Sector Working Group Meetings - April 22, 2025

This document is a compilation of notes taken during the two Working Group sessions hosted on April 22, 2025 to further develop CCAP measure. Working Group stakeholders participated in a "Measure Fair" where they wrote sticky notes on milestones, metrics, implementing authority, and equity considerations for the 19 CCAP measures - then discussed in breakout groups.

The project team reviewed stakeholder notes, organized them by measure, and added annotations (indicated in *italics*) to provide clarity, examples, and recommendations.

Notes from the Equity Working Group meeting hosted April 21 are in a separate document.

Acronyms

CAC: Community Action Committee
ETHRA: East Tennessee Human Resource Agency
KAT: Knoxville Area Transit
LPCs: local power companies
ORNL: Oak Ridge National Laboratory
TDA: Tennessee Department of Agriculture
TDEC: Tennessee Department of Environment and Conservation
TDOT: Tennessee Department of Transportation
TPO: Knoxville Regional Transportation Planning Organization
TSU: Tennessee State University
TVA: Tennessee Valley Authority
UT/UTK: University of Tennessee Knoxville

Key takeaways

Questions:

- *How do we maintain momentum on complex, long-term projects?*
- *Where does the money come from, and how do we incentivize initial investment?*
- *How do we 'matchmake' between nonprofits and private partners to create lasting collaboration?*
- *How can we use the CCAP plan as a lever to coordinate better across jurisdictions?*
- *How do we shift developer interests toward dense, green construction?*
- *Which cities can serve as implementation models for our region? (Austin? Pittsburgh?)*
- *How can homeowners identify the most cost-effective energy improvements?*
- *How do we show that climate planning is in the public's interest - especially in areas where people are lower-income or have negative perceptions about climate action?*

Action Priorities:

- Incorporate waste, energy, and emergency planning into climate resilience efforts proactively, not reactively (e.g., design circular solutions).
- Solar must be paired with maintenance plans and utility grid / battery storage integration.
- Prioritize residential energy peak-load reduction, ductwork improvements, weatherization, and design upgrades.
- Federal tax credits exist but aren't enough; additional incentives (e.g., local property tax breaks for installing solar) and mandatory building standards (e.g., energy audits) could drive uptake of energy efficiency solutions.
- Zoning reform could encourage multifamily housing located near transit and prevent community sprawl to lower transportation emissions.
- Incentivizing alternatives to single-passenger vehicle trips hinges on reducing cost, increasing ease, and improving the experience of alternative transportation options — especially for leisure trips where speed isn't critical.
- Consider public and freight rail, multimodal transportation corridors, and "quick build" and low-cost pilots like pedestrian crosswalks.

Best Practices for Implementation: Metrics, Monitoring, Pilots, Partnerships

- Embrace an iterative, "test run" approach (e.g., pilots), but ensure accountability and follow-through.
- Use clear timelines (short-, mid-, long-term) with accountability, and build on existing programs like Vision Zero and Safe Routes to School.
- Coordination among existing programs is weak; need better stakeholder alignment and data-sharing.
- Trade schools are growing, but job availability remains uncertain. Need to link training to market demand and project rollouts.
- Metrics should focus not just on direct measurements (e.g., EV sales) but on broader outcomes like fuel saved, health impacts, and behavior shifts.

- Reliable, localized data is critical, especially for equity and measuring long-term change; large datasets often miss key nuances.
- Objective metrics must be paired with community support indicators—success depends on adoption by new users and ongoing engagement to increase community buy-in.
- Sustainable changes will only stick if monetized; identify who stands to gain (e.g., private shuttle services, property owners) and align incentives.

Challenges to Creating Change

- City of Knoxville is grant lead but unable to enact change outside of jurisdiction, so BREATHE stakeholders are critical to leading efforts across region.
- Federal funding behind CPRG restricts political action, but the BREATHE initiative aims to increase understanding of key issues (such as regional utility structure) so climate stakeholders are better equipped to advocate for systemic change (such as net metering).
- Local governments face legal and political barriers to taking climate action (e.g. state pre-emption on building codes); need to find creative workarounds and local champions.
- Local energy code rollback shows the importance of enforcement, long-term planning, and perhaps offering support to offset compliance costs.
- Climate and equity messaging may deter some groups; adaptive framing is needed to broaden participation.
- Sudden, sweeping changes often fail - small steps like parking maximums and community solar can pave the way for bigger change.
- Programs like Idle Air failed due to conflicting interests (e.g., gas stations vs. emissions reduction), highlighting the need to anticipate opposition.
- Current community design assumes car ownership, making alternative transportation and mobility options impractical and inequitable.
- Upfront costs, lack of skilled labor, and low access to loans impede energy upgrades in residential and small commercial buildings (including places of worship).

Outreach Considerations:

- Educating the public on climate risks and benefits of action must be a top priority to build long-term support.
- Gaining public support is essential; strategies must be tailored by geography (urban vs. rural) and leverage trusted local institutions (schools, libraries).
- Expand communication to include healthier futures, children, and economic benefits instead of just climate/environmental impact.
- Community-based organizations (CBOs), digital tools, and logistical support (childcare, food, timing) are vital for inclusive, equitable participation.
- Identify key influencers and “activators” in the community, use social network mapping, and build long-term institutional knowledge and support.

Stakeholder Engagement:

- Engage boards and planning commissions, not just executives.
- Promote “non-ask” (i.e., voluntary, low-commitment) relationship building; careful policy wording is critical.
- Schools will be critical not just for educational efforts but also for fleet electrification, idling reduction, building efficiency, micro-agriculture, and more.
- Engage realtors, business owners, developers, chambers of commerce, large employers, and other private sector stakeholders in programs that provide mutual financial and other benefits.

Participant notes from Measure Fair

BUILDINGS

Measure 1: Increase uptake of energy efficiency and weatherization of residential, commercial, and industrial buildings through: increased marketing, education and outreach around technologies, funding opportunities, and maintenance and behavior changes; provide new or expanded incentives to support implementation; and, consider and implement solutions to incentivize landlords to make upgrades with managing resident costs.

Milestones

- Expand weatherization and energy efficiency programming to incorporate emerging building technologies and building science.
    - *Example: Integrate smart thermostats, advanced insulation materials, and high-performance windows into weatherization offerings*.
- Provide training and funding to grow the local weatherization workforce.
    - *Example: Partner with local technical colleges to create or grow HVAC and energy auditor certification programs*.
- Require energy audits for all new residential construction to ensure homes meet minimum energy performance standards.
- Strengthen building code enforcement for new construction and renovations.
- Develop area-wide and building-specific energy savings estimates for retrofit projects.
    - Example: Collaborate with ORNL to conduct energy modeling at the neighborhood or building stock level.
- Educate HVAC companies and contractors on high-efficiency technologies and practices.
- Prioritize implementation of high-efficiency measures targeted at peak load reduction and survivability.
- Offer more incentives and zero-interest loans for both developers and homeowners to support weatherization and energy efficiency upgrades.

Metrics

- Improvements in housing stock resilience, tracked through building condition assessments and surveys.
- Reduction in energy demand, as recorded through utility data from LPCs.
- Total dollar savings realized by households participating in weatherization and energy efficiency programs.

Implementation Authority

- *Local Governments*: Enforce building codes and audit requirements; monitor compliance with updated energy efficiency standards.
    - *Example: City of Knoxville Plans Review & Inspections*

- *Community Development programs of city/county governments and partner agencies:* Oversee investments in housing upgrades and affordability programs.
    - *Example: Knoxville's Community Development Corporation*
- *LPCs:* Administer energy efficiency and demand response programs; provide energy use data for measure tracking.
    - *Example: Knoxville Utilities Board*
- TVA: Fund and administer rebates and incentives.
- *Community Action Committees:* Administer weatherization assistance programs to qualifying households.
    - *Example: Knoxville-Knox County CAC's Home Repair and Weatherization Program*
- Contractors: Install high-efficiency HVAC, weatherization, and retrofit measures; promote available incentives.
- Nonprofit and Religious Organizations: Conduct outreach and community engagement, particularly in vulnerable areas.
- ORNL: Support technical modeling and analysis of energy savings potential.

Equity Considerations

- Design incentives and funding opportunities to ensure accessibility for low- and moderate-income households.
- Ensure programs maintain affordability for renters and homeowners.
- Expand emergency repair, health and safety, and Neighborhood Empowerment Network (NeN) programs to stabilize homes prior to energy efficiency upgrades.
- Form partnerships with LPCs, TVA, ORNL, and regional nonprofits to subsidize access to new technologies and behavioral programs for underserved communities.
- Engage trusted community groups to deliver outreach and information, particularly in vulnerable neighborhoods.

Cost Considerations

- Expand availability of zero-interest loans for weatherization and efficiency improvements.
- Leverage existing incentives from TVA and potential Inflation Reduction Act (IRA) funding to minimize upfront costs.
- Explore bulk purchasing or coordinated procurement programs to lower equipment and installation costs.
- Design incentives to ensure program accessibility and avoid cost burdens for renters.

Gaps and Other Considerations

- No specific targets set for the number of existing homes or commercial buildings to be weatherized or upgraded.
- No metrics focused on equitable outcomes (e.g., % of improvements in low- and moderate-income households).

Measure 2: Plan for and implement energy efficiency upgrades in and take other actions to decarbonize public buildings (e.g., electrification).

Milestones

- Establish minimum standards for new public buildings and make these targets accessible.
    - *Example: "solar ready" construction standard (i.e. having structure, coordination, and plan in place to add solar at a later phase)*
- Fund a *home weatherization program* for low-income housing.
    - Example: TVA and City of Knoxville's Extreme Energy Makeover (KEEM) program
- Encourage efficiency as a priority during HVAC maintenance.
- Encourage and promote easily-implementable, high-savings measures in public buildings (e.g., lighting, HVAC, solar, plumbing etc.) (potentially self-funded).
    - *Example: City of Knoxville's energy savings performance contract*
- Utilize wastewater as a source of thermal energy through wastewater energy exchange.
    - Example: SHARC energy *(private company)*
- *Optimize* west- and southwest-facing windows *to reduce solar heat*.
    - Example: awnings, overhangs, low solar heat gain windows
- Establish a plan to retrofit older, less-efficient systems with new technology (i.e. replacing fluorescent lightbulbs with LEDs).
- Improved building controls with more sensors and zoned HVAC.
- Implement green and/or solar roofs on all flat-roof public buildings.
- Utilize ORNL's carbon map to analyze energy use and identify locations where efficiency improvements should be prioritized.
- Work with LPCs and TVA to reduce emissions from grid electricity. Urge TVA to invest in clean energy instead of natural gas and coal plants to meet growing consumer demand.
- Engage local American Institute of Architects (AIA) and the East Tennessee Community Design Center (ETCDC) to provide expertise on how to best decarbonize buildings.

Metrics

- 'Test in, Test out' efficiency measures
- Post-occupancy tracking or benchmark energy use compared to average for similar buildings
- Energy use intensity
- Local energy consumption
- *General data source for metrics:* Utility analysis

Implementation Authority

- Local Governments: Determine which public buildings to decarbonize and coordinate implementation.
- State Government: Provide legislative and financial support.
- Energy Service Companies (ESCOs): Provide Energy Savings Performance Contracts (ESPCs) *to audit buildings, guarantee savings, and finance efficiency upgrades*.
- LPCs: pursue Utility Energy Service Contracts (UESCs) to implement efficiency upgrades.
- TVA: Assess potential energy efficiency upgrades for public buildings and coordinate installation with local governments.
- Community Organizations: Promote local awareness of the initiatives.
- Developers: Provide expertise on building efficiency and high-impact upgrades.

- Engineers: Provide expertise on energy efficiency.

Equity Considerations

- Help low-income areas reach net negative emissions.
- Government lead by example for members of the community to follow.
- Emphasize public service buildings like libraries, community centers, etc.
- Potential for job creation that targets disadvantaged youth (e.g., electricians).

Cost Considerations

- Apply for federal and state funding to implement decarbonization measures in public buildings.
- Work with TVA to consider potential incentives and ways to reduce costs for the implementation of energy efficient systems.

Gaps and Other Considerations

- *None identified*

Measure 3: Study, plan for and implement targeted electrification of residential, commercial, and industrial buildings.

Milestones

- Incentivize the adoption of updated building codes that favor electrification.
    - Example: Update codes to prioritize all-electric construction in residential and commercial sectors.
- Incentivize programs that combine electrification with demand response, energy efficiency, and lead management strategies.
- Promote geothermal heat pumps as a first-choice technology for new construction.
    - Example: Model local programs after New York state's Clean Heat incentives and ground source heat pump promotion.
- Modernize underground utility infrastructure to enhance resilience against extreme weather.
- Offer reasonable incentives for solar and storage installations through local utilities.
- Develop and deploy preliminary "no-touch" virtual audits (digital twins) to optimize retrofit packages for every building.
- Expand education initiatives to help individuals and organizations navigate available electrification funding options.
- Expand incentive programs to support LED lighting upgrades in commercial and residential buildings.
- Reform utility incentives to shift from promoting natural gas toward electrification.

Metrics

- Reductions in electricity and natural gas consumption.
- Percentage of homes and buildings electrified relative to comparable MSAs.

- Number of buildings retrofitted.
- Participation rates in incentive programs.

Implementation Authority

- LPCs: Administer incentive programs and support electrification infrastructure upgrades.
- TVA: Set regional policies to allow local flexibility in energy programs.
- State Government: Fund and administer programs for weatherization, efficiency, and electrification, such as the Weatherization Assistance Program (WAP) and State Energy Conservation Program (SCEP)
- Energy Service Companies (ESCOs): Provide building audits and implement large-scale building retrofit and electrification projects.
- Developers: Provide expertise on building electrification.

Equity Considerations

- Provide subsidies or protections to prevent property value increases from displacing residents in gentrifying communities.
- Support affordable fuel and technology choices for households with high energy burdens.
- Address impacts on homebound patients who depend on electric medical equipment.
- Target weatherization and electrification programs toward low- and moderate-income households.
- *Minimize electrification efforts in low-income areas due to higher cost burden.*
- Plan for an equitable transition in areas where LPCs sell natural gas, ensuring that electrification does not create cost burdens for gas-dependent customers.

Cost Considerations

- Expand incentive programs for electrification (rebates, zero-interest loans, tax breaks).
- Reduce utility incentives that promote natural gas over electricity.
- Leverage federal programs (WAP, SCEP) and local funding partnerships to subsidize electrification installations in underserved areas.
- Support programs for affordable installation of distributed generation (e.g. solar + battery storage) to reduce long-term energy costs.

Gaps and Other Considerations

- *None identified*

TRANSPORTATION

Measure 4: Accelerate use of passenger electric vehicles (EVs) across the region through education, incentives, and partnerships.

Milestones

- Support and expand EV charging infrastructure to improve connectivity and reliability across all areas of the community.
- Provide EV charging education led by actual EV drivers to reduce range anxiety and improve consumer understanding.
- Focus EV infrastructure development on Level 2 chargers for local destinations (businesses, entertainment) while maintaining DC fast chargers for long-distance travel.
- Establish regional targets for the number of public EV charging stations available in each community.
- Subsidize EV purchases through rebates, direct-pay options, and support for the used EV market.
- Identify and provide resources to make EV ownership more affordable for renters and low- to moderate-income buyers.
- Develop partnerships with dealerships and conduct ride-and-drive events to educate the public and boost EV adoption.
- Create or expand EV rideshare and rental programs, especially near public housing developments.
    - Example: Explore CityCar-type programs to offer low-cost, short-term EV rentals in urban areas.
    - Example: EV rideshare program implemented in Charlotte, NC.

Metrics

- Number of EV registrations.
- Number and distribution of public EV charging stations.
- Access to Level 2 and DC fast chargers in business, entertainment, and residential areas.
- Participation in EV purchase rebate programs.

Implementation Authority

- Public-Private Partnerships
- UT Center for Transportation Research
- LPCs and TVA
    - Develop and manage sustainable transportation electrification programs, including managed charging and vehicle-to-grid (V2G) initiatives
    - Deploy chargers in low- to moderate-income communities.
- Community Organizations: Conduct outreach and establish partnerships for expanding EV awareness.
- TDOT: Coordinate and fill in gaps in public EV charging infrastructure; *incentivize adoption of EVs (e.g. by removing additional fees for EV registration)*
    - *Example: TDOT leading Tennessee Electric Vehicle Infrastructure (TEVI) initiative*

Equity Considerations

- Address high purchase costs of EVs through subsidies, rebates, and direct pay incentives.
- Continue supporting public transit improvements as a mobility option for residents who cannot afford EVs.
- Support multi-family housing and rental properties by increasing access to affordable home and public charging infrastructure.

- Deploy utility-owned chargers in low- and moderate-income communities to ensure equitable access.
- Expand EV rideshare options in underserved areas to provide affordable access to clean transportation.
- Educate renters and low-income drivers about EV ownership options, including used EV purchases and shared mobility programs.

Cost Considerations

- Subsidize EV purchases and charging infrastructure to lower upfront ownership costs.
- Promote used EVs and short-term rental options to provide affordable electrification pathways.
- Develop direct-pay models or rebate programs to overcome tax liability barriers (particularly for low-income buyers who can't benefit from tax credits).

Gaps and Other Considerations

- *None identified*

Measure 5: Transition to electric and alternative fuel vehicles (EVs & AFVs) in public fleets, including government fleets, transit agencies, and school buses.

Milestones

- Focus initial implementation on short-run, high-pollution diesel vehicles (e.g., school buses, garbage trucks, drayage vehicles).
- Develop and adopt green fleet policies.
    - Example: City of Knoxville Green Fleet policy
- Electrify school bus fleets to further reduce idling emissions and reliance on fossil fuels.
- Engage with community school leadership and families to promote the local health benefits of electrification - especially children's respiratory health.
- Advocate for state and federal funding to support public fleet transitions.
- Explore vehicle-to-grid (V2G) technologies to enhance fleet resilience and reduce costs.

Metrics

- Number or percentage of fleet vehicles transitioned to electric or alternative fuel vehicles.
- Long-term cost savings from fuel and maintenance reductions.

Implementation Authority

- School Administration & Boards: Responsible for decisions related to school buses.
- Private Companies: Own and operate school buses for school systems.
    - *Example: Knox County Schools contracts ~100 individual bus operators*.
- TVA and Knoxville Center for Behavioral Health (KCB): *Mentioned as potential partners or authorities*
- *Local transit agencies (such as KAT and CAC): purchase and operate electric vehicles*.
    - *Example: KAT's Decarbonization Plan and ~18 EV buses already in service*

Equity Considerations

- Prioritize deployment of electric buses in communities with high asthma rates to address health disparities.
- Prevent fare increases that could burden low-income transit riders through funding or subsidies.
- Ensure equitable transition through fair treatment of all school bus contractors.
- Promote resource-sharing (e.g. collective procurement) among municipalities to meet fleet electrification goals.

Cost Considerations

- Leverage existing federal and state grants/programs to reduce upfront costs for vehicle acquisition and infrastructure.

Gaps and Other Considerations

- No existing plan to secure or coordinate grants and incentives across agencies.

Measure 6: Expand publicly accessible and private electric vehicle and alternative fueling infrastructure through education, regional siting analyses, incentives, partnerships, and other opportunities.

Milestones

- Conduct regional siting analyses to identify optimal locations for Level 2 chargers at destinations where people stay for longer periods (e.g., homes, movies, concert halls, office buildings).
- Partner with the UT Center for Transportation Research to apply innovations in charging infrastructure and grid resilience.
- Reform local zoning laws to allow and encourage more EV charging infrastructure near residential areas.
- Promote installation of EV chargers at gas stations through new or updated regulations.
- Expand deployment of solar-powered EV charging stations that operate independently of the grid to enhance resilience during natural disasters.
    - *Example: ARC (private company)*
- Ensure public chargers operated by local governments have real-time status updates publicly available to improve user trust and accessibility.
    - Example: Maintain charger status updates via PlugShare or similar platforms.
- Engage faith-based organizations to install chargers in underserved areas.
- Offer incentives to private businesses to install free public chargers.
- Include electric bikes (e-bikes) in planning for charging infrastructure expansion.

Metrics

- Gallons of gasoline avoided through EV charging expansion.
- Total number and geographic coverage of public and private charging stations.

- Uptake of innovations developed by UT Center for Transportation Research.
- Operational use time of chargers.
- Equitable distribution of charging infrastructure across neighborhoods and region.
    - *Example: City of Knoxville data-based EV siting map & survey tools*

Implementation Authority

- Local Governments: Lead planning, zoning reform, and public charger deployment.
    - *Example: City of Knoxville offers ~30 public chargers*
- TDOT: Integrate EV infrastructure into transportation projects.
- UT Center for Transportation Research: Provide technical expertise and analysis.
- LPCs: Assist with grid integration and financial incentives for EV chargers.
    - *Example: KUB EV charger rebate*
- TVA: Incentivize EV infrastructure development; *promote vehicle-to-home and vehicle-to-grid integration*.
- Federal Government: Fund and regulate EV infrastructure expansion.
- Private Companies: Install and maintain charging stations.

Equity Considerations

- Train a diversified workforce and create new job opportunities to support EV infrastructure expansion.
- Address concerns that EV infrastructure investment may lead to gentrification by ensuring equitable placement and affordability protections.
- Engage faith-based organizations in siting and hosting chargers in underserved communities.
- Recognize that EV battery warranties currently disincentivize vehicle-to-home (V2H) and vehicle-to-grid (V2G) modifications; consider offering rebates or incentives to offset this economic barrier for low-income households.

Cost Considerations

- Explore cost-sharing models between local governments, TDOT, and private businesses for charger installation and maintenance.
- Invest in resilient, solar-powered charging options like EV ARC stations to reduce grid reliance and demand.
- Offer financial support (e.g., rebates) to encourage vehicle-to-home (V2H) and vehicle-to-grid (V2G) technologies without penalizing EV owners.

Gaps and Other Considerations

- No clearly designated entity responsible for monitoring and maintaining charger operational status.

Measure 7: Optimize and improve efficiency of freight routes.

Milestones

- Support public-private partnerships to develop hybrid freight/passenger rail lines to reduce road traffic and emissions.
- Designate priority freight corridors to streamline routing and minimize total miles traveled.
- Promote the electrification of freight systems, including trucks and rail where feasible.
- Track regional companies' goals and progress toward fleet electrification.
    - Example: EPRI "Road Map" tool monitors fleet transition goals.
- Develop utility heatmaps to identify locations where installing electric truck chargers would not require major grid upgrades.
- Explore idling-reduction solutions at truck stops and encourage fuel stations to promote clean air measures.
    - Example: Idle Air pilot at fueling stations

Metrics

- Reduction in total freight miles traveled.

Implementation Authority

- TPO: *Coordinate regional freight and rail planning*.
- TDOT: *Support freight corridor designations and truck electrification efforts*.
- Private Fleets & Freight Companies: *Implement optimized routing, idle reduction, and fleet electrification measures*.
- LPCs and TVA: Plan and build charging infrastructure to support freight electrification.

Equity Considerations

- Prioritize emission reductions along highways and freight corridors near low-income and disadvantaged communities or communities with public health concerns.

Cost Considerations

- Promote public-private partnerships to increase investment in electrified freight infrastructure.
- Minimize costs of utility grid upgrades by strategically siting truck chargers.
- Offer tax breaks or incentives for companies adopting truck electrification and idle reduction technologies.

Gaps and Other Considerations

- Need more clarity on how TPO, TDOT, utilities, and private sector will implement this measure and coordinate efforts.

Measure 8: Improve transportation systems through sustainable construction practices.

Milestones

- Encourage the use of recycled materials (e.g., recycled tires, glass sand) in asphalt and concrete for transportation projects.
- Partner with UT to explore innovative and sustainable transportation materials.

- Promote greater community density to enhance transportation system efficiency and reduce infrastructure needs.
- Improve material collection systems at recycling centers and other sites for reuse in construction.
- Explore alternative materials for sidewalks that resist heat absorption and root disruption.
    - Example: Test light-colored asphalt or porous concrete alternatives for sidewalks.
- Require thorough cost-benefit assessments of retrofit versus replacement options in transportation infrastructure projects to promote reuse.
- Consider updating building codes or offering property tax incentives to promote use of efficiently-produced and durable, long-lived construction materials (e.g., higher quality concrete).

Metrics

- Number of jobs created in advanced manufacturing and sustainable construction.
- Amount of recycled and reused materials incorporated into transportation infrastructure (e.g., tracked through receipts or reporting on concrete and steel usage).

Implementation Authority

- Local Governments: *Lead transportation construction projects (including procurement) and zoning code updates*.
- State Government: *Develop and enforce policies that promote sustainable materials and recycling*.
- UT: Research and pilot *low-waste* materials and construction technologies.

Equity Considerations

- Target job training and placement programs in sustainable construction and advanced manufacturing toward disadvantaged populations.
- Focus infrastructure upgrades in areas that historically lack access to safe, resilient transportation infrastructure.

Cost Considerations

- Promote the use of recycled and reused materials to lower procurement costs and project life-cycle emissions.
- Develop property tax incentives to encourage the use of longer-lasting, sustainable construction materials.
- Design infrastructure projects to minimize lifecycle costs through enhanced durability and efficiency.

Gaps and Other Considerations

- Ensure active transportation users (pedestrians, cyclists) are considered during construction detours and planning.

Measure 9: Improve transportation systems' management and operations through new policies and practices (e.g., optimization to improve traffic flow, reduce idling, reduce VMT, etc.).

Milestones

- Adopt zoning and building regulations that increase density in the urban core and designated development areas.
- Expand air pollution mitigation programs by reducing school bus and personal vehicle idling, particularly in school zones.
    - Example: Implement school-based campaigns encouraging drivers to wait inside cooled buildings rather than idling vehicles; implement "no idling" policies at schools.
- Construct park-and-ride lots to support regional commuting and reduce single-occupancy vehicle travel.
- Promote installation of roundabouts where appropriate to improve traffic flow, reduce congestion, and lower emissions.
- Establish designated bus lanes on interstate highways and local corridors where feasible.
- Add direct bus routes to major regional destinations.
    - Example: Add service routes connecting downtown Knoxville, ORNL, and McGhee Tyson Airport.
- Launch "Cash for Clunkers"-style incentive programs to encourage turnover of older, higher-polluting vehicles.
- Conduct regular vehicle emissions testing and incentivize repair, particularly targeted to low-income drivers.
    - *Example: no- and low-cost repair programs offered through TCAT, churches, and other community hubs (see https://www.knoxschools.org/Page/18547). Incentives for medium- and heavy-duty vehicles may be available at the state level.*

Metrics

- Reduction in the number of cars on interstate highways.
- Average commute times and other traffic congestion metrics.

Implementation Authority

- Local Governments: *Lead traffic optimization efforts and park-and-ride development.*
- TDOT: *Support freight and interstate bus lane planning and traffic management.*
- ORNL: *Provide modeling and simulation support for traffic flow improvements.*
- School Boards, Principals, PTAs: *Implement anti-idling programs, share information with parents on health benefits of low-no idle, and promote fleet electrification.*

Equity Considerations

- Focus on reducing emissions in areas most impacted by heavy vehicle traffic and in communities with higher respiratory risk.
- Incentivize vehicle repairs and upgrades for low-income drivers through financial assistance programs.

- Design public transit improvements (e.g., direct bus routes) to ensure they serve a broad demographic, improving mobility options for all.
- Incorporate urban greening (e.g., tree planting in roundabout center islands) to enhance livability and environmental benefits in all communities.

Cost Considerations

- Upgrade signals and traffic lights as a relatively low-cost, high-impact congestion reduction strategy.
    - *Example: replacing equipment with vehicle sensor tech (higher cost) vs. reassessing optimal timing and frequency with updated modelling (lower cost)*
- Prioritize low-cost anti-idling programs at schools and community hubs.
- Use incentive programs (e.g., Cash for Clunkers) to cost-effectively accelerate turnover of high-emission vehicles.

Gaps and Other Considerations

- *None identified*

Measure 10: Expand and improve public transit infrastructure to create safe, reliable and affordable options for the region. Base these changes on studies, new and expanded programs, and community engagement to provide more mobility options for residents to access work and amenities

Milestones

- Expand and upgrade transit infrastructure.
    - Restrict and eventually eliminate on-street parking to prioritize dedicated bus lanes, bike lanes, and pedestrian spaces.
    - Improve sidewalks and pedestrian access to bus stops, especially in high-use corridors.
        - *Example: prioritize transit access in Knox Loves Bikes corridors where local businesses offer discounts to bicyclists.*
    - Increase shade coverage at bus stops through tree plantings and other design enhancements.
    - Install lights and shelters at bus stops to improve rider safety and comfort.
    - Promote higher residential and commercial density within ½ mile of bus stops to encourage transit-oriented development.
- Improve transit service and reliability to encourage use.
    - Design and implement a regional park-and-ride network to improve transit accessibility and ridership.
    - Increase bus service frequency to reduce wait times and make transit a viable option for more residents.
    - Ensure wait times are accurate and reliable.
    - Provide backup transportation options for transit riders (e.g., limited late-night service or rideshare subsidies for riders who miss the last bus).

    - Explore microtransit systems to provide first-/last-mile connections from bus stops.
    - Provide Wi-Fi and power outlets on buses.
- Offer free or reduced-cost public transit to lower barriers to use.
- Use arts-based education and outreach (movies, music, visual arts) to improve negative perceptions of public transportation.

Metrics

- Transit ridership.
- Number of bus routes.
- Frequency of service (shorter headways and reduced wait times).
- Number of bus stops with shelters, lighting, and shaded areas.

Implementation Authority

- Local Governments: *Support regional transit and lead local infrastructure improvements*.
- TPO: *Coordinate regional transit planning, identify funding, and lead transit expansion*.
- TDOT
- CAC and ETHRA: *provide first-/last-mile service throughout region*

Equity Considerations

- Expand routes and increase service frequency in low-income communities or areas of low vehicle ownership.
- Prioritize improvements to increase comfort and safety, especially for riders traveling along high-traffic or historically neglected corridors.
- Address cost barriers by offering free or reduced transit fares.
- Involve bus riders and community groups in planning and decision-making to ensure investments reflect real user needs.
- Frame transit improvements as community investments for everyone, helping to combat stigma associated with transit use.
- Prepare for increased KAT riders as systems become more efficient and comfortable.
- Increased coordination will reduce wait times, expand ridership, and build community trust.

Cost Considerations

- Invest in low-cost, high-impact improvements (e.g., shading, shelters, sidewalk upgrades).
- Pursue grants and partnerships to fund free or reduced transit fares.
- Leverage state and federal transit funding sources for infrastructure upgrades and microtransit pilots.

Gaps and Other Considerations

- *None identified*

Measure 11: Boost active transportation and the use of alternative transportation systems through expanding safe, reliable and affordable options, and marketing those options

Milestones

- Integrate arts and engineering to promote active and public transportation (e.g., make bicycle safety barriers out of used tires and let the artists design the barriers).
- Establish e-bike rental programs and purchase incentives.
- Work with agencies providing e-bikes to ensure they are efficient and available to riders.
- Expand sidewalks.
- Implement protected bike infrastructure to increase ridership and safety.
    - Separate bike lanes from traffic by creating a physical barrier of parked cars.
    - Close selected downtown streets to vehicles.
    - Connect greenways with sidewalks and bike lanes.
    - Ensure safe bike paths to schools to encourage ridership at a young age.
    - Increase support to existing programs such as Bike to School/Work initiatives.
    - Incorporate biking safety into school safety patrol programs.
    - Provide safe storage/parking space options for bikes.

Metrics

- Modal share
- Ridership
- Miles of bike lanes
- Miles of greenway
- Miles of sidewalks

Implementation Authority

- TPO: Encourage public and active transit ridership through existing Smart Trips program; facilitate planning for regional transit and active transportation system improvements.
- KAT: Provide and expand public transit service; improve accessibility and efficiency.
    - *Example: KAT Reimagined*
- CAC: Provide affordable door to door transportation services throughout region.
- *Community Organizations (such as Kickstand, Two Bikes): provide low- and no-cost bicycles and rider education*.

Equity Considerations

- Universal accessibility and sidewalk repairs often counteract each other with car topography. It is important to balance walkability and sidewalk condition in high-traffic areas to ensure safety for all road users.
- Prioritize active transit and public transit improvements in low-income neighborhoods and areas with low car ownership.
- Utilize local resources to help community members access low- or no-cost bicycles and provide trainings on bike repair at schools.

Cost Considerations

- Work with private developers to increase funding for sidewalks, bike lanes, greenway connections, and transit connections.

Gaps and Other Considerations

- *None identified*

ENERGY

Measure 12: Develop, invest in, and provide marketing outreach and education around distributed clean energy options, including onsite solar and community choice solar.

Milestones

- Support battery storage programs to make behind-the-meter (consumer-end) solar more economic and reliable.
- Secure funding and support for solar infrastructure.
- Perform and publish analyses of regional solar policies to assess affordability and accessibility.
- Promote community solar projects.
    - *Example: KUB Community Solar array in partnership with City of Knoxville*
- Promote installation of solar panels in residential areas.
    - Invest in solar for low-income residential and multi-family developments.
    - Offer a property tax incentive to low- and moderate-income houses to install solar.
    - Focus on households with critical medical devices to ensure reliability.
        - Example: Duke Energy's program
- Lower energy use through efficiency upgrades and weatherization before installing solar.
- *Work with utilities to improve policy and financial incentives for solar.*
    - Develop a net-energy metering (NEM) policy to incentivize customers to install solar and make solar installations more cost-effective.
    - *Adjust TVA's Generation Flexibility program to allow LPCs to generate more than 5% of total customer demand from alternate sources.*
    - Adjust TVA's distributed generation policies to count total electricity generation, not net generation.
    - *Adjust TVA's Green Power Providers program to compensate customers for distributed electricity generation at more competitive or retail rates, rather than avoided-cost rate.*
    - Implement power purchase agreements (PPAs) and battery storage solutions to reduce peak grid demand.

Metrics

- Energy bill savings
- Number/size of new solar installations
- Number of residents with solar
- Carbon intensity of grid electricity for TVA and LPCs throughout region
- Number of solar permits processed through local codes offices
- Cost and energy savings from distributed solar generation

Implementation Authority

- TVA: Regulate utility rates and policies, including net metering and distributed renewable energy generation.
- LPCs: Maximize 5% generation allotted by TVA; promote customer programs.
    - *Note from project team: LPCs are required to distribute benefits equally across customer base, which could affect project design.*
    - *Example: KUB Community Solar array in partnership with City of Knoxville*
- Local Governments and Partner Agencies: Assess public buildings and land for opportunities to install solar; *adopt solar-ready codes for public buildings.*
- City of Knoxville and TDEC: Implement TN Solar for All to benefit low-income residents.
- *Financing Organizations: Provide funding for solar installations.*
    - *Example: SEEED promoting accessible loans for energy efficiency and renewable energy installations through Sustainable Home Improvement Program.*

Equity Considerations

- Design solar policies and programs to lower utility bills for low-income residents and boost home equity.
- Identify opportunities to boost low-income access to solar.
- Implement roof repair programs or roof rental for solar installations.
- Establish resilience hubs in vulnerable communities to increase energy security and public safety in cases of natural hazards and grid outages.

Cost Considerations

- Work with utilities and companies to create accessible pricing for solar installations.
- Community-scale solar installations can be more cost effective and feasible.
- Utilize federal and state funding (such as Solar for All) to install solar in low- and moderate-income communities.

Gaps and Other Considerations

- Need to identify metrics to account for low-income communities
- Clearly communicate how to recycle solar panels.

WASTE

Measure 13: Reduce or divert waste going to landfills and wastewater going to water treatment plants through engagement, and education and programs for recycling

Milestones

- Conduct a study on waste reduction for buildings switching to LEDs.
- Offer incentives/acknowledgment to businesses to decrease waste production.
    - Require vendors at large festivals to reduce waste.

    - Encourage businesses (restaurants, coffee shops, bars) to reduce disposable, single-use items (like plastic utensils) and increase use of reusable and recyclable products (such as aluminum cans).
    - Encourage neighborhood and community organizations to use reusable and recyclable products (aluminum, dishes, etc.) during events.
- Educate the community on how to reduce waste *and build trust in waste programs*.
    - Provide consistent messaging on what is/is not recyclable.
    - Educate and engage local media outlets and other sources of information to build trust in waste reduction programs.
    - Provide tours of recycling and material processing facilities for the public to get first-hand experience with how these systems work.
    - Create a program to spotlight community leaders working to reduce waste.
        - *Example: City of Knoxville's ConServe certification program*
    - Use the arts to spread awareness about waste reduction (movies, music, and visual arts).
- Make waste reduction easy and accessible to community members.
    - Increase access to waste disposal and pick-up locations.
    - Develop and expand opportunities for community members to reuse and repurpose furniture and large items rather than throwing them away.
        - Host 'repair fairs' to mend/fix items instead of throwing them away.
        - Establish regular pick-ups for textiles, furniture, and other items that can be reused or repurposed.
    - Establish an outlet for community members to recycle solar panels and other assets after use.

Metrics

- Number of households participating in curbside and drop-off recycling programs
- Volume sent to material recovery facilities versus landfills (total and per capita)
- Volume of hazardous materials (such as fluorescent lightbulbs) disposed of responsibly or recycled

Implementation Authority

- Local Governments: Implement waste management and reduction initiatives, *including collection services, drop-off locations, and hazardous/specialty material disposal*.
- Community Organizations (such as Keep Knoxville Beautiful): Educate and engage community on waste reduction initiatives.
- WestRock: Manage recycling facilities and resale.
- *TDEC: Track data on local waste streams*.

Equity Considerations

- Keep hazardous waste out of landfills.
- Landfills are often located in low- and moderate-income communities.
- Make sure information is designed for all members of the community. Those who speak another language and are without internet access have historically been excluded.

Cost Considerations

- Waste reduction events (such as repair fairs) can require a significant amount of staff time to coordinate.
- Consider the cost/benefit of having news outlets spread information on waste reduction.

Gaps and Other Considerations

- *None identified*

Measure 14: Study, design, and implement composting programs and other organic waste management.

Milestones

- *Expand existing programs, such as the City of Knoxville's compost drop-off pilot.*
- Partner with UT to establish a regional commercial composting facility *open to stakeholders beyond campus*.
- Make composting easy and accessible to the community:
    - Connect restaurants to farmers and private organic waste processors to promote a circular economy.
    - Host educational workshops on backyard composting for households.
    - Provide programs, infrastructure, and technical support to help organizations and businesses compost organic waste.
    - Pick up composting on the same schedule as trash and recycling to make it accessible and intuitive to households.
    - Collaborate with local initiatives (such as UTK's "Food for You" program) to raise awareness about food insecurity.
- Lead initiatives to change community perceptions and practices around waste.

Metrics

- Number of people who use composting programs
- Analysis of composted materials
- Volume of food and organic waste diverted from landfills

Implementation Authority

- Local Governments: Oversee and implement organic waste initiatives (such as yard waste and composting).
- TDEC: Coordinate and promote composting efforts *(e.g. Food Waste Awareness Week)*
- Private waste processors (such as Living Earth): Process and utilize organic materials (such as mulch and finished compost).
- Community gardens and farms: Provide spaces to collect/process organic materials and utilize finished compost onsite.

- Community Organizations (such as Society of St. Andrews): Lead gleaning and other food waste reduction efforts.
- Second Harvest: Perform food recovery and redistribution efforts.
- United Way: Analyzes food waste and tracks key performance indicator data.
- UT: performs food redistribution through campus-wide food4Vols initiative.

Equity Considerations

- Ensure that composting facilities are accessible to low- and moderate-income communities but that location does not negatively impact nearby residents.
- Gather community input on needs and desires for waste collection and facilities.
- Offer free pickup of organic waste to ensure everyone can participate.

Cost Considerations

- Secure and expand funding for compost programs from local governments.
- Engage elected officials to build support for funding compost programs.

Gaps and Other Considerations

- Use supportive political figures to spread awareness about composting to reach a broader audience. One participant offered the idea of "Burchett Loves Composting."

NATURAL & WORKING LANDS

Measure 15: Enhance tree canopy through strategic planning, implementation, and community engagement, particularly focused on areas at high risk for urban heat island effects

Milestones

- Prioritize heat island mitigation efforts in low- and moderate-income communities that are disproportionately impacted by the heat.
    - Collaborate with ORNL to perform an Urban Heat Island (UHI) analysis.
    - Plant trees in high-heat areas and specific locations such as bus stops.
- Incentivize developers to plant and maintain trees.
- Develop incentives, outreach, and policies to encourage enhanced tree canopy.
    - Educate households and neighborhoods on how increasing tree canopy improves home resale value, *walkability, and health benefits*.
    - Engage neighborhoods, community organizations, schools, and faith groups to promote increased tree canopy *in shared community spaces*.
    - Provide trees at low- or no-cost for community members.
    - Require that new construction and developments (apartments, shops, roads) replant trees and native habitats.

Metrics

- Tree canopy
- Number of trees in developments (pre- and post- development)
- Area of grass replanted
- Heat island data, maps, and trends (including heat impacts of tree plantings)

Implementation Authority

- Neighborhood / *Homeowner* Associations: Enact policies that support greenery on private property; plant and maintain green infrastructure in shared spaces.
- Private landscaping companies: Provide technical expertise on tree planting and maintenance.
- Community Organizations (such as *Trees Knoxville and* Keep Knoxville Beautiful): Engage the community on the importance of tree canopy; lead planting initiatives.
- Local Governments: Coordinate municipal plantings and maintenance; *provide technical support for community groups and individuals*.

Equity Considerations

- Employ youth from under-resourced areas in planting initiatives and provide wider skills training to grow their career readiness and expose them to broader "green collar" job opportunities.
- Design policies and programs that balance tree coverage with dense development (for example, tree policies should not prevent multi-family construction on single lots).
- The communities most impacted by heat are often historically under-resourced and often do not have institutions like neighborhood associations - so ensure that community members are involved early and their concerns and priorities directly inform changes.
- Ask bus riders to help select the tree types to be planted at their most-used stops to facilitate trust and support for the program.

Cost Considerations

- Establish a funding plan for tree planting and maintenance. While it will rely on a large body of volunteers, it is also expensive to buy trees in large quantities.
- Some neighborhood groups have the funding and resources to plan, implement, and maintain green infrastructure. Coordinate with these groups to also support efforts in low- and moderate-income communities.

Gaps and Other Considerations

- *None identified*

Measure 16: Evaluate policies and opportunities for reduced sprawl.

Milestones

- Adopt zoning/building/development regulations that encourage building construction in existing developed areas to increase density.

    - Incentivize multi-family zoning and construction in urban areas.
    - Increase outreach and information on missing middle housing policy.
    - Provide property tax incentives for homes in dense areas.
    - Adopt a payment-in-lieu-of-taxes program to encourage developers to build multifamily homes in dense areas.
- Develop a comprehensive master plan that identifies and prioritizes pedestrian and bike infrastructure.
    - Engage the community and analyze traffic patterns, bus ridership, and crash data to create maps and projections that facilitate effective prioritization.

Metrics

- Density of residents/units
- Number of individuals within a ½ mile radius of public transit or walkable areas
- Building stock and density over time

Implementation Authority

- Local Governments: Coordinate and plan policies and initiatives to decrease sprawl.
- *Knox Planning: Facilitate regional and municipal-level planning processes; educate elected officials and the public on the importance of dense development.*
- Local Zoning Commissions: Regulate development policy and strategy.

Equity Considerations

- Diverse neighborhoods foster more equitable learning and work opportunities.
- Affluent neighborhoods have more social and political capital to oppose density.
- Create an equity score for developers who are continuously building in urban areas to showcase the individuals contributing positively to the community.

Cost Considerations

- Utilize grant funds to make it more cost-effective for developers to build above minimum code requirements.
- Leverage community organizations, faith-based groups, and private sector donors to ensure equitable housing options for low- and moderate-income populations in dense communities.
- Develop fees and agreements with developers so that residents do not bear the full cost and inconveniences of development.
    - Impose impact fees on developers to fund sidewalks, bike lanes and other transportation infrastructure at new properties.
    - Ensure green spaces are protected during development to decrease urban heat islands and ensure outdoor spaces for community members.
    - Work with nonprofits, organizations, and developers to identify infill opportunities.

Gaps and Other Considerations

- Density can be difficult to accomplish in rural areas without a rigorous planning authority and a comprehensive plan. It is important to have a coordinated and thoughtful plan prior to performing community engagement.

Measure 17: Promote land conservation and the creation of green spaces through education and more shared green community spaces, while balancing different needs for land use (e.g., renewable energy).

Milestones

- Establish policies, incentives, and standards to encourage creation and conservation of green spaces.
    - Set a target for the number of neighborhood parks relative to population size.
    - Enforce policies to limit sprawled development.
    - Provide tax breaks to preserve forests.
    - Incentivize multi-family development combined with community green spaces over single-family units on large lots.
- Educate residents on the importance of green spaces and conservation.
    - Educate households on the impact of yards and landscaping practices and provide support to encourage native plants and foodscaping.
    - Educate the community on the harmful environmental impacts of logging in the region.
    - Partner with local community organizations such as Trees Knoxville and environmental advocacy groups such as the Nature Conservancy to collaborate on initiatives to expand green spaces.
    - UT: TN Smart Yards initiative helps community members utilize more environmentally friendly practices in their yards.

Metrics

- Area of green space
- Number of new community green spaces established

Implementation Authority

- Local Governments: Develop master plan for maintaining and expanding parks and green spaces; enact zoning laws that protect natural lands and promote dense development.
- Knox Planning: Coordinate regional master plans for green spaces.
- UT: TN Smart Yards initiative helps community members utilize more environmentally friendly practices in their yards.

Equity Considerations

- Prioritize green spaces in low-income neighborhoods and high-heat areas.

- Design equitable housing policies that ensure that conservation and expansion of green spaces does not result in increased housing costs and displacement of low-income residents.
    - *Note from project team: green spaces increase neighborhood appeal and property value. Homeowners and higher-income residents benefit, but lower-income residents face developer buy-outs and rent increases.*
- Create green spaces and plant habitats along transportation corridors.
- Support lawn and tree service for low- and moderate-income communities.

Cost Considerations

- Utilize federal and state funding to purchase land to conserve and protect.
- Work with neighborhoods, community organizations, and environmental advocacy groups to fundraise for green spaces.

Gaps and Other

- *None identified*

AGRICULTURE

Measure 18: Create opportunities for, reduce barriers to, and increase education about small-scale farming and benefits.

Milestones

- Create and enforce policies and zoning regulations to promote small-scale farming.
    - Establish shared land for farmers to rent a plot. Shared plots allow for increased collaboration and knowledge-sharing while decreasing financial and educational barriers for small farmers.
    - Establish zoning policies that allow for more open space and agriculture.
    - Encourage new developments to reserve land for potential farms and gardens.
    - Support local farms.
- Promote resources on small-scale farming to the community.
    - Provide tool shares and seed libraries at libraries, community centers, parks, and community gardens.
- Partner with educational entities and community groups to create educational programs on the basics of small-scale farming.
    - Provide free classes to households on growing native plants.
    - Create workforce development programs and classes on agriculture and farming.
    - Educate on farming methods to reduce erosion.
    - Educate people on small steps to begin farming such as providing information on local produce and native plants.
    - Example: Locavore farms working to increase community awareness of farm to table efforts.

    - Example: UT could develop coursework and programs to educate students and community members on small farming techniques.
- Enhance farming profitability and reduce emissions with innovative technologies such as agrivoltaics and carbon capture.

Metrics

- Local populations of pollinators such as bees and butterflies.
- Quantity and variety of local food available at farmers markets
- Participation in programming and educational opportunities on small farming
- Community garden data
    - United Way's annual Knox County Community Garden Report (number, location, and size of gardens; number of gardeners and volunteers; amount of food grown)
    - Rooted East (tracks number of home gardens)
- Farm data (via USDA)
- Local agricultural practices (via UT College of Agriculture)

Implementation Authority

- UT: Provide data on agricultural practices and farming in the region.
- ORNL: Conduct research on agricultural practices and crops.
- TDA and UT/TSA Extension: Provide resources and education on best practices to farmers.
- Landowners: Participate in small farming programs.
- Knox Planning: Plan and establish new zoning policies for small scale farming.
- Community Organizations (such as United Way and Nourish Knoxville): Collaborate with small farms to make food accessible to communities in need.
- Farmer and gardener groups (such as Knox County Community Garden and Growers Alliance): Spread awareness about agricultural events and learning opportunities.
- Loal farms (such as Battlefield Farms): Pilot innovations and act as a trusted messenger to the agricultural community regarding new farming initiatives.

Equity Considerations

- Local farms can provide fresher food at schools and markets, thereby improving public health and food security.
- Establish programs for low-income communities to participate in local co-ops and learn to grow healthy food.
- Increasing access to food increases resilience at the community and household scale.

Cost Considerations

- Utilize federal and state funding to perform education initiatives on small-scale farming.
- Collaborate with UT and TSU Extension to reach communities using existing relationships and communication channels.

Gaps and Other

- *None identified*

Measure 19: Promote and support new and improved agricultural farming practices and educate and support farmers around available incentives

Milestones

- Support rotational grazing practices to limit chemical use and improve pollinator habitat.
- Provide free courses and technical support on agricultural best practices.
- Encourage grocery stores to carry products from local farms.
- Develop more mobile groceries to increase accessibility to local produce.
- Better integrate climate-controlled strategies into agricultural practices (e.g., low/high tunnels, vertical farming, aqua/hydroponics).
- Adopt better land use policies for growing food and supporting pollinators such as planting cover crops and developing programs to support agrivoltaics.
- Encourage forest farming and foraging.

Metrics

- Farm run-off
- Dollars saved from buying less synthetic chemicals
- Populations of pollinators such as bees and butterflies
- Acreage of green/agricultural space

Implementation Authority

- USDA: Natural Resources Conservation Service helps farmers conserve soil and water.
- Farmer and gardener groups (such as Knox County Community Garden and Growers Alliance): Spread awareness about agricultural events and learning opportunities.
- UT/TSU Extension: Provides educational and community development opportunities to the agricultural community.
- TVA: Implement and coordinate solar energy for agrivoltaics projects.
- Local Governments: Engage and educate farmers on sustainable land management practices.

Equity Considerations

- More nutrient-dense food increases community resilience.
- Improved water, soil, and erosion in low-income agricultural communities.
- Many communities lack access to capital and technical assistance, which presents barriers to implementing new agriculture improvements.
- Provide low-income communities with a point of contact who can direct them on actions and funding opportunities.

Cost Considerations

- Identify funding opportunities through Natural Resources Conservation Service (NRCS).
- Utilize federal and state funding to support new farming techniques and education.

Gaps and Other

- *None identified*