American Council for an Energy-Efficient Economy
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Aida Camacho-Welch August 5, 2020

Secretary of the Board
New Jersey Board of Public Utilities
44 South Clinton Avenue, 9th Floor P.O. Box 350
Trenton, New Jersey 08625-0350

RE: New Jersey Cost Test Proposal

Dear Secretary Camacho-Welch:

The American Council for an Energy-Efficient Economy (ACEEE) welcomes this opportunity to provide comments in response to the "New Jersey Cost Test Proposal" (the "NJ Cost Test Proposal") issued by the New Jersey Board of Public Utilities' ("BPU" or the "Board") Division of Clean Energy ("DCE") for public comment on July 24, 2020. ACEEE is a nonprofit research organization based in Washington, D.C. that conducts research and analysis on energy efficiency. ACEEE is one of the leading groups working on energy efficiency issues in the United States at the national, state, and local levels. We have been active on efficiency for more than three decades and have actively participated in the Energy Efficiency Transition stakeholder process in New Jersey to share our research and understanding of best practices.

We commend staff for its draft NJ Cost Test Proposal that would include many of the multiple benefits of energy efficiency including energy and non-energy impacts. We also commend its approach to use a primary New Jersey Cost Test ("NJCT") that aims to reflect the state's public policies and to fully value the benefits and costs of efficiency with an approach that is symmetrical. After reviewing the staff proposal, we recommend five improvements in our comments to further support the test's alignment with state public policy and to support the principle of symmetry in cost-benefit analysis. We first summarize our recommendations and then provide additional details below.

1. *Global NJCT Inputs*: Use a low risk/societal discount rate (e.g., 3% or less).
2. *Global NJCT Inputs*: Use marginal line losses.
3. *Non-Energy Resource Savings, Public Health Benefits*: Quantify the avoided pollution and emissions reductions benefits of efficiency.
4. *Non-Energy Resource Savings, Other Low-Income Health and Safety Impacts*: quantify the indoor health and safety benefits for whole-house interventions for *both* low-income and non-low-income households

5. *Other Non-Energy Indirect Benefits*: consistent with other states' approaches, use adders to capture the many other benefits of efficiency beyond the quantifiable energy, health and environment benefits described above. Adders ensure these other benefits are valued rather than assumed to be zero. We recommend applying a 10% adder to all non-low-income programs and an adder of at least 20% to low-income programs.

Global NJCT Inputs

1. Discount Rates

One important issue in determining whether a state will succeed in its policy objectives to advance energy efficiency accomplishments is the choice of a discount rate to use in assessing the cost-effectiveness of energy efficiency programs. As the Staff Report clearly illustrates with examples (p.8), the use of different discount rates can have a profound effect on the perceived value of energy efficiency benefits over time. While it is true that a majority of states still use an estimate of the utility's weighted-average cost of capital (WACC) as their discount rate, the National Standard Practice Manual (NSPM)[1] provides a discussion of the theory behind discount rates and explains why the assumption of using WACC for energy efficiency programs is not necessarily appropriate.

> "The utility WACC is typically used to indicate the time preference for investor-owned utilities (i.e., reflects the time preference of the utility investors, which is the after-tax cost of equity and the cost of debt). The key goal of utility investors is to maximize the returns on their investments. Therefore, the time preference of utility investors is not necessarily the same as the time preference of utility customers, or the regulatory time preference.
> Regulators/decision-makers should recognize this important distinction when considering whether to use the utility WACC as a discount rate. The primary objective of the cost-effectiveness analysis is to identify those utility resources that will best serve customers with safe, reliable, low-cost energy services over the long term. This objective is fundamentally different from the objective of maximizing utility investors' returns. These different objectives dictate different time preferences.
> Another objective of the cost-effectiveness analysis is to meet the jurisdiction's applicable policy goals, which might include, for example, reducing the energy burden for low-income customers, reducing price volatility, reducing reliance upon fossil fuels, and reducing carbon emissions. Again, this objective of meeting applicable policy goals

[1] *The National Standard Practice Manual for Assessing Cost-Effectiveness of Energy Efficiency Resources*, National Efficiency Screening Project (2017). https://www.nationalenergyscreeningproject.org/the-national-standard-practice-manual-for-energy-efficiency/

is fundamentally different from the objective of maximizing utility investors' returns; and these different objectives dictate different time preferences. These longer-term, broader objectives suggest that utility cost-effectiveness analyses should place a higher value on future impacts than utility investors would." (p. 77)

The Database on State Efficiency Screening Practices (DSESP)[2] provides a database on state approaches to assessing cost-effectiveness of energy efficiency programs. In that dataset, they identify at least 11 states that use a "low-risk"[3] discount rate rather than a WACC, and a total of 15 states that use a discount rate of less than 5%. Nine states us a discount rate of 3% or less (IL, ME, MA, MI, MN, NH, RI, VT, and WI).

Those states with the lower discount rates tend to be national leaders in utility energy efficiency accomplishments. Six of those nine states are in the top 10 of states in the nation in terms of utility energy efficiency polices and production, in ACEEE's most recent State Scorecard report.[4] Also, six of those states are in the top ten of actual utility energy efficiency savings achieved (electricity savings as a percentage of sales) in that Scorecard report, including four of the top five states in the nation.

ACEEE considers the use of a low-risk/societal discount rate for energy efficiency programs to represent best practice in the industry today. As New Jersey aspires to be a leading state in terms of energy efficiency, it should implement the approach that many other leading states have adopted and utilize a low-risk/societal discount rate for energy efficiency programs. **We recommend that the NJCT use a low-risk/societal discount rate of 3% or less.**

2. Line Losses

The Staff Report correctly identifies the issue here.

"The higher the load on the electric system, the higher the line losses. This means that the line losses from energy saved through efficiency, which saves energy at the margin, are significantly higher than average system losses." (p. 8)

This issue has been well documented and explained elsewhere (e.g., Lazar & Baldwin, 2011).[5] In order to properly quantify the benefits of end-use energy efficiency in terms of utility system energy and capacity savings, the estimation of savings should include a factor for line

[2] https://nationalefficiencyscreening.org/state-database-dsesp/

[3] This is a term commonly applied to a low discount rate (lower than WACC) to reflect that energy efficiency as a resource has advantages in terms of lower risk, as well as the fact that energy efficiency programs are often intended to serve a number of societal policy objectives (as described in the NSPM quote above). The interest rate on 10-year U.S. Treasury bonds (over the last 10 years typically in the range of 0.6% to 3.0%) is commonly used to represent a low-risk/societal discount rate.

[4] [4] *2019 State Energy Efficiency Scorecard*, ACEEE, 2019 https://www.aceee.org/research-report/u1908

[5] *Valuing the Contribution of Energy Efficiency to Avoided Marginal Line Losses and Reserve Requirements* Principal authors Jim Lazar and Xavier Baldwin, Regulatory Assistance Project, August, 2011 https://www.raponline.org/wp-content/uploads/2016/05/rap-lazar-eeandlinelosses-2011-08-17.pdf

losses at the margin. **We recommend that the NJCT use marginal line losses rather than average line losses in estimating energy efficiency impacts.**

Non-Energy Resource Savings

3. Public Health Benefits of Avoided Pollution

Power plants generate a long list of health-harming pollutants, including fine particulate matter ($PM_{2.5}$) and nitrogen oxides (NO_x), which contribute to serious respiratory health problems—including lung cancer, which kills more men and women in the United States than any other form of cancer.[6] These same pollutants exacerbate chronic obstructive pulmonary disease (COPD), which is the third leading cause of death in the country.[7] Pollution from power plants also triggers asthma, a chronic disease already at epidemic levels.[8] In addition to respiratory harm, air pollutants such as NOx, sulfur dioxide (SO2), and PM2.5 produced by burning fossil fuels harm cardiovascular health. They contribute to coronary heart disease, the leading cause of death in the United States.[9] These pollutants also lead to increased hospitalizations for heart attacks and congestive heart failure, and the mercury they include causes serious neurological damage.[10] Finally, power plants emit greenhouse gases that contribute to climate change. Climate change causes extreme weather events such as heat waves, extreme storms, and droughts; the resulting consequences—including heat effects, floods, increases in waterborne and insect-borne diseases, drops in crop production, and wildfires—can severely affect the health of people living in those communities.[11] We recommend the adoption of the following values for avoided pollution from energy savings programs in New Jersey:

- Carbon dioxide (CO_2) – We recommend using the social cost of carbon for each ton of CO_2 avoided as listed in the Interagency Working Group on Social Cost of Greenhouse Gases, United States Government. 2016 Technical Support Document: -Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis -Under Executive Order 12866.12 The dollar values in this document should be updated from 2007 dollars as appropriate for the New Jersey analysis. To determine the total tons of CO_2 avoided

[6] ALCF. 2017. "Lung Cancer Facts." Accessed October. www. lungcancerfoundation.org/about-us/lung-cancer-facts/.
[7] National Institutes of Health. 2017. "COPD: What Is." https://www.nhlbi.nih.gov/health-topics/copd
[8] Akinbami, Simon, and Rossen 2016. "Changing Trends in Asthma Prevalence among Children." *Pediatrics* 137 (1): 1–9. https://pediatrics.aappublications.org/content/early/2015/12/24/peds.2015-2354
[9] Physicians for Social Responsibility. 2011. *How Air Pollution Contributes to Heart Disease.* www.psr.org/assets/pdfs/air-pollution-effects-cardiovascular.pdf.
[10] WHO 2017. "Mercury and Health." www.who.int/mediacentre/factsheets/fs361/en/.
[11] IPCC. 2015. *Climate Change 2014 Synthesis Report.*
https://www.ipcc.ch/site/assets/uploads/2018/05/SYR_AR5_FINAL_full_wcover.pdf
12 August 2016. epa.gov/sites/production/files/2016- 12/documents/sc_co2_tsd_august_2016.pdf.

by the portfolio of energy efficiency programs, we recommend using EPA's AVoided Emissions and geneRation Tool (AVERT).

- Other pollutants – We do not at this time have a recommendation for calculating the benefits of other avoided pollutants, but support doing so for other pollutants, particularly NOx, SO2, mercury, and methane.

4. Participant Health and Safety Benefits

Using the methodology outlined in ACEEE's recent report *Making Health Count*[13], we quantified some of the indoor health benefits of whole house (including low-income) energy efficiency programs for New Jersey residents. The table below lists the per household benefits at 1 year and after 10 years for benefits related to asthma, avoided falls, and both heat and cold related thermal stress. Formulas and assumptions can be found in the Appendix. **We estimate that well-designed whole-house and low-income energy efficiency programs that address these health and safety risks, if delivered in New Jersey, would result in a per household dollar value of benefits of $14,484.**

Table 1 Monetized Benefits of Whole-Home and Low-Income Energy Efficiency Programs for Select Health and Safety Outcomes

	Household savings after one year	Household savings after ten years	Statewide total after one year (500 Households)	Statewide total after ten years (500 Households)
Reduced trip-and-fall injuries	$369	$9,404	$184,595	$4,702,035
Reduced asthma symptoms	$231	$4,491	$115,389	$2,245,514
Reduced heat-related thermal stress	$42	$382	$20,817	$191,293
Reduced cold-related thermal stress	$24	$207	$11,789	$103,635
Total monetized health benefits from four targeted interventions	$666	$14,484	$332,590	$7,256,798

[13] ACEEE. 2020. *Making Health Count: Monetizing the Health Benefits of In-Home Services Delivered by Energy Efficiency Programs.* www.aceee.org/research-report/h2001.

Some of these benefits were measured and monetized in a national evaluation of the federal Weatherization Assistance Program. This peer reviewed evaluation found the per unit health-related benefits of the WAP program to be $14,148. The report explains that the main contributors to this total are: "avoided deaths from CO poisoning, fire, and thermal stress; avoided hospitalizations and emergency department (ED) visits related to these three areas as well as asthma-related symptoms; increased ability to afford prescriptions; and disposable income gains from fewer missed days at work."[14]

In the following sections we discuss each of these four categories of health benefit in additional detail.

Asthma

In New Jersey, approximately 600,000 adults and 177,000 children currently suffer from asthma. The disease disproportionately impacts communities of color; in New Jersey 14% of Black adults have asthma.[15] In 2017, there were 6,810 asthma-related hospitalizations and 45,578 emergency room visits.[16] The estimated cost of these visits was a total $391 million.[17] The governor and department of health created the New Jersey Asthma Strategic Plan to reduce the burden of asthma across the state.[18]

Homes may contain a number of asthma triggers, including mold, dust mites, and pests.[19] Additional factors that can trigger asthma attacks include extreme indoor temperatures, humidity and moisture, and other sources of poor air quality.[20] Leaky windows and poor insulation, for example, can lead to cold drafts and extreme temperatures in a home, which can in turn trigger asthma attacks and exacerbate other respiratory illnesses.[21] Poorly sealed building envelopes also make it easier for pests and moisture to infiltrate, which can lead to mold growth and the introduction of allergens and disease.

Changes to a living environment can help to limit emergency department visits, hospitalizations, and other medical costs associated with asthma by reducing triggers within the home that can cause an attack.[22] Implementing energy efficiency measures can mitigate all

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[14] Oak Ridge National Laboratory. 2015. *Exploratory Review of Grantee, Subgrantee and Client Experiences with Deferred Services under the Weatherization Assistance Program*. https://weatherization.ornl.gov/wp-content/uploads/pdf/WAPRecoveryActEvalFinalReports/ORNL_TM-2014_364.pdf

[15] State of New Jersey Department of Health. https://www.state.nj.us/health/chs/hnj2020/chronic/asthma/

[16] Based on data from the New Jersey State Health Assessment Data query tool. https://www-doh.state.nj.us/doh-shad/

[17] Calculations were estimated using the average cost of asthma-related hospitalizations and emergency room visits as detailed in the Healthcare Cost and Utilization Project. https://hcupnet.ahrq.gov/#setup

[18] State of New Jersey Department of Health. https://www.state.nj.us/health/chs/hnj2020/chronic/asthma/

[19] CDC. 2010. "Common Asthma Triggers." www.cdc.gov/asthma/triggers.html

[20] Vermont Department of Health. 2018. *Weatherization + Health: Health and Climate Change Co- Benefits of Home Weatherization in Vermont*. www.healthvermont.gov/sites/default/files/documents/pdf/ENV_CH_WxHealthReport.pdf.

[21] Asthma and Allergy Foundation of America. 2020. "Weather Can Trigger Asthma." www.aafa.org/page/weather-triggers-asthma.aspx. American Lung Association. 2018. "Cold Weather and Your Lungs." www.lung.org/about-us/media/top-stories/cold-weather-your-lungs.html.

[22] Breysse et al. 2011. "Health Outcomes and Green Renovation of Affordable Housing." *Public Health Reports.* www.ncbi.nlm.nih.gov/pmc/articles/PMC3072905. Breysse et al. 2014. "Effect of Weatherization Combined with Community Health Worker In-Home Education on Asthma Control." *American Journal of Public Health.* www .ncbi.nlm.nih.gov/pmc/articles/PMC3910032/. Osman et al. 2010. "A Randomised Trial of Home Energy Efficiency Improvement in the Homes of Elderly COPD Patients." *European Respiratory Journal*. www.ncbi.nlm.nih.gov/pubmed/19643937. Oak Ridge National Laboratory. 2015. *Exploratory Review of Grantee, Subgrantee and Client Experiences with Deferred Services under the Weatherization Assistance Program*. https://weatherization.ornl.gov/wp-content/uploads/pdf/WAPRecoveryActEvalFinalReports/ORNL_TM-2014_364.pdf

of these risks and make homes healthier by sealing up building envelopes, improving ventilation, increasing insulation, and repairing or upgrading heating and cooling equipment.[23] Offering health and safety measures—such as mold remediation, and providing pillow covers and low-emission vacuums—alongside these energy efficiency measures through in- home programs can help to alleviate asthma triggers.[24]

Fall-Related Injuries

In 2017, there were 441 deaths associated with older adults falling, over 17,000 hospitalizations, and over 57,000 emergency room visits.[25] Such falls can result in serious injuries, including broken bones and head injuries, as well as weakness that can lead to greater risk of future falls.[26] Falls can impact quality of life, particularly for older adults whose fear of falling can lead to limiting activities, physical decline, depression, and social isolation.[27] The medical costs associated with trips and falls in adults over 60 were estimated at more than $1.8 billion in New Jersey in 2017.[28]

To prevent trips and falls in the home, the CDC recommends installing good lighting, stair handrails, and shower grab bars.[29] Additional modifications might include installing ramps; repairing steps; installing raised, water-conserving toilets; and making modifications to reduce other trip hazards.[30] Studies have shown that in- home interventions such as these can reduce trips and falls that require older adults to seek medical attention.[31]

Cold-Related Thermal Stress

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[23] Francisco et al. 2016. "Ventilation, Indoor Air Quality, and Health in Homes Undergoing Weatherization." *Indoor Air* 27 (2): 463–77. www.ncbi.nlm.nih.gov/pubmed/27490066. Leech, J., M. Raizenne, and J. Gusdorf. 2004. "Health in Occupants of Energy Efficient New Homes." *Indoor Air* 14 (3): 169–73. www.ncbi.nlm.nih.gov/pubmed/15104783. Wallner et al. 2015. "Indoor Environmental Quality in Mechanically Ventilated, Energy-Efficient Buildings vs. Conventional Buildings." *International Journal of Environmental Research and Public Health* 12 (11): 14132–47. www.ncbi.nlm.nih.gov/pubmed/26561823. Wilson et al. 2014. "Watts-to-Wellbeing: Does Residential Energy Conservation Improve Health?" *Energy Efficiency* 7 (1): 151–60. doi.org/10.1007/s12053-013-9216-8.

[24] Breysse et al. 2014. "Effect of Weatherization Combined with Community Health Worker In-Home Education on Asthma Control." *American Journal of Public Health.* www .ncbi.nlm.nih.gov/pmc/articles/PMC3910032/. Oak Ridge National Laboratory. 2015. *Exploratory Review of Grantee, Subgrantee and Client Experiences with Deferred Services under the Weatherization Assistance Program*. https://weatherization.ornl.gov/wp-content/uploads/pdf/WAPRecoveryActEvalFinalReports/ORNL_TM-2014_364.pdf

[25] New Jersey Falls Prevention Workgroup. 2018. *New Jersey Falls Prevention Awareness Week.* https://www.state.nj.us/humanservices/doas/documents/Falls%20Fact%20Sheet%202018.pdf

[26] CDC. 2017. "Important Facts about Falls." www.cdc.gov/homeandrecreationalsafety/falls/adultfalls.html.

[27] National Council on Aging. 2018. *Falls Prevention Awareness Day: 2017 Impact Report*. Arlington, VA: NCOA. d2mkcg26uvg1cz.cloudfront.net/wp- content/uploads/2017-FP AD-Compendium-1.pdf.

[28] New Jersey Falls Prevention Workgroup. 2018. *New Jersey Falls Prevention Awareness Week.* https://www.state.nj.us/humanservices/doas/documents/Falls%20Fact%20Sheet%202018.pdf

[29] CDC. 2015. *Check for Safety: A Home Fall Prevention Checklist for Older Adults*. www.cdc.gov/steadi/pdf/check_for_safety_brochure-a.pdf

[30] Tohn et al. 2020. "Incorporating Injury Prevention into Energy Weatherization Programs." *Journal of Public Health Management and Practice* 26 (1): 80–2. https://journals.lww.com/jphmp/Citation/2020/01000/Incorporating_Injury_Prevention_Into_Energy.14.

[31] Breysse et al. 2015. "Self-Reported Health Outcomes Associated with Green-Renovated Public Housing among Primarily Elderly Residents." *Journal of Public Health Management and Practice* 21 (4): 335–67. www.ncbi.nlm.nih.gov/pubmed/25679773. Tohn et al. 2020. "Incorporating Injury Prevention into Energy Weatherization Programs." *Journal of Public Health Management and Practice* 26 (1): 80–2. https://journals.lww.com/jphmp/Citation/2020/01000/Incorporating_Injury_Prevention_Into_Energy.14. Moylan and Binder. 2007. Falls in Older Adults: Risk Assessment, Management and Prevention." *American Journal of Medicine* 120 (6): 493–7. www.amjmed.com/article/S0002-9343(06)00903-X/fulltext.

Extreme indoor thermal conditions—temperatures and drafts—can have significant adverse health effects. Infants and elderly populations are especially at risk.[32] Weatherization measures in cold climates address inadequate heating systems and excessive drafts in homes, decreasing the chances of households experiencing dangerously cold temperatures.[33] These programs also lower energy burdens, which can make heating a home more affordable and help to avoid utility shut-offs. Weatherization programs can target populations that are particularly at risk for developing cold-related thermal stress, including households with inadequate food, clothing, or heating systems; children and/or elderly occupants; and individuals with chronic medical conditions.[34] By air-sealing building envelopes and installing insulation, weatherization efforts can reduce heat loss and mitigate the risk of thermal stress for building occupants.[35]

Heat-Related Thermal Stress

Exposure to excessive heat inside the home can lead to heat exhaustion or heat stroke, which can cause fatigue, headache, nausea, fainting, muscle cramping, confusion, and rapid pulse.[36] In New Jersey, there were over 1,200 hyperthermia related ER visits and 166 hospitalizations.[37]

Weatherization addresses inadequate cooling systems and improves home ventilation, decreasing the chances of households experiencing dangerously hot temperatures that can lead to heat-related illnesses.[38] Weatherization programs can target households with inadequate cooling systems, children and/or elderly occupants, and individuals with chronic medical conditions.[39]

Other Health & Safety Benefits

We have calculated only a few select benefits from the long list of health outcomes that might accrue to households participating in an in-home energy efficiency program. These benefits could be maximized through strategic delivery of programs that offer simple and proven strategies such as fire prevention, remediation of lead and mold, and mitigation of exposures to hazards and indoor air pollution from chemicals, carbon monoxide, and combustion sources. In New Jersey, approximately 12% of houses do not have working carbon monoxide monitors. By installing carbon monoxide detectors as part of energy efficiency services, there could be a reduction in the 117 annual emergency room visits associated with in-building

[32] CDC. 2019. "Hypothermia." www.cdc.gov/disasters/winter/staysafe/hypothermia.html.
[33] ORNL. 2014. *Health and Household-Related Benefits Attributable to the Weatherization Assistance Program.* weatherization.ornl.gov/wp- content/uploads/pdf/WAPRetroEvalFinalReports/ORNL_TM-2014_345.pdf.
[34] Mayo Clinic. 2019. "Hypothermia." www.mayoclinic.org/diseases- conditions/hypothermia/symptoms-causes/syc-20352682.
[35] Green & Healthy Homes Initiative. 2017. *Weatherization and Its Impact on Occupant Health Outcomes*. www.greenandhealthyhomes.org/wp-content/uploads/Weatherization-and-its- Impact-on-Occupant-Health_Final_5_23_2017_online.pdf.
[36] CDC. 2016. *Picture of America: Heat-Related Illness*. www.cdc.gov/pictureofamerica/pdfs/picture_of_america_heat-related_illness.pdf.
[37] Based on data from the New Jersey State Health Assessment Data query tool. https://www-doh.state.nj.us/doh-shad/
[38] ORNL. 2014. *Health and Household-Related Benefits Attributable to the Weatherization Assistance Program.* weatherization.ornl.gov/wp- content/uploads/pdf/WAPRetroEvalFinalReports/ORNL_TM-2014_345.pdf.
[39] CDC. 2016. *Picture of America: Heat-Related Illness*. www.cdc.gov/pictureofamerica/pdfs/picture_of_america_heat-related_illness.pdf.

carbon monoxide poisoning, which cost New Jersey residents over $3 million a year.[40] Similarly, by installing smoke detectors in homes, there could be a reduction in the number of fire-related injuries. In 2016, 53 people died as a result of a fire and there were 239 injuries.[41] The following are among the many potentially achievable benefits: improved sleep, improved comfort of home, ability to afford prescriptions, ability to afford nutritious food, reduced outdoor noise infiltration, reduced stress, fewer days of asthma-related symptoms, reduced exposure to mold, humidity, and excess moisture, reduced home fires, and fewer missed days of school and work.

Other Non-Energy Indirect Benefits

5. Adopt Adders to Capture Other Non-Energy Indirect Benefits

In addition to the quantifiable energy, environmental, and health benefits of energy efficiency, many other non-energy, indirect benefits result from efficiency investments that we have not attempted to quantify here. To be true to the principle of symmetry in cost benefit analysis, it is critical that benefit-cost tests capture all benefits if they capture all costs. For example, if all participant costs are included in a test, then that same test must include all participant benefits. Participants invest in efficiency for many reasons other than economic reasons. It would be imbalanced to count all the costs and only the energy-related benefits. Additional participant benefits include things like increased property asset values, improved comfort & satisfaction, water savings and several other health benefits beyond those captured in our calculations above on health and safety. These include avoided deaths from carbon monoxide poisoning, fewer missed days of work and school, improved sleep, reduced exposure to mold, humidity, and excess moisture; reduced cockroach, rodent, and other pest infestations; improved indoor air quality and reduced exposure to outdoor air pollution; reduced home fires; reduced "heat, treat, or eat" choice dilemma and improved ability to afford prescription medications; reduced stress from lower living expenses and improved living conditions. For business participants, a significant additional benefit includes improved productivity. Beyond participant non-energy benefits, additional non-energy benefits accrue to the utility system such as avoided risk, improved resilience, and reduced arrearages (See the National Standard Practice Manual for additional examples).

Rather than attempting to quantify each of these non-energy, indirect benefits to participants and to the utility system, **we recommend a more practical approach: a 10% adder to represent**

[40] New Jersey State Health Assessment Indicator Report noted that 83.7% of NJ residents had a working CO detector.https://www-doh.state.nj.us/doh-shad/indicator/complete_profile/COdetector.html
Hospitalization numbers are based on data from the New Jersey State Health Assessment Data query tool. https://www-doh.state.nj.us/doh-shad/. Total cost of carbon monoxide poisoning based on costs detailed in the Healthcare Cost and Utilization Project. https://hcupnet.ahrq.gov/#setup
[41] New Jersey Division of Fire Safety. 2017. https://www.nj.gov/dca/divisions/dfs/pdf/fire_in_nj_2016.pdf

the broad range of these additional benefits. This would be separate and distinct from the quantified benefits calculations for energy, environment, and health benefits. While this is an imperfect estimate, it is common practice in several states and regions. We reviewed the Database of State Energy Screening Practices (DSESP)[42] and found at least the following states use a benefits adder for non—low-income programs: Colorado (20% adder), District of Columbia (5% adder), Montana (10%), Nevada (10%), and New Hampshire (10%). In addition, the Pacific Northwest[43] region has for a longtime used a 10% cost preference for energy efficiency programs when comparing to other resource options. Specific non-energy benefits that are cited as included in these adders may vary but they point to a growing acknowledgment of the importance of assigning a value to these other non-energy benefits.

In addition to that broadly justified adder for all types of energy efficiency programs, we recommend establishing an additional dedicated adder specifically for low-income (LI) programs. This would be to reflect the wide range of additional benefits to LI participants and to the community from energy efficiency programs targeted at that sector. These would include things like housing stock preservation; reduced transience in the community; improved comfort and livability in the home (which could also improve school and work performance); lower household energy burdens which could lead to increased disposable income to use for other household needs (which could also benefit the local economy).

While LI programs may be exempt from meeting specified benefit-cost analysis thresholds in New Jersey, it is still good practice to analyze benefits and costs for all programs. In addition, it could prove useful to have an agreed-upon adder for LI programs to evaluate new opportunities given the BPU's stated priority objective to reach low-income communities. Our review of DSESP and other sources identified at least the following LI adder examples: Colorado (up to a 50% adder)[44], Pacific Northwest states Idaho, Oregon, Washington (10% adder), Nevada (25%), New Hampshire (20%), New Mexico (20%), and Vermont (15% adder). Based on this review and consistent with our February 2020 comments to the NJPU on utility targets and QPIs, **we recommend the BPU establish an adder of at least 20% for low-income programs.**

[42] https://www.nationalenergyscreeningproject.org/state-database-dsesp/

[43] The Pacific Northwest Electric Power Planning and Conservation Act of 1980, which applies to the states of Washington, Oregon, Idaho and parts of Montana, contains a general 10% extra credit (or 'adder') in the form of a cost preference for energy conservation compared to any other resource.

[44] http://www.swenergy.org/Data/Sites/1/media/documents/news/co-xcel-dsm-puc-decision-6-6-18.pdf. ""45. The Settling Parties agree that for purposes of evaluating cost-effectiveness, Public Service shall apply a 50 percent "non-energy benefits adder" to low-income measures and products and a 20 percent adder to all other measures and products. However, the non-energy benefits adder will only apply for screening purposes and will be excluded from the calculation of the net economic benefits used to derive the proposed financial incentives."

We look forward to continued engagement with the Commission on these issues. ACEEE welcomes this opportunity to provide comments.

Sincerely,

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APPENDIX

Table 1. Monetary value of reduced asthma hospitalizations, ER visits, and deaths, in 2019 dollars

CATEGORY	CALCULATION	RESULT
Number of people reached	Houses served[1] x People per household[2]	500 x 2.71
Number of vulnerable occupants	Percentage of the population with asthma[3]	**8.6%**
Number of Incidences avoided through intervention	Rate of hospitalization[4] / ER visits[5]/ deaths per patients[6]	0.9%/6%/0.001%
	Percentage of hospital visits[7]/ ER visits[8]/ deaths avoided through intervention[9]	65.5%/27.7%/65.6%
Dollar value of avoided health harm	Cost of an ER visit[10] Cost of a hospitalization[11] Value of a life[12]	$1,784 $25,497 $9,400,000
Total Savings in One Year = $115,389		
Cumulative savings over 10 years[13] = $2,245,514		

1 ACEEE estimate. 2 NJ Census 2019. 3 NJ DOH 2017. 4 Based on number of hospitalizations (6,810) and people with asthma (767,000) in NJ as reported in NJSHAD. 5 Based on number of ER visits (45,578) and people with asthma (767,000) in NJ as reported in NJSHAD 6 CDC. 2019. "Asthma." www.cdc.gov/asthma/default.htm. 7 GHHI. 2017. *Weatherization and Its Impact on Occupant Health Outcomes*. www.greenandhealthyhomes.org/wp-content/uploads/Weatherization-and-its-Impact-on-Occupant-Health_Final_5_23_2017_online.pdf. 8 Ibid. 9 Ibid. 10 Wang et al. 2014. "Emergency Department Charges for Asthma-Related Outpatient Visits by Insurance Status." *Journal of Health Care for the Poor and Underserved* 25 (1): 396–405. muse.jhu.edu/article/536594. 11 HCUP 2016. 12 EPA 2018."Mortality Risk Evaluation." www.epa.gov/environmental-economics/mortality-risk-valuation. 13 Discount rate of 3% applied.

Table 2. Monetary value of avoided trip-and-fall hospital visits and deaths, in 2019 dollars

CATEGORY	CALCULATION	RESULT
Number of people reached	Houses served[1] x People per household[2]	500 x 2.71
Number of vulnerable occupants	Percentage of the population aged 65 and older[3] x Percentage of older adults that fall annually[4]	**16.6% x 21.2%**
Number of Incidences avoided through intervention	Percentage of falls that result in death[5]/hospitalization[6] x Percentage of falls avoided through intervention[7]	0.1%/2.8% 77%
Dollar value of avoided health harm	Cost related to a hospitalization[8] Value of a life[9]	$81,394 $9,400,000
Total Savings in One Year = $184,595		
Cumulative savings over 10 years[13] = $4,702,035		

1 ACEEE estimate. 2 NJ Census 2019. 3 Ibid. 4 American Health Rankings. https://www.americashealthrankings.org/explore/senior/measure/falls_sr/state/NJ 5 See https://www.state.nj.us/health/chs/hnj2020/objectives/reduce_fatal_falls_older_adults.shtml?cT=Health%20%26amp%3B%20Wellness&cSN=health&tT=Older%20Adults&tSN=older 6 CDC. 2017. "Important Facts about Falls." www.cdc.gov/homeandrecreationalsafety/falls/adultfalls.html. 7 Tohn et al. 2020. "Incorporating Injury Prevention into Energy Weatherization Programs." *Journal of Public Health Management and Practice* 26 (1): 80–2. https://journals.lww.com/jphmp/Citation/2020/01000/Incorporating_Injury_Prevention_Into_Energy.14.. 8 NJ Falls Prevention Work Group. https://www.state.nj.us/humanservices/doas/documents/NJ%20FP%20Profile%202018.pdf 9 EPA 2018."Mortality Risk Evaluation." www.epa.gov/environmental-economics/mortality-risk-valuation 10 Discount rate of 3% applied.

Table 3. Monetary value of avoided cold-related thermal stress hospitalizations, ER visits, and deaths, in 2019 dollars

CATEGORY	CALCULATION	RESULT
Number of people reached	Houses served[1] x People per household[2]	500 x 2.71
Number of vulnerable occupants	Rate of hospitalizations[3]/ED visits[4]/deaths[5]	0.0002%/0.00003%/<0.0001%
Number of Incidences avoided through intervention	Percentage of harms avoided by intervention[6]	23%
Dollar value of avoided health harm	Cost of an ER visit[7] Cost of a hospitalization[8] Value of a life[9]	$558 $10,072 $9,400,000
Total Savings in One Year = $11,789		
Cumulative savings over 10 years[10] = $103,635		

1 ACEEE estimate. 2 NJ Census 2019 3 Based on number of hypothermia hospitalizations (3) and population of NJ (8,944,469) as reported in NJSHAD 2017. 4 Based on number of hypothermia ED visits (19) and population of NJ (8,944,469) as reported in NJSHAD 2017. 5 Extrapolated from national data CDC. 2019. www.cdc.gov/disasters/winter/staysafe/hypothermia.html and HCUP 2018 6 Extrapolated from CDC 2006 www.cdc.gov/mmwr/preview/mmwrhtml/mm5510a5.htm. [7]HCUP 2016 [8]HCUP 2016 [9]EPA 2018."Mortality Risk Evaluation." www.epa.gov/environmental-economics/mortality-risk-valuation 10Discount rate of 3% applied.

Table 4. Monetary value of avoided heat-related thermal stress hospitalizations, ER visits, and deaths, in 2019 dollars

CATEGORY	CALCULATION	RESULT
Number of people reached	Houses served[1] x People per household[2]	500 x 2.71
Number of vulnerable occupants	Rate of hospitalizations[3]/ED visits[4]/deaths[5]	0.01%/0.002%/<0.0001%
Number of Incidences avoided through intervention	Percentage of harms avoided by intervention[6]	80%
Dollar value of avoided health harm	Cost of an ER visit[7] Cost of a hospitalization[8] Value of a life[9]	$665 $6,180 $9,400,000
Total Savings in One Year = $20,817		
Cumulative savings over 10 years[10] = $191,293		

1 ACEEE estimate. 2 NJ Census 2019 3 Based on number of hypothermia hospitalizations (166) and population of NJ (8,944,469) as reported in NJSHAD 2017. 4 Based on number of hypothermia ED visits (1,241) and population of NJ (8,944,469) as reported in NJSHAD 2017. 5 Extrapolated from national data CDC 2019b; HCUP 2018 6 NYC DHMH. 2020. 2020. "Extreme Heat and Your Health." https://www1.nyc.gov/site/doh/health/emergency-preparedness/emergencies-extreme-weather-heat.page 7HCUP 2016 8HCUP 2016 9EPA 2018."Mortality Risk Evaluation." www.epa.gov/environmental-economics/mortality-risk-valuation. 10Discount rate of 3% applied.