

Metro Council Parks & Sustainability Committee

Strategic Planning for Louisville's Energy Goals

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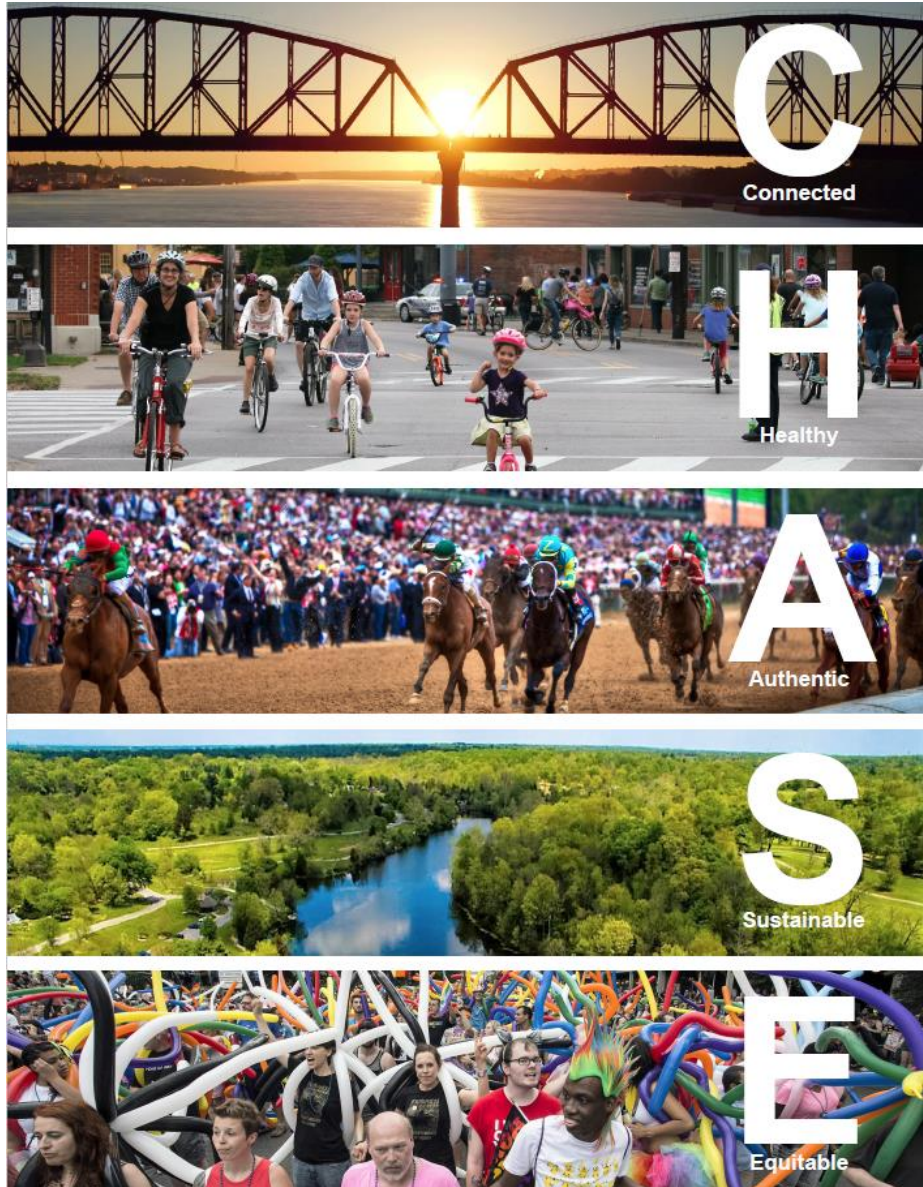
SUSTAIN *Louisville*



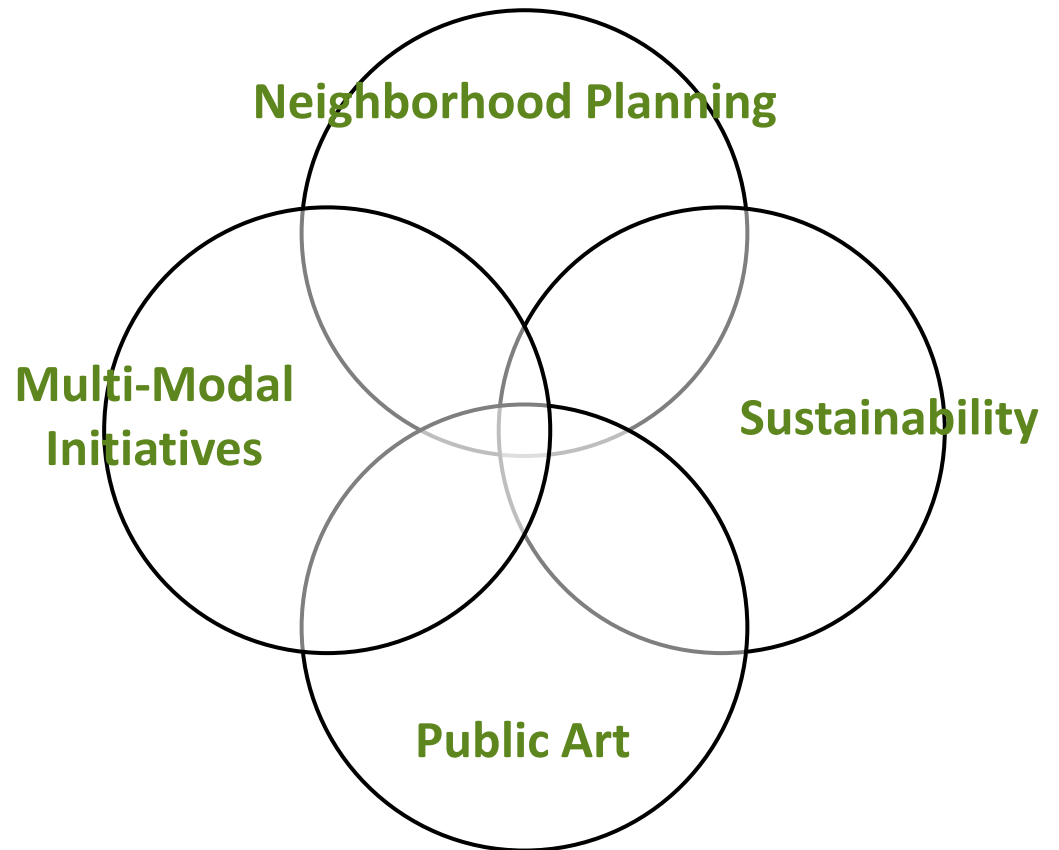
OFFICE OF
ADVANCED PLANNING
AND SUSTAINABILITY

A Division of Develop Louisville

Office of Advanced Planning and Sustainability



Envisions, designs and implements long-range planning solutions to create a vibrant, sustainable community where people want to live, work and innovate.





Zachary Tyler



Michael King



Julie Donna



Allison Smith

Sustainability Team

L.T. 11/18/58

Air Pollution May Melt Polar Ice Caps

Auto-Exhaust. Action Urged

Washington, Nov. 18 (AP)—A spokesman for the American Association for the Advancement of Science said today increasing air pollution will make the earth hotter and might even slowly melt the polar ice caps. He also said air pollution is as much to blame as cigarettes for increasing lung cancer.

Dr. Chauncey D. Leake, assistant dean of the Ohio State University School of Medicine, said there is a "tremendous increase in the blanket of carbon dioxide we are throwing above us, which will inevitably tend to increase heat capture from the sun."

"What will we do if this occurs with gradual melting of the huge polar ice caps, and the gradual rise of our oceans, drowning out still further our shorelines" he asked.

Leake addressed the opening session of a national conference on air pollution. The three-day meeting was called by U.S. Sur-

geon General Leroy S. Burney to get the views of scientists and civic leaders on how to prevent contamination of the air we breathe.

More Trees Advised

Leake suggested the carbon dioxide "blanket" might be reduced by extensive planting of trees and other green things which absorb the gas along city streets. "Maybe 10 trees planted for every automobile, with 100 for every truck, would help," he said.

Leake said about half of air pollution is traceable to automobile exhausts. He suggested that manufacturers "turn from the foolishness of silly style whims, from oversized models and from too much horsepower to the essential but tough job of controlling exhausts."

Senator Thomas H. Kuchel (R., Calif.), a self-styled "recently escaped smog refugee," said he plans to introduce legislation in Congress next year to continue and possibly broaden the Federal air pollution con-

trol program. The program, calling for Federal studies and research on the causes and control of air pollution, now is due to expire July 1, 1960.

Kuchel said unchecked continuation of air contamination "undeniably and eventually will halt the growth and progress of any community as surely as a Chinese wall" around it. He said cities may have to fight smog with "air zoning" laws for industries and autos.

Dr. Herman E. Hilleboe, New York State health commissioner, called for a "crash" recruitment and training program in air pollution control by the U.S. Public Health Service. He said a "massive effort" is needed to get states and communities started on effective air pollution control programs.

More Research Pledged

Retired Army General John E. Hull, president of the Manufacturing Chemists Association, said scientific investigation "offers probably the best hope for sensible and effective control of air pollution."

He pledged that the chemical industry, which now spends about \$250,000,000 annually to curb or avoid air pollution, "will continue to be one of the leading partners" in solving the problem.

The conference, first nationwide meeting of its kind, has a twofold purpose:

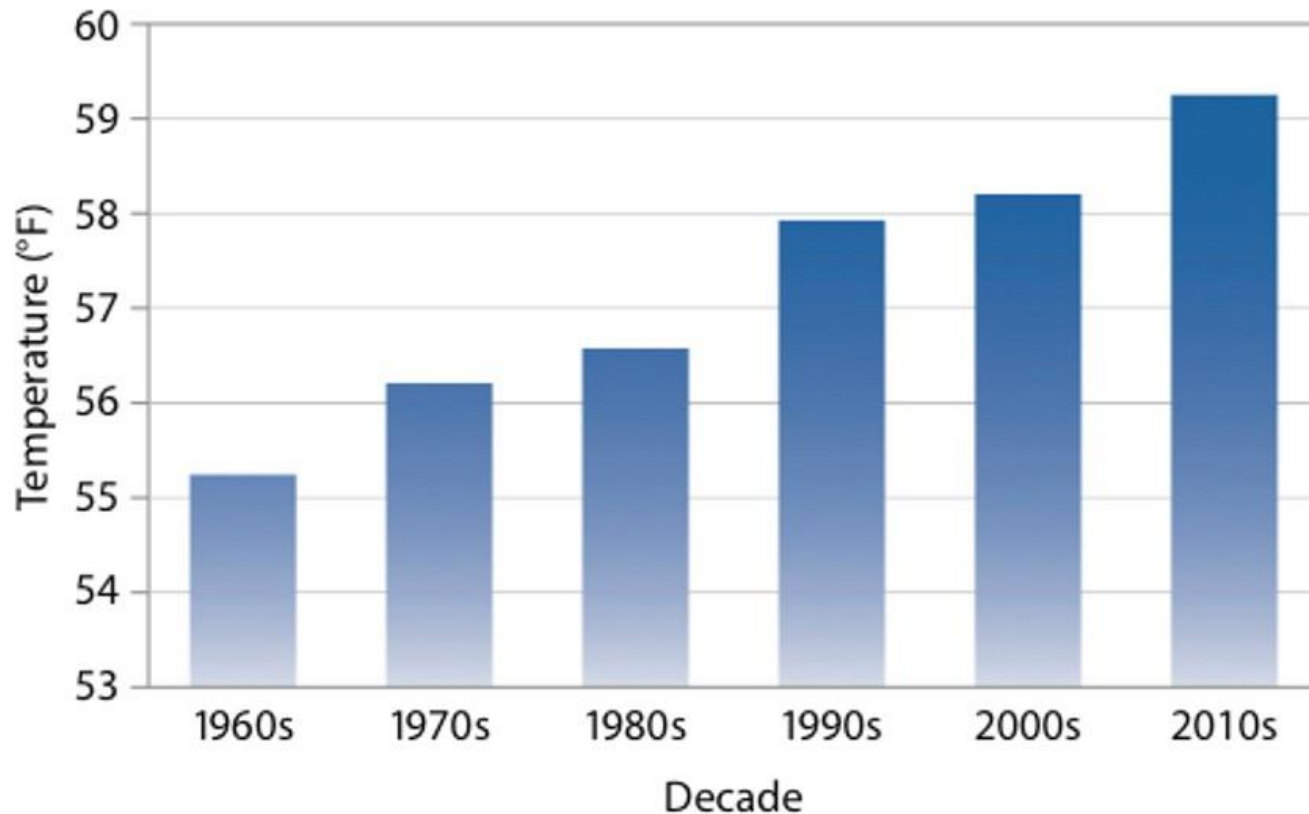
1. To awaken public interest in the problem of air pollution, which costs the public an estimated \$1,500,000,000 to four billion dollars a year, not counting any damage to health.

2. To develop a 10-year plan to cope with air pollution, which Burney calls "an unwanted by-product of progress."

About 1,000 persons are expected to participate in the discussions. They include doctors, engineers, meteorologists, chemists, State and local health officials, city planners and representatives of industry, auto associations, Chambers of Commerce, women's clubs, the Council of State Governments and the American Municipal Association.

Louisville's Changing Climate

Average Temperature in Louisville



Higher Temperatures

The average number of days per year above 90°F has increased by 12 days since 1960

Heavier Rain Events

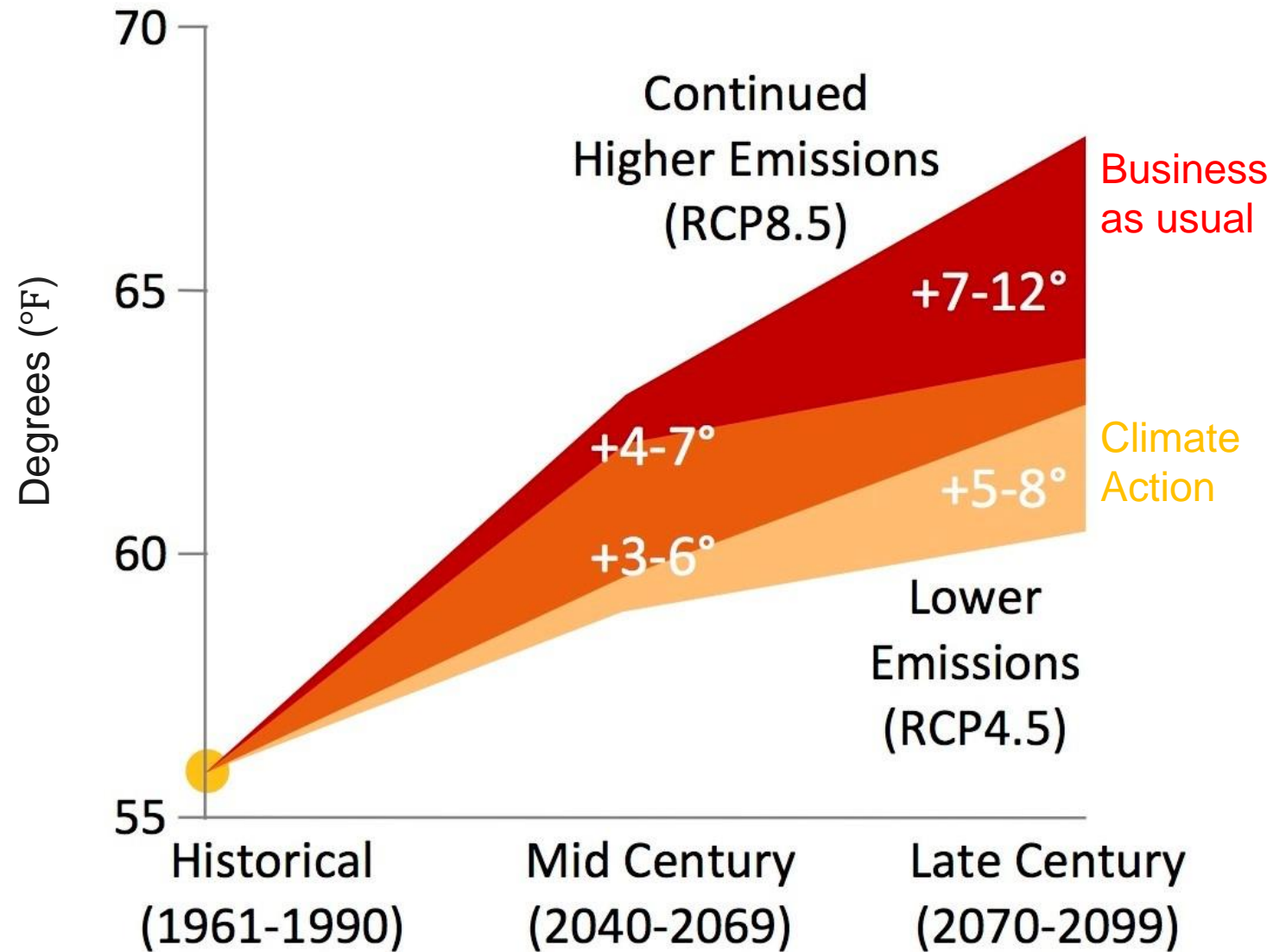
The 3 largest rain events in Louisville happened in the last decade

Louisville's Climate Future

Montgomery, AL

*6°F warmer, 10% drier
by 2080*

*100-year floods
every 20-30 years*

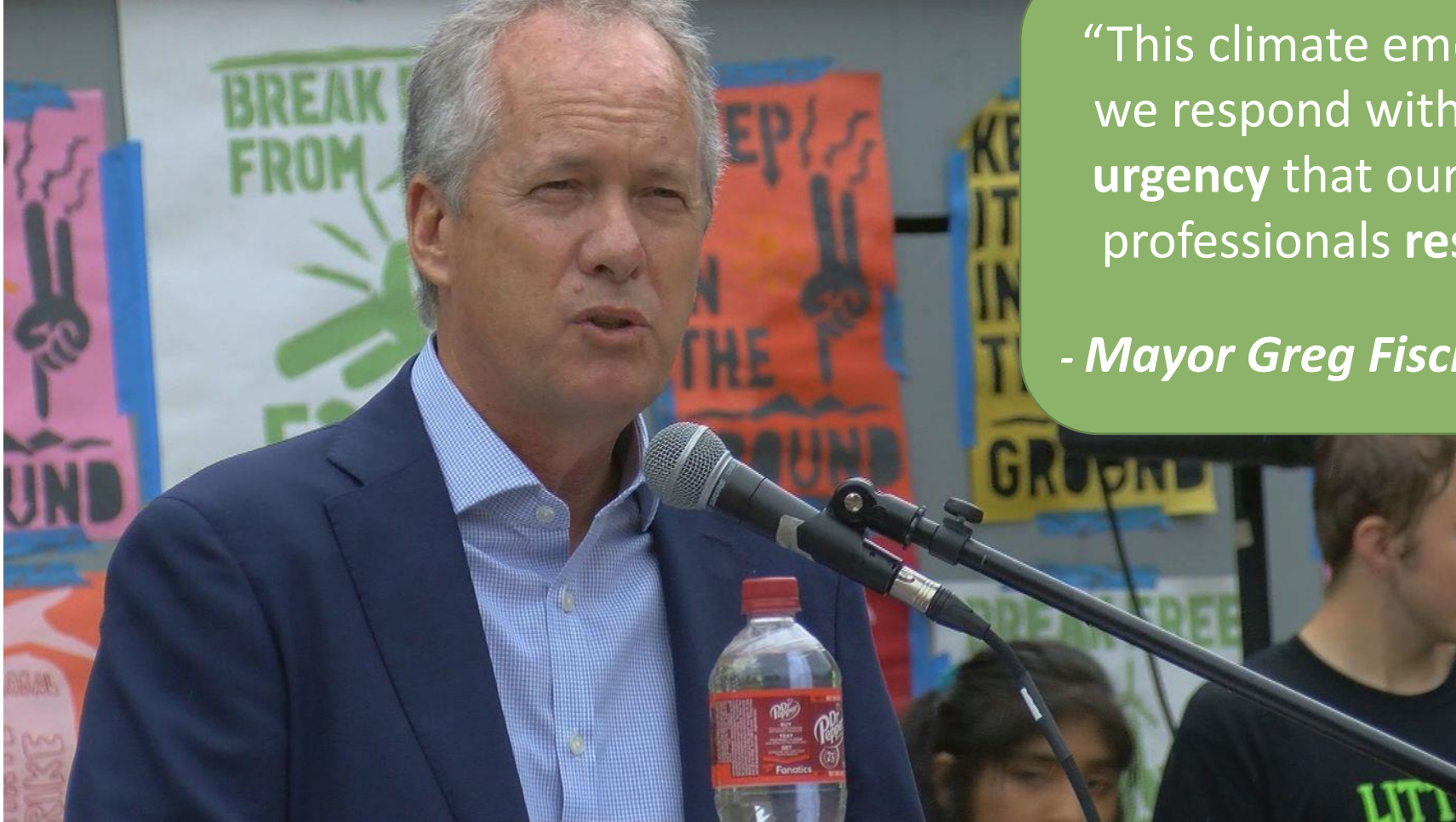




Preparing Louisville for Climate Change Impacts


- Heat-related fatalities
- Increased cost of energy
- Increasing violence and crime
- Loss of affordability and housing opportunities
- Worsening inequities around gentrification, race, and income
- Worsening traffic congestion
- Declining air quality
- Increased food insecurity

Louisville Declares Climate Emergency



“This climate emergency requires that we respond with the **same focus and urgency** that our police, fire and EMS professionals respond to a 911 call.”

- *Mayor Greg Fischer, September 2019*



Louisville is Ready for 100%

100% clean energy for
government operations
and community-wide

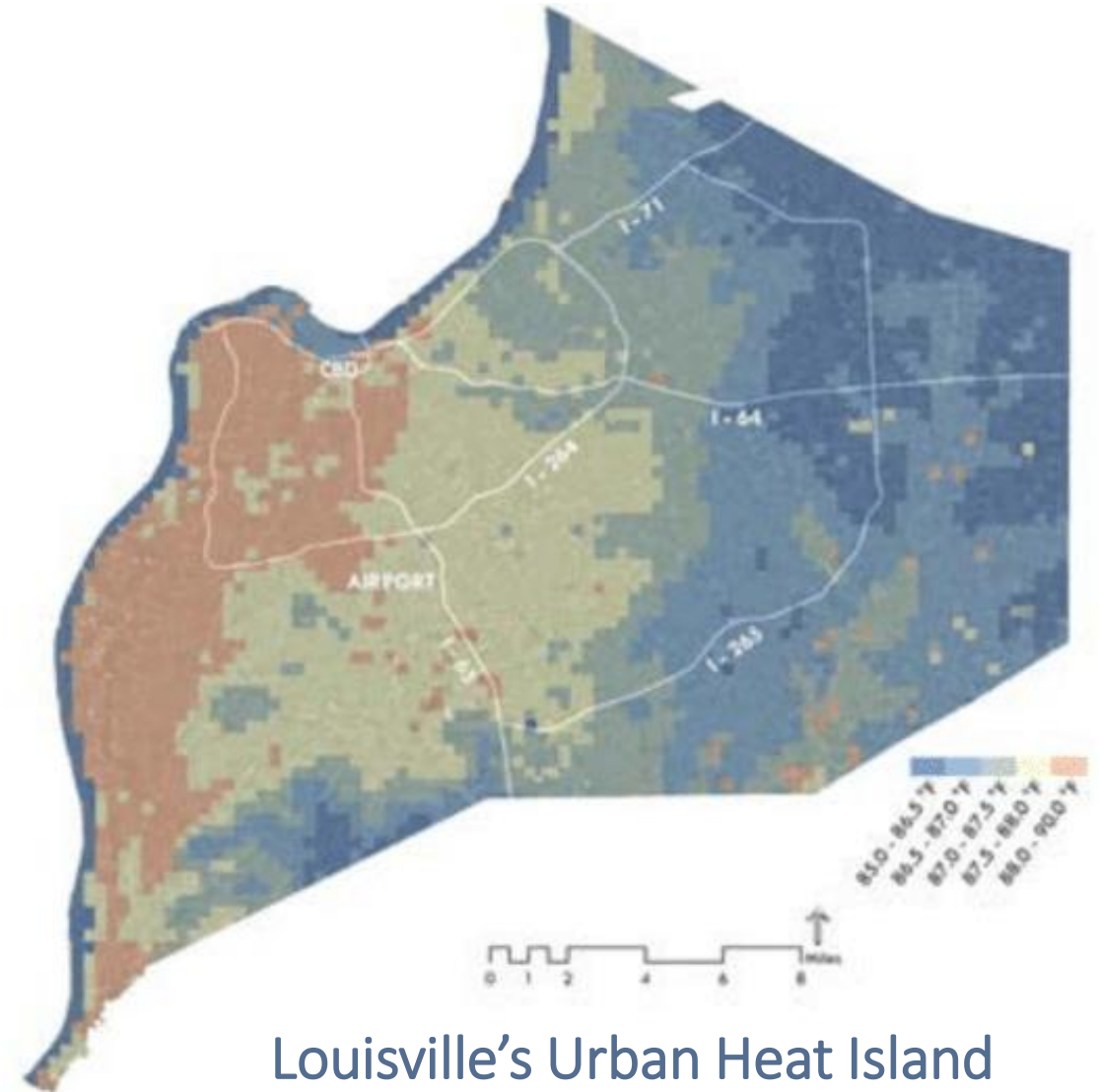
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An Opportunity for Equity

Climate change will not impact everyone equally!

Strategies must not simply address climate change vulnerabilities, but **the intersecting factors** that make populations more vulnerable.

Strategies that do not **actively address** historical inequities will, in fact, **actively worsen** those inequities.



Louisville's Urban Heat Island

Louisville Metro Sustainability Programs

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Cool Roof Rebate Program

Install an ENERGY STAR reflective roof on your property and receive a \$1/ft² rebate

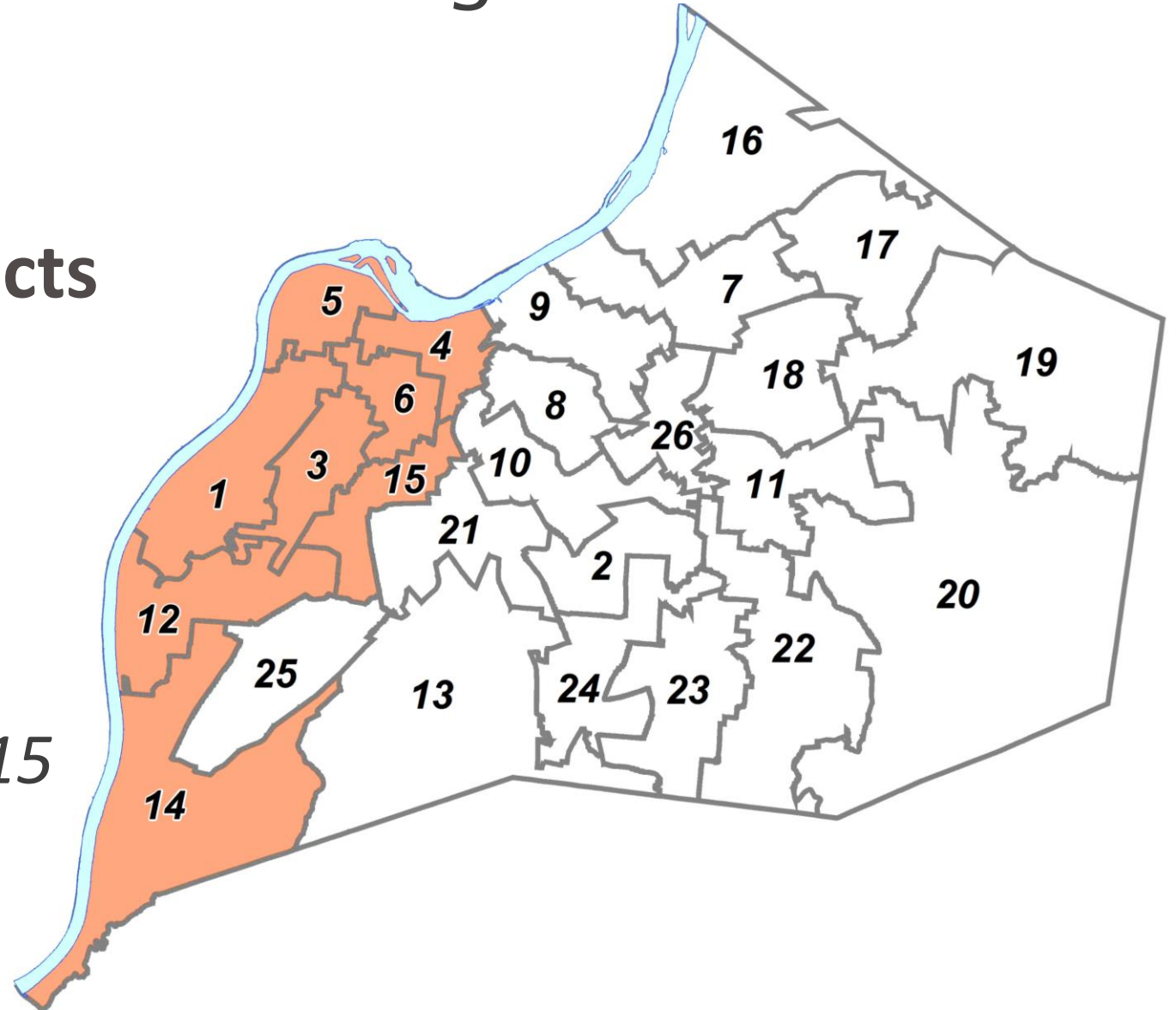


Save 7-15% on cooling costs and help the city manage urban heat!

Cool Roof Rebate Program

Targeted High-Heat Districts
receive 70% of funding

Districts 1, 3, 4, 5, 6, 12, 14, 15



Energy Project Assessment District - EPAD Program



Financing mechanism to repay private loans for energy efficiency, renewable energy, and water conservation projects



EPAD loan remains **affixed to the commercial property**, not the property owner



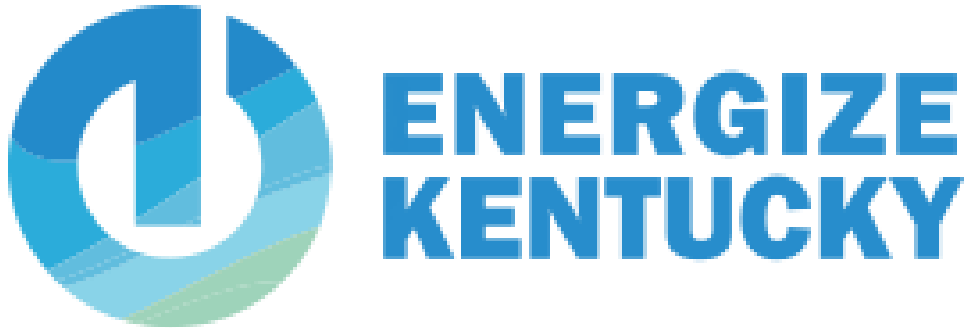
Extended repayment term of up to **30 years**



Private loan provides up to **100% of the project's cost** and requires no down payment

EPAD Program Changes

Third-Party EPAD Administration



- Experts in EPAD financial markets & national trends
- Administrators for all other EPAD programs in Kentucky

“The EPAD Program allowed us to easily finance a much better system than we could afford through general cash flow. And the financing process is so easy and straightforward. *We loved the process and love the product.*”

- **Chris Mather**

Property Owner of Springhurst Tennis Club

Other Metro Efforts



Sustainable transportation alternatives

Air quality improvement programs



Urban heat island mitigation



**GREEN
HEART**
LOUISVILLE

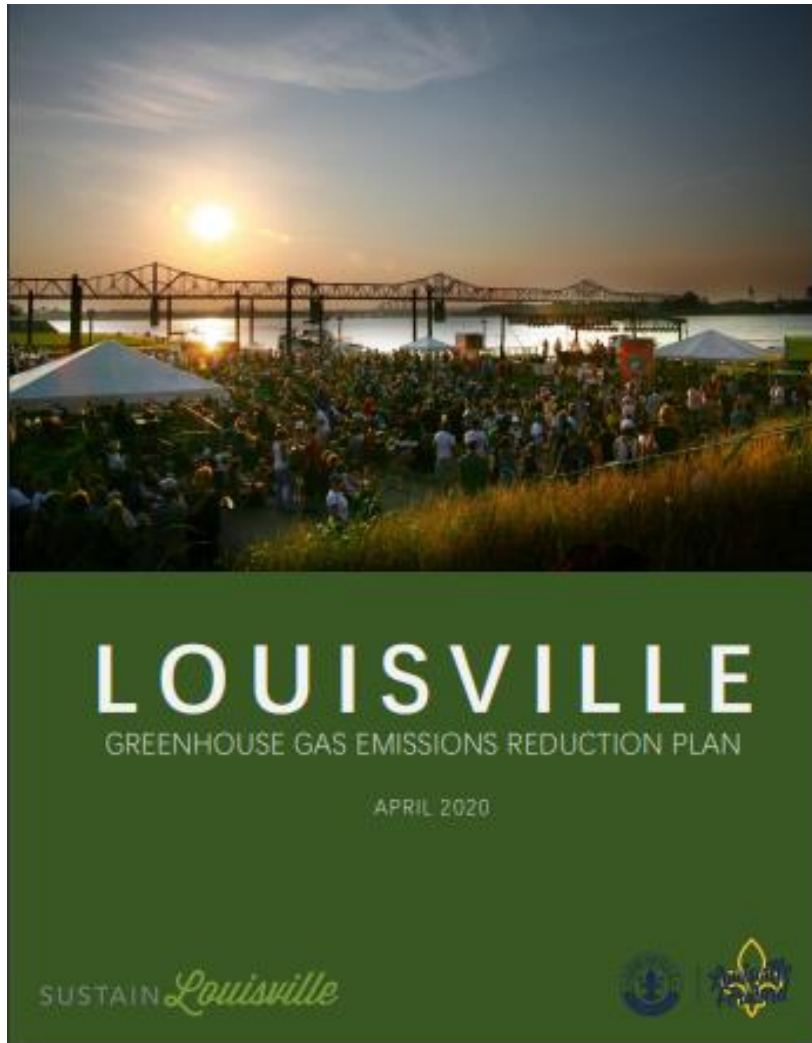


Partnerships

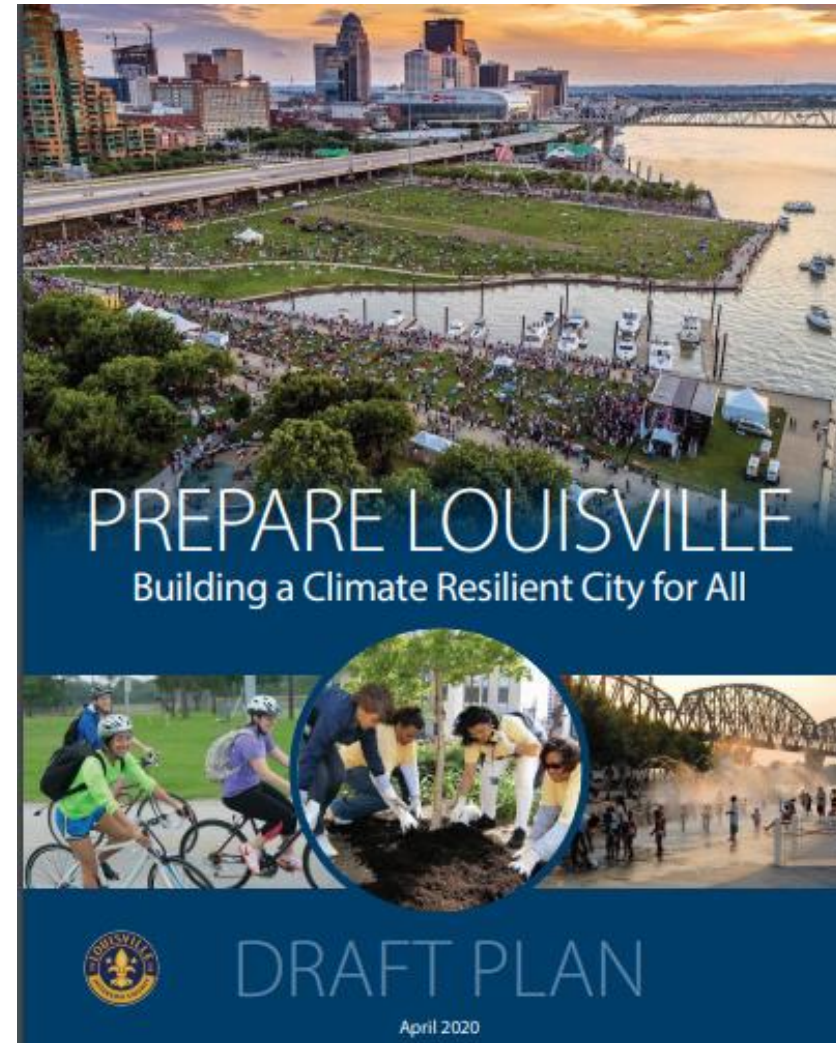
Louisville Metro Sustainability Plans

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Louisville's Climate Action and Adaptation Plans



GHG Emissions Reduction Plan



Prepare Louisville

Potential Emissions Reduction Strategies



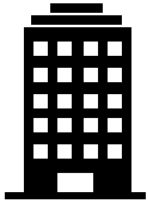
Residential Buildings

- Existing building retrofits
- Solar PV Systems on 50% of homes



Energy Industry

- **70% reduction in energy generation intensity factor**
- LEDs in lighting fixtures and streetlights



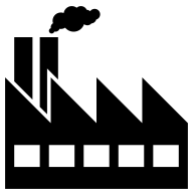
Commercial Buildings

- Bio-gas in 20% of buildings
- Solar PV Systems on 25% of buildings



Transportation

- Electric vehicles
- Active transportation & ride-sharing



Manufacturing Industries and Construction

- Deep energy retrofits
- Fuel switch to natural gas



Waste

- Organic waste diversion programs
- Methane recovery at landfills and wastewater treatment plants



The single biggest way to
reduce our GHG emissions?

Changing our source of energy.

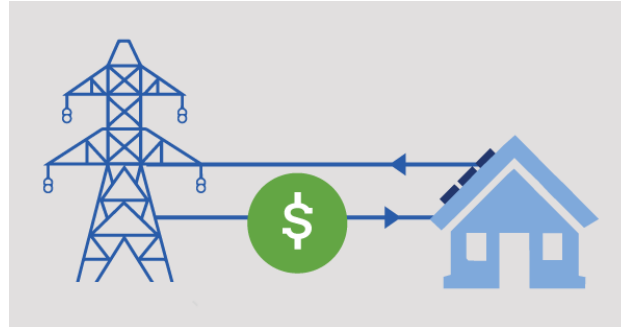
The transition to a future electricity grid with a 70% lower carbon intensity factor will potentially offer a cumulative avoidance of 7,553,055 tCO₂e by 2050, representing a **40.2% reduction** in emissions over the Business-As-Usual scenario.

Local Renewable Solutions

Expedite permitting process



Advocate to expand net metering policy



Create a Solar Rebate Program



Require new homes to be 'solar-ready'



Start a local Green Bank



Invest in community solar programs



State Renewable Solutions

Expand & improve Net Metering Policy

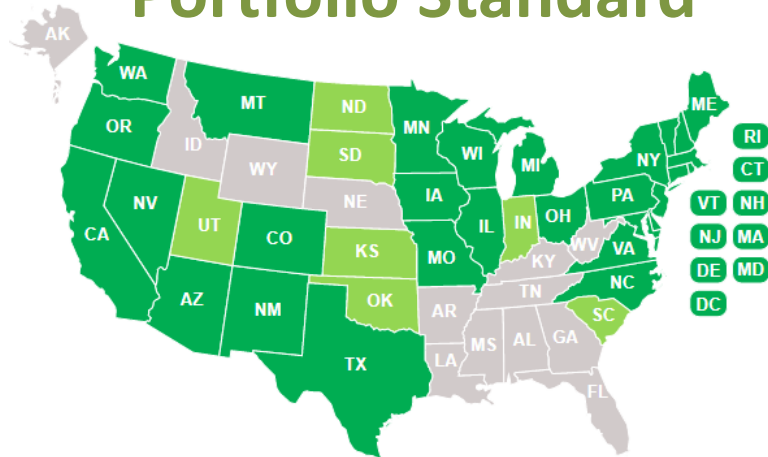


NET METERING

Set stronger financial incentives



Adopt a Renewable Energy Portfolio Standard



Update state building and energy codes



Louisville's Energy Management Program

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Energy Program Breakdown

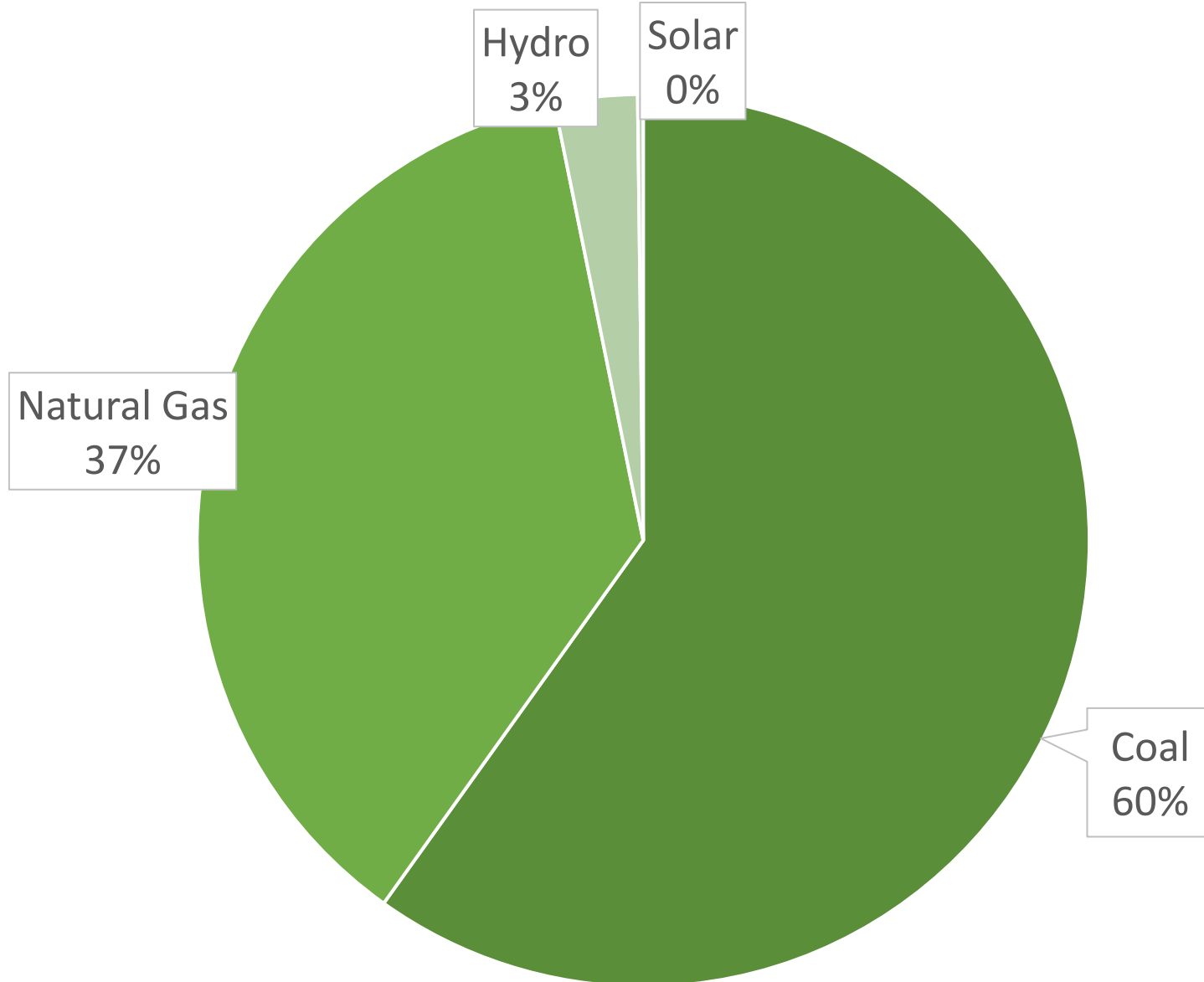
- Overview of current energy profile
- Demand Side Management (Conservation)
 - Data
 - Billing Structure
 - Operational Changes
 - Building Infrastructure
- Supply Side Management / Renewable energy supply
 - Partnerships to Explore Generation and Procurement Strategies
- Takeaways and Questions

Utility Snapshot

- Louisville Metro's annual utility costs are approximately **\$15 million**
 - Street lights: **\$5.5 million**
 - 97,000,000 kWh and 130,000,000 CF
 - Equivalent to burning 55,000 tons of coal. Would fill the Judicial Center in two years.
- Without action, costs will continue to rise.
- 2021 costs will likely increase with return to work along with simultaneous increase in LG&E's rate.



Louisville's Energy Mix



Louisville's Renewable Capacity

Renewable Source	MW capacity (2019)
Solar PV	5.23
Solar thermal	--
Ground or water source (hydro)	101
Wind	0.013
LG&E total capacity	2,786

Power use results in emissions of approximately **81,000 tCO₂e**

100% Clean Energy Resolution

- Metro Council has already taken the first, and perhaps hardest, step:

- 100% renewable electricity for Metro operations by 2030
- 100% clean energy for Metro operations by 2035
- 100% clean energy community-wide by 2040

- Ambitious goals are what drive innovation and progress
- Louisville has created the opportunity to become a regional leader and forge a path for similar cities to follow.



Rooftop solar on Louisville Metro Development Center

The Energy Pyramid



Demand Side Management – *Energy Conservation*

The first step in meeting these goals is to reduce our consumption and utility costs.

\$3 million saved over 6 years
in Cincinnati

\$930K saved annually
in Lexington

Energy management
programs can save
10% - 30%

Lexington's *Energy
Improvement Fund* has
financed more than
\$2.5 million in
conservation projects
since 2010.

Data is a top priority

- Prioritizes buildings that perform poorly or merit energy projects
- Reliable data is necessary to develop our pathway to 100% renewable. It clarifies the amount of energy we need to procure, and the best ways to meet this demand.



Test

Filter by building or building group

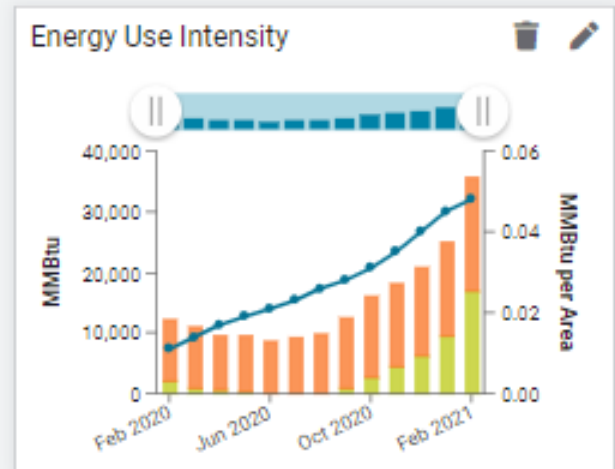
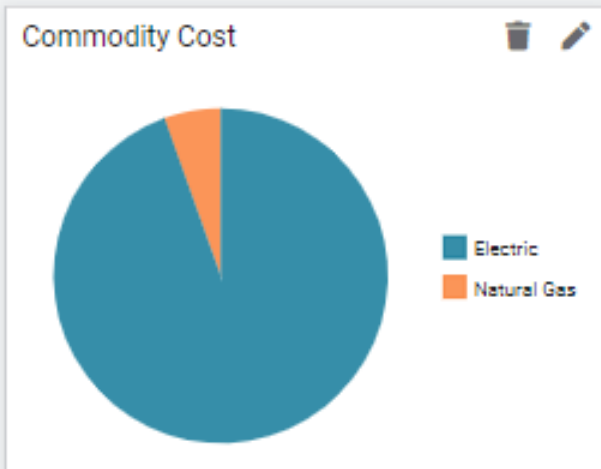
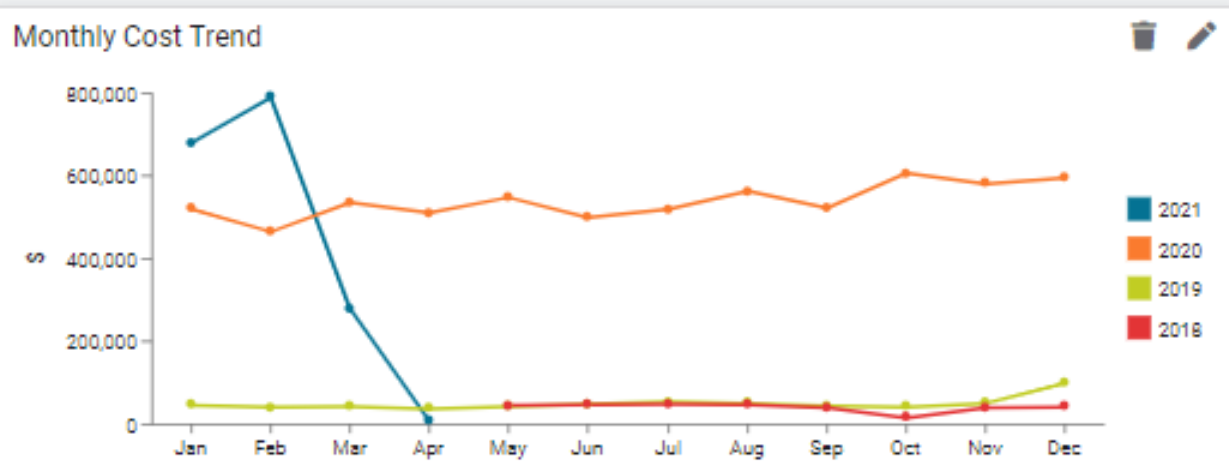


Top 20 EUI

Newburg Radio Shop an...	0.085 MMBtu/SqFt
Main Library	0.080 MMBtu/SqFt
Engine 12	0.076 MMBtu/SqFt
Portland Library	0.075 MMBtu/SqFt
Public Works Roads-Ce...	0.074 MMBtu/SqFt
EMS Building	0.074 MMBtu/SqFt
Jeffersontown Library	0.073 MMBtu/SqFt
Engine 22 / Truck 04	0.072 MMBtu/SqFt
Auto Service Facility	0.062 MMBtu/SqFt
Western Library	0.060 MMBtu/SqFt
Engine 07	0.060 MMBtu/SqFt
Engine 23	0.055 MMBtu/SqFt
Engine 19	0.051 MMBtu/SqFt

Highest Cost Facilities

PSL Foundation	\$278,967
Main Library	\$264,127
Public Works Traffic Signals	\$186,704
Metro Animal Services	\$79,543
Judicial Center	\$56,063
Sirens	\$54,524
MetroSafe	\$50,210
Hall of Justice	\$49,692
Southwest Regional Library	\$48,771
Corrections HQ	\$45,007
Northeast Regional Library	\$44,216
South Central Regional	\$28,163
Engine 02 / Truck 01 / Headquarters	\$27,239



Billing needs to be regularly monitored to lower costs

- Metro accounts feature dozens of different utility rates and complex billing structures.
- Billing integrity
- Accounts must be reviewed to optimize rates.

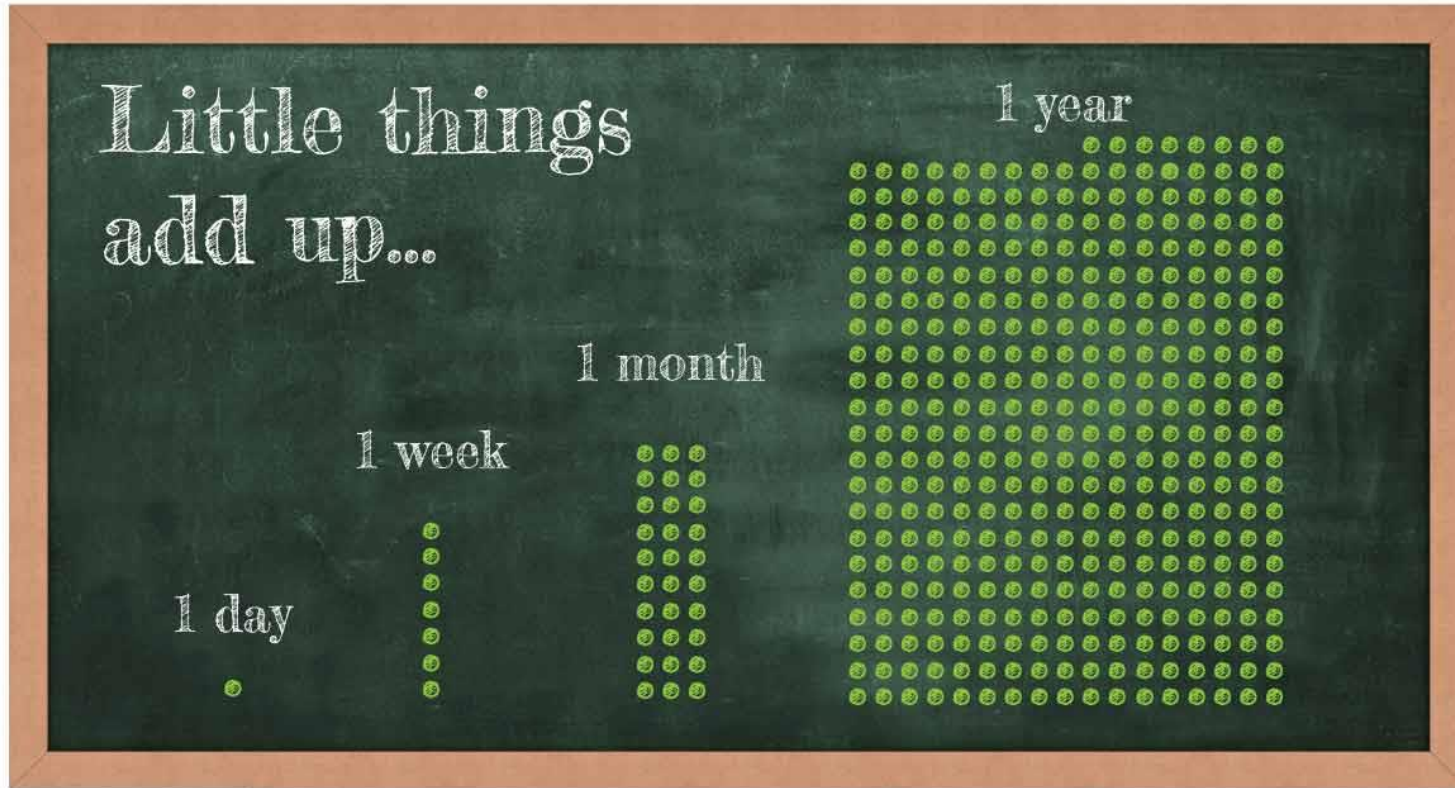
The Gardens

2020 power: **\$19,000**

New rate **saves over \$5,000**

THE GARDENS

Subtle operational improvements
can sharply lower consumption



- Recommissioning
- Sequencing
- Scheduling

Accomplished
night and weekend
HVAC setbacks in
700,000 ft²

**51% runtime
reduction**

Building Infrastructure

Selectively invest in energy projects with biggest impact

- Convert to LED lighting
- Expand BAS controls, or add smart thermostat functionality for HVAC setbacks in more facilities
- Replace or repair outdated HVAC, water heaters, boilers, chillers, and appliances
- Building envelope and insulation



How will we get to 100% renewable energy?



Today's **Energy Challenges**, Tomorrow's **Solutions**

NREL's vision lays the foundation for scientific research and technological innovation to shape a highly efficient and resilient energy future.

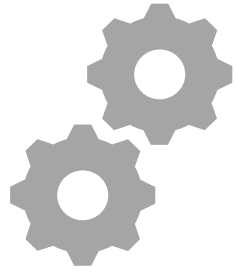
National Renewable Energy Lab (NREL)

- NREL is the only DOE national laboratory solely dedicated to advancing energy efficiency (EE) and renewable energy (RE) technologies and applications
- NREL is a sought-after resource for EE, RE, transportation, conventional power systems, combined heat and power, and resilience expertise.
- NREL has provided hundreds of local jurisdictions with data-driven modeling and analytics to help these jurisdictions understand their options in meeting energy and climate goals and targets.

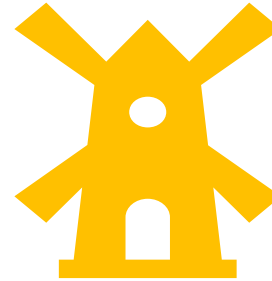
Takeaways



1st Priority: gathering data and consolidating into usable platforms for full transparency and easy analysis.



Simultaneously launching **core operational improvements**, with **high-impact strategies** such as building setbacks and adjustments to the logic in BAS.



Cost savings from energy conservation needs to be **reinvested back into improving facility infrastructure** as well as securing renewable supply. This should be seen as a financing mechanism which will result in increasing returns with time.



We have established regular **meetings with LG&E** and a **strong partnership with NREL** and will work with both partners to fully explore every option in securing the supply of renewable energy needed.

Stay Involved!



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Sustain Louisville e-newsletter
LouisvilleKY.gov/Sustainability



Thank you!

Office of Advanced Planning and Sustainability

<https://louisvilleky.gov/sustainability>

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