



The Keystone Energy Efficiency Alliance (KEEA) thanks the Pennsylvania Utility Commission (Commission) for its September 19, 2019 Tentative Order on the 2021 Total Resource Cost (TRC) at Docket No. M-2019-3006868 (TRC Tentative Order) and hopes its comments will assist the Commission as it seeks to accurately capture the costs and benefits of Act 129 Energy Efficiency and Conservation (EE&C) plans. KEEA is a 501(c)(6) trade association committed to advancing energy efficiency in the Commonwealth of Pennsylvania. With more than sixty business members operating throughout the Commonwealth, KEEA is growing the market for energy efficiency and helping Pennsylvania maintain an affordable and sustainable energy economy.

Act 129, 66 Pa. C.S. § 2806.1, (Act 129) requires Pennsylvania to reduce electric consumption. To do so, the Commission is directed to use a total resource cost (TRC) test to analyze the benefits and costs of the EE&C plans filed by electric distribution companies under Act 129. Act 129 defines the 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.”¹

In its comments, KEEA would like to highlight the following issues within the TRC Tentative Order:

1. The Commission is correct to update the discount rate to reflect future value.
2. The TRC should adjust costs for energy efficiency measures limited by the 15-year cap.
3. The TRC should include avoided distribution costs for all customers.
4. The TRC should include price suppression effects of reduced demand.
5. The TRC should include participant health benefits.
6. The proposed multiplier for demand response is insufficiently supported by the evidence.

¹ 66 Pa. C.S. § 2806.1(m).

1. The Commission is correct to utilize a discount rate to reflect present value of future savings. (Section A.4)

KEEA supports the Commission’s proposed use of a discount rate to reflect available data and best practices more accurately. The evidence cited in the TRC Tentative Order clearly demonstrates that the proposed discount rate more accurately represents the net present value of future savings than the weighted average cost of capital. By updating its methodology and assumptions, the Commission is recognizing that over time and as new data emerges, it is prudent to re-examine existing policies. KEEA urges the Commission to take a similar approach to other issues whose justification relies heavily on determinations and evidence from previous orders, as discussed in other sections of this comment.

2. The TRC should adjust costs for energy efficiency measures limited by the 15-year cap. (Section A.5)

Act 129 states that the TRC should be applied “over the effective life of each plan not to exceed 15 years.”² In previous iterations of the TRC, the Commission has applied this language in a manner to truncate the benefit of measures with lifetimes greater than 15 years. KEEA believes that this interpretation contributes to underinvestment in long-lived energy efficient measures. As the Commission notes in its TRC Tentative Order, the National Standard Practice Manual (NSPM) proposes a methodology to adjust for these missing benefits by adjusting costs for measures that exceed a 15-year lifetime. This methodology specifically does not circumvent the legislative directive to limit benefits to 15 years by adjusting only the cost calculation and allows for equitable accounting methods for both costs and benefits in the TRC. Through the TRC, the Commission should strive for an accurate accounting of costs and benefits within the bounds of the law, and the NSPM provides a tool with which to do so. Therefore, KEEA requests that the Commission adjust costs for energy efficiency measures limited by the 15-year cap.

3. The TRC should include avoided distribution costs for all customers. (Section B.7)

A significant benefit of energy efficiency programs is the avoided cost of distribution upgrades due to reduced demand. However, the TRC Tentative Order proposes to exclude these avoided costs for Large C&I customers because the costs are incurred by the customer, not the utility. This would be appropriate if the Commission were utilizing a utility cost test, under which only utility costs and utility benefits were considered. However, since the Commission is using the TRC and counting total costs – including participant costs – it must count total benefits, including the avoided costs of distribution upgrades, even if the distribution equipment exists behind the utility meter.

4. The TRC should include price suppression effects of reduced demand. (Section B.9)

In its February 2014 Final Order for the Phase III Demand Response Potential Study, the Commission found that price suppression effects, referred to as Demand Reduction Induced Price Effects (DRIPE), were too difficult to reliably project, and it has since relied on this

² 66 Pa. C.S. § 2806.1(m).

determination to exclude DRIPE from the TRC in subsequent orders.³ Given that the Commission’s preliminary analysis found that price suppression effects could increase TRC benefits by roughly 50 percent in some cases⁴, and the Commission has not conducted any analysis on whether DRIPE would be appropriate since 2013, it is worth re-examining whether a reasonably accurate calculation of price suppression effects is possible.

DRIPE is a well-documented benefit of demand reduction and clearly applicable to Pennsylvania as it is already in use in the Commonwealth. In a 2014 review of price suppression effects, research published for the ACEEE Summer Study on Energy Efficiency in Buildings determined that price suppression impacts were particularly relevant in states with restructured electricity markets.⁵ Additionally, in recommending the addition of DRIPE benefits to the Pennsylvania TRC test, a Pennsylvania Utility Commission Administrative Law Judge noted that these benefits “provide a more accurate valuation of the costs and benefits of the DSM plan.”⁶

Finally, the 2013 review that the Commission relies upon for its determination to not include DRIPE benefits did not examine the effects of energy efficiency measures. The 2013 study and stakeholder process to examine the accuracy of price suppression effects was in the context of a demand response potential study, not energy efficiency. However, the price suppression effects of energy efficiency measures are just as relevant and can lead to substantial benefits. Furthermore, the Commission noted in its 2014 order, “if the Commission were to determine any wholesale price suppression effects from DR programs, it would be appropriate to also do so for the EE programs.”⁷ This reasoning justifies the inclusion of price suppression effects for energy efficiency in any re-evaluation of DRIPE benefits for demand response.

5. The TRC should include participant health benefits. (Section C.7)

The Commission has not provided justification for excluding participant health benefits in this or previous TRC Orders. While the Act 129 does not require the consideration of health benefits, the Commission has already made the prudent judgment to include other participant benefits not explicitly named in the statute, specifically fossil fuel, water, and operations and maintenance (O&M) savings. Recent research clearly demonstrates that participant health benefits are readily quantifiable and merits that the Commission reconsider its prior decision to exclude participant health benefits from the TRC, just as it has expanded and clarified its position to include fossil fuel, water, and O&M savings.⁸

³ PA Public Utility Commission Harrisburg, PA, Final Order, February 20, 2014, Docket No. M-2012-2289411; M-2008-2069887, available at <http://www.puc.pa.gov/pcdocs/1269801.doc>.

⁴ Ibid.

⁵ Paul Chenick and John J. Plunkett, Price Effects as a Benefit of Energy-Efficiency Programs, 2014 ACEEE Summer Study on Energy Efficiency in Buildings, available at <https://aceee.org/files/proceedings/2014/data/papers/5-1047.pdf>.

⁶ Petition of Philadelphia Gas Works for Approval of demand-Side Management Plan for FY 2016-2020, and Philadelphia Gas Works Universal Service and Energy Conservation Plan for 2014 – 2015. 2016 Pa. PUC LEXIS 88, *33 - 40 (March 8, 2016).

⁷ PA Public Utility Commission Harrisburg, PA, Final Order, February 20, 2014, Docket No. M-2012-2289411; M-2008-2069887, available at <http://www.puc.pa.gov/pcdocs/1269801.doc>.

⁸ E4 the Future, Occupant Health Benefits in Residential Energy Efficiency, November 2016, available at <https://e4thefuture.org/wp-content/uploads/2016/11/Occupant-Health-Benefits-Residential-EE.pdf>. (See Attachment A for a breakdown of findings of savings from participant health benefits studies).

In addition to the data supporting this decision, Pennsylvania would have ample precedent to draw on as nine states include participant health benefits in their TRC tests.⁹ A review of state approaches by American Council for an Energy Efficient Economy (ACEEE) provides a number of possible methodologies for calculating participant health benefits that are already utilized by other states.¹⁰ KEEA recommends updating the TRC to include participant health benefit values for specific measures, as it is easily quantifiable, a clear benefit provided by energy efficiency, and a common practice in other states with similar mandates.

6. The proposed multiplier for demand response is insufficiently supported by the evidence. (Section G.2)

The Commission risks significantly underestimating the value of demand response by assuming a 60% multiplier for the avoided cost of generation. We agree that the relationship between summer peak savings and reductions in peak load forecast is likely not 1:1 for Pennsylvania. However, a number of factors, including differences in demand profiles, energy supply mixes, and distribution system investments, may contribute to differences between BG&E and Pennsylvania utilities. At the very least, the Commission should consider the inclusion of additional Pennsylvania specific proxies to draw conclusions on the associated impact of demand response nominations on peak load forecasts.

Conclusion

The Commission has made significant progress in updating its TRC to reflect existing data and best practices. It should continue to re-evaluate assumptions and determinations made years ago, as new data and evidence come to light. The accuracy of the cost-effectiveness test applied to energy efficiency measures is critical to informing policymakers and the public about the real value of the program, and it weighs heavily on the development of utility plans as program designers seek to plan out cost-effective portfolios.

KEEA appreciates the opportunity to offer these comments on this important TRC Tentative Order.

Sincerely,

Erin Cosgrove, esq.
Policy Counsel
Keystone Energy Efficiency Alliance

⁹ American Council For Energy Efficiency, Cost Effectiveness Tests: Overview of State Approaches to Account for Health and Environmental Benefits of Energy Efficiency, December 2018, available at <https://aceee.org/sites/default/files/he-ce-tests-121318.pdf>

¹⁰ Ibid. (See Attachment B for a breakdown of state specific programs).

Attachment A

Table 3: Respiratory Related Benefits From EE

Author, Date	Health Related Outcomes (Statistically significant at p<.05 unless noted)		
Comparison group	Health Care Use	Asthma or Respiratory Symptoms	Indoor Environmental Conditions
Tonn 2014 EE (Health care and symptom results for treatment group only)	Asthma ED visits: 12% reduction; predicted 6 times less likely to visit ED after EE Ability to pay for prescription drugs or medical care: improved	Persistent colds: 9% less	Moisture/mold and pests reduced
Wilson 2014 EE		Asthma rescue medication: 20% less * Sinusitis: 5% reduction <i>Asthma symptom days: 26% increase; sleep disruption: increased</i>	Moisture and smoke in dwelling - reductions observed
Francisco 2016 EE & ventilation		Eczema/allergies: 13% less Sinusitis: reduced*	Volatile Organic Compounds (VOCs): Reduced
Breyse 2014 EE, repairs, education vs. education only for asthmatics		Uncontrolled asthma: 71% less; 23% less with energy/repairs vs. education Asthma Caregiver Quality of Life: 31% improvement	Asthma trigger score: 13% greater decline in Wx* v. home education homes** Mold: 19% greater decline in Wx homes v. education*
Rose 2015 EE, energy & repairs; healthy homes repairs for asthmatics	Medicaid Costs/yr: \$500 decline in EE homes, \$421 all groups Claims/Month: declined		
Leech 2004 New energy efficient vs. standard homes		Asthma symptoms: reduced Throat irritation, cough: reduced	
Jacobs 2016 Window replacement		Sinusitis: 18% decline adults Hay fever: 5% decline adults Allergies: 12% decline children	
Norton 2014 EE, repairs, education homes of asthmatics	Hospitalizations: 65% reduction in mean # visits; 28% reduction mean # ED visits		
Howden-Chapman 2007 Insulation in homes of those with respiratory risks vs. control group	Fewer medical visits (0.73 OR) Fewer respiratory hospital admissions (0.53 OR)*	Reduced sleeping problems due to wheeze (0.57 OR) reduced wheeze (0.57 OR) Reduced fair/poor health cold/flu (0.50/0.57 OR)	Reduced condensation (0.16 OR) Reduced mold (0.24 OR) Decline in temperature less than 50°F Increase RH less than 75%

*Weatherization

**Positive impact, marginally statistically significant at p < .10 *Italics indicate some negative findings*

Attachment B

State by State Details

Table 2. Health and environmental benefits in cost-effectiveness tests by state

State	Primary test Assessment level	Avoided utility environmental compliance costs		Societal environmental and/or public health benefits		Participant health benefits	
		Method	Value and impacts included	Method	Value and impacts included	Method	Value and impacts included
California	TRC Portfolio	Monetized	CO ₂ , NO _x , and particulate matter (PM ₁₀).		N/A		N/A
Colorado	State-specific, modified TRC Program	Monetized and proxy	Avoided CO ₂ , SO ₂ , and NO _x emissions. See most recent Electric Resource Plan for values.	Proxy	10% adder applied to sum of other quantifiable benefits for electric and 5% adder for gas.	Proxy	10% adder applied to sum of other quantifiable benefits for electric, 5% adder for gas
District of Columbia	SCT Portfolio		N/A	Monetized	Electric externality value of \$0.0477764/kWh. 5% adder may be applied to utility benefits if calculating nonenergy benefits is excessively expensive. Environmental externalities include air and water pollution, greenhouse gas emissions, and cooling water use.	Proxy	Adder equal to 5% of the utility benefits may be used if calculating nonenergy benefits is excessively expensive. Impacts include health and safety, and reduced work absences.
Delaware	TRC Program	Monetized	Avoided environmental compliance costs, where such costs can be directly tied to changes in energy use.	Quantitative and qualitative	Utilities address in their plans. Based on low end of avoided costs for NO _x and SO ₂ from DPL IRPs (2012 and 2014) and reported PJM emissions rates for 2014–2015, emissions de-rated by 75%, and inflated to 2016\$. Does not include compliance costs for NO _x /SO ₂ .	Monetized	\$182 per home (annual) applied to low-income weatherization programs. Participant health and safety benefits do not include avoided death value. Based on national WAP evaluation that includes occupant survey of random sample of weatherized single-family homes pre- and post-weatherization vs. comparison group.

State	Primary test Assessment level	Avoided utility environmental compliance costs		Societal environmental and/or public health benefits		Participant health benefits	
		Method	Value and impacts included	Method	Value and impacts included	Method	Value and impacts included
Idaho	UCT, TRC	Proxy	Utilities use 10% conservation benefit adder to calculate cost effectiveness of DSM programs including low-income weatherization programs.		N/A	Proxy and quantitative and qualitative	Combine more readily quantifiable nonenergy benefits (e.g., health, safety, and repair measures) with 10% adder for hard-to-measure nonenergy benefits. Likely underestimates value of health, safety, and repair measures. Provides transparent one-to-one ratio of benefits to investments. Only included in TRC. Utilities can claim \$1 of nonenergy benefits for each dollar of federal funds invested in health, safety, and repair measures.
Illinois	TRC Portfolio	Monetized	Most recent utility plans include reasonable estimates of financial costs likely to be imposed by future regulations and legislation on emissions of greenhouse gases.	Monetized	See most recent utility plans and reports for values. Ameren IL 2018–2021 plan includes value of \$16.50 per MWh in 2016 dollars. Accounts for environmental impacts from CO ₂ .		N/A
Iowa	SCT Portfolio, program, project, measure	Proxy	10% externality factor applied to avoided capacity costs for electric and 7.5% for natural gas. Utility may propose a different externality factor but must document its accuracy (none have to date).		N/A		N/A
Maryland	TRC, SCT Sub-portfolio		N/A	Monetized	Quantify business-as-usual valuation of nonenergy avoided air emissions (CO ₂ , NO _x , SO ₂) benefits with value of \$0.002/kWh for SCT.		N/A

State	Primary test Assessment level	Avoided utility environmental compliance costs		Societal environmental and/or public health benefits		Participant health benefits	
		Method	Value and impacts included	Method	Value and impacts included	Method	Value and impacts included
Massachusetts	TRC Program	Monetized	Refer to most recent regional study for values. Avoided costs used are according to AESC 2018 report, including cost of complying with Regional Greenhouse Gas Initiative (RGGI), NOx and SO ₂ reduction policies, and state environmental rules.		N/A	Monetized	See most recent Statewide TRM for list of values. Measures avoided costs associated with health-related impacts resulting from installed measures. Includes asthma, cold- and heat-related thermal stress, missed days of work, deaths, and fire damage.
Minnesota	SCT Customer segment		N/A	Monetized	Environmental damages include SO ₂ , particulates, carbon monoxide, N ₂ O, lead, and CO ₂ . See utility-specific reports for environmental damage costs by location, including urban, metropolitan fringe, and rural. Values include federal Social Cost of Carbon (SCC).		N/A
Nevada	TRC Program		N/A	Proxy	10% adder applied to SCT accounts for indirect benefits such as those arising from avoided environmental externalities such as emissions.		N/A

State	· Primary test · Assessment level	Avoided utility environmental compliance costs		Societal environmental and/or public health benefits		Participant health benefits	
		Method	Value and impacts included	Method	Value and impacts included	Method	Value and impacts included
New Hampshire	TRC Program	Monetized	Cost of carbon compliance included in Synapse's 2015 AESC Update avoided cost values.	Proxy	Part of 10% adder may include societal environmental and public health benefits.	Proxy	Part of 10% adder includes improved health benefits for participants. In absence of state-specific nonenergy impact evaluations, proposed adder based on evidence of neighboring states' NEIs as % of total benefits of energy efficiency portfolios, neighboring states' NEI evaluations, and adder levels.
New York	SCT (Total Resource Cost plus CO ₂ damage costs) Portfolio	Monetized	Avoided compliance costs of RGGI and SO ₂ and NO _x cap-and-trade markets reflected in locational-based marginal price (LBMP).	Monetized	Environmental externalities include CO ₂ . Value of avoided CO ₂ based on Clean Energy Standard Tier 1 Renewable Energy Credit (REC) price or federal SCC net of RGGI clearing price. Utilities include SO ₂ and NO _x externalities to extent they are greater than reflected in LBMPs. To date, none have included.		N/A
Oregon	TRC Program	Proxy	Compliance with potential future state carbon policies in addition to 10% adder. Values vary by utility.		N/A		N/A

State	Primary test Assessment level	Avoided utility environmental compliance costs		Societal environmental and/or public health benefits		Participant health benefits	
		Method	Value and impacts included	Method	Value and impacts included	Method	Value and impacts included
Rhode Island	State-specific Portfolio	Monetized	Utility system costs associated with reasonably anticipated future state, regional, and federal greenhouse gas reduction requirements for electric and gas programs. May also include costs and benefits of other emissions and their generation or reduction through Least Cost Procurement. Values included in AECS 2018 study.	Monetized	SCC that is not embedded in projected energy market prices. Refer to most recent regional study for details.	Monetized	Health benefits include fewer colds and viruses, improved indoor air quality and ease of maintaining healthy relative humidity from weatherization included in TRM.
Utah	UTC, TRC		N/A	Proxy	10% adder to benefits to account for non-quantified environmental and nonenergy benefits of conservation resources over supply-side alternatives. PacifiCorp performs TRC test with and without adder.		N/A
Vermont	SCT Portfolio	Monetized	Societal Cost Test uses environmental compliance and externality values from Synapse's 2015 AESC Study. Externality values not used for TRC or UCT tests. Value is estimated at \$100/ton of CO ₂ . Estimated marginal cost of carbon emissions abatement associated with RGGI.	Monetized and proxy	Environmental costs included in AESC 2018 study. Societal health benefits included in 15% benefits adder.	Proxy	15% adder to account for participant health impacts. Considered to be at low end of appropriate set of values for this adjustment since it almost certainly underestimates full range of impacts.

State	Primary test Assessment level	Avoided utility environmental compliance costs		Societal environmental and/or public health benefits		Participant health benefits	
		Method	Value and impacts included	Method	Value and impacts included	Method	Value and impacts included
Washington	TRC Measure	Monetized	Social cost of carbon. See recent utility plans for values.		N/A	Alternative thresholds	Measures identified through Weatherization Manual priority list are considered cost effective. Utilities may fully fund repairs, administrative costs, and health and safety improvements associated with cost-effective low-income conservation measures. Utilities may exclude low-income conservation from portfolio-level cost-effectiveness calculations. See recent utility plans for values.
Wisconsin	State-specific Portfolio		N/A	Monetized	Value of emissions avoided through program, including carbon dioxide, sulfur oxides, and nitrogen oxides. See evaluation report for specific values. SO ₂ and NO _x allowance price values from Cross-State Air Pollution Rule. CO ₂ valued at \$15/ton. EPA AVERT used for emissions estimates for electric.		N/A

Sources: **California** Policy: CPUC 2017; Value: CPUC 2018, InTech Energy 2018; Method: CPUC 2013. **Colorado** Policy: Colorado General Assembly 2017, CO PUC 2017; Value: Public Service Company of Colorado 2016b, CO PUC 2008; Method: Public Service Company of Colorado 2018, 2016a. **District of Columbia** Policy: VEIC and DC DOEE 2017; Value: VEIC and DC DOEE 2017, Tetra Tech 2017; Method: Exeter Associates 2014. **Delaware** Policy: DE DEC 2017, DE EEAC 2018, DE SEU 2017; Value: Exeter Associates 2014, Hawkins et al. 2016, DE EEAC 2018; Method: Exeter Associates 2014, PJM 2016, DPL 2014. **Idaho** Policy: ID PUC 2013, Northwest Power and Conservation Council 2010; Value: Idaho Power 2018, Rocky Mountain Power 2018a. **Illinois** Policy: Illinois General Assembly 2017; Value: Navigant 2018, ComEd 2017, Ameren 2017; Method: EIA 2016, EPA 2016. **Iowa** Policy: Iowa Administrative Code 2010; Value: Iowa Utilities Board 2018. **Maryland** Policy: MD PSC 2015; Value: Itron 2014; Method: Itron 2014. **Massachusetts** Policy: MA DPU 2013; Value: Synapse 2018, MassDEP 2018, MA PA 2015, MA PA 2018, Mass Save 2017; Method: Synapse 2018, Hawkins et al. 2016. **Minnesota** Policy: Minnesota State Legislature 2018; Value: MN PUC 2018, Xcel Energy 2018; Method: MN PUC 2018, EPA 2016. **Nevada** Policy: Nevada State Legislature 2017; Value: NV Energy 2018. **New Hampshire** Policy: NH Electric Utilities 2007, NH PUC 2018, NH PUC 2017; Value: New Hampshire’s Electric and Natural Gas Utilities 2017; Method: Hornby et al. 2016. **New York** Policy: NY PSC 2016; Value: NYS DPS 2018, NYISO 2018; Method: NYISO 2018, EPA 2016, NYSERDA 2018. **Oregon** Policy: OR PUC 1993, OR PUC 1994, Energy Trust of Oregon 2017a; Value: OR PUC 2008, Energy Trust of Oregon 2011, Malmgren and Skumatz 2014; Method: Energy Trust of Oregon 2017b. **Rhode Island** Policy: RI PUC 2018;