November 29, 2023

Dr. Jennifer Tribble and Rachael Maitland
Tennessee Department of Environment and Conservation
Office of Policy & Planning
Tennessee Tower, Second Floor
312 Rosa L. Parks Ave., Nashville, TN 37243
Delivered electronically

Dear Dr. Tribble and Ms. Maitland,

Thank you for your work on developing the Tennessee Volunteer Emissions Reduction Strategy (TVERS) and for soliciting public input to guide it.

TVERS represents an uncommonly valuable opportunity to address harmful pollution while delivering large benefits to Tennessee residents. One characteristic of the federal program that funds TVERS that sets it apart from other federal programs is the unique flexibility it provides the State of Tennessee to apply funds to projects across many sectors. While many other federal programs dictate where dollars can be spent and what types of activities money can support, TVERS has the flexibility to focus on whichever sectors or projects can best benefit the State from investment with potential for reducing harmful climate pollution.

This flexibility leads my organization, the Southern Alliance for Clean Energy (SACE), to take the position that TVERS should invest in areas that are neglected or underfunded, and can efficiently and cost-effectively reduce emissions and deliver benefits to Tennessee residents, particularly residents for whom such investment can represent life changing support. **A sector that fits these criteria is clean energy investments into multifamily affordable housing that directly benefit low-income residents.**

Detailed below is our reasoning for how clean energy investments into multifamily affordable housing is an efficient, effective, and equitable use for federal clean energy investment funding, especially for TVERS, through emissions reductions, cost-effectiveness, and large benefits for Tennessee residents, and importantly *why multifamily affordable housing specifically* holds such great potential.

Emissions Reductions:

Residential energy efficiency is a key strategy for reducing climate pollution. Many experts agree that the biggest essential steps needed to achieve a future with net-zero carbon pollution across our economy are: 1) reduce energy needs by increasing energy efficiency, 2) switch fuels of end use activity from fossil energy fuels to electricity, and 3) switch from carbon-intensive fossil fuels to zero-carbon energy sources for electricity production. For example, research by NRDC (the Natural Resources Defense Council) and Evolved Energy Research published a report earlier this year, underscoring the essential role of energy efficiency alongside other strategies, finding that: "*by deploying five crucial decarbonization strategies—clean power, energy efficiency, electrification, natural carbon solutions, and decarbonized fuels—achieving net zero GHG emissions in the United States can be technologically feasible and cost effective,*" with the first four of those strategies representing "*the highest priority actions for getting the United States on track to net zero within this crucial decade.*"[1] In NRDC's research scenario, at least one-third of existing buildings should be retrofitted with energy efficiency measures that cut energy needs by 30% by 2030, to be on track to reach economy-wide net-zero carbon pollution by 2050.

Closer to home in Tennessee, we at SACE have emphasized how energy efficiency plays a critical role in achieving a zero-carbon electricity system. Our report *Achieving 100% Clean Electricity in the Southeast: Enacting a Federal Clean Electricity Standard*, demonstrated that the Tennessee Valley Authority (TVA) could meet all customer needs with a zero-carbon pollution system by 2030 in large part by increasing its reliance on energy efficiency and demand-side management of electricity demand from 0.2% of its system capacity in 2019 to 9-10% in 2030.[2] Similarly, research by Synapse Energy Economics demonstrated that increasing investment in energy efficiency is a key strategy for achieving a TVA electricity system that not only costs less than business as usual, but also reduces more than 300 million metric tons of carbon pollution over the next two decades.[3]

Cost-Effectiveness:

Investing in energy efficiency measures to reduce energy demands of utility customers is often the most cost-effective way to meet the need for energy. It is often said that the least expensive

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[1] Jacqueline Ennis and Amanda Levin; NRDC (2023). *Clean Energy Now for a Safer Climate Future: Pathways to Net Zero in the United States by 2050*.
https://www.nrdc.org/sites/default/files/2023-04/clean-energy-pathways-net-zero-2050-report.pdf

[2] Southern Alliance for Clean Energy (2021). *Achieving 100% Clean Electricity in the Southeast, 2021 Report*.
https://cleanenergy.org/wp-content/uploads/Achieving-100-Clean-Electricity-in-the-Southeast-June-21.pdf

[3] Rachel Wilson, Iain Addleton, and Jon Tabernero; Synapse Energy Economics (2022). *Clean Portfolio Replacement at Tennessee Valley Authority: Economic and Emissions Benefits for TVA Customers*.
https://www.synapse-energy.com/sites/default/files/TVA_Clean_Portfolio_Modeling_21-097_0.pdf

kilowatt-hour is the one you don't use. Energy efficiency and other demand side management strategies allow customers' energy needs to be met while reducing the need to invest in relatively expensive infrastructure to generate, transmit, and distribute electricity.

Studies have quantified the savings by choosing to save energy rather than generate incrementally more energy. For example in a 2021 report, the American Council for an Energy-Efficient Economy (ACEEE) found from analyzing a large set of utility program data in 2018 that the national average levelized cost of saved energy was 2.4 cents per kilowatt-hour (kWh).[4] A more local analysis was done by Synapse Energy Economics in the aforementioned 2022 study, which focused on the TVA system. The researchers assumed the cost of energy efficiency in the TVA region to be 2.7 cents per kWh, based on data from the Lawrence Berkeley National Laboratory.[5] These calculated costs per kWh saved are lower than the cost of building resources to generate electricity, such as wind or solar energy (2.5 - 4 cents per kWh) or combined cycle natural gas (4 - 7 cents/kWh). A helpful data point to contextualize the cost of energy saved in Tennessee is TVA's recently published "avoided cost" of 4.376 cents per kWh.[6] This is approximately the cost that TVA avoids by not having to generate a kWh that is otherwise supplied by demand-side resources. ACEEE reports: "*When compared to the levelized cost of supply-side energy, energy efficiency is comparable to the least-cost generation resources available on the grid today, and it is cheaper than the least expensive fossil fuel option.*"

The low cost of energy efficiency translates to lower costs for everyone. While of course the individual households that participate in energy efficiency programs and carry out efficiency measures at home lower their utility bills, in fact it is not just these households that benefit from lower costs, but rather every customer served on the electric system. The low cost of energy efficiency lowers the overall cost of running the electric grid and therefore provides grid-wide cost benefits to everyone.

These grid-wide cost savings were quantified in a hypothetical power portfolio for TVA in the previously mentioned Synapse Energy Economics report. The researchers found that energy efficiency was a key component in the portfolio that would save $9.4 billion over next two decades compared to business as usual.[7]

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[4] ACEEE (2021). "The Cost of Saving Electricity for the Largest U.S. Utilities: Ratepayer-Funded Efficiency Programs in 2018" Policy Brief. https://www.aceee.org/sites/default/files/pdfs/cost_of_saving_electricity_final_6-22-21.pdf

[5] Wilson, Addleton, and Tabanero (2022). *Clean Portfolio Replacement at Tennessee Valley Authority.*

[6] Tennessee Valley Authority (October 31, 2023). Letter to participants in TVA's Dispersed Power Production Program. https://tva-azr-eastus-cdn-ep-tvawcm-prd.azureedge.net/cdn-tvawcma/docs/default-source/energy/valley-renewable-energy/dispersed-power-program/dispersed-power-production-guidelines-nov.pdf?sfvrsn=a247247d_1

[7] Wilson, Addleton, and Tabanero (2022). *Clean Portfolio Replacement at Tennessee Valley Authority.*

Table 1: Comparison of Cost and Carbon Pollution of Hypothetical TVA Resource Portfolios

Data from Wilson, Addleton, and Tabanero, 2022

Results (2022-2042)	**Business As Usual Portfolio**	**Solar/Storage Replacement Portfolio** (early coal plant retirements, no new gas plants, increased utility scale and behind-the-meter solar and storage resources, but no increased investment in energy efficiency)	**Clean Portfolio Replacement** (Solar/Storage Replacement Portfolio plus gradually scaling up energy efficiency, adding wind energy, and even more behind-the-meter solar and storage resources)
2042 Net Present Value with Energy Efficiency	$78.2 billion	$71.7 billion	$68.7 billion
Cumulative Carbon Pollution	742.9 million tons	465.7 million tons	441.2 million tons

[8]

However, an important aspect not captured in cost of energy saved analyses such as those cited above is how energy efficiency can reduce electric demand during peaks of high electricity demand. This peak load power is the most expensive power for utilities to generate, so reducing peak demand has a multiplier effect on potential cost savings that can be provided by energy efficiency. Other values of energy efficiency that can lower system wide costs include relieving capacity constraints on power transmission and distribution systems thereby reducing infrastructure investment needs, and improving reliability and resiliency of the power grid during extreme weather events.[9]

Positive Benefits for Residents:

The cost benefits of energy efficiency, described above, represent only a part of the value proposition offered by energy efficiency that could be realized by Tennesseans. While energy efficiency can meet energy needs at a very low cost, it also delivers numerous non-energy benefits. Such benefits specifically for multifamily residential energy efficiency were characterized by ACEEE in

[8] Data from Wilson, Addleton, and Tabanero (2022). *Clean Portfolio Replacement at Tennessee Valley Authority*.

[9] ACEEE (2021). "The Cost of Saving Electricity for the Largest U.S. Utilities: Ratepayer-Funded Efficiency Programs in 2018" Issue Brief.

a 2015 report as falling into several categories: participant benefits, utility benefits, and societal benefits:[10]

Participant benefits: Participant benefits accrue to both tenants and building owners. ACEEE reports that such participant benefits in the multifamily housing sector include "*reduced maintenance costs, improved appliance and equipment performance and lifespan, greater property value, increased building durability, and increased tenant comfort, health, and safety.*" Despite the split incentive described more thoroughly below (where the benefit of lower utility bills typically flows to the tenants while the responsibility for undertaking energy efficiency work is held by the owner), the non-energy benefits on the other hand are shared between tenants and owners. In addition to lower utility bills, tenants enjoy greater comfort and satisfaction after energy efficiency retrofits and are more confident in their ability to pay their bills on time, and therefore are more likely to renew their leases. This translates to lower turnover and vacancy rates for building owners. ACEEE reports that the value of lower vacancy rates could be equal to or greater than the value of the energy saved from the retrofits. Owners potentially also benefit from renters' enhanced ability to pay rent on time.

Utility benefits: Utility benefits accrue to utility companies and all of their ratepayers. ACEEE reports that utility customers who have lower, more predictable monthly utility bills as the result of energy efficiency upgrades "*are less likely to get behind on payments. A single retrofit to a multifamily building can positively affect many tenants and their accounts, leading to fewer shutoffs, reconnects, customer calls, and debt collection actions. Some utility benefits, including carrying cost on arrearages and debt collection efforts, may be more prevalent in low-income programs [...]*"

Additionally, the grid reliability and resilience benefits previously discussed are another significant benefit of energy efficiency.

Societal benefits: Societal benefits of energy efficiency accrue to everyone and include, according to ACEEE: "*(1) economic impacts such as job creation and higher levels of disposable income (leading to higher levels of local economic activity), (2) public health and welfare impacts such as reduced asthma and other disease associated with particulate matter and other air emissions, (3) environmental impacts such as effects on ecosystems and on the climate associated with air emissions, and (4) water and wastewater impacts due to water use and pollution at various points in the energy production process as well as in end uses. [...] Research has established that some societal benefits are greater for programs targeting low-income customers.*"[11]

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[10] Rachel Cluett and Jennifer Amann; ACEEE (2015). *Multiple Benefits of Multifamily Energy Efficiency for Cost-Effectiveness Screening*. https://www.aceee.org/research-report/a1502

[11] Cluett and Amann (2015). *Multiple Benefits of Multifamily Energy Efficiency for Cost-Effectiveness Screening*.

The environmental benefit of energy efficiency is particularly relevant for TVERS as the U.S. Environmental Protection Agency's scoring criteria for applications for implementation grants in the Climate Pollution Reduction Grant program weighs reduction of greenhouse gas pollution as the most important scoring factor.

A special focus was given to the job creation potential of energy efficiency in Tennessee in a recent analysis conducted by Appalachian Voices, which analyzed hypothetical investments in energy efficiency and clean energy resource portfolios for TVA's future. The report's authors state that "*EE* [energy efficiency] *jobs cannot be outsourced and are among the largest sources of energy sector jobs in the Tennessee Valley. The need for continual upgrades to buildings, appliances, and heating and cooling systems as building practices and technology improves means EE can also be a continual source of employment with sustained investment from utilities and coordinated program design.*"[12] Their analysis found that increasing investment in energy efficiency could result in net gains of thousands of jobs throughout the TVA service area, and importantly that clean energy resource portfolios with an emphasis on energy efficiency would create many times over the jobs that would be created by TVA's reliance on a new gas power plant to replace the retiring Cumberland plant.

Statement of Need for More Home Energy Efficiency:

Tennessee residents pay among the highest electricity bills in the nation–a problem exacerbated by energy inefficient residential buildings and a severe lack of energy efficiency programs available to residents. In 2021, households in Tennessee consumed nearly 34% more electricity than the national average, putting Tennessee as the second highest state for residential electricity consumption in the country. Meanwhile, the lack of investment into energy efficiency by TVA, which supplies power to nearly all of Tennessee, has resulted in an dramatic underachievement in energy efficiency. In 2021, while the national average of utilities' energy saved as a percentage of electric sales was 0.68%, TVA's savings amounted to just 0.01%.[13] This alarming underachievement underscores how investment in energy efficiency is sorely needed and has the potential to be transformational for Tennessee residents.

New federal funding and programs are positioned to help serve the needs of families in reducing energy bills through energy efficiency and clean energy, notably the large funding increase to the Weatherization Assistance Program, the forthcoming home energy rebate programs, and Solar For

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[12] Bri Knisley, Nikki Luke, Rory McIlmoil, James Barrett; Appalachian Voices (2021). *Save Energy, Grow Jobs in the Tennessee Valley: How investments in renewable and efficient resources could bring thousands of jobs to the TVA region.* https://appvoices.org/resources/reports/TVA_Jobs_Report_07_14_22.pdf

[13] Forest Bradley-Wright; Southern Alliance for Clean Energy (2023). *Energy Efficiency in the Southeast: Fifth Annual Report*. https://cleanenergy.org/blog/2023-ee-report/

All. However, while these programs will serve thousands–or even tens of thousands of Tennessee homes–they will ultimately only be able to serve a fraction of potentially eligible participants.

For example, the Tennessee Housing Development Agency is currently administering the Multifamily Weatherization Assistance Program ("WAP-BIL") program funded by the federal bipartisan Infrastructure Investment and Jobs Act, which is directing approximately $60 million to help lower energy costs for income-eligible multifamily properties across the state. While the funding will serve approximately 6,000 homes, hundreds of thousands of families residing in multifamily affordable housing units will be left out.

Similarly, while the forthcoming federal home energy rebate programs are poised to cut energy bills for tens of thousands of Tennessee households, the funds are ultimately limited, and many more households will be unable to be served. The table below demonstrates how many Tennessee households could be hypothetically served with the home energy rebate dollars if each household maximized utilization of the programs and received the maximum rebates available per household. These numbers exclude that up to 20% of the funding allocations may go to administrative costs, which would reduce the total number of households served.

Table 2: Federal Home Energy Rebate Programs Allocations and Potential Number of Tennessee Households Served

Program	Total Allocation for Tennessee	Maximum Rebate Per Household	Number of Households Served at Maximum Rebate Level
Home Efficiency Rebate Program	$83,877,940	$8,000 for low-income households ($4,000 for moderate and high-income households)	10,485
High Efficiency Electric Home Rebate Program	$83,390,060	$14,000	5,956

In reality, not every household will receive the maximum rebate and many will do work that qualifies the recipient for just a fraction of the possible maximum. The table below demonstrates how many households could hypothetically be served at 50% and 25% of the maximum rebate level, again excluding the administrative costs which could reduce the number of households served by up to 20%.

Table 3: Potential Number of Tennessee Households Served By Federal Home Energy Rebate Programs at Varying Levels of Program Utilization

Program	Number of Households Served at Maximum Rebate Level	Number of Households Served at 50% Maximum Rebate Level	Number of Households Served at 25% Maximum Rebate Level
Home Efficiency Rebate Program	10,485	20,970	41,940
High Efficiency Electric Home Rebate Program	5,956	11,912	23,824

While this level of funding for home energy efficiency is historically high, it still will only be able to serve a relatively small portion of Tennessee residents.

In October of this year, TVA began the process of addressing the need for more residential energy efficiency by establishing a rebate program. This is a welcome step in the right direction, however TVA has not publicly detailed how their efficiency rebate program will function in the future, particularly in conjunction with the forthcoming home energy rebate program from the federal government.

Importantly, while these programs will not be able to serve all the need that exists in Tennessee, they will be able to serve as a foundation for continued–and more efficient–future investment.

Why Focus on Multifamily?

The historic one-time infusion of funds into helping lower resident's energy bills from the Inflation Reduction Act and Bipartisan Infrastructure Law holds promise to deliver life-changing benefits for low-income families. In order to maximize those benefits, states must steward this rare funding opportunity and direct funds to where they can be used efficiently, effectively, and have the most impact. Directing the focus of federal funding programs, including TVERS, toward home energy improvements to multifamily affordable housing is one of the best opportunities for reducing pollution efficiently, cost-effectively, and with great positive impact on residents in an underfunded area of need.

To be clear, SACE takes the position that in general, energy efficiency programs should be scaled up across all market segments–not just multifamily to the exclusion of single family, or residential to the exclusion of commercial or industrial. We are however advocating for the use of the one-time

infusion of federal funds to be directed toward multifamily affordable housing, because this market segment has been historically overlooked and the scale of benefits for residents is so large.

Examining housing and demographic data in Tennessee illuminates the need and great possibilities by investing in energy efficiency for multifamily housing.[14] For example, 94% of residents of multifamily homes of 2+ units in Tennessee rent their homes, and therefore face the conundrum of split incentives (explained below), while just 19% of residents of single family homes in Tennessee rent. Meanwhile, the average annual income of Tennessee multifamily households is about half that of single family households (roughly $46,000 compared to roughly $89,000), meaning that residents of multifamily housing are much more likely to face financial barriers to investing in home energy efficiency than single family residents. Therefore focusing federal investment into the multifamily sector is sure to bring clean energy opportunities to families and communities that otherwise would not have market access.

Table 4: Profiles of Single- and Multifamily Households in Tennessee

Data from U.S. Department of Energy Low-income Energy Affordability Data Tool

	All Households	Single Family	Multifamily (2+ Units)
Number of Households	2,639,451	1,942,774	477,936
Average Household Income	$77,921	$88,738	$46,448
Percentage Renters	33%	19%	94%
Percentage Low-Income (<80% AMI)	40%	33%	61%

Yet despite the heightened need for energy efficiency investment in multifamily housing, the multifamily market is underserved by energy efficiency programs compared to single family housing.[15] There are a number of challenges to serving multifamily housing, including the issue of split incentives: the tenant pays the utility bills and realizes the savings of energy efficiency, but the building owner is the party who would be responsible for investing in the work. This dilemma is characterized in a 2017 ACEEE report as follows: "*Most apartment building residents pay for their own utilities, and in-unit efficiency upgrades can provide a financial benefit to these residents, but only if they occupy the units long enough to see a return on their investment. Otherwise renters have little incentive to invest in upgrades to an apartment they do not own. Renters are also unlikely to have the authority to upgrade in-unit equipment. On the other hand, multifamily building owners and managers have a long-term interest in lowering the costs associated with their buildings, but they are unlikely to*

[14] U.S. Department of Energy Office of State and Community Energy Programs. Low-income Energy Affordability Data Tool. https://www.energy.gov/scep/slsc/lead-tool, accessed November 2023.

[15] Stefen Samarripas, Dan York, and Lauren Ross; ACEEE (2017). *More Savings for More Residents: Progress in Multifamily Housing Energy Efficiency*.

financially benefit in the short term from in-unit upgrades because they typically pay only for the utility cost of common areas."[16] Energy efficiency programs that are geared toward multifamily buildings are usually limited in scope, and do not emphasize whole-building efficiency with envelope sealing, insulation, or upgrades to HVAC or hot water systems.[17] Yet these types of deep retrofit projects are precisely the tools to unlock the vast majority of potential savings from multifamily energy efficiency.[18]

The discussion above about cost-effectiveness of investments into energy efficiency demonstrates the cost-effectiveness of energy efficiency broadly, but there are some unique characteristics of multifamily housing that enable it to achieve greater cost efficiency than single family housing. According to experts, investment into energy efficiency work for multifamily housing yields a higher per-unit annual payback on investment than for single family homes. This is because "[m]*ultifamily retrofits can take advantage of economies of scale not available in single-family homes; it is easier to coordinate retrofits for multiple units that are contiguous and a single intervention (for example, HVAC replacement) can improve efficiency in every unit in the building.*"[19]

The nonprofit multifamily energy efficiency provider company ICAST estimates that twice as many multifamily homes can be retrofitted with energy efficiency for the same budget allocation as for single family homes, due to three primary reasons: 1) serving multiple units in one location lowers the cost per unit due to efficiencies in shared resources (i.e. improvements in shared HVAC, duct sealing, insulation, etc. benefit multiple households at once) and provides volume efficiencies, focusing construction crews at single work sites versus moving between locations; 2) the ability to leverage multifamily-specific funding sources that single family homes cannot access, such as specific tax credits or philanthropic grants; and 3) the ability to leverage owner cost-share, which can often cover 60% of the project cost, thus allowing public money to go farther.[20]

In addition to the cost-efficiencies presented by multifamily energy efficiency, investment into this sector makes sense due to the fact that the State of Tennessee has already built a solid foundation to work from, which will make additional dollars invested more effective. The State's commitment to serve the hard-to-reach income-qualified residents of multifamily housing via the $60 million allocation from the recent influx to the Weatherization Assistance Program is a large step in addressing the need, and while it will only serve a fraction of the families who could benefit from

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[16] Samarripas, York, and Ross (2017). *More Savings for More Residents*.
[17] Samarripas, York, and Ross (2017). *More Savings for More Residents*.
[18] ACEEE (2020). "Understanding Multifamily Home Energy Efficiency Potential" Topic Brief. https://www.aceee.org/topic-brief/2020/10/understanding-multifamily-home-energy-efficiency-potential
[19] U.S. Department of Housing and Urban Development's Office of Policy Development and Research (2011). "Quantifying Energy Efficiency in Multifamily Rental Housing." *Evidence Matters*, Summer 2011 edition. https://www.huduser.gov/portal/periodicals/em/summer11/highlight1.html
[20] ICAST (2022). "Case for Using Weatherization Assistance Program Funding in Multifamily Affordable Housing" white paper.

energy efficiency investment, it provides a foundation for a larger, more comprehensive program that can serve more residents. This foundation can be made stronger with dedicated application of the federal home energy rebate programs, Solar for All, and the new TVA rebate programs to the multifamily affordable housing sector.

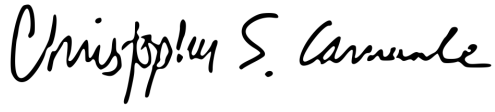
Conclusion

Some of the largest barriers to more widespread availability of multifamily energy efficiency programs could be addressed by a statewide strategy to direct investment into this sector. Specifically some of the solutions that a statewide program could offer to address large barriers identified by experts[21] include: education for building owners' awareness, availability of project financing, a streamlined program experience for participants, program quality control, and more. Administering a statewide program that is attractive to multifamily building owners and residents could overcome the split incentive conundrum that prevents many thousands of Tennesseans from benefiting from home energy investments. The State choosing to prioritize investment into multifamily affordable housing for TVERS and other federal energy funding programs would be a cost-effective and efficient way to bring about dramatic benefits for residents with great need. Particularly, given the flexibility of the Climate Pollution Reduction Grant Program, TVERS investment could be especially beneficial by focusing on filling gaps that other, more prescriptive programs do not cover, so that funds can be optimally used in conjunction with each other.

Please include energy efficiency and clean energy for multifamily affordable housing as a priority in the State's Priority Climate Action Plan (PCAP) and examine this for the next-phase Climate Pollution Reduction Grant Program implementation.

If you have any questions or would like to discuss the ideas herein, please don't hesitate to contact me or SACE.

Thank you,



Chris Carnevale
Climate Advocacy Director
Southern Alliance for Clean Energy

[21] Samarripas, York, and Ross (2017). *More Savings for More Residents*.