



Weatherization: Bringing Greater Comfort and Energy Savings to Your Community This Winter

Connected Communities Webinar Series

Sept 10, 2024



Welcome

- Updates from the Connected Communities Team
 - CC Conference
 - Upcoming Webinars
 - Community Information Hub
- Weatherization: The data and implementation
 - **Erin Rose**, Vice President, Social Equity, Three3
- Weatherization at TVA
 - **Frank Rapley**, Senior Manager, Energy Efficiency Services and Programs, TVA
- Multifamily Weatherization
 - **Elizabeth Moore**, Manager, Commercial Energy Solutions, TVA
- Q&A
- Close Out

The Latest From Connected Communities

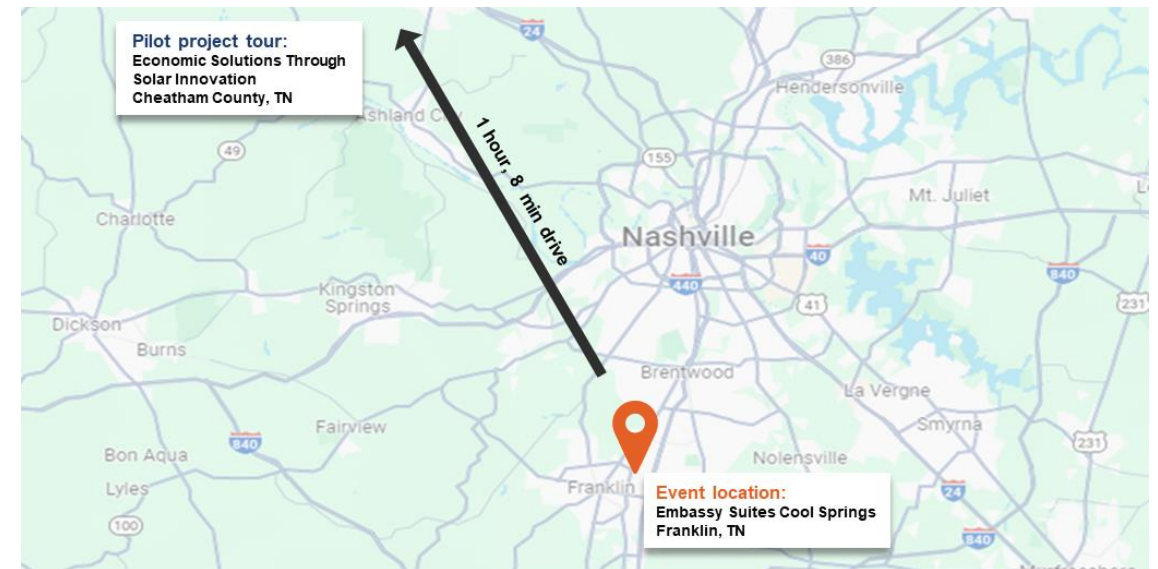
Conference Overview

Objectives

- Strengthen and broaden Connected Communities network
- Educate and share resources
- Show tangible benefits of Connected Communities as well as example projects (for local and national/federal audiences)
- Demonstrate the attainability of Connected Communities projects
- Elevate awareness of and involvement in Connected Communities work
- *Send an email to ConnectedCommunities@tva.gov to request an invite*

Highlights:

- September 24 – 25 in Franklin, TN
- Approximately 200 attendees including:
 - Community leaders
 - TVA leaders
 - State / regional / federal stakeholders leading work related to initiative focus areas



Connected Communities Initiative

We're helping communities embrace technology and data solutions to overcome their challenges and prepare to be part of the energy system of the future.

FOCUS AREAS	RESOURCES
 <hr/>	 <hr/>
Broadband and Digital Literacy	Off-the-Shelf Guides and Tools
	 <hr/>
Economic Empowerment	Tailored Support and Success Coaching Through Partnerships
 <hr/>	 <hr/>
Energy and Environmental Justice	 <hr/>
 <hr/>	Network to Share Information and Success Models
Enhanced Community Resiliency	

Upcoming Connected Communities Webinars



Community Information Hub

Your community's one-stop shop for information



[REGISTER NOW](#)

Tuesday, October 8, 1:00 – 2:00 pm ET



Solar for All

Leveraging federal funds to advance your community's priorities



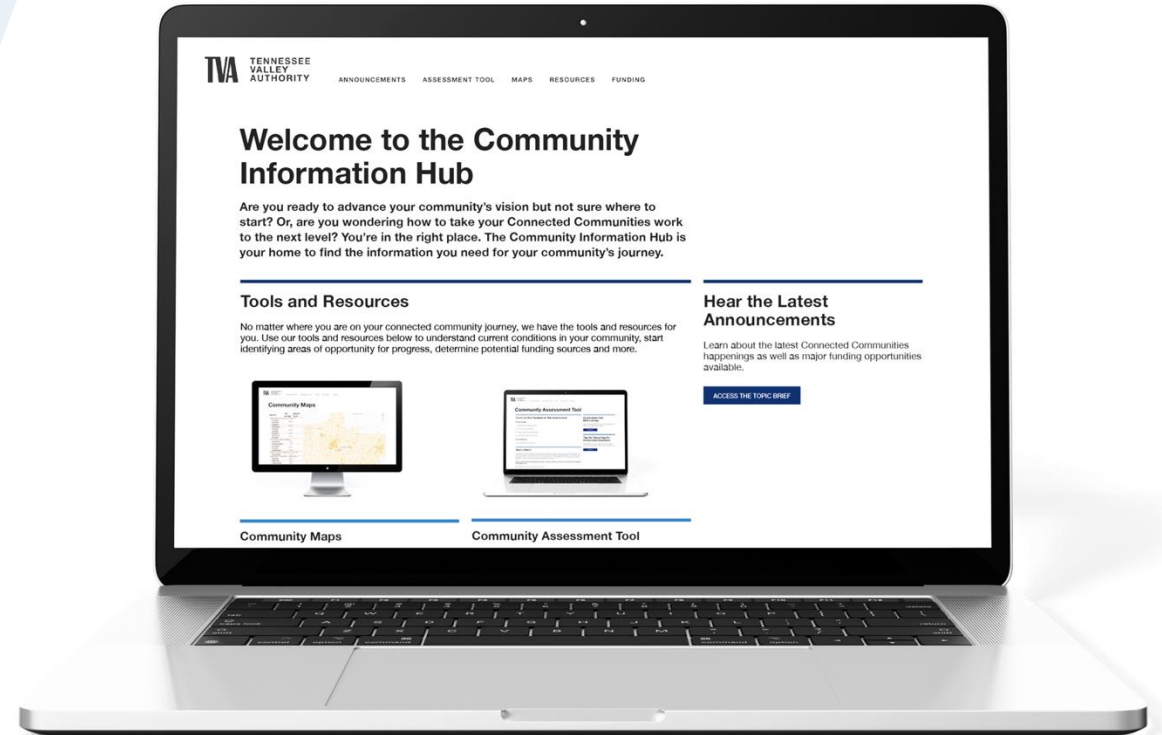
[REGISTER NOW](#)

Tuesday, November 12, 1:00 – 2:00 pm ET



Community Information Hub

A new, interactive tool is available to help **assess your community needs, prioritize solutions and identify funding opportunities.**



Meet Today's Speakers



Erin Rose

Vice President, Social Equity,
Three3



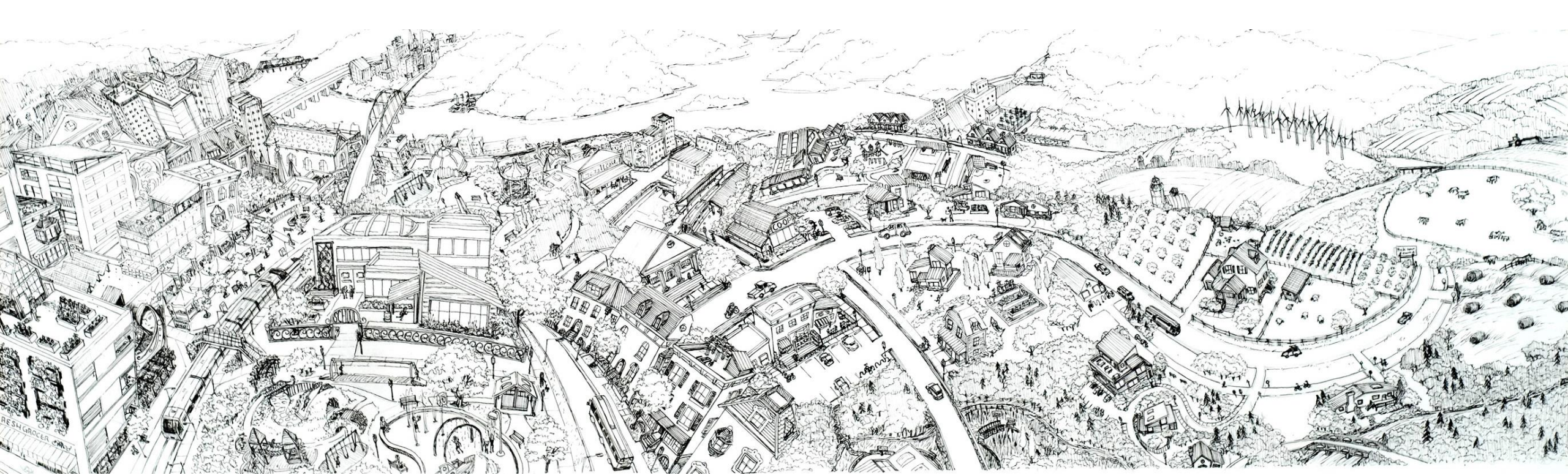
Frank Rapley

Senior Manager, Energy
Efficiency Services and
Programs, TVA



Elizabeth Moore

Manager, Commercial Energy
Solutions, TVA



Exploring the Multiple Benefits of Weatherization in the TN Valley

Erin Rose, MSSW, LLM

Co-found and VP of Social Equity

Three³
9

Three³

Fostering equitable, sustainable futures

HOME UPLIFT PARTICIPANTS AT BASELINE

She uses secondary heat sources including unvented gas heaters. Cold exacerbates her arthritis; will try to bundle up and will take pain killers.

– Memphis

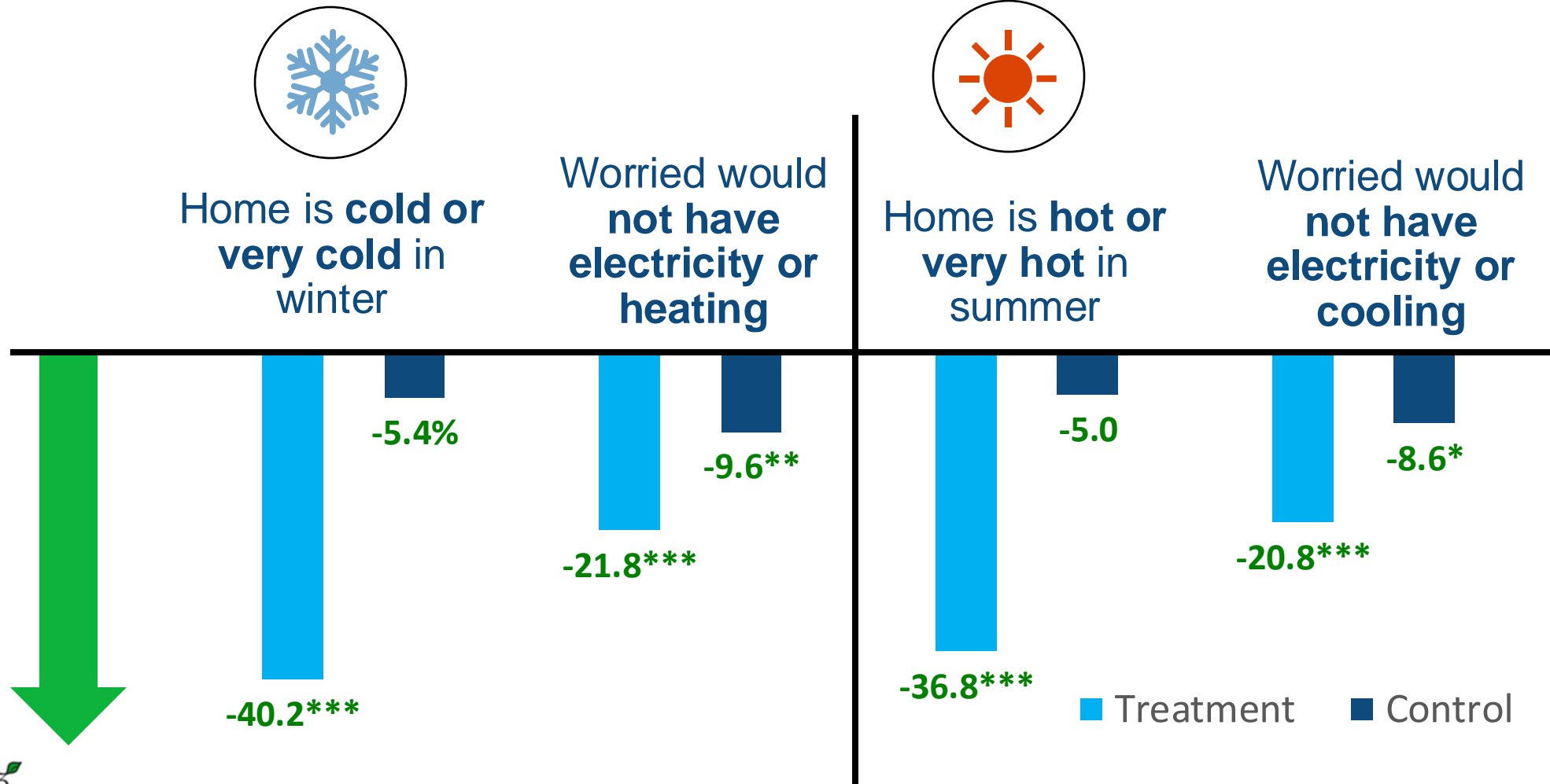
Respondent has lupus. Despite trying to stay cool, she still felt too hot during the summer inside her home. She also has fibromyalgia and arthritis which also flares with exposure to extreme temperatures

– Huntsville (Alabama)

Drafts come in through doors and windows. Puts up plastic sheeting. She has bronchitis and allergies. Upper respiratory issues worse in winter. She coughs and can't stop. Sometimes goes to ER for breathing treatments. When it's cold, she can't sleep.

– Nashville

Reductions (%): Temperature Exposures



TVA Connected Communities Pilot: Elders Alert System for Imminent Environmental Risks (EASIER)



- Alerts elders about potentially health threatening indoor conditions.
- Connects them to their social network via text message or email if the home environment becomes unsafe.
- Installed in 50 homes identified by the EPA as energy and environmental justice communities in Knoxville, TN



Installed in 50 homes



Users are pleased with the EASIER project



Elders and their social networks are receiving alerts

EASIER Status:

- TVA CC Pilot complete
- Participants can continue to use their EASIER tablet
- Many have joined other indoor air quality monitoring studies
- Foundation funding for developing reports out of EASIER to share with health care providers



The interface and resource links are complete.



Integrating new functions, resources, future research such as home energy management, food security and AI data mining for anticipatory alerts



Three-month reports are being developed for users and their healthcare providers

Examining Home Environments & Asthma Interventions in the TN Valley (Home Uplift Homes)

Three



Quarterly Asthma Control Tests

45-minute Asthma Interview

Home Assessment + Interview

IAQ Monitor + Hotspot Installation

Air Cleaning Devices

Pre & Post Intervention Surveys




Portrait of a Study Home

Home Weatherized? YES

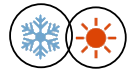
This White female, aged 64, has owned her home for 12 years. The home is a single-family detached house built in the 1940s. The occupant grew up in a different home heated with coal and then fuel oil with a gas cooking range. She grew up near a heavy trucking route and continues to live along a traffic corridor. As she is low-income and unable to work, she is eligible for weatherization programs. Her physical health prevents her from working and from daily activities.

Female with Chronic Bronchitis, Mild COPD + Emphysema




Your Asthma Control Test Score

18



Current Exposures

- Exposure to Extreme Hot + Cold Temperatures
- Dust Mites
- Mice/Rodents (reportedly under control)
- Pets (cat)
- Seasonal Allergies: Summer



Lifetime Exposures

- Quit smoking Summer 2023
- Nature Gas Cook Stove in Childhood Home
- Use of Scented Candles



Portrait: This single-family, detached home was recently weatherized. It has central air, an electric heat pump and no combustion appliances. The home has a crawl space with a vapor barrier. Gutters are intact, but the foundation drainage runs toward the house and there are observations of ponding/standing water. It has hardwood flooring. The bathroom has an exhaust fan that is rarely used; the kitchen has no exhaust fan. The dryer vent had a hole in it.

Plots 4 and 5 compare data from the first week of January 2023 with data from the first week of June 2024 highlighting four indoor air quality indicators (CO₂, humidity, PM_{2.5} and TVOCs); **Plot 4** shows density (%) of observations over the course of the weeks of focus to observe patterns over times of day. **Plot 5** shows hourly averages for this same household in both January 2023 and June 2024.



Erin Rose

VP of Social Equity

erose@threecubed.org

www.threecubed.org



TVA's Residential Energy Efficiency Programs

TVA and Energy Efficiency History



1970's & 1980's

- Energy conservation became an economic necessity for homeowners and businesses alike, and TVA became a national leader in promoting energy conservation.
- Energy efficiency (EE) programs were response to 1970 energy crisis
- TVA began energy audits and financing weatherization and heat pumps to help homes become more energy efficient
- 1986 – celebrated 1 million home energy audits and retrofits

Residential Services

- No income qualification
- DIY, in-home or virtual audit
- Measure based action plan
- QCN referral system
- Curated marketplace
- Financing
- Modeled savings
- TVA assurance
- Rebates



Key program elements



Quality Contractors

TVA recruits, trains, and manages approved contractors to perform work through the program. TVA provides quality checks at the customer's request.



Trusted Advice

Through world-class program design and technology, customers learn what upgrades their home needs to be its most energy efficient.



Home Energy Financing

Financing options are available for most professionally installed home energy upgrades.

Home Uplift

- Income qualified
- No cost to homeowner
- Whole home approach
- Utilizes multiple funding streams
- Audit and inspection
- Trusted TVA Quality Contractor Network
- Modeled savings
- TVA assurance
- Home Performance with ENERGY STAR program



Partnership-driven funding model



- LPCs and/or charitable organizations provide foundational funding for their community
- A third-party CDFI partner manages program funds

- LPC funds are matched by TVA on a formula allocation basis
- Charitable donations are matched at TVA's discretion

- Participant screening
- Energy audits to qualify the home and inform scope of work
- Upgrades performed by TVA trade allies
- Quality assurance inspections
- Homeowner education

EnergyRight for Communities

For schools:

School Uplift supports public schools in the region by offering energy efficiency training and grants that reduce energy costs and improve the quality of the learning environment.



Scan the QR code below and sign up for School Uplift!



For small businesses:

We offer energy efficiency upgrade incentives for LED lighting, HVACs, refrigeration and more to help make a difference on energy costs.

Not sure where to start? Scan to connect with a vetted contractor and develop a personalized scope.



Thank you!

Frank Rapley – Sr. Manager

Tennessee Valley Authority
EnergyRight® Residential

fmrapley@tva.gov

Community Power Challenge

Multifamily Strategic Energy Management

Elizabeth Moore

Tennessee Valley Authority



Multifamily Market – an untapped opportunity



21

MILLION

U.S. households live in multifamily apartments and condominiums.



\$3.4

BILLION / YEAR

in national potential savings through energy management.

Hard-to-reach customer

For residential and commercial utility programs

Community Power Challenge

- Year-long engagement strategy to engage multifamily (apartment) communities
- Multifamily energy experts and engineering level audit
- Energy efficiency education workshops (tailored for renter audience)



O&M Staff Engagement

- Profile of community/buildings
- Walkthrough of property
- Customized SEM training



Resident Engagement

- Energy Education Workshops
- Monthly tips
- Gamification & Competition



Technical Audit

- Engineering assessment
- ROI for efficiency improvements
- Final report of opportunities

Community Power Challenge Pilots

Nashville 2018-2019

6 Properties

Income Qualified

2 Property Management Firms

829 Households (units)



Memphis 2021-2022

5 Properties

Income Qualified

1 Property Management Firm

650 Households (units)



It's residential & commercial

What's the same

- HVAC
- Lighting
- Envelope
- Water heating
- System replacement
- People and the choices they make

What's different

- Two audiences – owners/staff and residents
- Common area meters are commercial
- Resident unit meters are residential
- Some residents pay their bill
- Some properties are master metered

O&M Workshop

- ☑ Education and professional development for staff
- ☑ Cohort-style peer learning
- ☑ Public commitment to action and improvement
- ☑ Relationship building with LPC



Winter and summer resident workshops

Similarities and differences with the Home Energy workshops.

Same presentation with two customization options:

- Seasonal highlights
- Central meter vs individually meter – and related motivations (save money, improve comfort, etc.).



Community Power Challenge Messaging



Understanding energy bills

✓ What's a demand charge?

✓ What's my property's EUJ, and what can I do with the information?

MF SEM Resources



SEM booklet

can be used to refresh and educate staff around Strategic Energy Management.



O&M workbook

can be used throughout the year to refer back to the SEM Cycle and best practices.

The image shows a "Exterior Monthly Checklist" form. The form is divided into several sections: "Roof/Flat", "Walls", "Exterior Perforations", "Entrances", "Foundation / Groundwork", and "Outdoor Equipment". Each section contains a list of items to be checked, with checkboxes and columns for "Date", "Initials", and "Rating/Status". The form is designed to be used for walk-through inspections.

Monthly checklists

on the front and back covers of the O&M Workbook are dry-erase friendly and can be used for walk-through inspections.

Multifamily & Inflation Reduction Act (IRA)

Home Energy Rebate Programs (FY25 – FY31)

Home Efficiency Rebates (HER)

IRA, Section 50121

- Performance-based program
- A minimum allocation of 10% must be reserved for low-income multifamily households

Modeled Energy Savings	Income Level (by building)	Rebate Amount
20% or greater	100% of households with incomes less than 80% AMI or pre-identified buildings that meets income requirements for WAP, LIHTC or other HUD-assistance programs to be announced by TDEC OEP	Lesser of \$16,000 per dwelling unit or 100% of project cost

Home Electrification and Appliance Rebate (HEAR)

IRA, Section 50122

- LMI focused program
- A minimum allocation of 10% must be reserved for low-income multifamily households

Eligible Rebate Recipient	Income Level (by building)	Rebate Amount
Owner of multifamily building or Eligible entity representative of multifamily building	100% of households with incomes less than 80% AMI or pre-identified buildings that meet income requirements for WAP, LIHTC or other HUD-assistance programs to be announced by TDEC OEP	100% of qualified project cost (maximum rebate \$14,000)

Panel Discussion

Let's Stay Connected



Continue the Conversation

Contact Georgia Caruthers to learn more:

gmcaruthers@tva.gov

Or

ConnectedCommunities@tva.gov



Join Our Connected Communities Network

Visit the Connected Communities website and sign up to be part of the Connected Communities Network:

tva.com/connectedcommunities



Access Our Resources

Access the Community Information Hub and relevant guides:

- [Community Information Hub](#)
- [Community Funding Guidebook](#)

TVA

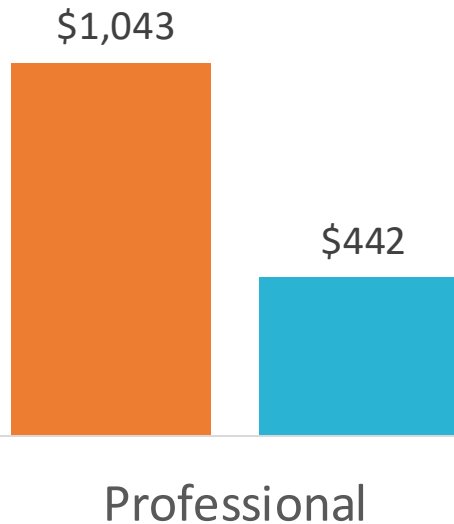
**TENNESSEE
VALLEY
AUTHORITY**

TVA Home Uplift TennCare Medicaid Claims Study

Pre-Post Analysis

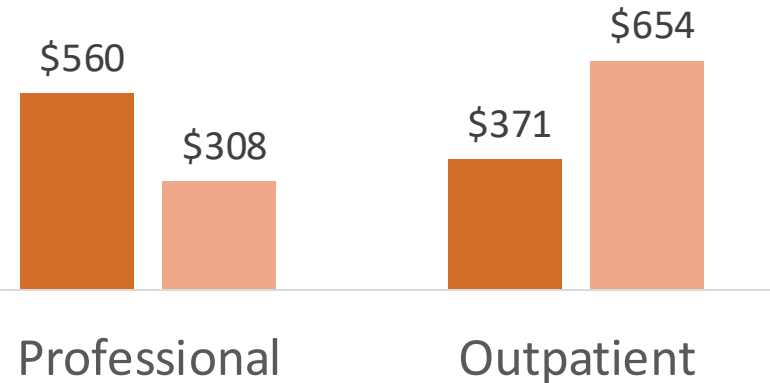
Asthma-Related Expenditures

Pre-Wx Post-Wx



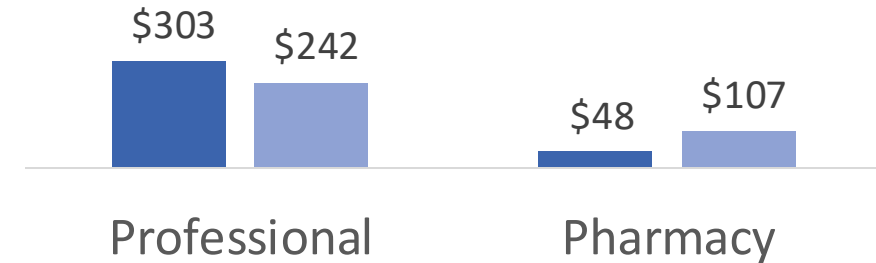
Respiratory-Related Expenditures

Pre-Wx Post-Wx



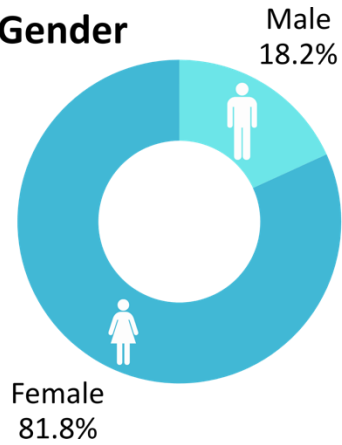
All Rhinitis/Cold-Like Symptom Expenditures

Pre-Wx Post-Wx

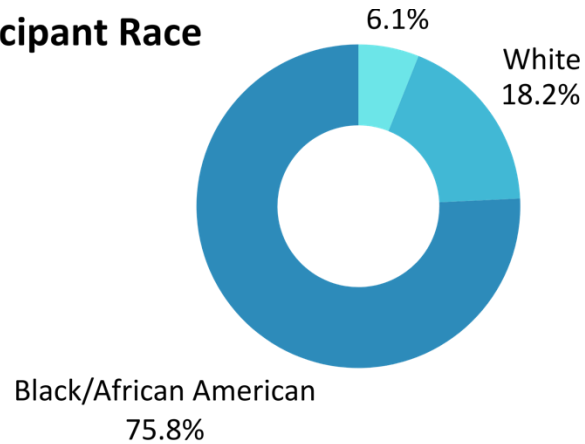


Participant Demographic Characteristics

Participant Gender



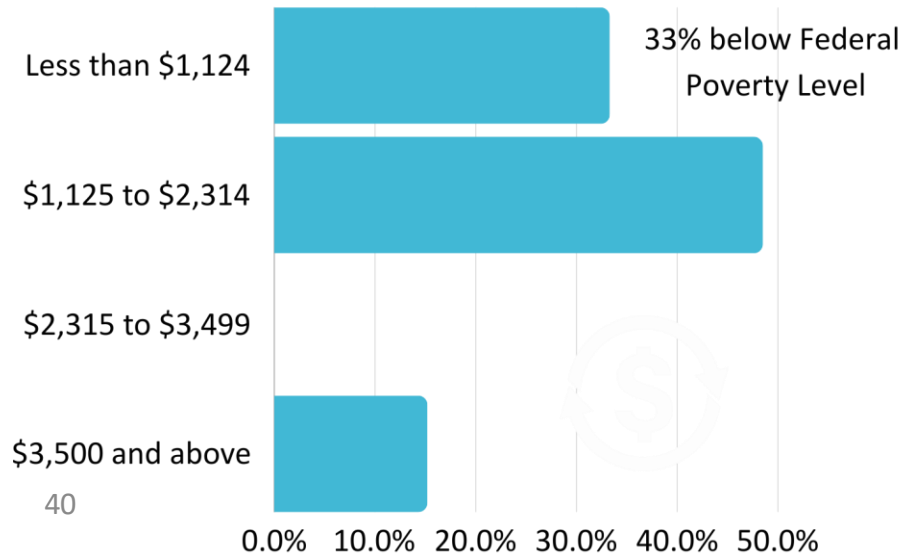
Participant Race



Home Ownership



Monthly Income

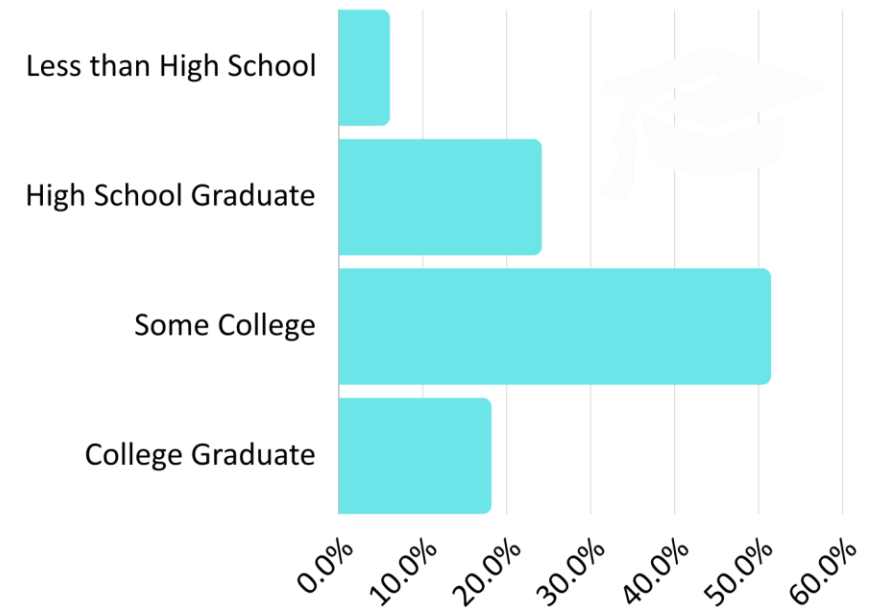


Median Age

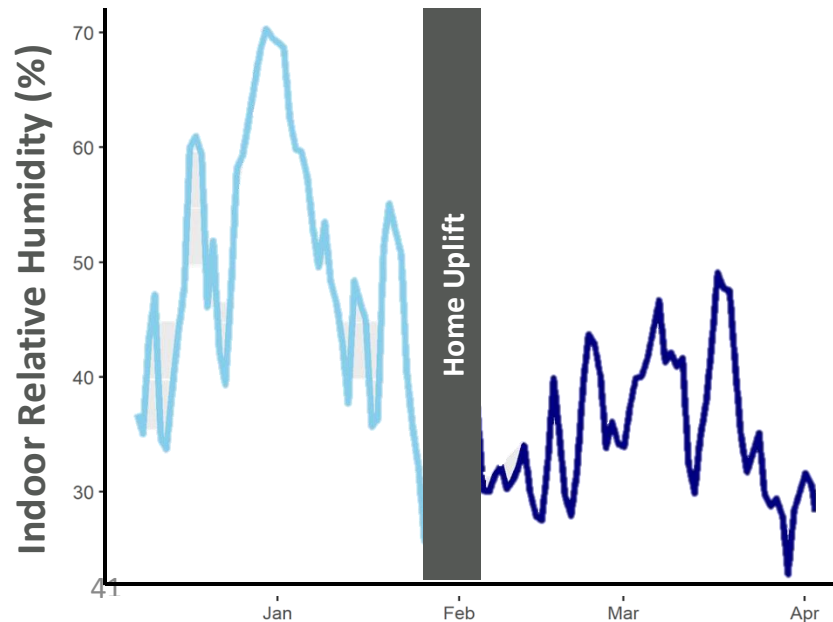
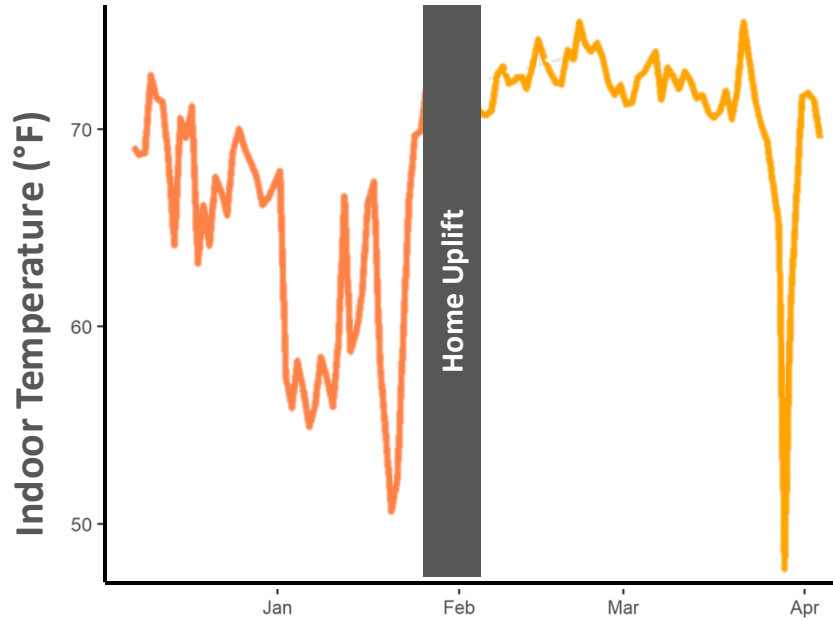


Years

Education Level



Temperature and Humidity Monitoring Study Outcomes; Case Example



Pre-Home Uplift

Post-Home Uplift

Average Indoor Temperature

65 °F

71 °F

Percent of time < 55 °F

10%

2%

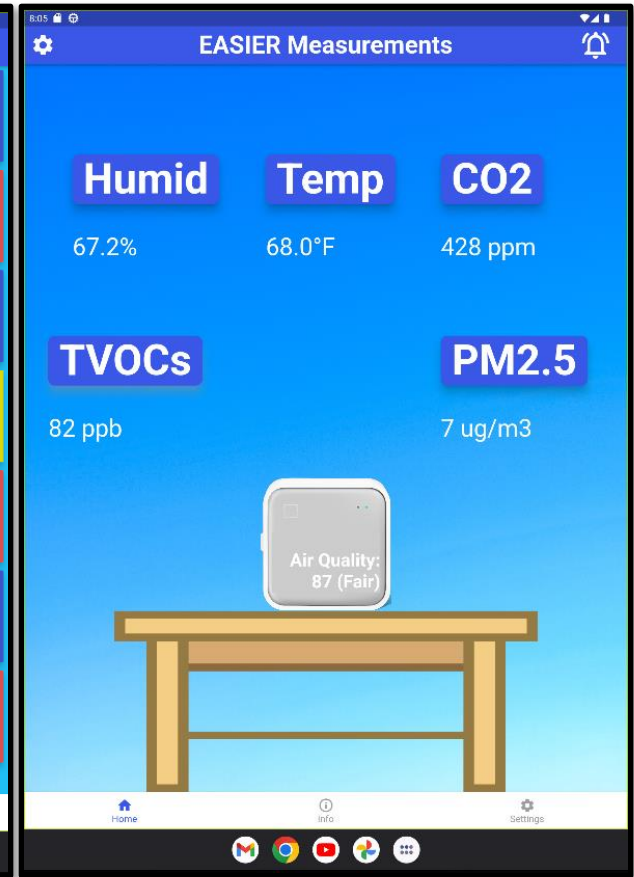
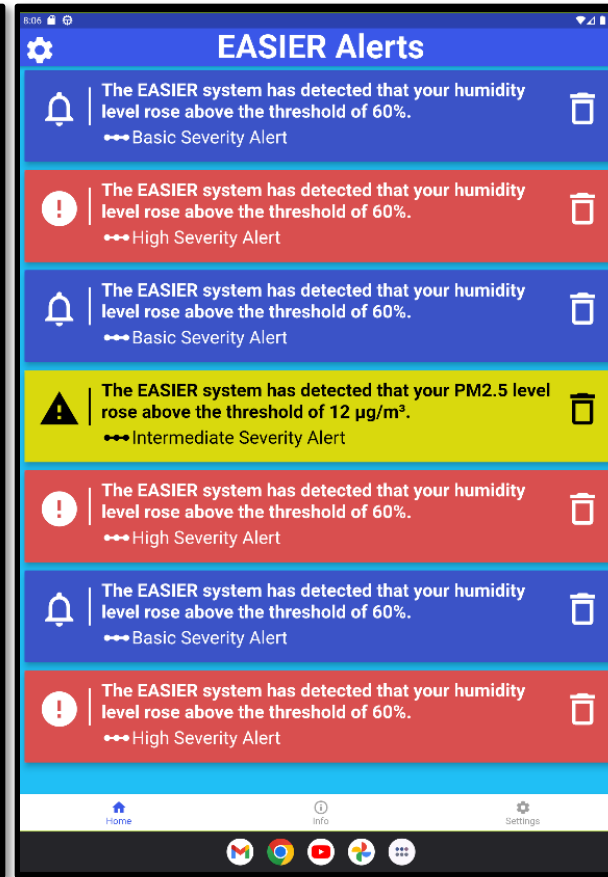
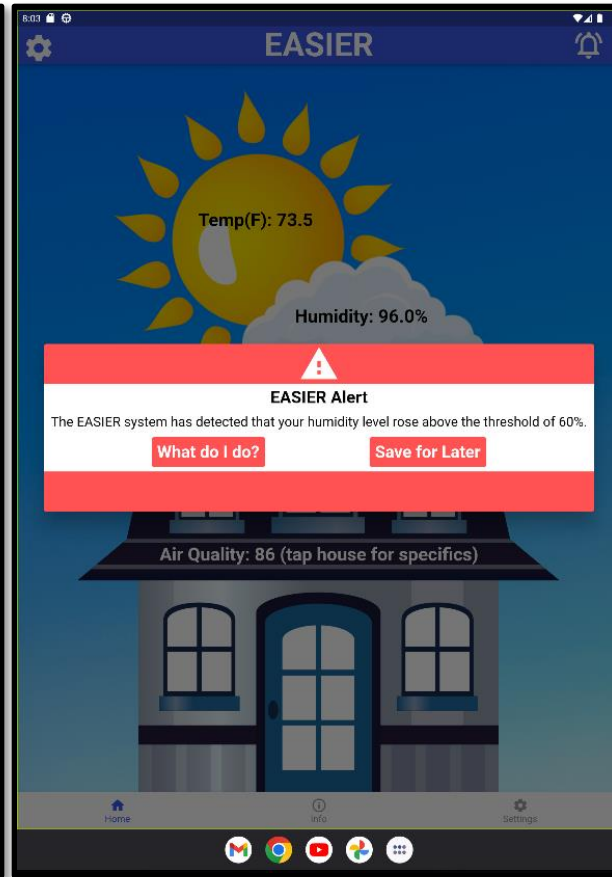
Average Indoor RH

48%

35%

*Funded by the TN Dept. of Environment and Conservation and TVA

Early Feedback & Alert Creation



Weatherization and Energy Insecurity



Definitions



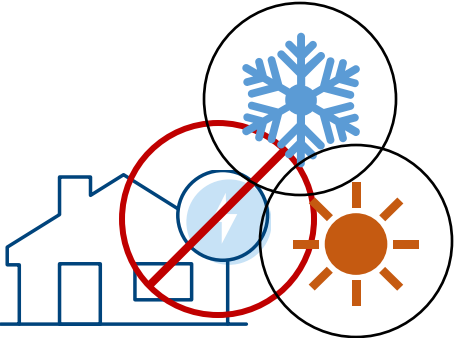
Energy Burden

A household is energy burdened if its costs for home energy are **greater than 6% of the household's annual income.**



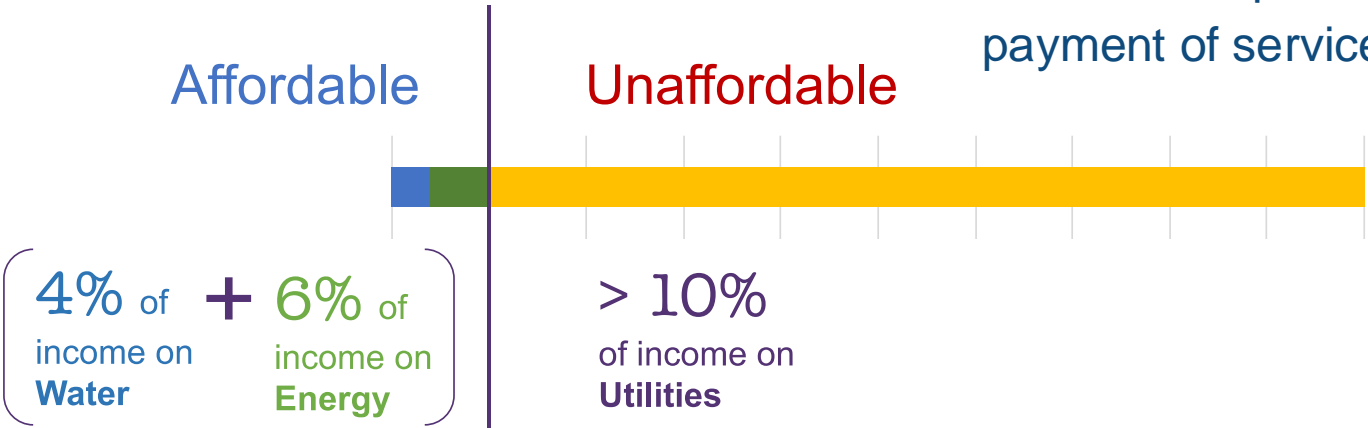
Energy Insecurity

Energy insecurity is often a result of unaffordable utilities due to high energy burden and can lead to disconnections or 'shut-offs' of power for non-payment of services.



Energy Poverty

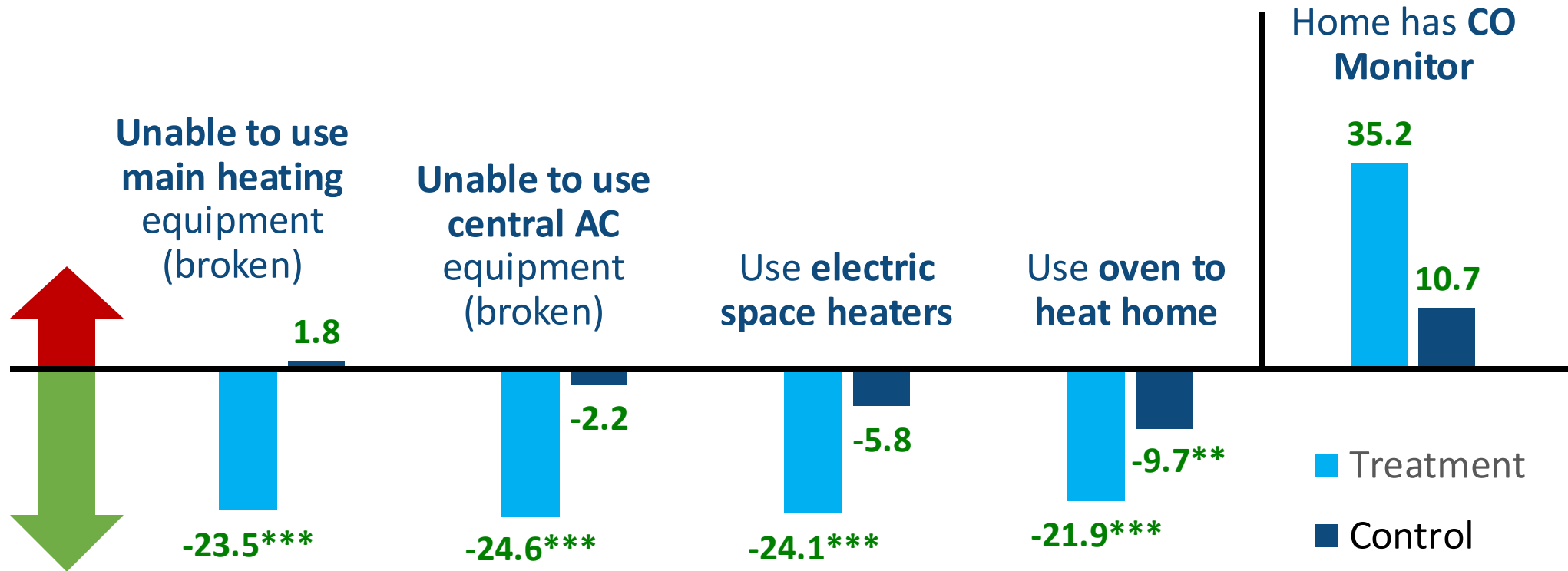
Energy (or fuel) poverty considers multiple factors (including energy burden and insecurity) that contribute to a household having uninterrupted access to enough power and equipment to adequately meet their basic needs – from heating and cooling to lighting and cooking.





Reductions (%) in Hazardous Conditions: Equipment

Improvement



Current National Energy Burden Study

- Update projected **energy characteristics** (energy consumption + expenditures) and **energy burden** of WAP eligible households for FY2023
- By proxy, reflect energy burden of clients served by WAP
- Assist with measuring the need for WAP and the program's effectiveness in meeting its statutory mandate to:

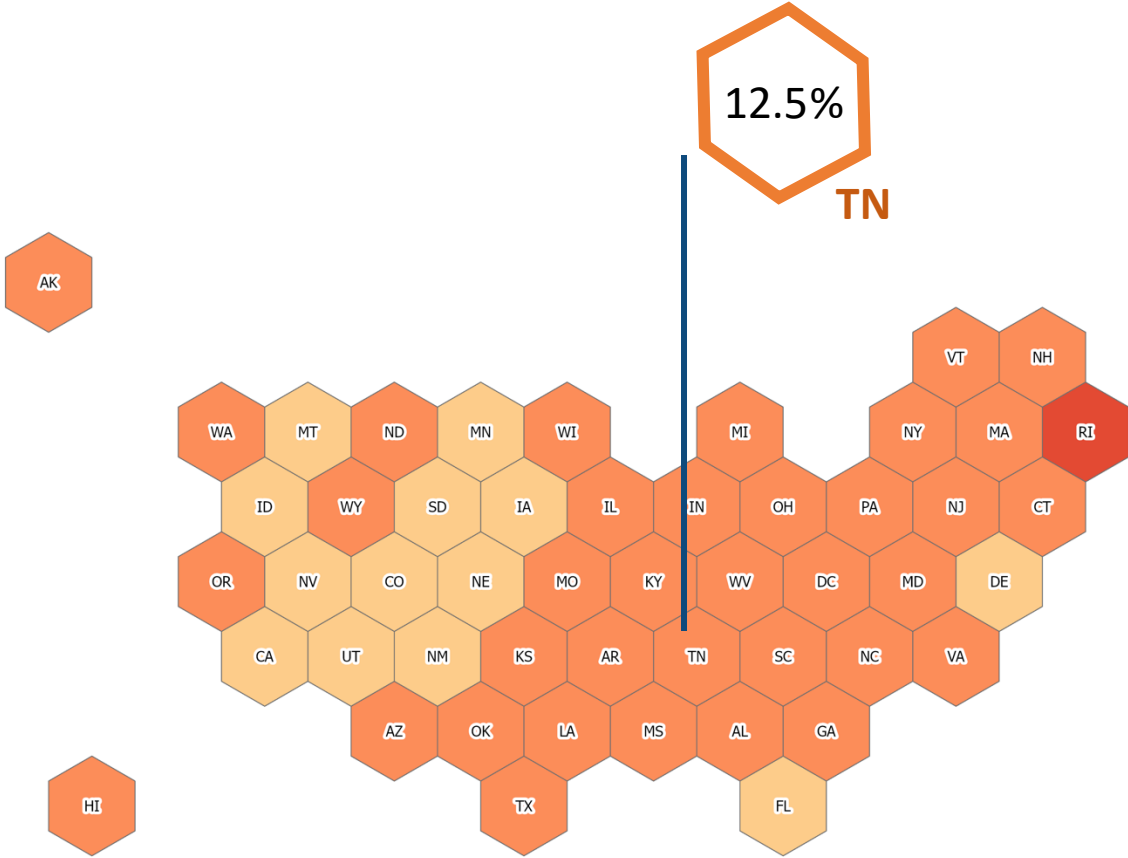
“reduce [...] total residential energy expenditures” while prioritizing assistance to targeted households including “high-residential energy users” and “households with high energy burden”

- These estimates provide insight into the potential for reductions in energy burden through energy savings as a result of WAP.



*Funded by the U.S. Department of Energy Weatherization Assistance Program Office

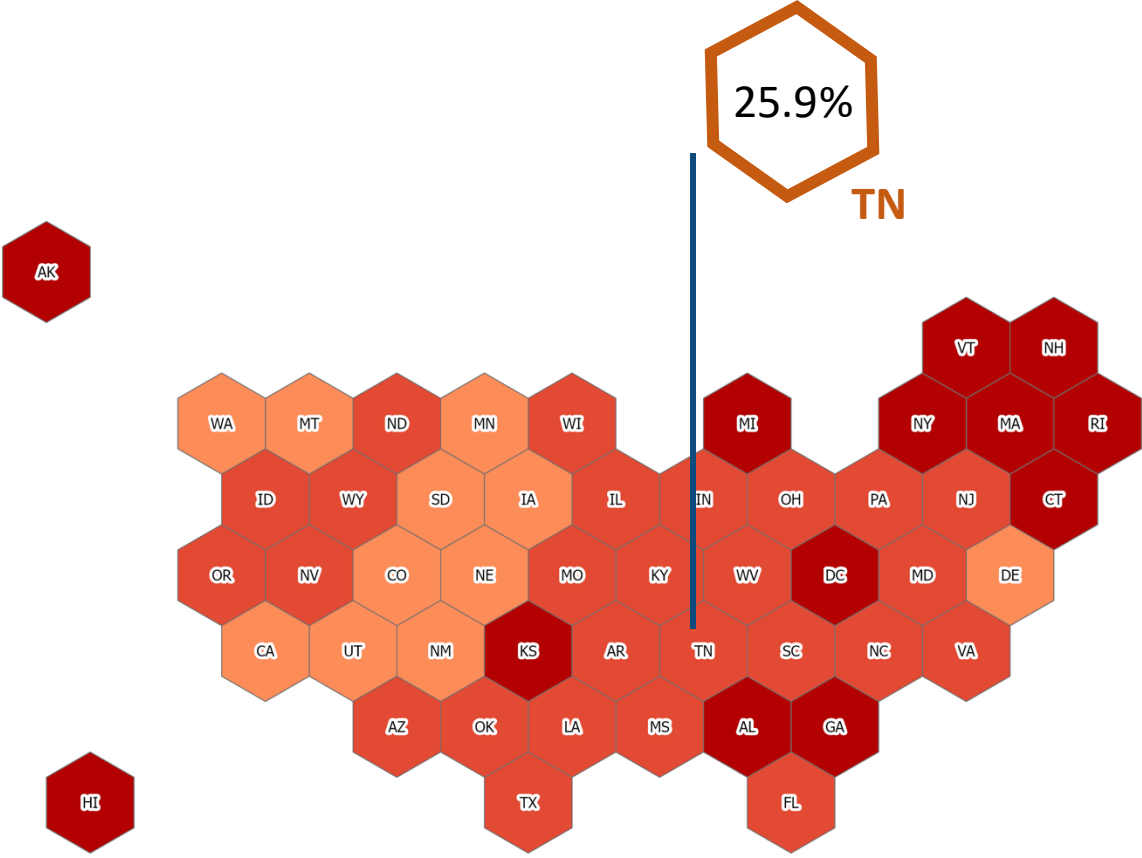
Energy Burden by State for 2023



< 200% Federal Poverty Level

0-6% 7-10% 11-20% 21-30% 31-50%

Energy Burden



< 100% Federal Poverty Level

0-6% 7-10% 11-20% 21-30% 31-50%

Energy Burden