and thus are not part of net program costs, while the *2007 Clarification Memo* includes the value of the free rider incentives.

The differences in the approaches (*i.e.*, the *2002 CSPM*, the *2007 Clarification Memo*, and the PPL alternative) are compared and contrasted in the table below, using the program characteristics used in the *2007 CPUC Clarification Memo*.

|  |  |  |  |
| --- | --- | --- | --- |
| **TRC Cost Model** | **Description** | **Rebate Example** | **Direct Install Example** |
| Program Characteristics | Participants who installed measures | 4 | 4 |
| Free Riders (FR) | 1 | 1 |
| FR % | 0.25 | 0.25 |
| Incremental Measure Cost | $ 2,000 | $2,000 |
| NTG Ratio | 0.75 | 0.75 |
| Incentive Per Measure | $ 2,000 | $0 |
| Direct Program Paid Cost Per Measure | $0 | $ 2,000 |
| Administrative Cost | $ 400 | $ 400 |
| Average Value of Saved kWh | $ 3,000 | $ 3,000 |
|  |  |  |  |
| TRC Costs | *2002 CSPM* | $ 6,400 | $ 8,400 |
| *2007 Clarification Memo* | $ 8,400 | $ 8,400 |
| **PPL Alternative** | **$ 6,400** | **$ 6,400** |
|  |  |  |  |
| Total Pre/Post Program Benefits/Costs | Total Benefits | $ 12,000 | $ 12,000 |
| Total Costs | $ 8,400 | $ 8,400 |
|  |  |  |  |
| TRC Ratios | *2002 CSPM* | 1.41 | 1.07 |
| *2007 Clarification Memo* | 1.07 | 1.07 |
| **PPL Alternative** | **1.41** | **1.41** |
| Difference | PPL Alternative – *2007 Clarification Memo* | 0.33 | 0.33 |

 Free-ridership and spillover shall be factored into the calculation of TRC benefits and costs by comparing the benefits and costs of a program with what the savings and costs would have been in the absence of the program. This approach provides a sound framework to account for free-ridership and spillover when calculating the benefits and costs of EE and DR programs. Accordingly, the EDCs shall use the new formulae in Appendix A.

**VII. Demand Response**

**A. Inclusion Of Demand Response In Phase III**

The Commission has set peak demand reduction targets for Phase III in the Implementation proceeding at Docket No. M-2014-2424864. Our decision to establish DR requirements for Phase III renders the FirstEnergy and Duquesne comments on this point moot.

**B. TRC Test Benefits From Demand Response**

**(a) Summary of Issue and Proposed Resolution**

The peak demand reductions achieved by demand response programs in Phase III must be monetized by EDCs for purposes of the TRC Test. The Commission proposed the following procedure based on the methodology used by the SWE in its *DR Potential Study*.

The Phase III demand response program design will result in a variable number of demand response dispatch hours each program year. For purposes of the 2016 TRC test, EDCs would average the gross verified demand reductions over each hour of performance and apply a line loss adjustment factor to estimate the magnitude of the peak demand reduced. This demand reduction value would be multiplied by either two or three avoided cost-of-capacity values depending on customer sector. According to the SWE, this is the appropriate way to estimate the economic effects of DR.

All peak demand reduction values would be multiplied by the avoided cost of **generation** capacity ($/kW-year for the Annual Product Type) for the delivery year as set by PJM’s Base Residual Auction. If an EDC elects to bid a program into PJM’s forward capacity market and have the program recognized as a wholesale resource, the actual revenue earned from the transaction should be used instead of a calculated value.

Peak demand reductions achieved by DR participation from all sectors would also be multiplied by an avoided cost of **transmission** capacity ($/kW-year) as calculated by the SWE and presented in the *DR Potential Study*.

Peak demand reductions achieved by DR participation from the residential and commercial sectors would be multiplied by an avoided cost of **distribution** capacity ($/kW-year) as calculated by the SWE and presented in the *DR Potential Study*. We proposed to not include industrial customers who are excluded from this benefits calculation because many of these large accounts receive service at high voltage and largely bypass the distribution system. As such, peak demand reductions achieved by this sector were presumed unlikely to avoid or defer load growth related investments in an EDC distribution system.

Energy impacts from demand response programs would also be considered in the 2016 TRC Test. The central question when valuing energy impacts from DR is whether or not the energy reduced during a demand response event is recovered in later hours or not. The *DR Potential Study* assumed that each kWh reduced during a DR event was offset by an extra kWh used during an off-peak hour. Using this approach, the avoided cost of energy attributable to a DR program would equal to the kWh impact during event hours multiplied by the difference in the EDC’s on-peak and off-peak summer avoided cost of electricity for the program year.

**(b) Comments and Reply Comments**

 FirstEnergy asserts that avoided T&D costs should be excluded in the TRC Test for DR programs. Targeting peak loads in excess of 96% of peak load for a maximum of six (6) events that last a maximum of four (4) hours each per summer period will not impact the system actual peak to a level that results in any avoided T&D investments. Any demand reductions may be short-lived or infrequent, as customers may opt out of DR programs. Reductions in either EE or DR may not cause a decrease in T&D investments because the location of the reduced demand may not be coincident with the location of the loading conditions necessitating T&D investments. FirstEnergy avers that including avoided T&D costs on a one-for-one basis in the cost benefit calculations will overstate cost-effectiveness of these programs. Avoided T&D should, therefore, be excluded in the TRC Test for DR programs. FirstEnergy Comments at 5-6.

PECO requests confirmation that, in the cases in which the EDC does not elect to bid a program into PJM’s forward capacity market and have the program recognized as a wholesale resource, the assumed avoided cost of generation capacity should be set equal to the “Zonal Capacity Price” as reported by PJM.[[40]](#footnote-40) PECO further requests that the Commission clarify whether the assumed avoided cost of generation capacity for a given delivery year should be set equal to: (1) the Base Residual Auction capacity price; or (2) the most recently reported capacity price (at the time of the avoided cost calculation) which reflects both the Base Residual Auction capacity price and possibly one or more Incremental Auction capacity prices. PECO Comments at 6-7.

 **(c) Final Resolution**

PECO’s comments on this point also touch on an earlier topic in this Order, IV.C. Transmission, Distribution, and Capacity Costs. For clarity, we point out that our resolution above has bearing on this resolution as well. The instructions above, provided in the context of monetizing peak demand reductions from EE programs, should be applied in the same manner for DR programs. Specifically, zonal capacity prices from the PJM’s Base Residual Auction should be used to determine the avoided cost of **generation** capacity.

While FirstEnergy’s comments about the locational nature of transmission and distribution investments have merit, such precision would not come without certain detriments. We find that it would be impractical to calculate a separate avoided T&D cost for each feeder for each EDC in the Commonwealth and apply it in the 2016 TRC Test. Although such a practice would arguably be technically the most accurate, we find that the effort required to perform the research and the added complexity of tracking the distribution circuits associated with every EE and DR measure installed would overwhelm any benefit from increased accuracy in the 2016 TRC Test.

Further, we find FirstEnergy’s assertion that T&D avoided costs should be excluded for DR spurious. While a single $/kW-year value for an entire EDC service territory may be an oversimplification of a complex issue, FirstEnergy’s proposal to use $0/kW-year would systematically understate the cost-effectiveness of demand response programs.

Accordingly, we shall adopt the proposal in the *2016 TRC Test Tentative Order*, subject to the clarification that peak demand reductions from DR programs shall be monetized in the same manner as from EE programs. Specifically, zonal capacity prices from the PJM’s Base Residual Auction should be used to determine the avoided cost of generation capacity.

**C. 75% Participant Cost Assumption**

**(a) Summary of Issue and Proposed Resolution**

As established in Phase I, customer incentives in a DR program are intended to compensate participants for the sacrifices they make to consume less electricity during peak periods. This can take the form of being less comfortable in the case of a residential Direct Load Control (DLC) program or a disruption in production for a business that shuts down a manufacturing process. In recognition of these sacrifices, we directed EDCs in Phase I to include the full incentive payment amount as a cost to the participant (as well as a benefit) as a monetary proxy for the participant costs. *See 2011 TRC Test Order* at 13-14. There were no DR requirements in Phase II.

Based upon informal input from stakeholders to the SWE as well as the SWE’s expertise, we opined in the Tentative Order that it appeared that using 100% of incentive amount could be problematic and could yield skewed TRC Test results because it assumes that participation in a DR program is a ‘break-even’ arrangement for the participant where the benefits are identical to the costs. In our experience, the customers are generally rational and would likely only participate in a DR program if they felt the benefits of participation outweighed the costs.

We considered the 75% participant cost assumption set forth in California’s 2010 DR Cost-Effectiveness Protocols[[41]](#footnote-41) as the potential solution. Under this protocol, 75% of the customer incentive payment would be used as a proxy for the participant cost when calculating the TRC test ratio for DR programs. We recognized that many EDCs would elect to use Conservation Service Providers (CSPs) to implement DR programs and that the exact incentive payment from the CSP to the participant will therefore be unknown. In this case, EDCs could use 75% of the payment amount to the CSPs as a cost in the TRC Test.

We proposed to adopt the 75% participant cost assumption set forth in California’s 2010 DR Cost-Effectiveness Protocols for Phase III. Under this protocol 75% of the customer incentive payment would be used as a proxy for the participant cost when calculating the TRC Test ratio for demand response programs. For EDCs that elect to use CSPs to implement DR programs when the exact incentive payment from the CSP to the participant is unknown, we proposed that those EDCs would use 75% of the payment amount to the CSPs as a cost in the TRC Test.

**(b) Comments and Reply Comments**

Stakeholders did not comment on this topic.

 **(c) Final Resolution**

For Phase III, the Commission adopts the 75% participant cost assumption set forth in California’s 2010 DR Cost-Effectiveness Protocols. Under this protocol 75% of the customer incentive payment will be used as a proxy for the participant cost when calculating the TRC Test ratio for demand response programs. For EDCs that elect to use CSPs to implement DR programs when the exact incentive payment from the CSP to the participant is unknown, we will permit those EDCs to use 75% of the payment amount to the CSPs as a cost in the TRC Test.

**D. Measure Life Of Demand Response Equipment**

**(a) Summary of Issue and Proposed Resolution**

In Phase I, all DR measures were assigned a one-year effective useful life. *See 2011 TRC Test Order* at 17-20. There were no DR provisions in Phase II. Based upon informal input from stakeholders to the SWE, as well as the SWE’s expertise, we opined in the *2016 TRC Test Tentative Order* that this Phase I directive, if carried forward to Phase III, could underestimate the mechanical life of DLC equipment and lead to low TRC test ratios for DLC programs. We made no specific proposal regarding this aspect.

As noted in the *2016 TRC Test Tentative Order*, the SWE has opined that it is inappropriate to calculate load reduction benefits from future years during which no agreement exists between the EDC and a customer for control of the equipment regardless of the anticipated mechanical life of the equipment. We therefore proposed that peak demand reduction benefits from the applicable years be included in the TRC test only to the extent that multi-year or “lifetime” participation agreements are executed between EDCs and participating customers.

According to the SWE, in order for load impacts from a DLC program to be valued in the TRC test, two financial transactions are required. (1) The EDC must purchase or lease the equipment itself, and (2) The EDC or CSP must incent the customer for the right to modify equipment operation during DR event calls. We, therefore, proposed that EDCs use only those load impacts for which both equipment and incentive costs have both been incurred when calculating TRC test benefits.

We also proposed that EDCs that purchased DLC equipment in a previous phase should not include those costs in the TRC Test for Phase III as those expenses were accounted for as costs in a previous TRC Test and to consider them as TRC test costs again would be “double-counting.”

**(b) Comments and Reply Comments**

 Duquesne asserts that the cost effectiveness of DLC DR programs should not be marginalized due to the uncertainties of future Commission decisions. An EE measure with a multi‑year life does not have its benefit streams truncated so that it only accounts for benefits that accrue within the current authorized performance period. The Commission should ensure equitable treatment of both EE and DR programs and allow multi-year lives for DR. Duquesne disagrees with the SWE’s opinion to exclude anticipated load reduction benefits from future years for which no agreement exists between the EDC and a customer for control of the equipment. Duquesne asserts that investment in equipment is based on the reasonable assumption that the equipment will be used during and across the equipment’s projected useful life. Duquesne Comments at 5.

 **(c) Final Resolution**[[42]](#footnote-42)

The *DR Potential Study* utilized a 10-year effective useful life for DLC equipment; this long-term view provides the basis for inclusion of DR in Phase III. Using measure life longer than one year will be a more accurate value for use in the TRC test, but, according to the SWE, this may create accounting challenges for EDCs making such acquisitions within a phase. We recognize this and may need to address such issues as they arise on an individual basis with an affected EDC.

Similarly, during Phase III, EDCs may include the anticipated, as well as the known, benefits and costs for DLC. Evaluations will be based on benefits and costs which have occurred, or which are known to be likely to occur, throughout the life of the DLC equipment as calculated at the time the TRC test is being performed. We predicate this decision on the fact that once the infrastructure is purchased, DLC DR programs should be competitive since the majority of the measure costs are sunk. This has the potential to enhance the TRC test ratio and the cost effectiveness of these measures in subsequent phases, if any. Presuming termination of these measures at the end of Phase III is not supported by the more fundamental economics of these measures.

The costs of DLC equipment purchased outside of an approved Phase III plan shall not be included in the 2016 TRC Test. If the approved plan recognizes that there will be benefits within Phase III from such equipment, then the incentive costs may be factored into the TRC test consistent with the discussions herein.

**E. Treatment Of DR Payments To CSPs And EDCs From PJM**

**(a) Summary of Issue and Proposed Resolution**

There were no DR provisions in Phase II.

For Phase III, we proposed TRC methodology for the treatment of DR payment to CSPs and EDCs from PJM in the 2016 TRC Test, noting that the treatment of incentive payments and possible penalties from PJM to CSPs or from PJM to EDCs was addressed in the *2011 TRC Test Order*. In Phase I, EDCs were directed to ignore all charges, penalties, or payments resulting from participation in PJM’s wholesale markets. We considered revising this provision in the case where an EDC bids an Act 129 program into PJM’s forward capacity market. Rather than perform a calculation of the avoided cost of generation capacity, an EDC could use the actual revenue received from PJM for the cleared resource as benefits in the TRC test calculation.

If an EDC allowed a CSP to bid the program into PJM as a wholesale resource on its behalf, all revenues received from the bid would still be returned to the customer sector contributing the load reduction and used as a benefit in the TRC test in place of an estimated avoided cost of generation capacity. *See 2011 TRC Test Order* at 8-13*.*

It is important to note that the SWE has subtracted projections of the DR commitments in PJM’s forward capacity market from its estimates of non-residential demand response potential. This netting-out of projected PJM DR commitments was in direct response to the Commission’s directive that the SWE “disallow dual participation when it performs its [Load Curtailment (LC)] analysis” as part of its *DR Potential Study*.”[[43]](#footnote-43) In light of the SWE’s potential estimates and the proposed instructions in Tentative Phase III Implementation Order at M‑2014-2424864, we opined in the *2016 TRC Test Tentative Order* that it would appear that such a change would eliminate instances of a customer, or a CSP on a customer’s behalf, receiving incentives from both PJM and an EDC. We proposed that DR targets for Phase III be achieved by customers not concurrently committed as capacity resources in PJM’s forward capacity market to avoid double dipping.

For Phase III, we proposed that charges, penalties, and payments from PJM to an EDC, or CSP on an EDC’s behalf, be included in the 2016 TRC Test as benefits or costs as appropriate. In order to prevent double-counting of benefits, this inclusion of actual financial transactions would be used in place of the avoided cost of generation capacity calculation method described previously in this Order for those Act 129 peak demand reductions not recognized by PJM as wholesale resources.

Similar to Phase I, we proposed for Phase III that all revenues from or costs incurred from an EDC bidding an Act 129 program into PJM’s wholesale markets be passed through to the customer class which contributed the load impact.

**(b) Comments and Reply Comments**

This issue was not discussed in comments or reply comments to the *2016 TRC Test Tentative Order*.

**(c) Final Resolution**

Following the analysis and logic in the *2016 TRC Test Tentative Order*, we find that charges, penalties, and payments from PJM to an EDC, or CSP on an EDC’s behalf, should be included in the 2016 TRC Test as benefits or costs as appropriate. In order to prevent double-counting of benefits, this inclusion of actual financial transactions will be used in place of the avoided cost of generation capacity calculation method for those Act 129 peak demand reductions not recognized by PJM as wholesale resources.

Furthermore, all revenues from or costs incurred from an EDC bidding an Act 129 program into PJM’s wholesale markets shall be passed through to the customer class which contributed the load impact.

**VIII. Frequency Of Review Of TRC Test**

**(a) Summary of Issue and Proposed Resolution**

The Commission proposed that the 2016 TRC Test apply for the entirety of Phase III. Reviews would be undertaken when warranted, and changes would be made only when justified during a phase.

 **(b) Comments and Reply Comments**

HPC/KEEA support establishment of a general TRC framework and guidelines that would last for the full length of Phase III of Act 129. However, some mechanism for reviewing and making changes and modifications to the TRC would be valuable, both because a significant body of new research and findings related to cost-effectiveness testing has taken place over the past few years and is still underway and because the EPA’s Final Rule on the Clean Air Act may have a major impact on the Act 129 program generally and on the Phase III plans specifically. HPC/KEEA recommend that the Commission support the creation of standing technical committee that could review TRC implementation and provide advice and guidance as appropriate. HPC/KEEA Comments at 5.

Penn State submits that while the Commission’s concerns are relevant to whether the 2016 TRC Test should be *changed* mid-phase, they are not relevant to whether the 2016 TRC Test should be periodically *reviewed* during Phase III. Periodic review is necessary to ensure that the 2016 TRC Test keeps pace with technological changes. Penn State urges the Commission to establish an annual process in Phase III for reviewing and updating the 2016 TRC Test. Penn State Comments at 2.

In reply comments, the Joint Commenters/NRDC/KEEA support Penn State’s recommendation that the Commission establish a periodic review and updating process and that the TRC methodology be reviewed and updated annually. They agree that reviewing the TRC Test is not synonymous with changing the TRC Test mid-phase. The Commission should be able to review the TRC Test throughout Phase III to ensure that the appropriate “costs, benefits, technologies, etc.,” are accounted for. This is especially important considering that the EPA’s Clean Power Plan will likely have an impact on the program. Joint Commenters/NRDC/KEEA RC at 6.

In its reply comments, FirstEnergy agrees with the Commission’s proposal that the 2016 TRC Test apply for the entirety of Phase III and disagrees with the recommendation to establish a standing technical committee. FirstEnergy asserts that the EPA’s proposed rule does not address cost-effectiveness requirements for EE and that this matter is left to the states’ prerogative. FirstEnergy believes that creating an additional committee would create administrative burden and uncertainty about TRC requirements. FirstEnergy RC at 4.

In its reply comments, Duquesne disagrees with Penn State. Duquesne asserts that such review and changes would have questionable benefit and would not be cost-effective. Duquesne also maintains that the cost-effectiveness measurement should remain constant for the duration of Phase III. Duquesne RC at 1-2.

 **(c) Final Resolution**

The Commission has considered the arguments advanced and decided that the 2016 TRC Test shall apply for the entirety of Phase III. Reviews will be undertaken when warranted, and changes will be made only when justified during a phase. Based on our experience with using a TRC Test in Phase I and Phase II, it appears that a fixed timeline for further review is not necessary. Amending the TRC Test mid-phase could be detrimental to the determination of cost-effectiveness of the programs and could result in extensive EE&C Plan changes. Such changes could also interfere with comparisons between years within a phase. It is necessary to keep the parameters constant, so we can compare the actual Phase III benefits and costs to the planned Phase III benefits and costs, using a definition of TRC costs and benefits that remains constant over Phase III.

**IX. New Matters – New Topics**

Two parties raised issues as new matter. We shall address each in turn. All parties had the opportunity to address these matters if they wished to do so.

**A.** **Escalation Factor For Natural Gas Prices**

PECO states that with respect to the calculation of the avoided costs of supplying electricity specified in the *2013 TRC Test Order*, the Commission accepted a prior proposal by PECO allowing for the calculation of avoided energy costs for later years of the forecast based on NYMEX natural gas futures prices and provided that 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 U.S. Energy Information Administration’s (EIA) Annual Energy Outlook (AEO).[[44]](#footnote-44)

PECO believes that using both NYMEX natural gas futures prices and EIA AEO natural gas projections within a single forecast may be problematic for several reasons. First, the EIA AEO is an entirely different data source, which increases the chance of internal inconsistencies in the forecast. Second, the EIA AEO is updated infrequently (often only once per year), so the EIA AEO projections may not be reflective of current market expectations, while more current expectations are embedded in the recent market price data from NYMEX, which is updated on a daily basis. Third, the NYMEX market prices pertain to a precise delivery point applicable to PECO, while the EIA AEO projections pertain to a very broad “Middle Atlantic Region” designation, which can result in inconsistencies between the data sources due to differences in delivery locations.

For all of these reasons, PECO requests that, for the years where NYMEX natural gas futures prices are not available, the Commission allow PECO to calculate natural gas prices by applying the same BLS escalator that the Commission has proposed that PECO use to escalate capacity, transmission, and distribution prices.[[45]](#footnote-45) PECO Comments at 7-8.

**Resolution** – For the future years where NYMEX natural gas futures prices are not available, we shall allow EDCs to escalate natural gas prices by applying the forecast average annual rate of growth for the natural gas price index (for All Users) from the U.S. Energy Information Administration (EIA) for the mid-Atlantic region from the 2015 EIA Annual Energy Outlook forecast. We have selected this specific EIA Outlook price index because it is tied directly to the price of the natural gas fuel, not to natural gas infrastructure equipment such as pipelines, pump stations, and other natural gas utility physical structures. We have determined that the BLS price index for Electric Power GTD[[46]](#footnote-46) should only be used as the proxy rate of escalation for electric transmission, distribution, capacity, and ancillary service costs. The BLS index should not be used to escalate natural gas fuel prices. It is important that the price index used to escalate natural gas prices be totally related to the natural gas commodity, not to electric plant.

**B. Combined Heat And Power (CHP) Systems**

Prof. Freihaut[[47]](#footnote-47) commented (1) that a 15‑year effective lifecycle undervalues the useful benefit of CHPs, (2) that the 2016 TRC Test discount rate for CHPs should use the Commonwealth’s cost of borrowing because CHP costs are customer costs and not EDC costs, and (3) that incentive structures as used by other states should be considered in Pennsylvania. Freihaut Comments in M-2014-2424864 at 2-4.

**(1) Life Cycle**: FirstEnergy responds that it is particularly speculative to include benefits beyond 15 years for CHP projects where factors such as higher O&M costs, new environmental regulations, obsolescence, and outages may cause owners to decommission the unit early FirstEnergy also suggests that long-term energy and capacity forecasts are uncertain and that their uncertainties increase significantly into the future. FirstEnergy RC at 4-5, citing the July 7, 2011 Itron Report *CPUC Self Generation Incentive Program Tenth-Year Impact Evaluation*.

**Resolution** – We have determined that the 15-year cap on the useful life of measures eligible under Act 29 must be capped at 15 years to comply with the Act 129 statute. This includes CHP measures.

 **(2) Discount Rate**: FirstEnergy responded that, from the TRC perspective, both the benefits and the costs that result from CHP projects are no different from other EDC energy efficiency programs, and, thus, there is no basis for using a different discount rate. Second, the discount rate is based on factors in addition to the cost of borrowing. The discount rate used in the present value calculation must take into consideration the risk of the benefit and cost streams in the long term as well as the cost of capital. The uncertainty of long term benefits should weigh more heavily in the selection of the discount rate because the capital expenditures are near term and less impacted by discount rates, whereas long-term benefits are impacted exponentially.[[48]](#footnote-48) Additionally, the monetization of up to 15 years of benefits is inherently uncertain, and any discount rate used should consider such uncertainty. FirstEnergy RC at 5-6.

**Resolution**: We find FirstEnergy’s reply comments to be persuasive and, therefore, will not change how the discount rate is factored into the 2016 TRC Test. The EDC’s weighted average cost of capital is the correct basis for the discount rate so that supply-side and demand-side alternatives are placed on a level playing field. Accordingly, EDCs shall continue to use the EDC’s weighted average cost of capital as the discount rate used in TRC calculations for all measures and programs that are eligible for Act 129 funding.

**(3)** **Incentives**: FirstEnergy responds that the TRC proceeding is inappropriate for discussion of incentive structures of EDC programs and that such discussion should be part of the proceeding reviewing Phase III EE&C Plans. FirstEnergy RC at 6.

**Resolution**: We agree that this discussion might be more properly undertaken in the Phase III Implementation proceeding, but, in any case, we not are persuaded that we need to re-examine incentive structures at this time.

**X. 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 for the TRC Tests for Phase I, II, and III were predicated on material in the *2002 CSPM*. Additionally, we clarified how the TRC test is to be applied in Pennsylvania. For example, the Commission has provided explicit direction on how the avoided costs of electricity and natural gas are to be calculated, and has provided direction on how T&D avoided costs are to be calculated. As detailed above, the formulae have been further modified for Phase III. The Commission has provided clarifications and/or new formulae for Phase III regarding: (1) the benefits of the avoided costs of fossil fuels and water; (2) the costs and benefits of free-riders and spillover; and (3) reporting of TRC test calculations based on gross savings and net savings in EDC Phase III EE&C plans.

**XI. Conclusion**

The *Phase III Implementation Order* entered in conjunction with this Order established the third phase of the Act 129 EE&C program which 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. That order, *inter alia*, set the required consumption reduction and DR requirements for each EDC, as well as guidelines for implementing the third phase of the energy efficiency and conservation program. This Order adopts the 2016 PA TRC Test to be used to evaluate the Phase III EE&C plans. All comments and reply comments to the tentative orders have duly

considered.[[49]](#footnote-49) Any provisions of prior PA TRC Tests that have not been specifically, or by necessary implication, addressed and changed or eliminated herein shall continue in full force. Any issues raised by stakeholders that have not been addressed herein are deemed denied**; THEREFORE,**

**IT IS ORDERED:**

1. That the 2016 Pennsylvania Total Resource Cost Test be used for evaluating energy efficiency and conservation programs during Phase III 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 Docket No. M-2014-2424864, and all parties who commented on the Tentative Order at this docket.

 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 website at <http://www.puc.pa.gov/filing_resources/issues_laws_regulations/act_129_information/total_resource_cost_test.aspx>.

5. That the contact person for technical issues related to this Order and the 2016 Total Resource Cost Test for Phase III of Act 129 is Scott Gebhardt, Bureau of Technical Utility Services, 717-425-2860 or sgebhardt@pa.gov. The contact person for legal and process issues related to this Order and the 2016 Total Resource Cost Test for Phase III of Act 129 is Louise Fink Smith, Law Bureau, 717‑787‑5000 or finksmith@pa.gov.

**BY THE COMMISSION**

Rosemary Chiavetta

Secretary

(SEAL)

ORDER ADOPTED: June 11, 2015

ORDER ENTERED: June 22, 2015

**Appendix A**

The definitions and formulae to be used for the

Pennsylvania-specific 2016 TRC Test, consistent with Act 129 of 2008,

are set forth in this Appendix A.

The definitions and formulae in this Appendix A are adapted from

pages 10 – 12, 15-17, and 22 of the

2002 *California Standard Practice Manual* (*2002 CSPM*)[[50]](#footnote-50)

without further specific attribution.

**TRC Formulae**

The formulae for the net present value (NPVTRC), the benefit/cost ratio (BCRTRC), and the levelized costs per lifetime kWh or kW saved (LCTRC) are:

|  |  |  |
| --- | --- | --- |
| NPVTRC | = | BTRC – CTRC |
| BCRTRC | = | BTRC/CTRC |
| LCTRC Energy | = | LCRC/IMPE |
| LCTRC Demand | = | LCRC/IMPD |

The BTRC, CTRC, TRC costs used for levelizing (LCRC) and the total discounted load impacts of the energy and demand program (IMPE or IMPD) terms are defined as follows.[[51]](#footnote-51) The first summation in the BTRC equation should be used for conservation and load management programs. The second summation in the BTRC equation should be added to the calculation for fuel-switching or measures that result in fossil fuel conservation. The third summation in the BTRC equation should be added to the calculation to monetize water savings.

$$B\_{TRC}= \sum\_{t=1}^{N}\frac{UAC\_{t}+ TC\_{t }}{\left(1+d\right)^{t-1}} + \sum\_{t=1}^{N}\frac{UAC\_{at}+ PAC\_{at}}{\left(1+d\right)^{t-1}}+ \sum\_{t=1}^{N}\frac{EXT\_{t}}{\left(1+d\right)^{t-1}}$$

$$ C\_{TRC } = \sum\_{t=1}^{N}\frac{(PRC\_{t}+ UIC\_{t})+ (IMC\*NTG) }{\left(1+d\right)^{t-1}}$$

$$LCRC= \sum\_{t=1}^{N}\frac{(PRC\_{t}-TC)+(IMC\*NTG)}{\left(1+d\right)^{t-1}}$$

$$IMP\_{E}= \frac{\sum\_{t=1}^{n}\left[\left(\sum\_{i=1}^{n}∆EN\_{it}\right)\right]}{\left(1+d\right)^{t-1}}$$

$$IMP\_{D}= \frac{\sum\_{t=1}^{n}\left[\left(\sum\_{i=1}^{n}∆DN\_{it}\right)\right]}{\left(1+d\right)^{t-1}}$$

The utility avoided cost terms (UACt, UACat, and UICt) are determined by costing period to reflect time-variant costs of supply[[52]](#footnote-52):

$$UAC\_{t}= \sum\_{i=1}^{I}\left(∆EN\_{it} × MC:E\_{it} ×K\_{it}\right)+ \sum\_{i=1}^{I}\left(∆DN\_{it} × MC:D\_{it} × K\_{it}\right)$$

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

$$UIC\_{t}= \sum\_{i=1}^{I}\left(∆EN\_{it} × MC:E\_{it} ×(K\_{it}- 1)\right)+ \sum\_{i=1}^{I}\left(∆DN\_{it} × MC:D\_{it} ×(K\_{it}- 1)\right)$$

Water savings are captured in the EXTt term to the extent practicable:

$$EXT\_{t}= \sum\_{i=1}^{I}\left(∆H\_{2}0\_{it} × MC:H\_{2}0\_{it} ×K\_{it}\right) $$

The Net-to-Gross (NTG) adjustment affects both the numerator and the denominator of the TRC benefits and costs. Free-ridership (FR) and spillover (SO) are factored into the calculation of TRC benefits and costs by comparing the benefits and costs of an EE or DR program (or measure) with what the savings and costs would have been in the absence of the program (or measure). This process is illustrated in Table 1 below.

|  |
| --- |
| **Table 1: TRC Benefits and Costs with****Adjustments for Free-Ridership and Spillover** |
| **Status** | **Without Program/Measure (Energy savings are on a net basis)** | **With Program/Measure (Energy savings are on a net basis)** | **Incremental Difference** |
| **Benefits** | 0 | UACt + TCt +UACat | UACt + TCt +UACat |
| **Costs** | IMC \* FR | IMC \* (1 + SO) + PRC | PRC + IMC \* (1 – FR + SO) |

The effects of NTG on the calculation of the TRC cost test have been incorporated using the adjustment shown in the equations for CTRC and LCRC.

The definitions of the change in energy savings and demand savings in the equations for UAC and UIC are on a net savings basis.

When performing the TRC test on a gross basis, the net-to-gross term (NTG) should be set to 1.0 in the CTRC and LCRC formulae.

**Glossary of Terms**

|  |  |
| --- | --- |
| ∆DNit | Reduction in net[[53]](#footnote-53) demand in costing period *i* in year *t* |
| ∆ENit | Reduction in net[[54]](#footnote-54) energy use in costing period *i* in year *t* |
| ΔH20it | Reduced water consumption in costing period *i* in year *t* |
| BCRTRC | Benefit/cost ratio (NPV of total benefits of resource divided by NPV of total costs of 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 |
| EXTt | Non-energy benefits in year *t* limited by Commission order to water |
| FR | Free-ridership rate |
| *i* | Avoided cost costing period |
| I | Number of periods of a participant’s participation |
| IMC | Incremental measure cost (*i.e.*, difference between baseline standard efficiency measure cost and program high efficiency measure cost) in year *t*  |
| IMPD | Total discounted demand impacts of the program |
| IMPE | Total discounted energy impacts of the program |
| Kit | 1 when ∆ENit or ∆DNit is positive (*i.e.*, a reduction) in costing period *i* in year *t*, and 0 (zero) otherwise, when calculating on a net basis[[55]](#footnote-55) |
| 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* |
| MC:H20it | Marginal cost of water in costing period *i* in year *t* |
| NPVTRC | Net present value of total costs of the resource |
| NTG | Net-to-Gross ratio = (1- FR + SO) |
| PACat | Participant avoided costs in year t for the alternate fuel devices (*i.e.*, costs of devices not chosen) |
| PRCt | Program administrator costs in year *t* (*i.e.*, utility administration costs). In PA, the EDC is the program administrator |
| SO | Spillover rate |
| 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 factor: NAICS 221110: Bureau of Labor Statistics Electric Power Generation Transmission Distribution (GTD) sector price index (North American Industry Classification System 221110)

*California Manual*: 2002 *California Standard Practice Manual*, also *2002 CSPM*

CFL: Compact Fluorescent Light bulb

CSP: Conservation Service Providers

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

NPV: Net Present Value

NTG: Net-to-Gross

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

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

Phase III: Act 129 requirement from June 1, 2016, through May 31, 2021

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

*2002 CSPM*: 2002 *California Standard Practice Manual*, also *California Manual*

1. *See* *Phase I Implementation Order*, Docket No. M-2008-2069887; *Phase II Implementation Order*, Docket No. M-2012-2289411; and *Phase III Implementation Order*, Docket No. M-2014-2424864, for the full history of each phase. [↑](#footnote-ref-1)
2. The SWE is a team of technical consultants. For a further description of the SWE and the process used to select the SWE, see the *Act 129 Phase III Implementation* docket. [↑](#footnote-ref-2)
3. Act 129 sets a limit on the cost of an EDC’s EE&C plan at 2% of the EDC’s annual revenue as of December 31, 2006. *See* 66 Pa. C.S. § 2806.1(g). [↑](#footnote-ref-3)
4. After 2013, the Commission has the option to determine what test to use. 66 Pa. C.S. § 2806.1(m). [↑](#footnote-ref-4)
5. *See* <http://www.puc.pa.gov/pcdocs/1256728.docx>. [↑](#footnote-ref-5)
6. *See* [http://www.puc.pa.gov//pcdocs/1321846.docx](http://www.puc.pa.gov/pcdocs/1321846.docx). [↑](#footnote-ref-6)
7. The Industrials filing jointly are Industrial Energy Consumers of Pennsylvania (IECPA), Duquesne Industrial Intervenors (DII), Met-Ed Industrial Users Group (MEIUG), Penelec Industrial Customer Alliance (PICA), Penn Power Users Group (PPUG), West Penn Power Industrial Intervenors (WPPII), Philadelphia Area Industrial Energy Users Group (PAIEUG), and PP&L Industrial Customer Alliance (PPLICA). [↑](#footnote-ref-7)
8. Citizens for Pennsylvania’s Future, in conjunction with the Clean Air Council (CAC), the Environmental Defense Fund (EDF), and the Sierra Club (Sierra), designated herein as Joint Commenters, filed comments to the *Secretarial Letter*. Subsequent filings by the Joint Commenters were in conjunction with additional parties as noted below. [↑](#footnote-ref-8)
9. *See* <http://www.puc.pa.gov/pcdocs/1345079.pdf>. [↑](#footnote-ref-9)
10. *See* <http://www.puc.state.pa.us/filing_resources/issues_laws_regulations/act_129_information/act_129_statewide_evaluator_swe_.aspx>. [↑](#footnote-ref-10)
11. *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-11)
12. PennFuture’s comments to the Tentative Order were filed jointly with CAC, EDF, Sierra, and the Natural Resources Defense Council (NRDC). [↑](#footnote-ref-12)
13. HPC/KEEA’s comments were initially filed at the Phase III Implementation docket but were subsequently re-filed at this docket. [↑](#footnote-ref-13)
14. Penn State’s comments were accepted as late-filed. [↑](#footnote-ref-14)
15. Prof. Freihaut is a professor of architectural engineering at Penn State, but his comments appear to be his own and not those of the university. He filed his TRC Test comments in combination with his Implementation comments at the Implementation docket. [↑](#footnote-ref-15)
16. Industrials filing reply comments jointly are IECPA, MEIUG, PICA, PPUG, PAIEUG, PPLICA, and WPPII. DII did not join the reply comments. [↑](#footnote-ref-16)
17. PennFuture filed reply comments in conjunction with CAC, EDF, Sierra, NRDC, and KEEA. [↑](#footnote-ref-17)
18. We note that any issue that we do not specifically address herein has been duly considered and denied without further discussion this Order. It is well settled that we are not required to consider expressly or at length each contention or argument raised by a party. [Conrail v. Pa. PUC, 625 A.2d 741 (Pa. Cmwlth. Ct. 1993);](file://C:\research\buttonTFLink?_m=69761b6202cb4178e2a6e6fe02f5751b&_xfercite=%3ccite%20cc=%22USA%22%3e%3c!%5bCDATA%5b2000%20Pa.%20PUC%20LEXIS%2067%20%5d%5d%3e%3c\cite%3e&_butType=3&_butStat=242&_butNum=5&_butInline=1&_butinfo=%3ccite%20cc=%22USA%22%3e%3c!%5bCDATA%5b625%20A.2d%20741%5d%5d%3e%3c\cite%3e&_fmtstr=FULL&docnum=5&_startdoc=1&_startchk=1&wchp=dGLSzS-lSlbz&_md5=ad2b02d95c2a9216e83b92a3570d4785) see also, generally, [U. of Pa. v. Pa. PUC, 485 A.2d 1217 (Pa. Cmwlth. Ct. 1984).](file://C:\research\buttonTFLink?_m=69761b6202cb4178e2a6e6fe02f5751b&_xfercite=%3ccite%20cc=%22USA%22%3e%3c!%5bCDATA%5b2000%20Pa.%20PUC%20LEXIS%2067%20%5d%5d%3e%3c\cite%3e&_butType=3&_butStat=242&_butNum=6&_butInline=1&_butinfo=%3ccite%20cc=%22USA%22%3e%3c!%5bCDATA%5b485%20A.2d%201217%5d%5d%3e%3c\cite%3e&_fmtstr=FULL&docnum=5&_startdoc=1&_startchk=1&wchp=dGLSzS-lSlbz&_md5=9b1cc8319afd12440738bb82d74455ef) [↑](#footnote-ref-18)
19. *See* 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). *See* *Phase II Implementation Order* at 81. [↑](#footnote-ref-19)
20. After November 30, 2013, and every five years thereafter, the Commission is to evaluate the benefits and costs of the EE&C program and of the approved EE&C plans using a TRC test or a benefit/cost analysis of the Commission’s determination. 66 Pa. C.S. § 2806.1(a) and (c)(3). [↑](#footnote-ref-20)
21. In this regard, the 2016 TRC Test will continue to use the incremental measure costs of services and equipment. This matter is discussed in more detail below in the segment addressing incentive payments from an EDC. [↑](#footnote-ref-21)
22. *See* the Appendix of this order. *See*, *also*, *2002 CSPM* at 18‑19 for the underlying methodology to calculate the NPV and B/C ratio of the TRC test. [↑](#footnote-ref-22)
23. Act 129 limits the “effective life of each plan” to 15 years of less. 66 Pa. C.S. § 2806.1(m), defining “TRC test.” [↑](#footnote-ref-23)
24. “An example of a customer-avoided cost includes the reduced labor costs for street bulb maintenance that a municipality would realize from installing light-emitting diode (LED) street lights, given that the LED lights would last up to 5 times longer than conventional sodium bulbs.” *2011 TRC Test Order* at 27. [↑](#footnote-ref-24)
25. 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-25)
26. *See* 73 P.S. §§ 1648.1 – 1648.8 and 66 Pa. C.S. § 2814. [↑](#footnote-ref-26)
27. *See* *Phase II Implementation Order* at 50 – 51. [↑](#footnote-ref-27)
28. *See* <http://www.energy.ca.gov/deer/>. [↑](#footnote-ref-28)
29. PJM (the regional transmission organization covering Pennsylvania) Regional Transmission Organization’s (RTO) Reliability Pricing Model. [↑](#footnote-ref-29)
30. North American Industry Classification System. [↑](#footnote-ref-30)
31. For each delivery year, PJM administers “Incremental Auctions” for capacity after the initial “Base Residual Auction” and, as each Incremental Auction is completed, PJM reports a price for capacity reflecting the combined auction results. [↑](#footnote-ref-31)
32. Capacity prices for the 2017/2018 delivery year are available at <http://www.pjm.com/~/media/markets-ops/rpm/rpm-auction-info/2017-2018-base-residual-auction-results.ashx> [↑](#footnote-ref-32)
33. For each delivery year, PJM administers “Incremental Auctions” for capacity after the initial “Base Residual Auction” and, as each Incremental Auction is completed, PJM reports a price for capacity reflecting the combined auction results. [↑](#footnote-ref-33)
34. *See*, *e.g.*, <http://www.pjm.com/markets-and-operations/ancillary-services.aspx>. [↑](#footnote-ref-34)
35. PECO provides the following additional information: For any one of the 24 monthly on-peak/off-peak calendar periods, if a NYMEX futures price is not available for the PECO Zone for that on-peak/off-peak calendar period in at least one year, then a basis factor (PECO Zone price / PJM Western Hub price) for that given monthly on-peak/off-peak calendar period cannot be calculated. [↑](#footnote-ref-35)
36. *See* *2016 TRC Test Tentative Order* at 25. [↑](#footnote-ref-36)
37. *See 2009 TRC Test* at 18. [↑](#footnote-ref-37)
38. See *2013 TRC Test* at 35-36. [↑](#footnote-ref-38)
39. *2007 Clarification Memo* at 154-158 regarding the *2002 CSPM*, from D.07-09-043; *see* [*http://www.cpuc.ca.gov/NR/rdonlyres/A7C97EB0-48FA-4F05-9F3D-*4934512FEDEA/0/2007SPMClarificationMemo.doc](http://www.cpuc.ca.gov/NR/rdonlyres/A7C97EB0-48FA-4F05-9F3D-4934512FEDEA/0/2007SPMClarificationMemo.doc). [↑](#footnote-ref-39)
40. *See* <http://www.pjm.com/~/media/documents/manuals/m18.ashx>; <http://www.pjm.com/markets-and-operations/rpm.aspx>. [↑](#footnote-ref-40)
41. *See* [http://www.cpuc.ca.gov/PUC/energy/Demand+Response/Cost-Effectiveness.htm](http://www.cpuc.ca.gov/PUC/energy/Demand%2BResponse/Cost-Effectiveness.htm). [↑](#footnote-ref-41)
42. DLC is component of DR. This resolution is informative to all DR measures for which similar issues arise. [↑](#footnote-ref-42)
43. *See Act 129 SWE to Perform DR Potential Study*, Docket Nos. M-2012-2289411 and M‑2008‑2069887 (Feb. 20, 2014) at 57. [↑](#footnote-ref-43)
44. *See* *2012 PA TRC Test at* 32. The natural gas prices are converted into estimated wholesale energy prices through the use of heat rates spark price spreads calculated as prescribed by the Commission. [↑](#footnote-ref-44)
45. *See* *2016 TRC Test Tentative Order* at 23-25. [↑](#footnote-ref-45)
46. BLS factor: NAICS 221110. [↑](#footnote-ref-46)
47. Prof. Freihaut filed his TRC test comments/new matter at the Phase III Implementation docket. FirstEnergy responded to the new matter at this docket. [↑](#footnote-ref-47)
48. FirstEnergy presents the following example: The benefits and costs in year one are discounted by a factor of 1/(1+d)1 while the benefits in year fifteen are discounted by a factor of 1/(1+d)15, where d = discount rate. In year 15, benefits compose the majority, if not all, of the present value calculation for TRC test. [↑](#footnote-ref-48)
49. The full texts of the *Phase III Implementation Tentative Order* and *2016 TRC Test Tentative Order*, as well as the comments and reply comments thereto, may be found on the Commission’s Act 129 information web page: <http://www.puc.pa.gov/filing_resources/issues_laws_regulations/act_129_information/total_resource_cost_test.aspx> [↑](#footnote-ref-49)
50. *The California Standard Practice Manual – Economic Analysis of Demand‑Side Programs and Projects*, July 2002, (*2002 CSPM*), p. 18. *See* <http://www.calmac.org/events/SPM_9_20_02.pdf>. [↑](#footnote-ref-50)
51. *t* = time; *i* = avoided cost costing period. [↑](#footnote-ref-51)
52. I = number of periods of a participant’s participation. [↑](#footnote-ref-52)
53. When performing the TRC test on a gross basis, the reduction in gross demand is used, *i.e.*, ∆DGit. [↑](#footnote-ref-53)
54. When performing the TRC test on a gross basis, the reduction in gross energy is used, *i.e.*, ∆EGit. [↑](#footnote-ref-54)
55. When performing the TRC test on a gross basis, the reduction in gross energy or demand is used, *i.e.*, ∆EGit or ∆DGit. [↑](#footnote-ref-55)