Emissions Reduction Plan: Race to Net Zero

Jada Walker Griggs, Program Manager Senior, Sustainability
Abby Terry, PE, Tetra Tech

Environmental Quality and Public Works Committee
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What is Sustainability?

"Sustainability in Lexington means meeting the needs of our generations while ensuring future generations are able to enjoy our urban communities, tree-lined rural roads, equine farms, and countless other physical and social elements that contribute to what makes Lexington, Lexington."
– Empower Lexington

It involves three main areas:

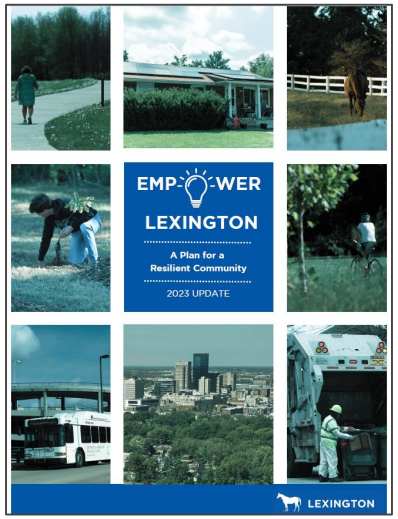
1. Environment: Protecting natural resources and reducing pollution to keep our planet healthy.
2. People: Ensuring fair and equitable treatment for all individuals and improving quality of life.
3. Economy: Creating robust economic systems that can support ongoing growth without depleting resources.

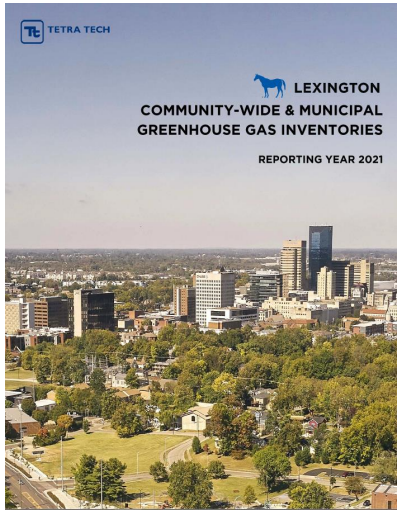
This approach helps strengthen our community and improve its ability to handle challenges. By doing these things, LFUCG shows how we can all work together for a better future.

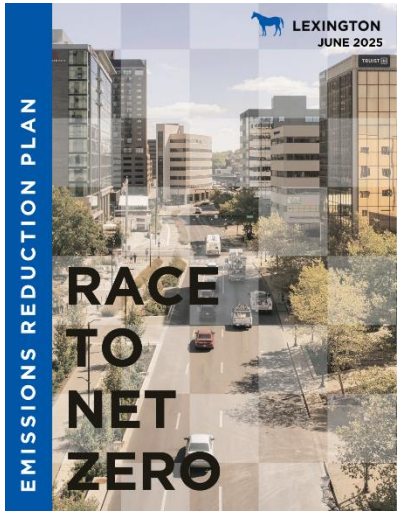

2008
Council passes resolution authorizing Lexington to participate in the voluntary Cities for Climate Protection Program
2009 - 2012
Stakeholders develop Empower Lexington plan
May 2012
Council passes resolution supporting implementation of Empower Lexington plan
June 2021
Program Manager Senior for Sustainability position approved in FY22 budget
Feb. 2022
City hires Program Manager Senior for Sustainability
2023
Work begins on updating Empower Lexington plan
Dec. 2023
City hires Env. Initiatives Specialist for Sustainability
2024
Work begins on Emissions Reduction plan
Aug. 2024
Council passes resolution approving Empower Lexington plan
Nov. 2024
Lexington receives Silver LEED for Cities award

Lexington's Sustainability Strategy

- Empower Lexington
- 2021 Community-wide & Municipal Greenhouse Gas Inventories Report
- Race to Net Zero Emissions Reduction Plan

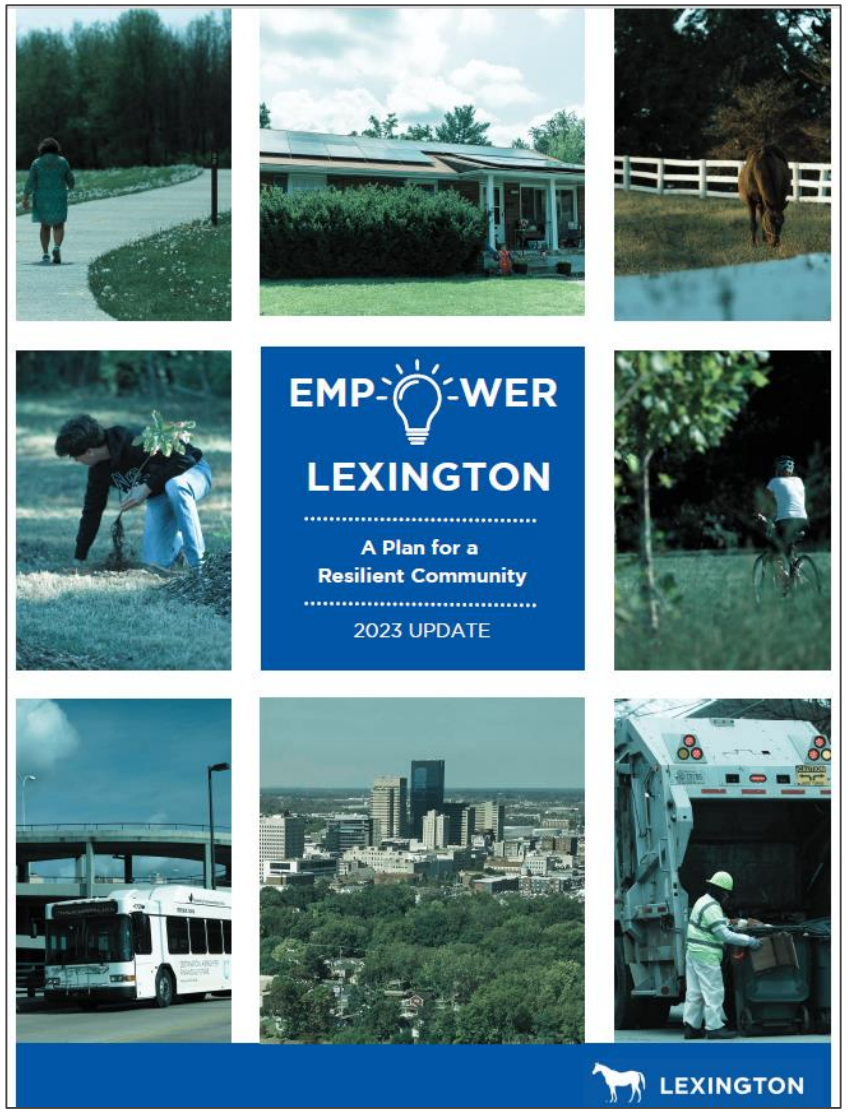






Empower Lexington: 2023 Updates

- About 50 stakeholders reviewed information for the following 6 sectors: *Materials and Resources; Natural Systems and Ecology; Transportation and Land Use; Quality of Life (Justice, Equity, Diversity, and Inclusion); Water Efficiency; and Energy and Greenhouse Gas Emissions*
- Sectors align with the Leadership in Energy and Environmental Design (LEED) for Cities Certification to identify actions critical to reducing our environmental impact.
- Plan includes an updated community-wide and LFUCG municipal greenhouse gas (GHG) emissions inventory.
- Includes high-level strategies per sector to help meet our sustainability goals. Highlights the top 3 identified by the community.



**GHG - Gases in the earth's atmosphere that trap heat. Increased concentrations of certain gases contributes to climate change.*

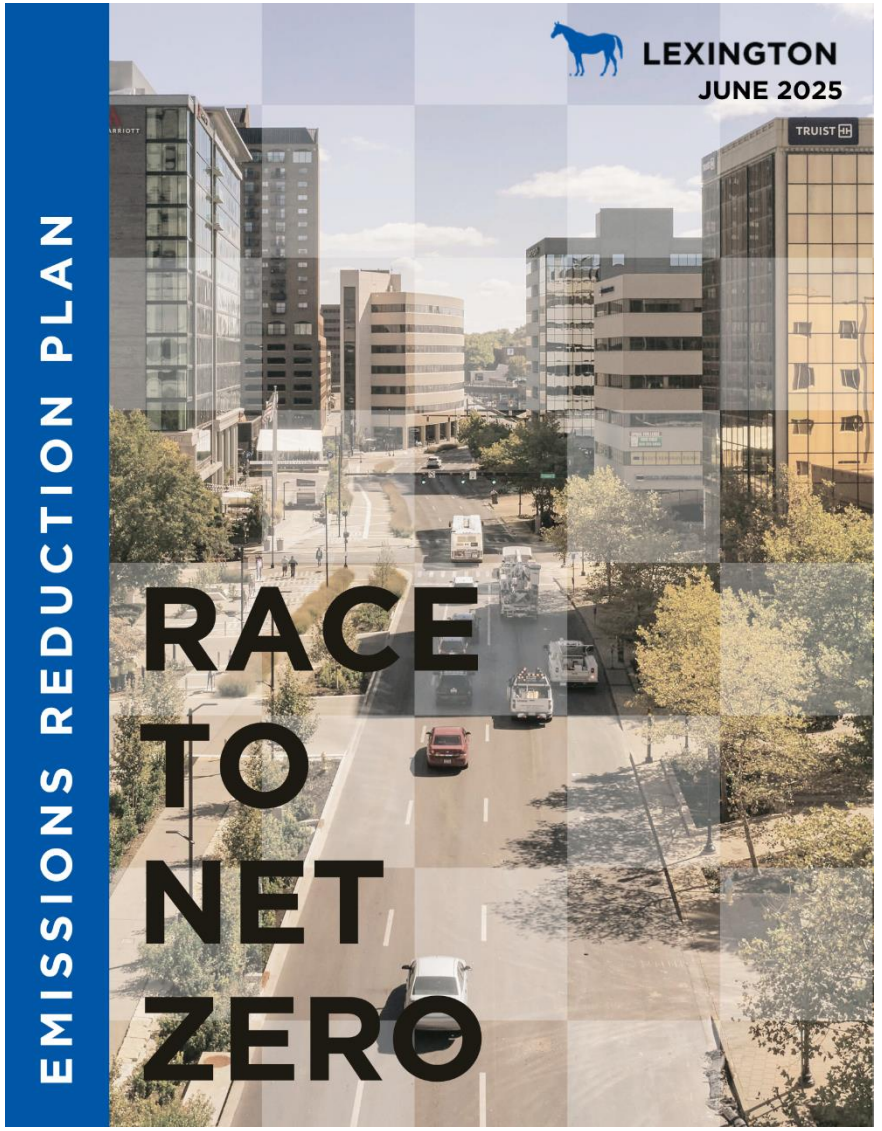
Empower Lexington: Resolution

RESOLUTION #435-2024

A RESOLUTION APPROVING "*EMPOWER LEXINGTON: A PLAN FOR A RESILIENT COMMUNITY*," A COMMUNITY-WIDE SUSTAINABILITY PLAN DESIGNED TO REDUCE GREENHOUSE GAS EMISSIONS AND ENERGY USE IN LEXINGTON-FAYETTE COUNTY, AND FURTHER SUPPORTING COMMUNITY EFFORTS IN FURTHERANCE OF ITS IMPLEMENTATION.

Race to Net Zero

- **What is Net Zero?**
  - Achieving net zero means that any emissions produced by human activities are counterbalanced by an equivalent amount of emissions being absorbed or offset.
- **Plan includes:**
  - Climate Vulnerability: Exposure, Sensitivity, and Adaptive Capacity
  - Suite of reduction measures to facilitate net-zero transition



Race to Net Zero: National Risk Index

FEMA tool that rates US community risk for 18 natural hazards:

- Avalanche
- Coastal Flooding
- Cold Wave
- Drought
- Earthquake
- Hail
- Heat Wave
- Hurricane
- Ice Storm
- Landslide
- Lightning
- Riverine Flooding
- Strong Wind
- Tornado
- Tsunami
- Volcanic Activity
- Wildfire
- Winter Weather

NATIONAL RISK INDEX REPORT: FAYETTE COUNTY, KY

Hazard Type	Risk Index Rating
Cold Wave	Very High
Tornado	Relatively High
Strong Wind	Relatively High
Lightning	Relatively High
Ice Storm	Relatively High
Hail	Relatively Moderate
Heat Wave	Relatively Moderate
Winter Weather	Relatively Moderate
Earthquake	Relatively Low
Riverine Flooding	Relatively Low
Landslide	Relatively Low
Hurricane	Very Low
Wildfire	Very Low
Drought	Very Low
Avalanche	Not Applicable
Coastal Flooding	Not Applicable
Tsunami	Not Applicable
Volcanic Activity	Not Applicable

Race to Net Zero: Climate Vulnerability

Exposure

- The degree to which a community, system or individual is **subjected to** the impacts of climate-related hazards and environmental changes.

Sensitivity

- The degree to which a community, system or individual is **affected by** the impacts of climate change and climate-related hazards.

Adaptive Capacity

- **The ability of** individuals, communities, systems or organizations to adjust to the impacts of climate change and other environmental stressors.

Race to Net Zero: Building Resiliency

AGING AND DISABILITY SERVICES

COMMUNITY AND RESIDENT SERVICES

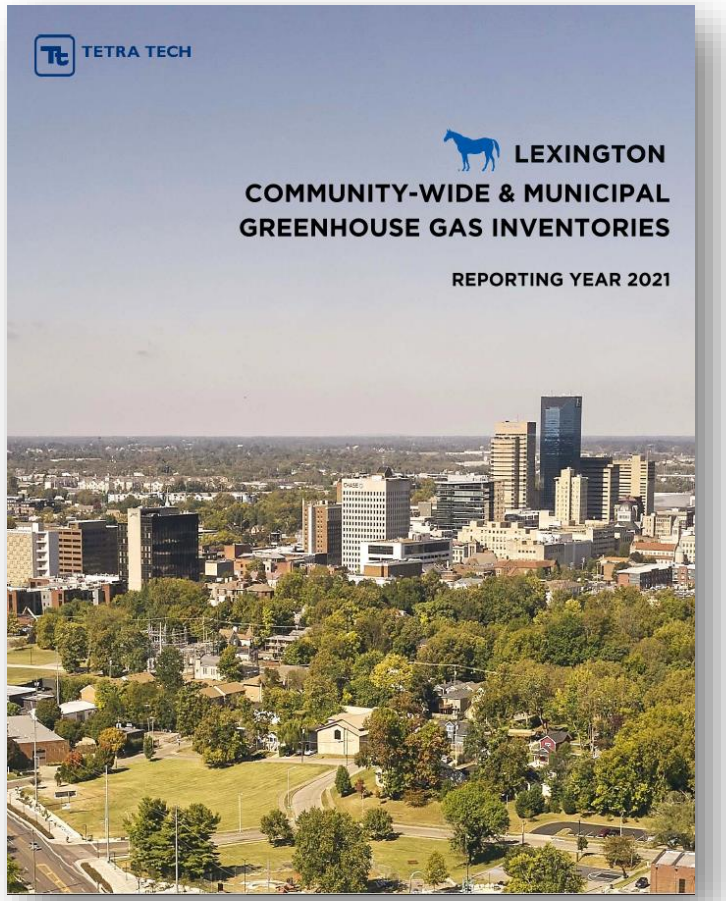
FAMILY SERVICES

OFFICE OF AFFORDABLE HOUSING

OFFICE OF HOMELESSNESS PREVENTION AND INTERVENTION

YOUTH SERVICES

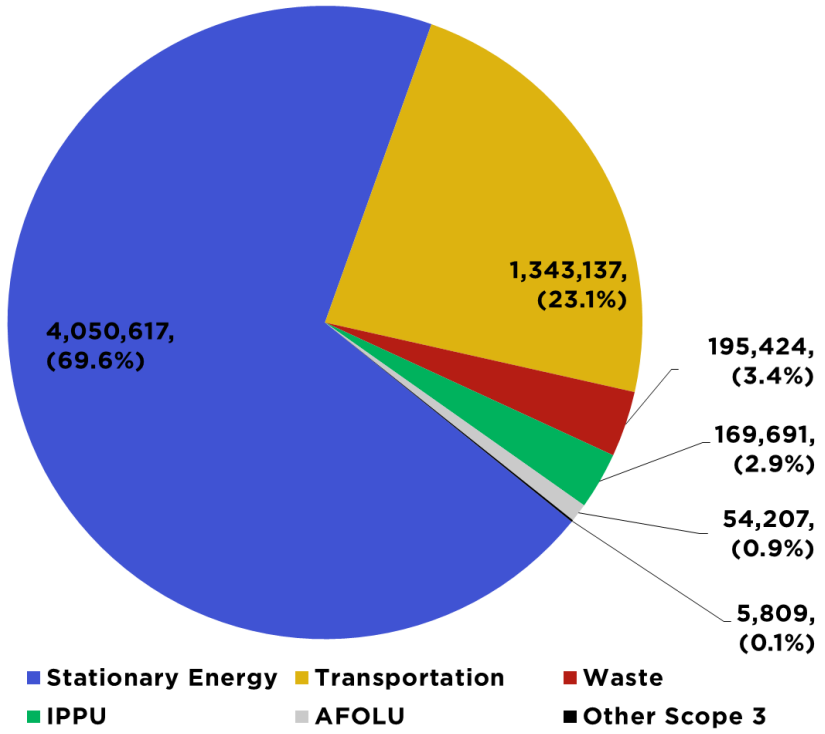
Greenhouse Gas Emissions Inventory



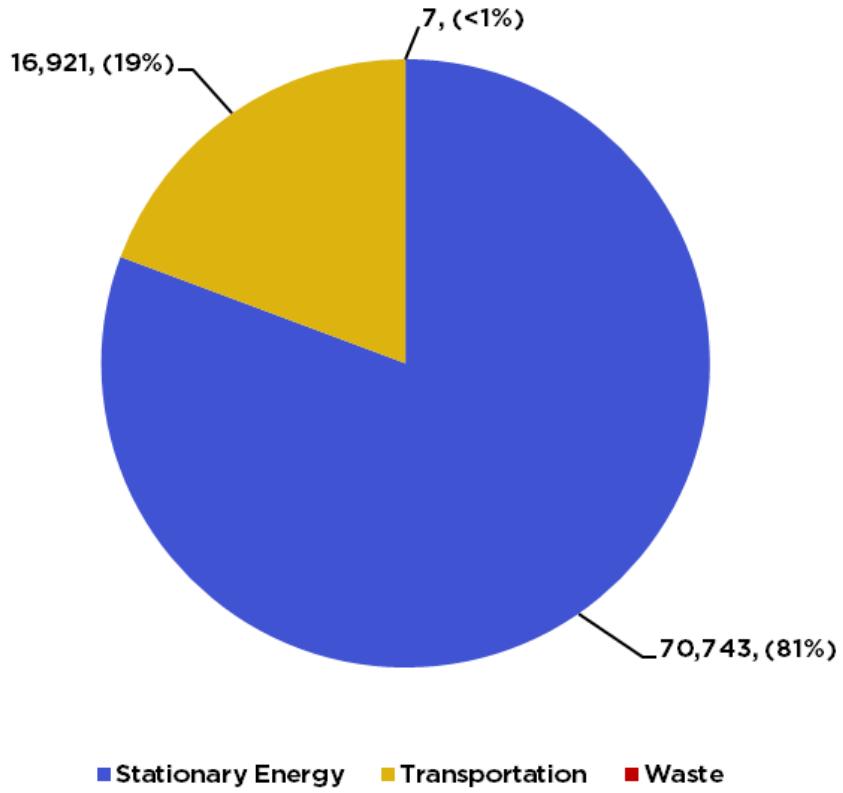
- Reactivated our community-wide GHG emissions inventory for calendar year 2021
- City contracted Tetra Tech to complete the inventory
- Calculated community-wide & LFUCG GHG emissions
- Activities and sources attributed to LFUCG operations were included as a subset to the community-wide inventory

Greenhouse Gas Emissions Inventory

Community-Wide



LFUCG Municipal Operations



Values presented in metric tonnes of carbon dioxide equivalents (MT CO2e).

Race to Net Zero: Proposed Reduction Measures

PROPOSED REDUCTION MEASURES

A reduction measure is a behavior shift from a high-emissions activity to a low-emissions activity. The sections that follow present the selected measures to facilitate reducing emissions to net zero by 2050. Each measure features a summary page containing the following information:

Description:

What is the measure?

Status:

What is the current status of the measure?

GHG Reduction Potential:

How much of a reduction can this measure produce relative to the inventory total?

- Low = <10%
- Medium = 10-30%
- High = >30%

Key Stakeholders:

What external stakeholders are pivotal in implementing this measure?

Cost:

How much will it cost to implement this measure?

- $ = < $0.5 million
- $$ = $0.5 million - $1.5 million
- $$$ = > $1.5 million

Timeframe:

When can this measure be implemented?

- Near-term = <5 years
- Mid-term = 5-15 years
- Long-term = >15 years

LFUCG Authority:

What level of authority does LFUCG have in implementing the measure?

Co-benefits:

What other benefits does this measure provide?

CO-BENEFITS DEFINITIONS

AIR QUALITY

Reduced criteria and hazardous air pollutants (carbon monoxide, ground-level ozone, lead, nitrogen dioxide, particulate matter, and/or sulfur dioxide)

SOCIAL EQUITY

Addresses existing social inequities (e.g., disparities in opportunities based on race, gender, ethnicity, education, socioeconomic status, geographic location, and system barriers)

PUBLIC HEALTH

Air contaminant reductions, increased physical activity, improved public safety

ECONOMIC DEVELOPMENT

Growth of economic output, job creation, infrastructure development, education and skills development, or innovation and technology

CLIMATE RESILIENCY

Provides resilient physical or social infrastructure to mitigate climate risks and develop adaptation strategies

Race to Net Zero: Proposed Reduction Measures

STATIONARY ENERGY SUMMARY

	MEASURE	2030 TARGET	2050 TARGET	TRACKING METRIC
E-1	PARTNER WITH UTILITY COMPANIES TO REDUCE CARBON INTENSITY.	21%	75%	• ELECTRICITY EMISSION FACTOR (LBS/MWH)
E-2	INSTALL ROOFTOP SOLAR ON RESIDENTIAL, COMMERCIAL, AND PUBLIC BUILDINGS.	10%	30%	• INSTALLED CAPACITY (MW)
E-2A	INSTALL GROUND-MOUNTED SOLAR ARRAYS ON RE-POWERING SITES.	25%	100%	• INSTALLED CAPACITY (MW)
E-3	ADOPT THE NEWEST BUILDING CODE.	10%	30%	• ENERGY CONSUMPTION PER SQUARE FOOT
E-4	CONDUCT ENERGY AUDITS AND IMPLEMENT ENERGY EFFICIENCY MEASURES.	10%	30%	• ANNUAL ENERGY USAGE (KWH)
E-5	ELECTRIFY HOMES SERVED BY NATURAL GAS.	10%	30%	• ANNUAL ENERGY USAGE (MCF)

TRANSPORTATION SUMMARY

	MEASURE	2030 TARGET	2050 TARGET	TRACKING METRIC
T-1	INCREASE LEXTRAN RIDERSHIP.	10%	30%	• VEHICLE MILES TRAVELED • RIDERSHIP YEAR-OVER-YEAR PERCENT CHANGE
T-2	IMPLEMENT THE COMPLETE STREETS ACTION PLAN AND BICYCLE AND PEDESTRIAN MASTER PLAN.	10%	30%	• VEHICLE MILES TRAVELED • MILES OF INFRASTRUCTURE CONSTRUCTED
T-3	TRANSITION TO EVS.	10%	30%	• REGISTERED EVS IN FAYETTE COUNTY
T-4	CONTINUE TO PRIORITIZE AFFORDABLE, EQUITABLE, AND CONNECTED COMMUNITY DEVELOPMENTS.	10%	30%	• VEHICLE MILES TRAVELED

Race to Net Zero: Proposed Reduction Measures

WASTE SUMMARY

	MEASURE	2030 TARGET	2050 TARGET	TRACKING METRIC
W-1	REDUCE THE QUANTITY OF WASTE GENERATED.	10%	30%	• WASTE GENERATED (METRIC TONS)
W-2	INCREASE THE RECYCLING RATE AND REDUCE CONTAMINATION.	10%	30%	• MATERIALS RECYCLED (METRIC TONS)
W-3	REDUCE THE QUANTITY OF FOOD WASTE GENERATED.	10%	30%	• WASTE GENERATED (METRIC TONS)
W-4	INCREASE THE QUANTITY OF MATERIALS COMPOSTED (YARD AND FOOD WASTE).	5%	30%	• MATERIALS COMPOSTED (METRIC TONS)

AFOLU SUMMARY

	MEASURE	2030 TARGET	2050 TARGET	TRACKING METRIC
A-1	INCREASE URBAN TREE CANOPY.	10%	30%	• URBAN TREE CANOPY COVERAGE (%)
A-2	OPTIMIZE FERTILIZER USAGE.	5%	20%	• FERTILIZER APPLIED (METRIC TONS)

IPPU SUMMARY

	MEASURE	2030 TARGET	2050 TARGET	TRACKING METRIC
I-1	TRANSITION TO ALTERNATIVE REFRIGERANTS.	30%	90%	• PERCENTAGE OF ALTERNATIVE REFRIGERANTS IN MIX (%)

Race to Net Zero: Methodology and Emissions Scenario

- Emissions reduction calculations were completed using *The Handbook for Analyzing Greenhouse Gas Emission Reductions, Assessing Climate Vulnerabilities, and Advancing Health and Equity (October 2024)*
- Emissions scenarios presented **reduces Lexington's baseline 2050 emissions by approximately 80%.**
- Advancements over the next 25 years may allow for higher targets.
- Power Purchase Agreements (PPAs) (physical and/or virtual), Renewable Energy Certificates (RECs), and offsets required to balance remaining emissions and achieve net-zero emissions.

Measure	Estimated 2030 Reduction (MT CO2e)	Estimated 2050 Reduction (MT CO2e)
Stationary Energy		
E-1: Partner with utility companies to reduce carbon intensity.	928,345	3,949,357
E-2: Install rooftop solar.	346,070	1,038,210
E-2A: Install ground-mounted solar arrays on contaminated sites identified in EPA's RE-Powering America's Land Program.	118,405	459,693
E-3: Champion KY HBC adoption of the newest version of the International Energy Conservation Code.	7,044	67,967
E-4: Conduct energy audits and implement energy efficiency measures.	13,640	48,656
E-5: Replace gas boilers, stoves, dryers, and heating systems with electric alternatives.	15,433	46,299
Transportation		
T-1: Increase Lextran ridership.	3,218	34,644
T-2: Implement the Complete Streets Action Plan and Bicycle and Pedestrian Master Plan.	409	763
T-3: Transition to electric vehicles.	61,719	123,439
T-4: Continue to prioritize affordable, equitable, and connected community developments.	17,176	150,164
Waste		
W-1: Reduce the quantity of waste generated that is sent to landfills or recycled.	4,334	32,649
W-2: Increase recycling rate and reduce contamination.		
W-3: Reduce food waste that is sent to the landfill or composted.		
W-4: Increase yard waste collection and implement food waste organics collection.		
Agriculture, Forestry, and Other Land Use		
A-1: Increase urban tree canopy.	51,333	61,594
A-2: Reduce synthetic fertilizer usage.	1,913	8,097
Industrial Processes and Product Use		
I-1: Replace refrigerants with high global warming potential with those with lower global warming potentials.	98,242	123,586

Race to Net Zero: What's Next?

- Chance to shape the type of city we would like Lexington to be for future generations
- Collective effort from all of Lexington-Fayette County - everyone has a role

"The earth is what we all have in common."

– Wendell Berry, Kentucky Novelist, Poet and Farmer

"Sustainability in Lexington means meeting the needs of our generations while ensuring future generations are able to enjoy our urban communities, tree-lined rural roads, equine farms, and countless other physical and social elements that contribute to what makes Lexington, Lexington."

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Questions?

jgriggs@lexingtonky.gov
www.lexingtonky.gov/sustainability

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