Multipollutant Stakeholder Group

Final Report

August 2020

AIR POLLUTION CONTROL DISTRICT

701 West Ormsby Ave.
Louisville, Kentucky 40203

www.LouisvilleKy.gov/APCD

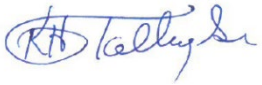
LETTER FROM THE DIRECTOR

First, I would like to express my heartfelt thanks to all who have participated in the MPSG process. It is your commitment to the betterment of our community that will pay dividends for many years to come.

Multi-pollutant control strategies can save money and time, they can achieve impactful health, economic, and environmental benefits. It has been proven that some control technologies can reduce emissions of multiple pollutants and it is often more efficient to develop integrated strategies that reduce multiple pollutants than individual strategies targeted at single pollutants. The work that you have done crosses multiple disciplines and speaks to the need for a comprehensive strategy that includes not just industry, but even what we as individuals can do to help improve air quality and health in our community.

The more we learn and the better we understand the health impacts of air pollution, it requires us to be smarter, more efficient, and more targeted in our work to reduce emissions and improve health outcomes in our community. And, as I think recent events have highlighted, these impacts are usually more pronounced on our most vulnerable and marginalized residents.

So again, let me thank you on behalf of the Air Pollution Control District and our community at large for your dedication, engagement, and hard work that you have contributed for the benefit of the community in which we all live, work, and play.



Keith H. Talley, Sr.

Director

ACKNOWLEDGMENTS

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ACRONYMS

APCD .....Louisville Metro Air Pollution Control District
AQI .....Air Quality Index
CAA .....Clean Air Act
CAMx.....Comprehensive Air Quality Model with Extensions
CASAC.....Clean Air Scientific Advisory Committee
CFR .....Code of Federal Regulations
CMAQ.....Congestion Mitigation and Air Quality Program
CO .....Carbon Monoxide
COPD.....Chronic Obstructive Pulmonary Disease
CTG.....Control Techniques Guidelines
DCA .....Division of Compliance Assistance
DCFC.....DC Fast Charger
DERA .....Diesel Emissions Reductions Act
EA .....Environmental Acceptability
EGU .....Electric Generating Unit
EPA.....United States Environmental Protection Agency
EPAD .....Energy Project Assessment District
EPCRA .....Emergency Planning and Community Right-to-Know Act
EV .....Electric Vehicle
FEDOOP .....Federally Enforceable District Origin Operating Permit
FGD .....Flue Gas Desulfurization system
HAP .....Hazardous Air Pollutant
HEAL .....Health Environment and Action in Louisville
HER.....Health Equity Report
IDEM.....Indiana Department of Environmental Management
INDOT .....Indiana Department of Transportation
KAIRE .....Kentuckiana Air Education
KIPDA .....Kentuckiana Regional Planning and Development Agency
KPPC.....Kentucky Pollution Prevention Center
KRS .....Kentucky Revised Statutes
KYDAQ .....Kentucky Division for Air Quality
KYDEP .....Kentucky Department of Environmental Protection
KY EXCEL .....Kentucky Excellence in Environmental Leadership Program
KYTC.....Kentucky Transportation Cabinet
LG&E .....Louisville Gas and Electric Company
LMAPCD .....Louisville Metro Air Pollution Control District
LMG.....Louisville Metro Government
MACT.....Maximum Achievable Control Technology
MSA.....Metropolitan Statistical Area
MPE .....Model Performance Evaluation

MPO .....Metropolitan Planning Organization
MPSG.....Multipollutant Stakeholder Group
NAA .....Nonattainment Area
NAAQS .....National Ambient Air Quality Standards
NATA.....National Air Toxics Assessment
NEI.....National Emissions Inventory
NESHAP .....National Emissions Standards for Hazardous Air Pollutants
NMB .....Normalized Mean Bias
NME.....Normalized Mean Error
NOx .....Oxides of Nitrogen/Nitrogen Oxides
NNSR.....Nonattainment New Source Review
NSPS .....New Source Performance Standards
NSR .....New Source Review
OFS.....Ozone Formation Study
PA.....Policy Assessment
PACE.....Property Assessed Clean Energy
PM .....Particulate Matter
PM_{10}.....Course Particulate Matter (particles with an aerodynamic diameter less than or equal to a nominal 10 micrometers)
$PM_{2.5}$ .....Fine Particulate Matter (particles with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers)
ppb .....parts per billion
ppm .....parts per million
PSC.....Public Service Commission
PSD.....Prevention of Significant Deterioration
PTE .....Potential To Emit
RACT/RACM ....Reasonably Available Control Technology/Reasonably Available Control Measures
RAP.....Regulated Air Pollutant
RFG.....Reformulated Gasoline
RFP .....Request for Proposals
SBEAP .....Small Business Environmental Assistance Program
SEMAP.....Southeastern Modeling, Analysis, and Planning
SIP .....State Implementation Plan
SMOKE .....Sparse Matrix Operator Kernel Emissions
SO_2 .....Sulfur Dioxide
STAR.....Strategic Toxic Air Reduction Program
TAC.....Toxic Air Contaminant
TARC .....Transit Authority of River City
tpy .....Tons Per Year
TRI .....Toxic Release Inventory
U.S. EPA .....United States Environmental Protection Agency
VET.....Vehicle Emissions Testing

VMT.....Vehicle Miles Traveled
VOC.....Volatile Organic Compound
VW.....Volkswagen
WRF.....Weather Research and Forecasting Model

EXECUTIVE SUMMARY

In November 2019, the Louisville Metro Air Pollution Control District (APCD or "the District") convened a broad range of stakeholders to form the Multipollutant Stakeholder Group (MPSG) to discuss current air quality challenges in the Louisville Metro area and develop recommendations for our community's next steps to improve local air quality and reduce health impacts associated with air pollution exposure. The area's current status as nonattainment for the 2015 8-hour Ozone National Ambient Air Quality Standard (NAAQS) was the focus of the MPSG's work. However, air quality status and community goals for fine particulates and air toxics were also discussed, and co-benefits to reduce health impacts from these pollutants sought.

Stakeholder organizations were invited to participate in stakeholder discussion and asked to select at least one committee on which to participate. Committees include: Point Source, Area Source, Mobile Source, Health, and Outreach and Education. APCD Program Planning staff developed a set of initial goals for the project, which were outlined in the invitations sent to stakeholders and are listed below:

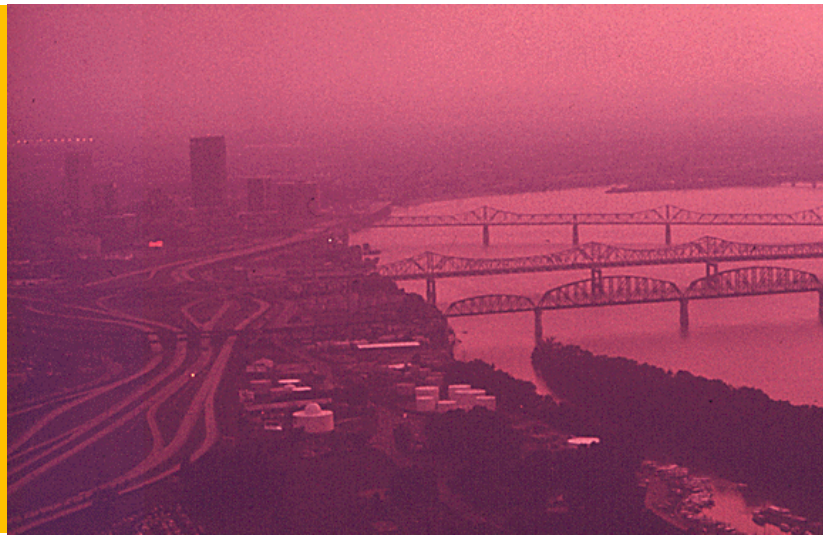
1. Develop recommendations to reduce emissions of ozone precursors in order to come into attainment of the 2015 8-hour Ozone NAAQS, with a focus on strategies that may achieve co-benefits of air toxics and fine particulate reductions.
2. Identify quantifiable emission reduction strategies – voluntary and regulatory – from the following source sectors: Point, Area, Mobile.
3. Identify voluntary programs and community initiatives to reduce emissions and exposure in order to reduce health risks.
4. Recommend programs, collaborations, etc. that will raise awareness of air quality impacts of local activities and the health impacts associated with them.

Initially, three meetings were held in November and December 2019 for the entire group before the MPSG broke out into its five committees in order to craft recommendations. Stakeholder organizations were encouraged to send representatives to more than one committee as desired, and all were asked to share the committee sign-up link throughout their networks to bring additional participants into the committees' processes to develop recommendations. The committees then met roughly every other week from mid-December 2019 through the beginning of March 2020. Committees discussed the source sector or topic with which they were charged and developed recommendations for emission reduction strategies, outreach and engagement opportunities around air quality and health impacts,

and additional lines of inquiry for how our community can protect public health from air pollution impacts.

After the committees finalized their recommendations, the full MPSG and all committee participants were invited back to a full reconvening for two final sessions in April 2020, during which each Committee's work was presented. The MPSG were then tasked with prioritizing recommendations and offering feedback. APCD Program Planning and Small Business Compliance Assistance Program staff then developed this report detailing the process, information shared, and recommendations of the committees. This Final Report of the MPSG process and resulting recommendations will be presented to the Louisville Metro Air Pollution Control Board, the Mayor's Office, Louisville Forward staff, and other community partner groups as opportunity allows.

Background



INTRODUCTION

The Louisville Metro Air Pollution Control District (APCD or "the District") has worked to make Louisville's air cleaner for more than 70 years. The APCD implements the federal Clean Air Act in Louisville/Jefferson County and works in partnership with the U.S. Environmental Protection Agency (EPA), the Kentucky Division for Air Quality (KYDAQ), and the Indiana Department of Environmental Management (IDEM). The APCD is part of Louisville Metro Government (LMG). Its leadership is appointed by the mayor and oversight is provided by the Louisville Metro Air Pollution Control Board.

Air pollution affects everyone. In the short term, air pollution can make it difficult to breathe when you are trying to enjoy the outdoors. In the long term, it can damage the lungs and cause or contribute to myriad chronic diseases. The most vulnerable people are senior citizens, very young children, and people who have respiratory ailments such as asthma, emphysema, and chronic obstructive pulmonary disease (COPD). All human activities add gases and particles to the air we breathe. When these gases and particles, or air pollutants, accumulate in the air in high enough concentrations, they can harm us and our environment. In response to the identification of air pollution as a national problem that needed a comprehensive program to address it, Congress passed the Clean Air Act and the EPA was established to implement it and other environmental laws. The District is the delegated authority to implement the Clean Air Act in Louisville/Jefferson County.

APCD's Mission Statement

The Air Pollution Control District protects air quality in Louisville Metro to ensure healthy air for breathing, economic security, and prosperity for all Louisvillians.

APCD's Equity Statement

The Air Pollution Control District will ensure the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of APCD regulations, programs, and policies.[1]

[1] Fair treatment means no group of people should bear a disproportionate share of the negative air quality consequences resulting from industrial, governmental, and commercial operations or policies. Meaningful involvement means people have an opportunity to participate in decisions about activities that may affect their environment and/or health; that the public's contribution can influence APCD's decisions; that

APCD CORE SERVICES/PROGRAMS

- Permitting – Issue permits for construction and operation of industrial and commercial facilities to ensure adherence to federal, state, and local air pollution regulations and emissions limits, resulting in clean, safe air for the citizens of Louisville Metro.
- Compliance – Perform inspections to ensure that permitted facilities are complying with permit conditions; assist businesses in maintaining permit compliance; determine whether individual businesses are required to apply for permits; investigate air-pollution complaints filed by citizens.
- Air Monitoring – Maintain a network of air monitors to gauge local air quality per EPA requirements; certify air data for submission to EPA.
- Enforcement – Investigate possible permit violations and, if necessary, compel compliance and collect fines.
- Emissions Analysis – Perform computer-modeling to determine levels of mobile-source pollution in Louisville Metro and to estimate dispersion of emissions from stationary sources.
- Program Planning – Collaborate with partners to develop community-wide policies and strategies for achieving clean air, which improves the overall quality of life and helps Louisville Metro meet and surpass federally mandated National Ambient Air Quality Standards; develop and lead agency-wide community engagement planning.
- Public Information/Outreach/Education – Inform the public about the benefits of clean air; issue Air Quality Alerts when needed; collaborate with other Metro agencies and non-Metro organizations; respond to media inquiries; solicit community involvement in Kentuckiana Air Education, Idle Free Louisville, Grow More Mow Less, and other programs; create and maintain informational materials such as websites, brochures, and PowerPoint presentations.
- Management – Ensures adequate resources are available for all core agency functions; maintain the APCD's Air Planning Agreement with the EPA; ensure the APCD is adhering to the State Implementation Plan (SIP).

community concerns will be considered in the decision-making process; and that decision-makers will seek out and facilitate the involvement of those potentially affected.

APCD STRATEGIC GOALS

1. Implement pollution regulations through permitting, compliance, and enforcement in a way that is fair, transparent, timely, and technologically advanced.
2. Engage residents, businesses, and governmental partners in developing and implementing policies and strategies to make the air cleaner for all citizens and improve the quality of place in Louisville Metro.
3. Monitor air quality to demonstrate compliance with the National Ambient Air Quality Standards, to identify air quality trends through data analysis, and to keep the public informed about air quality issues.
4. Develop and implement standards, plans, strategies, and actions to preserve and improve air quality.
5. Educate members of the public and the business community about the benefits of clean, safe air, and how their behavior impacts it.

APCD HISTORY

In the 1940s, Louisvillians were still heating their homes with coal. At the same time, industry was expanding, partly due to World War II. Louisville's "Rubbertown," an area of concentrated industry along the Ohio River in west Louisville, is a good example, as it sprang up during the war to supply synthetic rubber to the military. Prosperity increased for many, but so did air pollution.

Everyone could see that coal smoke was a problem, but the government had no legal authority to address it until 1945 when the Louisville Board of Aldermen passed a smoke ordinance. The ordinance also created the Louisville Smoke Commission to figure out ways to address the problem of air pollution. The Commission had no control over private residences and no jurisdiction outside the city limits at that time, including Rubbertown.

In 1952, the Kentucky Legislature passed Kentucky Revised Statutes (KRS) Chapter 77[2], authorizing the formation of county air pollution control districts. The same year, the Air Pollution Control District of Jefferson County was created and staffed with air quality professionals. It was governed by the new Air

[2] Kentucky Revised Statutes, Chapter 77, https://apps.legislature.ky.gov/law/statutes/chapter.aspx?id=37430.

Pollution Control Board, which replaced the Louisville Smoke Commission. The Board's jurisdiction expanded air pollution regulation beyond the city limits to include all industrial plants in Jefferson County. During this time, the APCD measured air pollution by collecting soot in buckets hung on lampposts around the county.

In 1956, the District took part in a pioneering air pollution study that brought city, county, state, and federal agencies together to understand pollution in Rubbertown. The study ran for two years and produced a wealth of information, including an inventory of air pollution sources in Louisville, an air sampling program, a network to collect meteorological data, and threshold concentrations for odor nuisance. The study made several recommendations to improve air quality, including:

- Emission limits for solid particles,
- Limited sulfur content for coal burned,
- Controls for hydrocarbon vapors,
- Odor nuisance and open burning regulations,
- Consideration of air pollution in planning and zoning decisions, and
- An education and outreach program.

In 1966, the Kentucky Air Pollution Control Commission was created and adopted a regulation requiring that all discharges of material into the air must be reported and registered with the Commission, which included emissions in Louisville. The state reaffirmed authority to control air pollution in Jefferson County to the Air Pollution Control Board in 1968.

The year 1970 was full of air pollution control milestones. Congress passed the Clean Air Act that year, and in Louisville the APCD began requiring permits for construction and operation of sources of air contaminants. Also of note, the APCD completed its first emissions inventory for Jefferson County.

Over the years, the APCD began to implement reduction strategies for sources beyond large industrial polluters. In 1970, leaf burning was banned and in 1971 the APCD began ticketing drivers for smoking vehicles. Then, in 1977, the Clean Air Act was amended. The new rules required several large-scale pollution reduction programs in Louisville, including the Vehicle Emissions Testing (VET) program, which began in 1984. The VET program required annual emissions tests from all vehicles in Louisville,

except construction and farm equipment. Clean Air Act requirements also lead to APCD review of traffic-control plans for new development in Louisville to reduce hot spots of carbon monoxide.

The Clean Air Act was amended again in 1990, bringing significant changes to the world of air pollution control. The federal government began to tighten tailpipe emission standards for vehicles and required the sale of cleaner-burning gasoline in the most-polluted cities. In 1995, Louisville gas stations were required to sell reformulated gasoline to reduce smog-forming pollution from vehicle exhaust. The 1990 amendments also created the Acid Rain program to reduce sulfur dioxide emissions nationwide as well as a federal program to reduce emissions of toxic pollutants.

In 2003, the VET program ended. That same year, the city and county governments merged. The APCD, which was an agency of Jefferson County government until merger, was renamed the Louisville Metro Air Pollution Control District.

State law allows the District to enact more stringent air quality standards than imposed by the state and federal governments. In response to growing community concern about toxic air emissions in west Louisville, the APCD in 2005 developed and implemented the Strategic Toxic Air Reduction Program (STAR). An air toxics program designed to require the reduction of toxic emissions by large industries, STAR was created after a monitoring study in 2000-2001 found unsafe levels of 18 toxic chemicals present in and around the Rubbertown industrial complex. Today, STAR is considered one of the most stringent local air toxics regulatory programs in the U.S.

AIR QUALITY OVERVIEW

In implementing the Clean Air Act (CAA), EPA identified six "criteria" air pollutants: ozone, carbon monoxide, sulfur dioxide, nitrogen dioxide, lead, and particulate matter. These pollutants endanger public health and welfare, come from a variety of sources, and are common throughout the United States. Further, EPA was charged with setting standards for each. These are known as National Ambient Air Quality Standards, or NAAQS. NAAQS are health-based standards that are regularly reviewed and, as our understanding of health-impacts evolves, are strengthened as needed over time to remain protective of public health.

When discussing air pollution and strategies to reduce emissions, it is important to recognize the many different sources of pollution in our air. Man-made, or anthropogenic, sources are typically separated out as "point sources" (also sometimes referred to as "stationary sources"), "area sources" (also referred to as "nonpoint sources"), and mobile sources (which collectively refers to "onroad" and "nonroad" sources). Throughout this report, "point sources" will refer to large stationary sources of air pollution such as power plants or large factories. All of the sources in this category require a permit from APCD to operate. "Area sources," however, are smaller sources, that while still stationary in nature, do not emit or have the potential to emit pollutants in quantities as large as point sources. There are many more area sources in the city though, so the collective emissions can add up to a large air quality impact. Examples of area sources range from smaller manufacturing to commercial operations like gas stations and dry cleaners. Lastly, "mobile sources" include cars, trucks, and other vehicles operating on the roadways, as well as sources that move around, but do not typically operate on streets, such as trains, construction equipment, and even lawnmowers and string trimmers. In addition to these man-made emissions, there are air quality impacts from the natural world as well, such as emissions from trees, volcanoes, and forest fires. Emissions from all these sources can also travel to the area from outside the region or the country, and some pollution is even formed when emissions from separate sources combine through atmospheric chemistry.

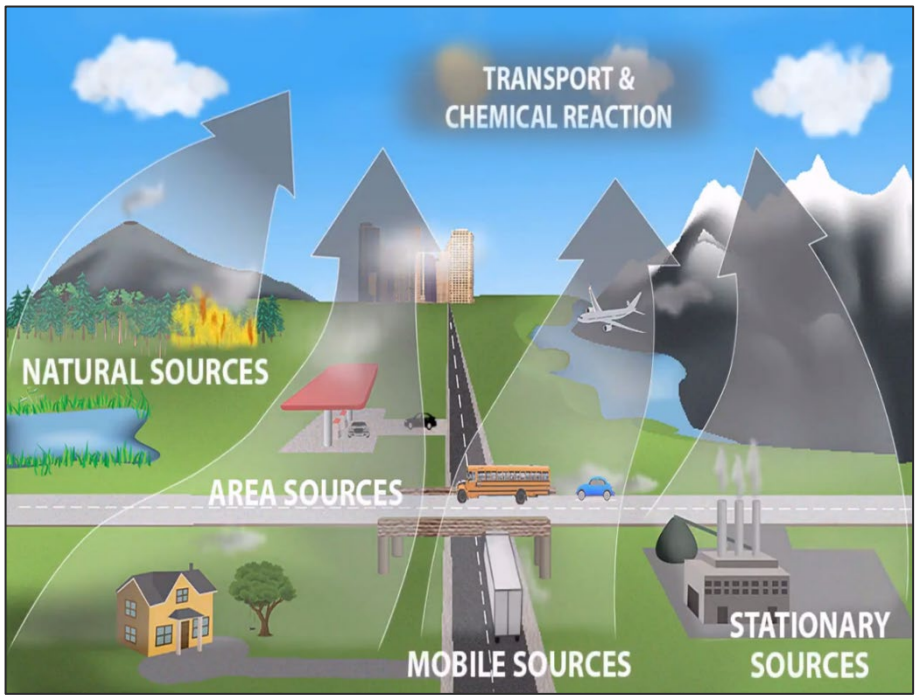


Figure 1 – Air Pollution Sources (image courtesy of EPA)

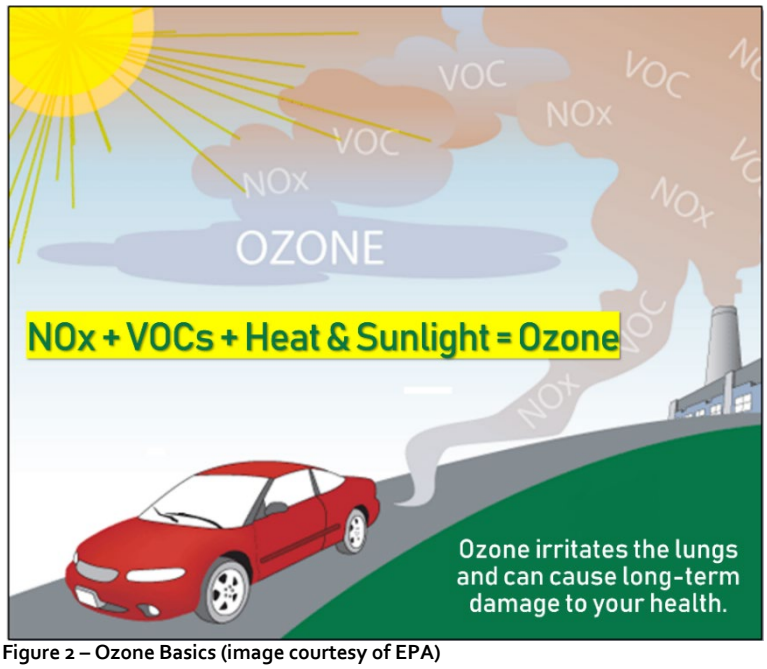


Figure 2 – Ozone Basics (image courtesy of EPA)

Our biggest ambient air quality challenge right now in Louisville is with ozone in the summer. Ozone is an air pollutant that damages your lungs and aggravates existing respiratory conditions through inflammation. Ozone is not emitted directly from industry, cars, trucks, or other sources of air pollution, rather it is formed when emissions from these sources, commonly referred to as "precursor emissions," mix in the atmosphere in the presence of sunlight. Essentially, the sun "cooks" these emissions from factories, businesses, and vehicles into ozone. The hotter it is, the faster this formation occurs. Subsequently, summer is when we are most at-risk for poor air quality from ozone. The ozone season, which is when we add to the year-round monitoring and begin to forecast ozone formation potential, is designated in the Louisville area as beginning March 1st and extending through the end of October. During this time, the daylight hours are longer, providing more time for ozone to build up during the day, and the days are hotter, which may mean more formation potential. Meteorology is a key factor in ozone formation and one that we cannot control, making it even more important to understand the emissions and their sources that drive ozone formation locally. Although ozone pollution has been trending downward since the 1970s, we are presently exceeding the current federal standard for ozone, which was strengthened to a level more protective of public health in 2015. Because Louisville is not meeting this standard, the area has been designated as "nonattainment" for ozone pollution.

Meanwhile, Louisville is meeting and designated as in "attainment" of federal air quality standards for particulate matter, airborne lead, oxides of nitrogen, and carbon monoxide. On May 15, 2020, the EPA published a Federal Register notice for public comment proposing designation of the Louisville area as "attainment" for sulfur dioxide now that current monitoring shows the community is well below the NAAQS standard for that pollutant.

ATTAINMENT STATUS

Attainment or nonattainment designations for an area are determined for each pollutant separately by comparing the area's "design value" for that pollutant to the corresponding NAAQS. For several criteria pollutants, including those for which Louisville is currently designated as nonattainment, design values are based on three-years of air monitoring data. Table 1 lists all design value forms and the area's current attainment status for each NAAQS. Following that is a discussion of the attainment history for each of the criteria pollutants for which Louisville is, or has been at one time, designated nonattainment. For some, like carbon monoxide, it has been decades since we saw an exceedance of the NAAQS. But for others, such as ozone and fine particulates, our challenges are much more recent and may continue in the future without sustained efforts to reduce emissions of these pollutants as standards continued to be re-evaluated and potentially strengthened time and again.

NAAQS AND DESIGN VALUES

Pollutant	Standard	Averaging Time	Design Value Form	Attainment Status
Carbon Monoxide	9 ppm	8-hour	Not to be exceeded more than once per year	Attainment
	35 ppm	1-hour		Attainment
Lead	0.15 µg/m^3	Rolling 3-month Average	Not to be exceeded	Attainment
Nitrogen Dioxide	53 ppb	Annual Average	Not to be exceeded	Attainment
	100 ppb	1-hour	98th percentile of 1-hour daily maximum concentrations, averaged over 3 years	Attainment
Particulate Matter (PM10)	150 µg/m^3	24-hour	Not to be exceeded more than once per year on average over 3 years	Attainment
Particulate Matter (PM2.5)	12.0 µg/m^3	Annual Average	Averaged over 3 years	Attainment
	35 µg/m^3	24-hour	98th percentile, averaged over 3 years	Attainment
Ozone	0.070 ppm	8-hour	Annual 4th highest daily maximum 8-hour concentration, averaged over 3 years	Nonattainment
Sulfur Dioxide	75 ppb	1-hour	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years	Attainment

Table 1 – NAAQS and Louisville Area Attainment Status

CRITERIA POLLUTANT STATUS AND TRENDS

Ozone

Ozone, which can cause health effects by causing constriction and inflammation of the airways[3], is not emitted directly from any of the man-made source sectors discussed above, rather it is formed in the atmosphere when certain other pollutants from those sources react in the presence of sunlight. Those pollutants are referred to as "precursor emissions" and include oxides of nitrogen (NOx) and volatile organic compounds (VOCs). Heat drives this reaction even faster, which is why our area has an ozone season from March to October, when days are longer and warmer than the rest of the year.[4]

Ozone precursor emissions come from a wide variety of sources. NOx is primarily emitted as a product of combustion. As such, NOx sources include activities like coal-fired electricity generation, cars and trucks, and natural gas combustion. VOCs, on the other hand, come from myriad sources across the city. These include industrial and commercial solvents and chemical manufacturing, but also consumer products such as paint, insecticides, and cleaners. Vegetation emits a large amount of VOCs as well, but also provides a wide variety of air quality and health benefits.[5] There are hundreds of VOCs and not all have the same potential to react and form ozone. Further, the amount of each of these precursors relative to each other can make a difference in how effective reductions of each are in reducing overall ozone formation. A more detailed discussion of ozone formation and precursor emission is found in the "Ozone – A Deeper Dive" section of this report.

[3] EPA, *Ground-Level Ozone Pollution: Health Effects of Ozone Pollution*, https://www.epa.gov/ground-level-ozone-pollution/health-effects-ozone-pollution

[4] *See also* EPA, *Ground-level Ozone Pollution*, https://www.epa.gov/ground-level-ozone-pollution/ground-level-ozone-basics#effects for more information; and Region 1: EPA New England, *The Ozone Problem*, https://www3.epa.gov/region1/airquality/oz_prob.html.

[5] Nowak, D.j., Heisler, G. M., *Air Quality Effects of Urban Trees and Parks*, National Recreation and Park Association Research Series, 2010. https://www.nrpa.org/uploadedFiles/nrpa.org/Publications_and_Research/Research/Papers/Nowak-Heisler-Research-Paper.pdf

ATTAINMENT HISTORY

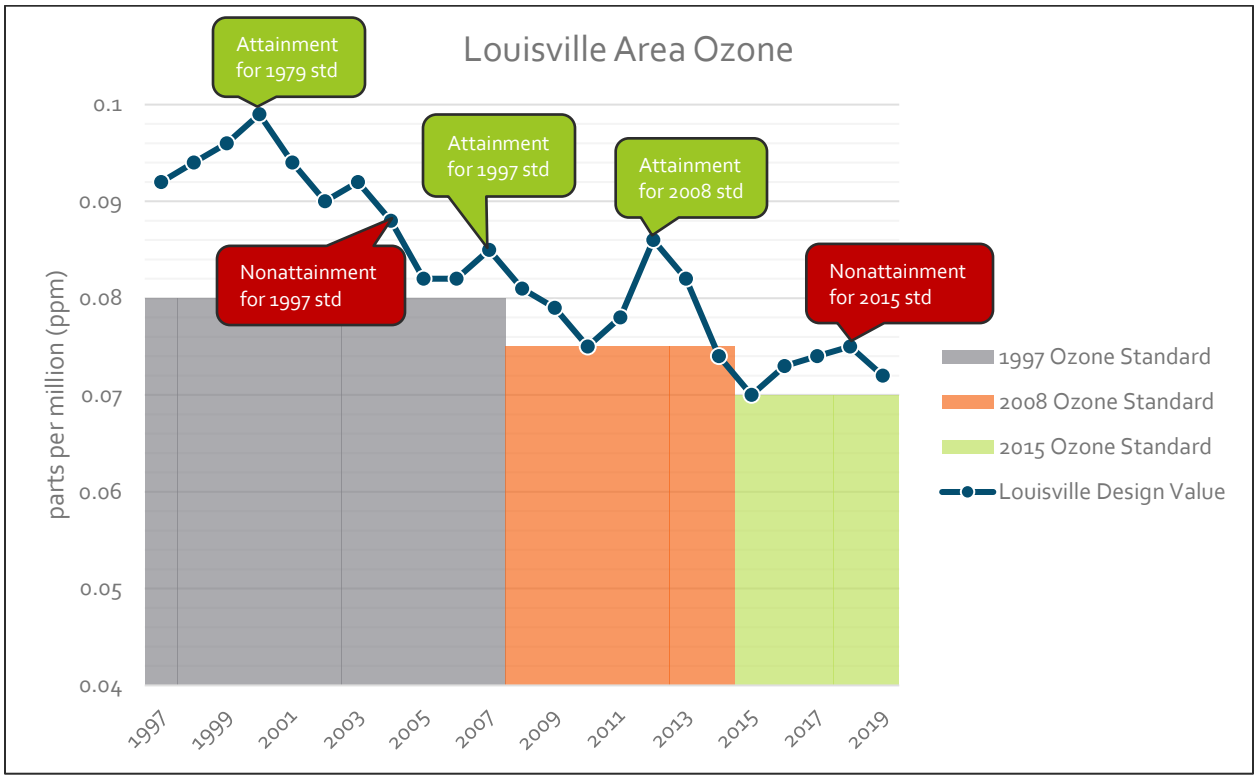


Figure 3 – Louisville Area 8-hour Ozone NAAQS History

Louisville has been designated nonattainment for two of the three most recent ozone NAAQS. And while subsequently being designated as attainment for all but the current standard, the area also quickly saw exceedances after each attainment designation. Ozone is a persistent problem for Louisville, like many urban areas, given our area's mix of emissions sources, topography (*i.e.*, location in a river valley), and climate. Figure 3 illustrates that the area has achieved ozone reductions, but that reductions, while consistent over the long run, have not ensured that Louisville stayed in attainment of the standards as they were strengthened over time.

In 2005 the area was designated nonattainment for the 1997 ozone NAAQS of 0.08 parts per million (ppm). After being redesignated to attainment for the 1997 NAAQS in 2007, and receiving an initial designation of attainment for the 2008 standard of 0.075 ppm in 2011, the area was designated marginal nonattainment for the 2015 NAAQS of 0.070 ppm effective August 3, 2018, kicking off a series of SIP requirements over the following years.

MARGINAL NONATTAINMENT SIP REQUIREMENTS

Year 1 (August 2019)

General & Transportation Conformity

Upon designation as nonattainment for any NAAQS, the first requirement is to implement general and transportation conformity beginning the next year. Section 176 of the CAA prohibits the federal government or any metropolitan planning organization (MPO) from approving or contributing to any activity which may, among other things, "delay timely attainment of any standard or any required interim emission reductions or other milestones in any area."[6] This has been interpreted to have two parts – transportation conformity and general conformity. Transportation conformity covers "activities include[ing] adopting, funding or approving transportation plans, transportation improvement programs and federally supported highway and transit projects."[7] General conformity covers "federal actions not related to highway and transit funding and approval actions."[8]

Year 2 (August 2020)

Additional requirements for ozone nonattainment areas are generally laid out in Section 182 of the Clean Air Act.[9] The structure of CAA §182 is generally such that certain requirements laid out are applicable to all areas designate marginal nonattainment or above, with additional requirements being added for each increasing classification.

- Emissions Inventory (base year only)

The Clean Air Act requires marginal nonattainment areas to submit a base year emissions inventory within two years of their designation as nonattainment.[10] The year selected for the inventory "shall be the emissions inventory for the most recent calendar year for which a complete triennial inventory is required to be submitted to the EPA"; *i.e.*, the year of the most recent National Emissions Inventory (NEI).[11] The most recent NEI was released in April 2020 for emissions year 2017. Requirements for the

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[6] 42 U.S.C. §7506(c)(1)(B)(iii).
[7] U.S. EPA, *Implementation of the 2015 National Ambient Air Quality Standards for Ozone: Nonattainment Area State Implementation Plan Requirements*, 83 Fed. Reg. 62,998 at 63,025 (Dec. 6, 2018) (codified at 40 C.F.R. Part 51). https://www.federalregister.gov/documents/2018/12/06/2018-25424/implementation-of-the-2015-national-ambient-air-quality-standards-for-ozone-nonattainment-area-state.
[8] *Id.*
[9] 42 U.S.C. §7511a..
[10] 42 U.S.C. §7511a.(a)(1); 40 C.F.R. §1315(a).
[11] *Id.*; 40 C.F.R. 1310(b).

inventory submitted include specifying actual emissions from point sources which emitted more than 100 tons of NOx or VOCs.

- Emissions Statements Rule

Aside from the emissions inventory the area is required to submit to the EPA, the CAA calls for the area to adopt rules and regulations requiring every stationary sources to submit emissions statements showing actual emissions of NOx and VOCs to the state or local authority each year. The only exemption the state or local authority is allowed to make is for sources emitting less than 25 tons each of NOx and VOCs. The first statement is required to be submitted within three years of initial designation.[12]

Year 3 (August 2021)

- Nonattainment New Source Review

Sections 172 and 182 of the CAA requires each nonattainment area to operate a Nonattainment New Source Review (NNSR) program, which only allows the permitting of new or modified sources meeting certain requirements. Such new or modified sources much demonstrate that they meet the lowest achievable emissions rate.[13] They must also offset any emissions increases by certain ratios.[14] For marginal nonattainment areas the offset ratio is 1.1 to 1.[15] A plan for implementing NNSR must be submitted within 3 years of designation as nonattainment.[16]

- Attainment or redesignation to moderate

Finally, the attainment date for marginal nonattainment areas is three years from its initial designation as nonattainment, according to the EPA's interpretation of Section 181 of the CAA.[17] If an area fails to reach attainment by the attainment date, the EPA is required to reclassify the area to the next higher classification within 6 months.[18] While this allows until 2021 for a marginal area to reach attainment under the 2015 ozone NAAQS, because the NAAQS is based on a three-year average of complete ozone season data, in effect the law requires the area to reach attainment based on 2018-2020 monitoring data, as this will be the most recent complete design value by August 3, 2021.

[12] 42 U.S.C. §7511a.(a)(3)(B).
[13] 42 U.S.C. §7503(a)(2).
[14] 42 U.S.C. §7503(a)(1).
[15] 42 U.S.C. §7511a.(a)(4).
[16] 42 U.S.C. §7502(b).
[17] 42 U.S.C. §7511(a)(1), 40 C.F.R. §51.1303(a).
[18] 42 U.S.C. §7511(b)(2)(A).

Fine Particulates

Unlike the other criteria pollutants, particulate matter (PM) is not defined by a specific chemical or group of chemicals, but instead by the substance's physical size. In air quality discussions, concern is primarily given to particles that are too small to see with the human eye as these particles can be inhaled and result in harmful health impacts. Particle pollution is a mixture of particles and liquid droplets that are found in the air and are classified by their size into two categories:

- Coarse particles, which are less than 10 micrometers (µm) in diameter and referred to as PM_{10}, and
- Fine Particles, which are even smaller, less than 2.5 µm in diameter and referred to as $PM_{2.5}$.

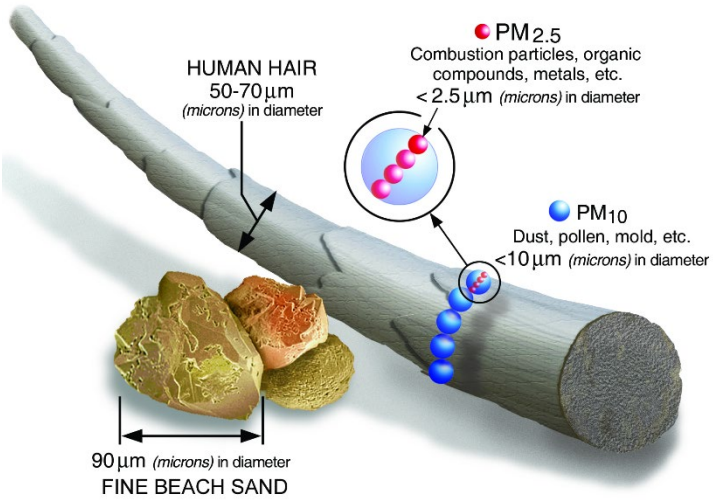

Figure 4 – Particle Size Comparison (image courtesy of EPA)

Figure 4 illustrates just how small these particles are by comparing them to the width of a human hair, which is on average 70 µm in diameter. Fine particles can be inhaled deeply into the lungs and even travel into the bloodstream. potentially causing a variety of health risks.[19] Fine particles can be emitted directly from sources such as cars and trucks (especially those with diesel engines), woodstoves and fireplaces, or coal-fired boilers. However, a large portion of fine particulate pollution is formed secondarily through chemical reactions of precursor emissions like NOx and sulfur dioxide (SO_2) in the atmosphere. Sources of those precursor emissions include many of those that also produce direct, or "primary" fine particulate emissions, such as power plants and diesel engines.[20]

[19] U.S. EPA, *Particulate Matter (PM) Basics*, https://www.epa.gov/pm-pollution/particulate-matter-pm-basics.
[20] U.S. EPA, *What is PM?*, https://www3.epa.gov/region1/airquality/pm-what-is.html.

ATTAINMENT HISTORY

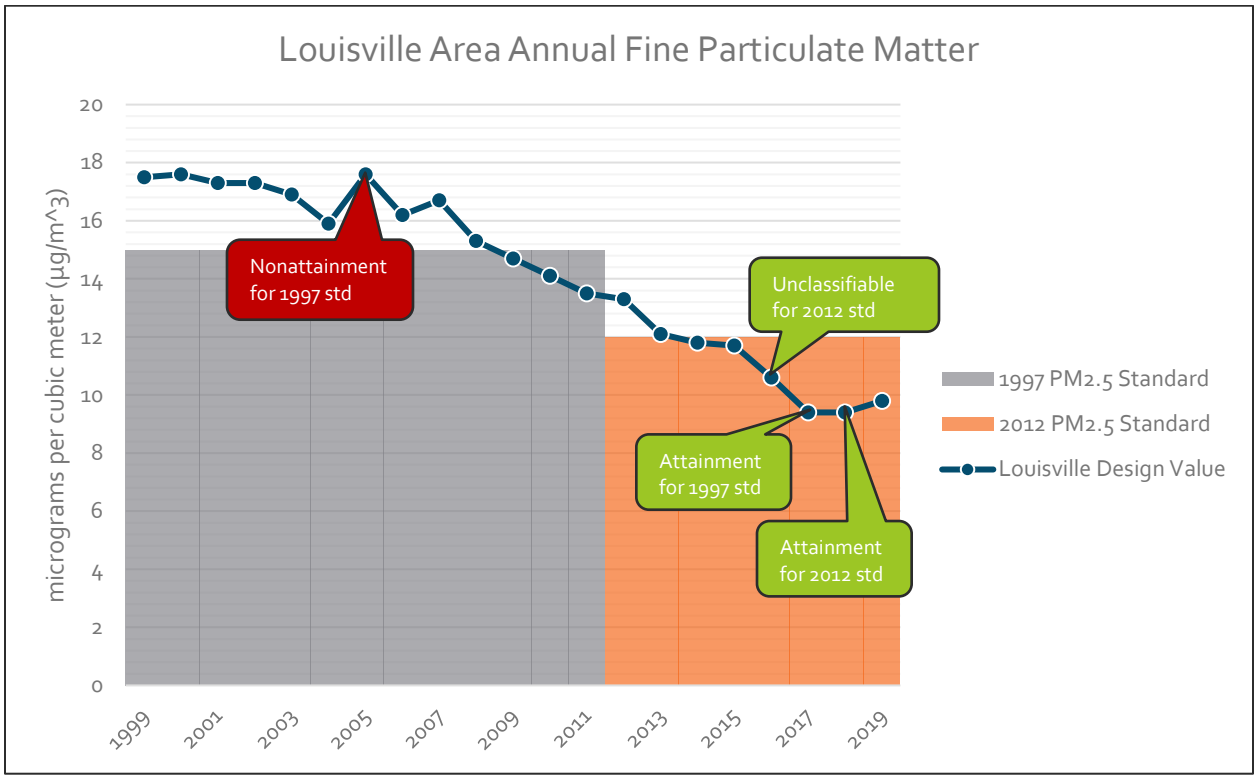

Figure 5 – Louisville Area Annual $PM_{2.5}$ NAAQS History

The EPA first promulgated NAAQS for particulate matter in the form of "Total Suspended Particles" in 1971, on both an annual and 24-hour average. (Though EPA continues to set both annual and 24-hour NAAQS for particulate matter, this section will focus discussion to just the annual standard, for which Louisville has had historical nonattainment designations.) In 1987 EPA updated these standards to regulate particulate matter less than 10 µm in diameter (PM_{10}). It wasn't until 1997 that the EPA promulgated a NAAQS specifically for fine particulate matter (particulate matter less than 2.5 µm in diameter, or $PM_{2.5}$), while also retaining the then-current PM_{10} standards.[21] At that time, the EPA decided that based on the latest science it was necessary to separately regulate $PM_{2.5}$ based on the

[21] *See* U.S. EPA, *Particulate Matter (PM) Standards - Table of Historical PM NAAQS*, https://www3.epa.gov/ttn/naaqs/standards/pm/s_pm_history.html.

health effects specifically linked to these smaller particles and set an annual standard of 15.0 µg/m^3 (annual mean, averaged over three years).[22]

The new standard was challenged in court by numerous parties, and eventually upheld by the U.S. Supreme Court in 2001.[23] After remaining challenges were rejected by the D.C. Circuit Court,[24] the EPA made initial designations for the 1997 NAAQS in 2005, designating Jefferson and Bullitt Counties in Kentucky and Clark and Floyd Counties and part of Jefferson County in Indiana as nonattainment for the 24-hour standard.[25] In 2011, prior to approving an attainment plan, which would have been necessary for a nonattainment area, the EPA determined that the area had attained the 1997 NAAQS based on monitoring data from 2007 to 2009, and suspended SIP requirements associated with the initial nonattainment designation.[26]

Meanwhile, the EPA had retained the annual $PM_{2.5}$ NAAQS of 15.0 µg/m^3 in its 2006 rulemaking ,[27] but then set a more stringent annual NAAQS of 12.0 µg/m^3 in 2012.[28] On January 15, 2015, the EPA initially designated Jefferson County and portions of Bullitt County, Kentucky, as nonattainment for the 2012 $PM_{2.5}$ NAAQS. This designation was based on ambient air quality data collected from 2011-2013 at a

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[22] U.S. EPA, National Ambient Air Quality Standards for Particulate Matter, 62 Fed. Reg. 38,652 (July 18, 1997). https://www.federalregister.gov/documents/1997/07/18/97-18577/national-ambient-air-quality-standards-for-particulate-matter.

[23] *EPA v. American Trucking Assoc.*, 531 U.S. 457 (2001).

[24] *American Trucking Assoc. v. EPA*, 283 F.3d 355 (D.C. Cir., 2002).

[25] U.S. EPA, Air Quality Designations and Classifications for the Fine Particles (PM2.5) National Ambient Air Quality Standards; Final Rule, 70 Fed. Reg. 943 (Jan. 5, 2005). https://www.federalregister.gov/documents/2005/01/05/05-1/air-quality-designations-and-classifications-for-the-fine-particles-pm25-national-ambient-air.

[26] U.S. EPA, *Approval and Promulgation of Air Quality Implementation Plans; Indiana; Kentucky; Louisville Nonattainment Area; Determination of Attainment of the 1997 Annual Fine Particle Standard*, 76 Fed. Reg. 12,860 (Mar. 9, 2011). https://www.federalregister.gov/documents/2011/03/09/2011-5214/approval-and-promulgation-of-air-quality-implementation-plans-indiana-kentucky-louisville. Note that a determination of attainment is not the same as a redesignation, which has additional requirements such as a maintenance demonstration and contingency plan.

[27] U.S. EPA, *National Ambient Air Quality Standards for Particulate Matter; Final Rule*, 71 Fed. Reg. 61,143 (Oct. 17, 2006). https://www.federalregister.gov/documents/2006/10/17/06-8477/national-ambient-air-quality-standards-for-particulate-matter.

[28] U.S. EPA, *National Ambient Air Quality Standards for Particulate Matter; Final Rule*, 78 Fed. Reg. 3085 (Jan. 15, 2013). https://www.federalregister.gov/documents/2013/01/15/2012-30946/national-ambient-air-quality-standards-for-particulate-matter.

monitor in Clark County, Indiana, which showed a violation.[29] EPA determined that emissions from Jefferson County, KY and the northern portion of Bullitt County, Kentucky were contributing to NAAQS violations at this monitor and included them in the nonattainment area. EPA was unable to consider monitoring data from sites within Jefferson County due to a lack of quality assured data from the years under review. The EPA subsequently changed this designation on April 7, 2015, to unclassifiable. This revision was made because data from the Clark County, Indiana violating monitor for the 2012-2014 period (i.e., 2011 data dropped out of the three-year average and 2014 data was included) showed compliance with the NAAQS. Due to invalid data from monitors located in Jefferson County, Kentucky, the area was not able to be designated as attainment at that time, however, the Kentucky portion of the area was included in the revised designation of unclassifiable .[30]

In 2017 the area was officially redesignated to attainment for the 1997 standard, which had been delayed as data quality problems were addressed and the air monitoring network came back into full compliance with EPA's criteria.[31]. Most recently, the area's designation for the 2012 standard was updated from unclassifiable to attainment. [32]

REDUCTIONS

Reductions of both primary $PM_{2.5}$ and its precursor emissions NOx, and SO_2 contributed to the attainment of the annual $PM_{2.5}$ standard. Rulemakings over the last two decades have focused on reducing emissions from diesel-powered mobile sources. In particular, tighter federal standards on

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[29] U.S. EPA, *Air Quality Designations for the 2012 Primary Annual Fine Particle (PM2.5) National Ambient Air Quality Standards (NAAQS); Final Rule*, 80 Fed. Reg. 2205 (Jan. 15, 2015). *Louisville, Kentucky-Indiana Area Designations for the 2012 Primary Annual PM2.5 National Ambient Air Quality Standards Technical Support Document* at 31, https://www3.epa.gov/pmdesignations/2012standards/final/Louisville_FinalNAATSD_Final.pdf.

[30] U.S. EPA, *Additional Air Quality Designations and Technical Amendment To Correct Inadvertent Error in Air Quality Designations for the 2012 Primary Annual Fine Particle (PM2.5) National Ambient Air Quality Standards (NAAQS)*, 80 Fed. Reg. 18,535, 18,537, 18,545 (Apr. 7, 2015). https://www.federalregister.gov/documents/2015/04/07/2015-07948/additional-air-quality-designations-and-technical-amendment-to-correct-inadvertent-error-in-air.

[31] U.S. EPA, *Air Plan Approval and Air Quality Designation; KY; Redesignation of the Kentucky Portion of the Louisville 1997 Annual PM2.5 Nonattainment Area to Attainment*, 82 Fed. Reg. 16,943 (Apr. 7, 2017). https://www.federalregister.gov/documents/2017/04/07/2017-06900/air-plan-approval-and-air-quality-designation-ky-redesignation-of-the-kentucky-portion-of-the.

[32] U.S. EPA, *Air Plan Approval and Air Quality Designation; KY; Redesignation of the Kentucky Portion of the Louisville Unclassifiable Area*, 83 Fed. Reg. 42,034 (Aug. 20, 2018). https://www.federalregister.gov/documents/2018/08/20/2018-17935/air-plan-approval-and-air-quality-designation-ky-redesignation-of-the-kentucky-portion-of-the.

nonroad diesel vehicles (Clean Air Nonroad Diesel Rule[33]) and the application of tighter federal standards on onroad diesel vehicles and highway diesel fuel standards[34] brought significant reductions nationally in these sectors. Further reductions to stationary sources came from the Acid Rain and interstate transport provisions of the CAA that mandated reductions in PM as well as precursors such as SO_2, and federal consent decrees based on violations of the CAA, which required the reductions of SO_2 and NOx emissions from utility sources. Local reductions came from the conversion of the Louisville Gas & Electric (LG&E) Cane Run Generating Facility (Cane Run) from coal to natural gas in 2015[35] and from new and/or upgraded controls, including scrubbers and baghouses, added to the Mill Creek Generating Facility (Mill Creek) around the same time.[36]

NEXT NAAQS – PROPOSAL TO RETAIN THE STANDARD

As required by the CAA, in 2016 EPA began review of the PM NAAQS, publishing its Integrated Review Plan (IRP),[37] the first step in planning for review of NAAQS. The Integrated Science Assessment (ISA) detailing the current science regarding the effects of PM was published in December, 2019. [38] The staff Policy Assessment (PA) was published a month later, in January 2020.[39] EPA has described the PA as a bridge "between the Agency's scientific assessments and quantitative technical analyses, and the judgments required of the Administrator in determining whether it is appropriate to retain or revise the NAAQS."[40] In the current PA EPA staff found:

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[33] U.S. EPA, *Final Rule for Control of Emissions of Air Pollution From Nonroad Diesel Engines and Fuel*, https://www.epa.gov/regulations-emissions-vehicles-and-engines/final-rule-control-emissions-air-pollution-nonroad-diesel.

[34] U.S. EPA, *Final Rule for Control of Air Pollution from New Motor Vehicles: Heavy-Duty Engine and Vehicle Standards and Highway Diesel Fuel Sulfur Control Requirements*, https://www.epa.gov/regulations-emissions-vehicles-and-engines/final-rule-control-air-pollution-new-motor-vehicles-heavy

[35] *See* LG&E – KU, *Cane Run Generating Station*, https://lge-ku.com/our-company/community/neighbor-neighbor/cane-run-generating-station

[36] *See* LG&E – KU, *Mill Creek Generating Station*, https://lge-ku.com/our-company/community/neighbor-neighbor/mill-creek-generating-station; & LG&E – KU, *New technology and emission controls*, https://lge-ku.com/environment/new-technology-and-emission-controls

[37] U.S. EPA, *Integrated Review Plan for the National Ambient Air Quality Standards for Particulate Matter*, Dec. 2016, https://www3.epa.gov/ttn/naaqs/standards/pm/data/201612-final-integrated-review-plan.pdf.

[38] U.S. EPA, *Integrated Science Assessment for Particulate Matter*, Dec. 2019, http://ofmpub.epa.gov/eims/eimscomm.getfile?p_download_id=539935.

[39] U.S. EPA, *Policy Assessment for the Review of the National Ambient Air Quality Standards for Particulate Matter*, Jan. 2020, https://www.epa.gov/sites/production/files/2020-01/documents/final_policy_assessment_for_the_review_of_the_pm_naaqs_01-2020.pdf.

[40] *Id.* at 1-1.

> When taken together, we reach the conclusion that the available scientific evidence, air quality analyses, and the risk assessment, as summarized above, can reasonably be viewed as calling into question the adequacy of the public health protection afforded by the combination of the current annual and 24-hour primary $PM_{2.5}$ standards, [41] and recommended a level for the annual standard of somewhere from 8 µg/m^3 to 10 µg/m^3. [42]

The EPA's Clean Air Scientific Advisory Committee (CASAC)[43], in reviewing a draft of the PA, stated in contrast that:

> [S]ome CASAC members conclude that the Draft PM PA does not establish that new scientific evidence and data reasonably call into question the public health protection afforded by the current 2012 $PM_{2.5}$ annual standard. Other members of CASAC conclude that the weight of the evidence, particularly reflecting recent epidemiology studies showing positive associations between $PM_{2.5}$ and health effects at estimated annual average $PM_{2.5}$ concentrations below the current standard, does reasonably call into question the adequacy of the 2012 annual $PM_{2.5}$ National Ambient Air Quality Standards (NAAQS) to protect public health with an adequate margin of safety. [44]

In April 2020, the Administrator of the EPA proposed to retain the current PM NAAQS. [45] EPA has stated that the Administrator intends to complete the current review and issue a final decision by the end of 2020. [46]

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[41] *Id.* at 3-106.
[42] *Id.* at 3-115 to 118.
[43] CASAC is a chartered committee of advisors that "provides independent advice to the EPA Administrator on the technical bases for EPA's National Ambient Air Quality Standards." https://yosemite.epa.gov/sab/sabpeople.nsf/WebCommittees/CASAC.
[44] Louis Anthony Cox, Jr., *CASAC Review of the EPA's Policy Assessment for the Review of the National Ambient Air Quality Standards for Particulate Matter (External Review Draft – September 2019)*, Dec. 2019 at 1. https://yosemite.epa.gov/sab/sabproduct.nsf/264cb1227d55e02c85257402007446a4/E2F6C7173720161285258 4D20069DFB1/$File/EPA-CASAC-20-001.pdf.
[45] U.S. EPA, *Review of the National Ambient Air Quality Standards for Particulate Matter*, 84 Fed. Reg. 24,094. https://www.govinfo.gov/content/pkg/FR-2020-04-30/pdf/2020-08143.pdf. *See, e.g.*, at 24,095-096.
[46] *See, e.g.*, U.S. EPA, *Summary of Proposal to Retain the Air Quality Standards for Particle Pollution*, Apr. 2020. https://www.epa.gov/sites/production/files/2020-04/documents/fact_sheet_pm_naaqs_proposal.pdf.

Sulfur Dioxide

Sulfur dioxide (SO_2) exposures can lead to respiratory harm, particularly for those with asthma and other breathing difficulties. SO_2 can also lead to the formation of fine particles, which penetrate deeply into the lungs and can lead to additional health impacts.[47] The largest source of SO_2 by far in the Louisville area is from coal-fired electric generation.[48] Through controls and conversion of processes to natural gas fuel, these emissions have dropped dramatically in the last 5 years.

ATTAINMENT HISTORY

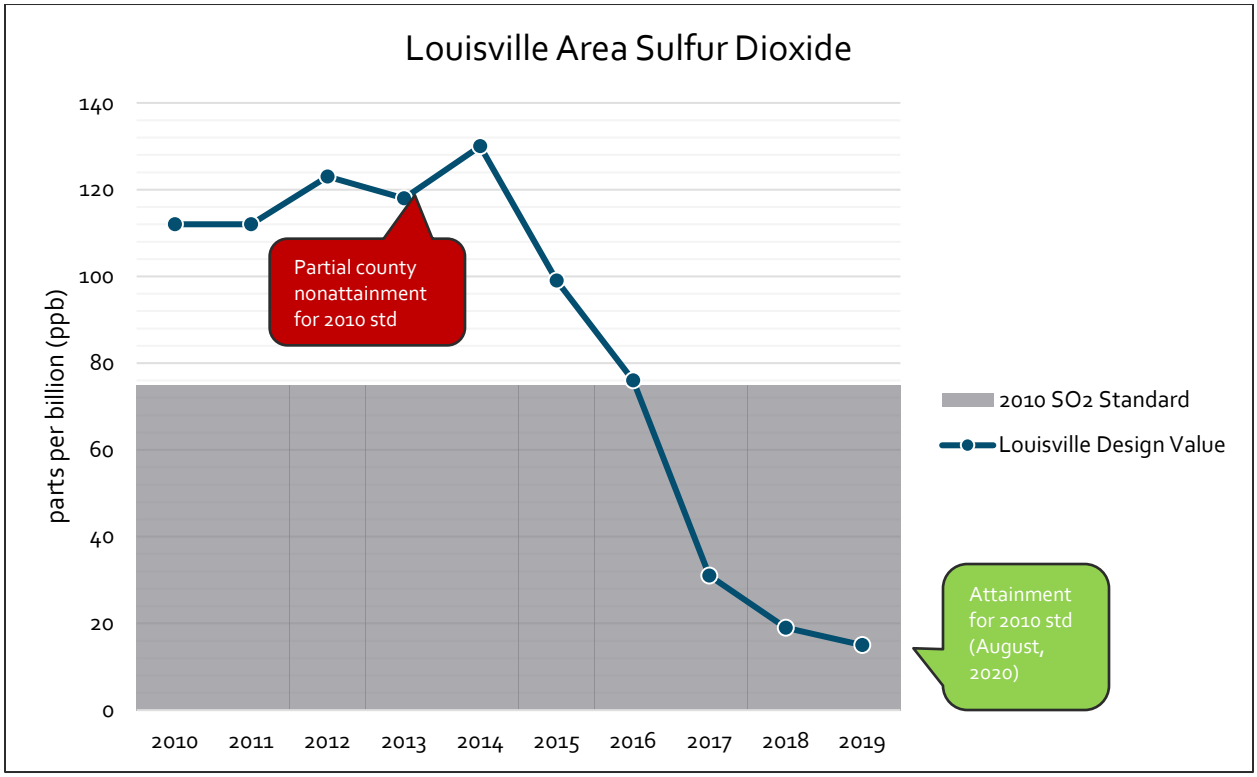

Figure 6 – Louisville Area 1-hour SO_2 NAAQS History

In 2010, the EPA revised both the level and form of the SO_2 NAAQS for the first time since the initial NAAQS promulgation in 1971. The level was strengthened from 140 parts per billion (ppb) on a 24-hour

[47] U.S. EPA, *Sulfur Dioxide (SO2) Pollution: Sulfur Dioxide Basics*, https://www.epa.gov/so2-pollution/sulfur-dioxide-basics#what%20is%20so2/.
[48] U.S. EPA, *2017 National Emissions Inventory (NEI)*, https://www.epa.gov/air-emissions-inventories/2017-national-emissions-inventory-nei-data. *See also* LMAPCD, *Emissions Inventory Dashboard*, https://louisvilleky.gov/sites/default/files/air_pollution_control_district/images/xsite_images/untitled_0_0.png for Louisville-specific data.

average or 30 ppb on an annual average, to a single 1-hour standard of 75 ppb based on the 3-year average of the 99th percentile of the yearly distribution of 1-hour daily maximum concentrations.[49] As part of its initial round of nonattainment designations in 2013, the EPA determined a small portion of southwestern Jefferson County to be nonattainment.[50] This Nonattainment Area (NAA) consists primarily of the LG&E Mill Creek Generating Station and the area surrounding the monitor immediately to the north of that facility. A map of the NAA is shown below in Figure 7.

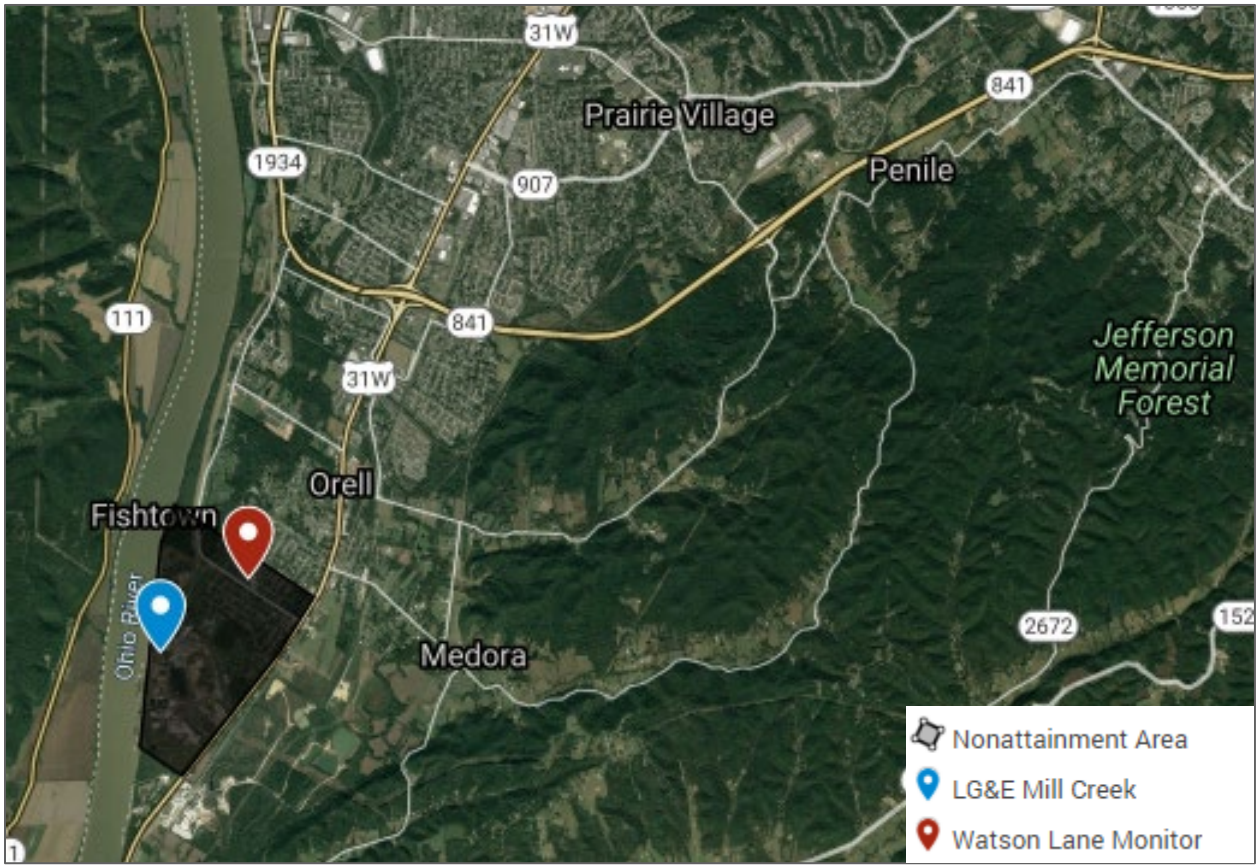

Figure 7 –-Map of SO_2 Nonattainment Area

[49] U.S. EPA, *Primary National Ambient Air Quality Standard for Sulfur Dioxide*, 75 Fed. Reg. 35,519 (Jun. 22, 2010).
[50] U.S. EPA, *Air Quality Designations for the 2010 Sulfur Dioxide (SO_2) Primary National Ambient Air Quality Standard*, 78 FR 47,191 at 47,200 (Aug. 5, 2013). https://www.federalregister.gov/documents/2013/08/05/2013-18835/air-quality-designations-for-the-2010-sulfur-dioxide-so2-primary-national-ambient-air-quality.

The EPA was required under a consent decree to make further designations in a second round on July 2, 2016, a third round by December 31, 2017, and a final round by December 31, 2020. *See* https://www.epa.gov/sulfur-dioxide-designations/learn-about-sulfur-dioxide-designations#status for more information.

The narrow scope of the NAA was based on an analysis of meteorology and SO_2 sources in the area, which determined that Mill Creek was "likely the major contributor to the violating monitor's design value."[51] Figure 8, below, shows a wind rose for the Watson Lane monitor (the violating monitor on which the designation was based, located at the red diamond in the image above), which demonstrates that winds are predominantly from the direction of Mill Creek when violations of the standard were detected at the monitor. [52]

[51] *Id.* at 19.
[52] *Id.*.

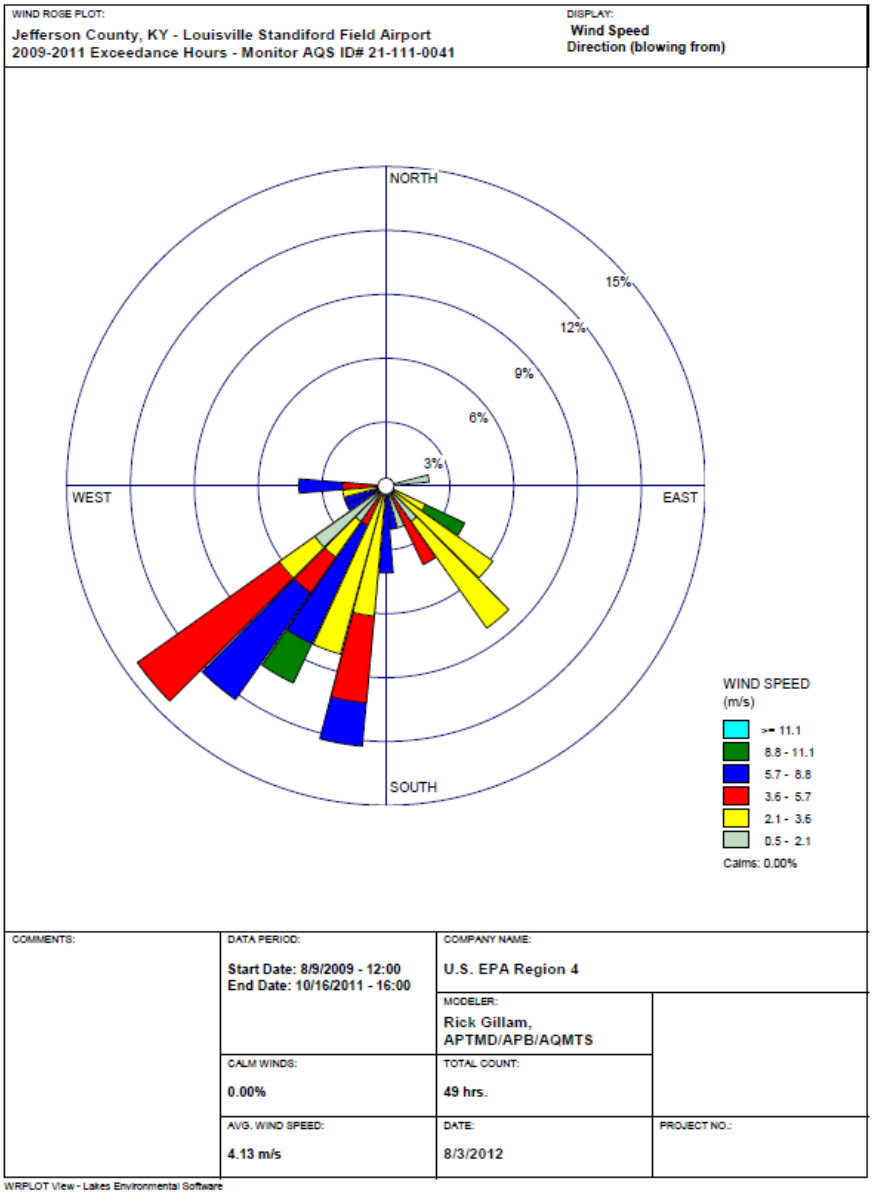

Figure 8 – Wind Rose of 2009-2011 hours exceeding the 1-hr SO_2 NAAQS

Based on dramatic reductions in emissions (*see* next section) and monitored levels (*see* Figure 6, above) since the area was initially designated nonattainment, APCD, via KYDAQ, submitted a request to redesignate the area to attainment on December 9, 2019. The EPA published final approval of that request on August 6, 2020.[53]

[53] U.S. EPA, Air Plan Approval and Designation of Areas; Kentucky; Redesignation of the Jefferson County 2010 1-Hour Sulfur Dioxide Nonattainment Area to Attainment, 85 Fed. Reg. 47,670 (August 6, 2020). https://www.federalregister.gov/documents/2020/08/06/2020-15598/air-plan-approval-and-designation-of-areas-kentucky-redesignation-of-the-jefferson-county-2010.

REDUCTIONS

Mill Creek consists of four coal-fired boilers. LG&E determined that construction of new Flue Gas Desulfurization systems (FGDs) along with new chimneys to increase SO_2 removal efficiency was the most reasonable strategy to comply with the revised NAAQS, in part because it allowed continued operation of the units while construction was underway.

LG&E initially applied to install new FGDs at Mill Creek in 2011. Initial plans were to build two new FGDs (one to accommodate Units 1 & 2 and one for Unit 4), and to upgrade one existing FGD (previously in service for Unit 4, upgraded to accommodate Unit 3), to improve SO_2 removal efficiency from 90% to 98% for each unit. These plans were revised in 2013 to include a third new FGD (for Unit 3, in place of upgrades to the old FGD). Construction began in 2013 and ended on June 8, 2016, when the final unit was completed and restarted.

The operation of the new FGDs, along with enforceable emissions limits, were incorporated into a construction permit in 2013 and incorporated into a Title V permit in 2014. The limits were made permanent by way of inclusion in the SIP along with the Attainment Demonstration submitted June 23, 2017. The limits were later revised to eliminate alternative compliance options.[54]

Carbon Monoxide

Carbon monoxide (CO) is a colorless and odorless gas that in the ambient outdoor air largely comes from cars, trucks, and machinery that burns fossil fuels. There are also a variety of sources in homes that can release CO and affect indoor air quality. Indoors, CO can be present in very high levels that can cause dizziness, unconsciousness, and even death. Such levels are not likely to occur outdoors, but elevated levels outdoors, such as the amount where the NAAQS is set, can cause health impacts for those suffering from various types of heart disease due to CO's effect on blood oxygen levels.[55]

[54] For a full discussion of reductions at LG&E, including a copy of the relevant permit, the full redesignation request from APCD can be found in the docket for EPA's action, EPA-R04-OAR-2020-0003.
[55] U.S.EPA, *Carbon Monoxide (CO) Pollution in Outdoor Air*, https://www.epa.gov/co-pollution/basic-information-about-carbon-monoxide-co-outdoor-air-pollution#What%20is%20CO.

ATTAINMENT HISTORY

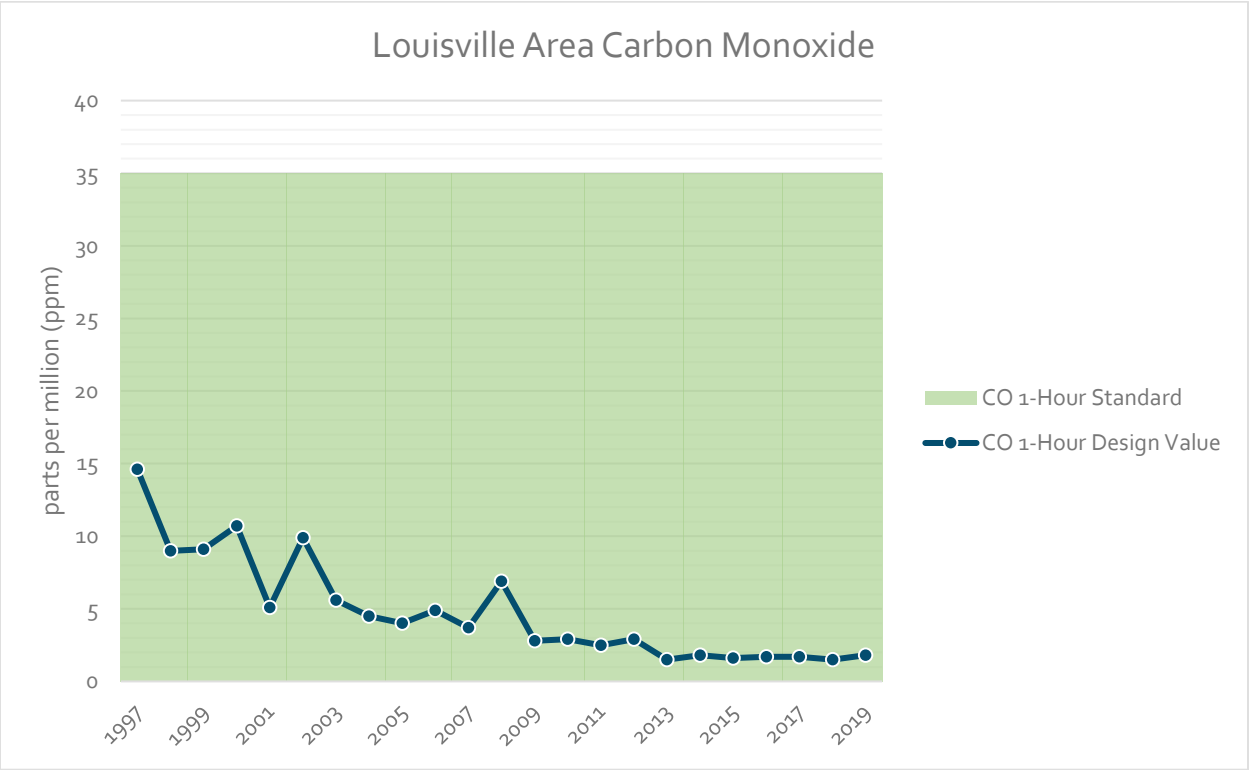

Figure 9 – Louisville Area CO NAAQS History

Jefferson County was designated as nonattainment of the CO NAAQS on March 3, 1978 and retained this designation until April 16, 1990, when the area's redesignation request approval was published as a final rule in the Federal Register.[56] Since that time, as illustrated in Figure 9, Louisville has stayed well under the NAAQS, which has remained unchanged through subsequent reviews by EPA of its adequacy to protect public health.

REDUCTIONS

In the 1970s and '80s, as remains the case today, the majority of CO emissions in Jefferson County were from mobile sources, specifically onroad mobile sources. CO is not a persistent pollutant, and as such, tends to accumulate in "hot spots" where vehicles tend to slow down or idle for periods of time. During

[56] U.S. EPA, *Designation of Areas for Air Quality Planning Purposes; Kentucky; Redesignation of Kentucky Carbon Monoxide Nonattainment Area*, 55 Fed. Reg. 73, 14092 (April 16, 1990). https://www.govinfo.gov/content/pkg/FR-1990-04-16/pdf/FR-1990-04-16.pdf.

the period for which the area was designated as nonattainment for this NAAQS, APCD staff and other transportation planning professional identified several problem areas in Jefferson County.[57]

In order to alleviate these potential CO hotspots, a number of transportation control measures were implemented throughout the county.[58] These included approaches such as intersection improvements, the addition of turn lanes, signal alterations, and other strategies aimed at reducing congestion and aiding in the free flow of traffic. These measures reduced the opportunity for CO hot spots to form. To ensure that future development did not create additional hot spots in the future, procedures were developed to model potential emissions and revise plans to incorporate these types of transportation control measures before being built. Those procedures were refined and are now found in the current Land Development Code – Chapter 6, Part 5.[59]

Also required was the implementation of a vehicle inspection and maintenance program throughout Jefferson County to ensure that onroad engine emissions were meeting the standards in place at that time. This program, known locally as the VET Program, was also instrumental in achieving ozone precursor emission reductions. The VET Program was discontinued in 2003.

AIR TOXICS STATUS AND TRENDS

What are Air Toxics

EPA defines "[h]azardous air pollutants, also known as toxic air pollutants or air toxics, [as] those pollutants that are known or suspected to cause cancer or other serious health effects, such as reproductive effects or birth defects, or adverse environmental effects."[60] Criteria pollutants come from a variety of sources, and are common throughout the United States. While criteria pollutants can have localized "hot spot" effects, they are generally regulated by the CAA on a broad, region-wide basis.[61]

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[57] Id.
[58] Id.
[59] Land Development Code for All of Jefferson County, Kentucky, https://louisvilleky.gov/sites/default/files/planning_design/ldc_louisvillemetro_06-2020.pdf.
[60] U.S. EPA, *What are Hazardous Air Pollutants?*, https://www.epa.gov/haps/what-are-hazardous-air-pollutants.
[61] *See, e.g.*, Carlson, Ann E.; *The Clean Air Act's Blind Spot: Microclimates and Hotspot Pollution*, 65 *UCLA LAW REVIEW* 1036 (2018). https://ssrn.com/abstract=3228715.

While air toxics can also come from a variety of sources (*e.g.*, formaldehyde and benzene, both of which come from industrial sources and vehicles, and even forest fires), most are much more localized in their effects, and are regulated on a source-by-source basis by the Clean Air Act.[62]

Unlike criteria pollutants, which have standards for the amount of each pollutant deemed acceptable in the ambient air, air toxics reductions at the federal level are not primarily driven by meeting a health-based standard. Instead, EPA has been charged with developing standards to reduce risk from hazardous air pollutants (HAPs) on a source by source basis. For mobile sources this includes cleaner fuels, more efficient engines, and more effective emission controls on cars, trucks, and other mobile sources. For stationary sources the CAA requires EPA to set National Emissions Standards for Hazardous Air Pollutants (NESHAPs); frequently these are "technology-based" standards, known as maximum achievable control technology (MACT) standards, for the industry groups that emit these substances.[63] From there, the CAA requires EPA to review and revise these standards as needed to address the residual risk if more health protective standards are necessary. [64]

While this process brought reductions across many sectors, the health risk remaining in parts of Louisville by the late 1990's, specifically west Louisville in the area of Rubbertown, remained too high for the community to accept and collective work toward the development of a local air toxics reduction program began.

STAR Program

The locally-enacted and implemented Strategic Toxic Air Reduction Program (STAR) is designed to reduce harmful contaminants in the air we breathe.[65] The program was created in response to several studies that showed that Louisville had unacceptably high levels of toxic chemicals in the air.[66] A

[62] CAA §112, 42 U.S.C. §7412.
[63] U.S. EPA, *Overview of CAA, Introduction to CAA and Section 112 (Air Toxics)*, https://www3.epa.gov/ttn/atw/overview.html.
[64] U.S. EPA, *Reducing Emissions of Hazardous Air Pollutants*, https://www.epa.gov/haps/reducing-emissions-hazardous-air-pollutants.
[65]LMAPCD, *Strategic Toxic Air Reduction Program*, https://louisvilleky.gov/government/air-pollution-control-district/strategic-toxic-air-reduction-program.
[66] LMAPCD, *Rubbertown Air Toxics Risk Assessment*, https://louisvilleky.gov/government/air-pollution-control-district/rubbertown-air-toxics-risk-assessment.

monitoring study documented that there were high concentrations of harmful air toxics, including cancer-causing chemicals, in specific neighborhoods.[67] EPA Region 4 released an additional study in that time that included modeling of reported emissions and concluded that our air had the highest potential risk for adverse effects of all of the counties in the eight southeastern states. [68] The threat to public health from toxic air contaminants was deemed sufficient to warrant action on the part of local government. Louisvillians knew that we could and should do better.

The STAR Program is found in APCD Regulations Part 5, particularly Regulations 5.20 through 5.30.[69] Regulation 5.20 lays out the process for determining the Benchmark Ambient Concentrations of the various toxic air contaminants (TACs) regulated by the STAR Program to determine their carcinogenic and non-carcinogenic impacts. Regulation 5.21 contains the levels, or environmental acceptability (EA) goals, for emissions of TACs. The EA goals include a goal for cancer risk of no greater than 1 in-a-million for a particular TAC from each given process, and 7.5 in-a-million for all TACs from all processes at an existing facility, and a Hazard Quotient of 1.0.[70] It also lays out the requirements for large facilities (all of those with a Title V permit and those with a Federally-Enforceable District-Origin Operating Permit (FEDOOP) emitting over certain levels[71]) to evaluate the TACs they emit and compare their allowed emissions to those EA goals in an EA demonstration to be submitted to the District.[72] If a facility is

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[67] Sciences International, Inc.; *Final Report: West Louisville Air Toxics Study Risk Assessment*; Louisville, KY: LMAPCD; Oct. 2003. https://louisvilleky.gov/sites/default/files/air_pollution_control_district/documents/allother/apcd_-_west_louisville_air_toxins_-_2003.pdf. Sciences International, Inc.; *Final Report: West Louisville Air Toxics Study Risk Assessment*; Louisville, KY: LMAPCD; Nov. 2006. https://louisvilleky.gov/sites/default/files/air_pollution_control_district/documents/allother/2006/wlats20012005final.pdf.

[68] U.S. EPA, EPA Region 4 *Relative Risk Screening Analysis*, 2002.

[69] LMAPCD Regulations, Part 5, *Standards for Toxic Air Contaminants and Hazardous Air Pollutants*, https://louisvilleky.gov/government/air-pollution-control-district/apcd-regulations-part-5-standards-toxic-air-contaminants

[70] LMAPCD Regulation 5.21, *Environmental Acceptability for Toxic Air Contaminants*, Section 3. https://louisvilleky.gov/sites/default/files/air_pollution_control_district/documents/regulations/5-21v6.pdf. The EA goals are even lower for new sources, but are adjusted upwards for ambient air on industrial properties and roadways.

[71] LMAPCD Regulation 5.00, *Definitions*, §1.13 exempts sources with a potential to emit less than 25 tons of any regulated air pollutant, and less than 5 tons of any one TAC, and 12.5 tons of all TACs combined. https://louisvilleky.gov/sites/default/files/air_pollution_control_district/documents/regulations/5-00v2.pdf.

[72] LMAPCD Regulation 5.21, *Environmental Acceptability for Toxic Air Contaminants*, Section 4. https://louisvilleky.gov/sites/default/files/air_pollution_control_district/documents/regulations/5-21v6.pdf.

unable to meet the EA goals at permitted levels, they are required to either submit a compliance plan and take additional limits in their permit or request a modification of the goals.[73]

Regulation 5.22 gives companies several options in determining the maximum concentrations of the TACs they emit for comparison to the EA goals, from a screening level evaluation that assumes worst-case concentrations, up to complex chemical dispersion modeling using approved models.

Priority in submission of EA demonstrations in Regulation 5.21 depends on the category of the TAC, as laid out in Regulation 5.23. Category 1 TACs are those which were found in the air monitoring study prior to the STAR program's development to be causing the greatest cancer risk in west Louisville. Category 2 TACs are those with reported emissions modeled to cause the greatest risk, which were not classified as Category 1 TACs. Category 3 & 4 TACs encompass all remaining chemicals classified by EPA as hazardous air pollutants (HAPs).

Over the years since the enactment of the STAR Program and in concert with federal action, air toxics from industry have dropped significantly, as shown in the next section.

TRI/NATA

Aside from reviewing and evaluating the EA demonstrations submitted by companies and conducting an in-depth retrospective internal review,[74] APCD has tracked the progress of the STAR Program through use of two separate national programs administered by EPA: The Toxics Release Inventory (TRI), which was established by the Emergency Planning and Community Right-to-Know Act (EPCRA) in 1986, and EPA's National Air Toxics Assessment (NATA), which was developed by EPA as a screening tool for state, local, and tribal air agencies.[75] Congress was inspired to pass EPCRA, as well as the Superfund Amendments and Reauthorization Act,[76] after the catastrophic release of forty tons of methyl isocyanate at a Union Carbide plant in Bhopal, India in December 1984 resulted in the deaths of

[73] *Id.* at Sections 4 & 5.
[74] LMAPCD, *Ten Years Later: STAR & Louisville Air Toxics*, Nov. 2015, https://louisvilleky.gov/sites/default/files/air_pollution_control_district/documents/allother/2015/star_board_presentation.pdf
[75] 42 U.S.C. §11023.
[76] 42 U.S.C. §9601, et seq.

as many as 16,000 people and injured at least half a million[77], as well as a subsequent release at another Union Carbide plant in Institute, West Virginia in August 1985, which sickened 135 people but fortunately did not result in any deaths.[78]

TRI requires companies in certain industries across the country to report the management of many toxic chemicals, including reporting annually their releases to air, water, or land. The information submitted is made publicly available through the online inventory.[79] The online inventory contains information from these companies going back to 1987, the first year reporting was required.[80]

APCD has used TRI data to track emissions of Category 1 TACs, those found in 2000 to 2001 monitoring to be causing the greatest cancer risk in west Louisville.[81] As shown in Figure 10, air releases of Category 1 TACs, as reported to TRI, have dropped dramatically from 1987 to today, particularly after 2007, when STAR required any company whose EA demonstration showed emissions did not meet EA goals to submit a compliance plan.

[77] Mandavilli, Apoorva (9 July 2018); "The World's Worst Industrial Disaster Is Still Unfolding"; The Atlantic; https://www.theatlantic.com/science/archive/2018/07/the-worlds-worst-industrial-disaster-is-still-unfolding/560726/.
[78] Wines, Michael (Aug. 24, 1985), "Carbide Lays Leak to Human, Machine Errors"; LA Times, https://www.latimes.com/archives/la-xpm-1985-08-24-mn-26087-story.html. U.S. EPA, *What is EPCRA?*, https://www.epa.gov/epcra/what-epcra.
[79] U.S. EPA, *What is the Toxics Release Inventory?*, https://www.epa.gov/toxics-release-inventory-tri-program/what-toxics-release-inventory.
[80] The data is available through a variety of different U.S. EPA portals. Annual data can be downloaded in spreadsheet format by year for the entire U.S. or individual states at https://www.epa.gov/toxics-release-inventory-tri-program/tri-basic-data-files-calendar-years-1987-2018?. It can also be viewed online and downloaded from https://enviro.epa.gov/triexplorer/tri_release.chemical.
[81] Not all TACs are required to be reported to the TRI, however all Category 1 TACs are. *See* U.S. EPA, *TRI-Listed Chemicals*, https://www.epa.gov/toxics-release-inventory-tri-program/tri-listed-chemicals; and LMAPCD Regulation 5.23, *Categories of Toxic Air Contaminants*, https://louisvilleky.gov/sites/default/files/air_pollution_control_district/documents/regulations/5-23v3.pdf, for more details.

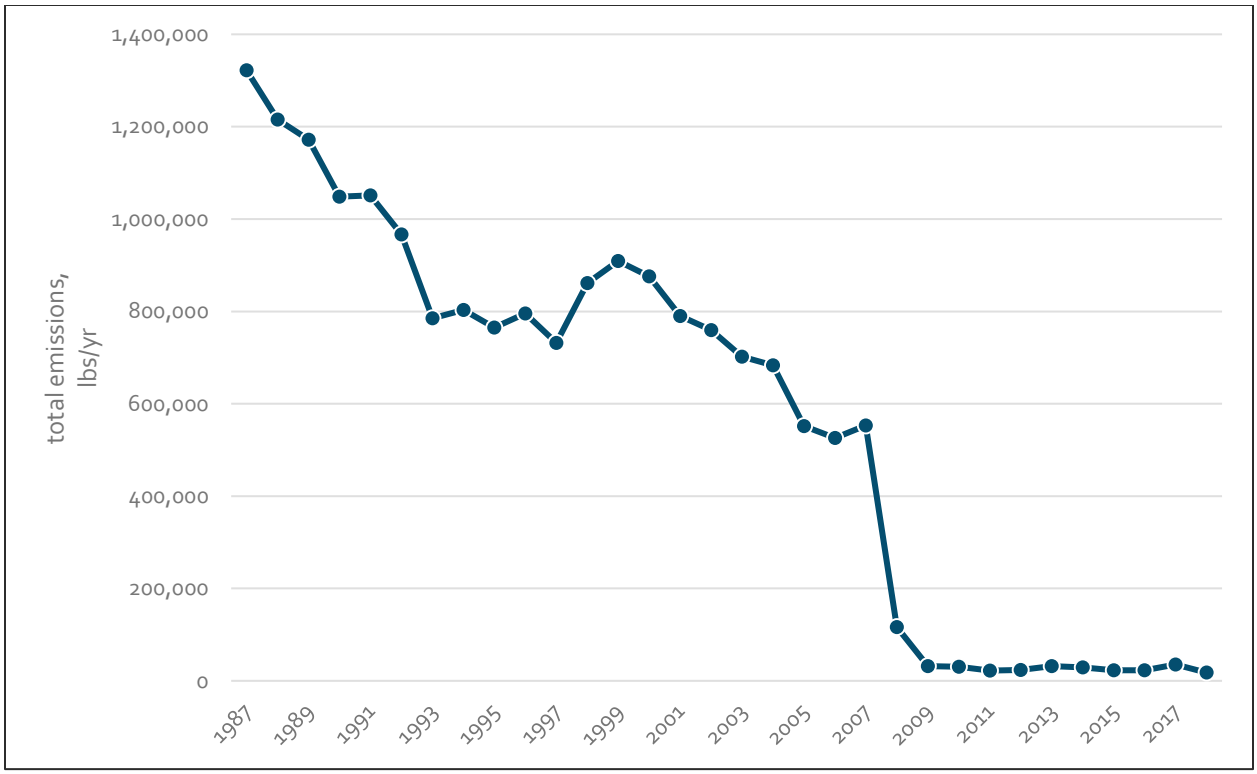


Figure 10 – Louisville Category 1 TAC Emissions in TRI

EPA's National Air Toxics Assessment (NATA) can help characterize how the decline in emissions has led to a decline in cancer risks across Louisville, and particularly in west Louisville. It relies on a four-step process, starting with the National Emissions Inventory (NEI), compiling emissions from all sources.[82] The NEI is used to estimate concentrations of air toxics at the census-tract level. EPA uses these estimated concentrations to determine population exposures, and from there to estimate cancer and non-cancer risks. Over the years EPA has made various improvements to NATA, including changes to estimates of how modeled chemicals affect health so care should be taken when looking at NATA results across years.[83]

To illustrate improvements related to toxic air emission reductions, APCD mapped data from the 2005 NATA,[84] reflecting emissions the year STAR was adopted but before companies were required to

[82] U.S. EPA, *National Emissions Inventory (NEI)*, https://www.epa.gov/air-emissions-inventories/national-emissions-inventory-nei. This includes large point sources such as those regulated by the STAR Program, as well as estimates for nonpoint, onroad, nonroad, and biogenic sources.
[83] U.S. EPA, *NATA Overview*, https://www.epa.gov/national-air-toxics-assessment/nata-overview.
[84] *See* https://www.epa.gov/national-air-toxics-assessment/2005-nata-assessment-results.

demonstrate environmental acceptability of their emissions, and the 2014 NATA,[85] the most recent available. An important update to NATA was made during this time period. At the time the 2005 NATA was being conducted, chloroprene was not considered a carcinogen by EPA. In contrast, chloroprene was treated as a carcinogen by the STAR program and was classified as a Category 1 TAC.[86] Shortly before the final 2005 NATA was completed in 2011, updates to the risk assessment for chloroprene in EPA's Integrated Risk Information System (IRIS) added a cancer risk for chloroprene. This cancer risk was used in each subsequent NATA. For consistency, and to show the full benefit of the STAR Program, APCD has taken the exposure concentrations modeled in the 2005 NATA, and the current cancer risk for chloroprene, to develop estimates of census-tract level risks from 2005 emissions, just as EPA has done in subsequent NATAs. The resulting map is shown below in Figure 11, followed by a map on the same scale showing the results of the 2014 NATA in Figure 12. Finally, Figure 13 shows the population in the 2010 U.S. Census that identified as something other than "White alone, not Hispanic or Latino" by census tract, demonstrating the disproportionate impact air toxics had and continue to have on minority populations.[87]

[85] *See* https://www.epa.gov/national-air-toxics-assessment/2014-national-air-toxics-assessment.
[86] LMAPCD Regulation 5.23, *Categories of Toxic Air Contaminants*, https://louisvilleky.gov/sites/default/files/air_pollution_control_district/documents/regulations/5-23v3.pdf.
[87] U.S. Census Bureau, https://www.census.gov/.

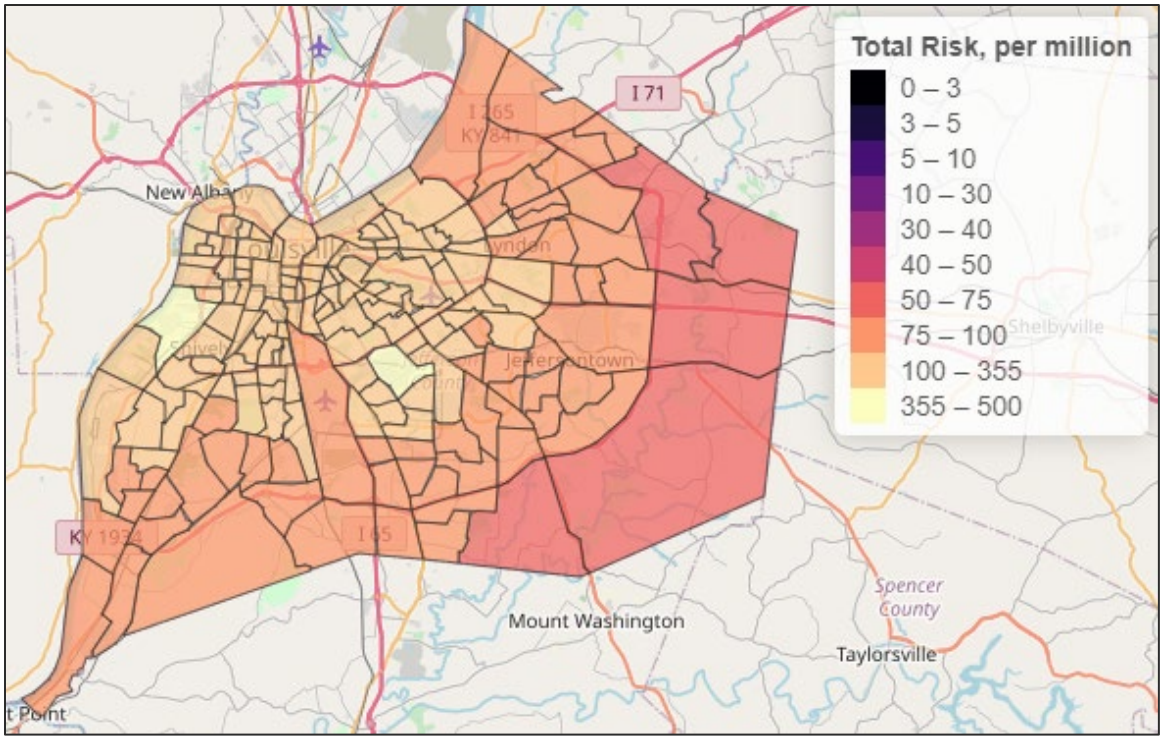
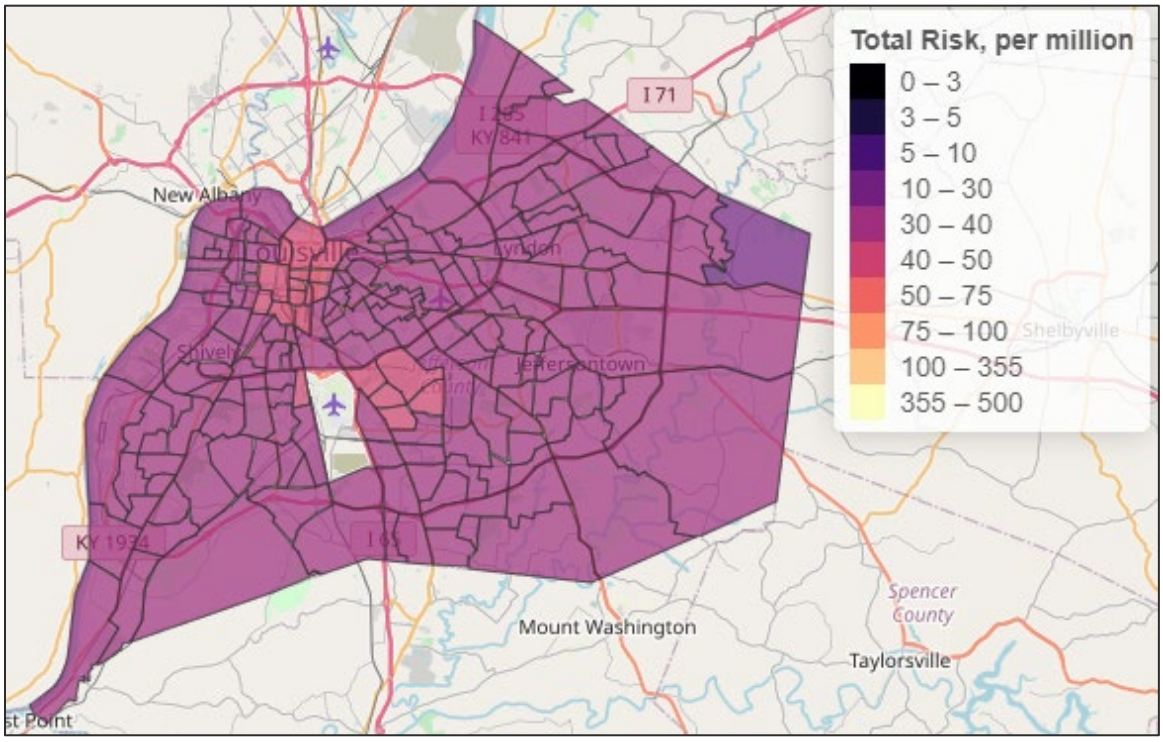


Figure 11 – 2005 NATA, Louisville Cancer Risk – All Source Sectors[88]



[88] 2005 NATA cancer risks were modified to include newer risk estimates from U.S. EPA for chloroprene and ethylene oxide.

Figure 12 – 2014 NATA, Louisville Cancer Risk – All Source Sectors

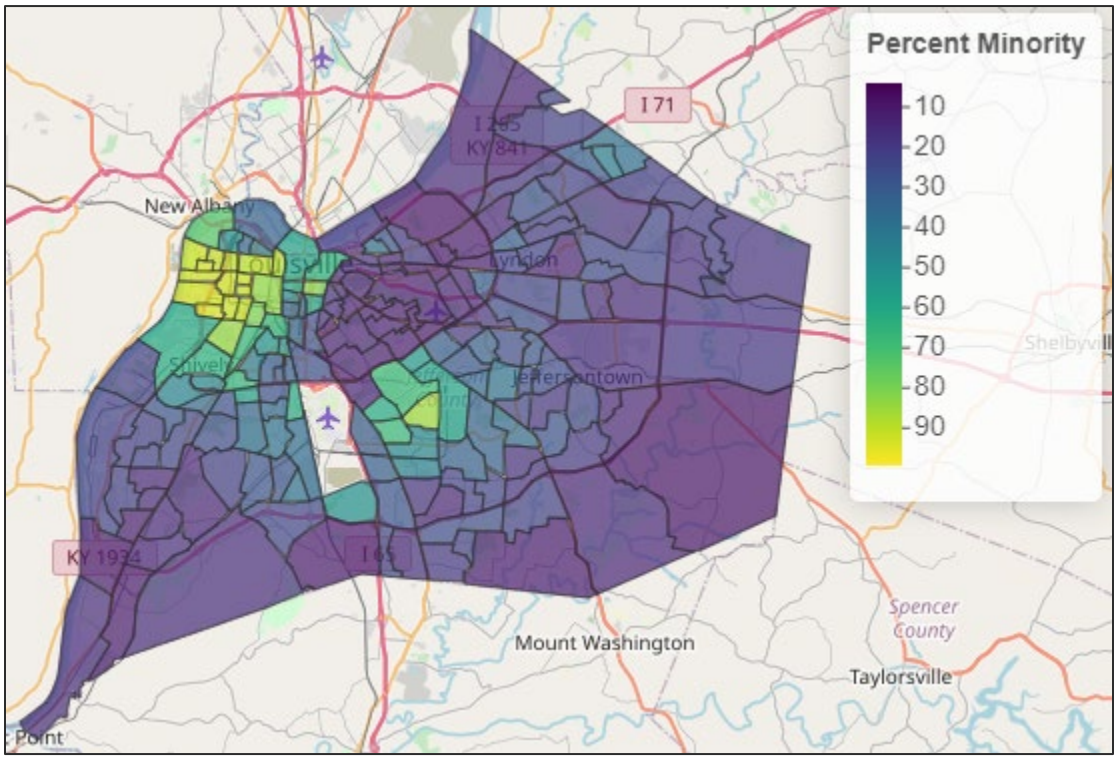


Figure 13 – 2010 Census, Percent Minority (*i.e.*, not "White alone, not Hispanic or Latino") Population

OZONE – A DEEPER DIVE

Because ozone is a persistent air quality challenge for Louisville, this section will provide a more in-depth discussion of the science behind ozone formation and the results of a modeling study initiated by APCD to provide a more localized look at the impacts of precursor emissions reductions.

Precursors & Formation

Ozone is formed through a complex series of non-linear reactions of various chemical compounds in the presence of sunlight, in particular NOx and VOCs. *See* Figure 14 for one example of a diagram of the reactions involved in ozone formation. Because ultraviolet radiation from the sun creates the chemical reactions that form ozone, ozone levels tend to be highest during the summer months. Furthermore, other meteorological conditions contribute to the formation or inhibition of formation, as well as its dilution in the atmosphere. Moisture tends to inhibit formation, and wind tends to distribute or dilute it. Therefore hot, clear, dry days with low winds tend to be the days with the highest ozone levels.

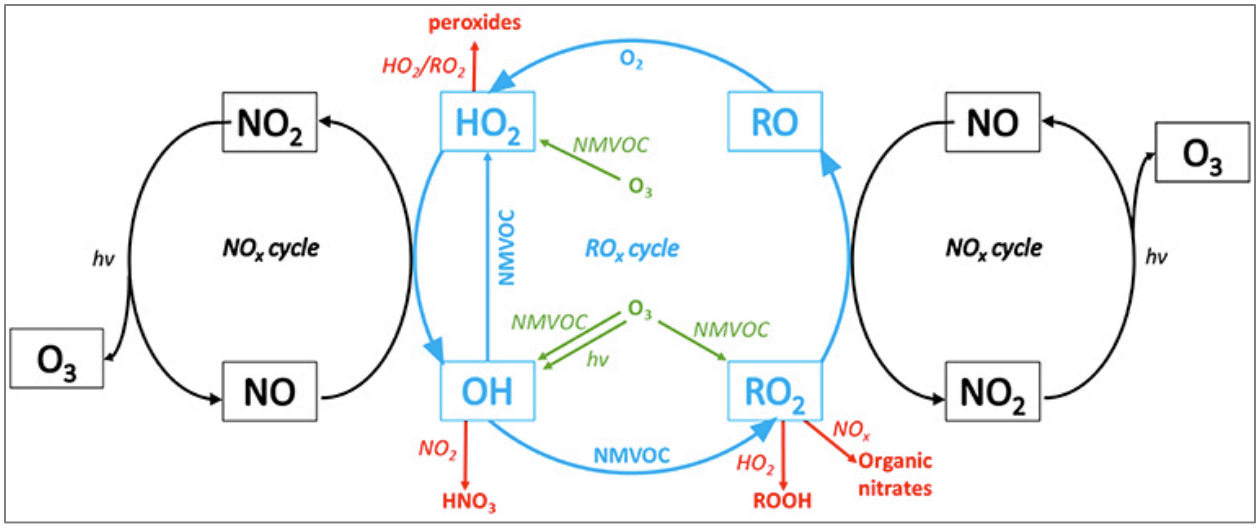


Figure 14 – Ozone formation via the interactions between the ROx- (blue) and NOx-cycles (black) [89]

Depending on the balance of these chemicals and other factors the amount of ozone formed can be limited by the amount of NOx or VOCs, or both. In general, the more VOCs available in the atmosphere for the reactions that form ozone, the more effective reductions in NOx are to reducing ozone, and vice versa.[90] Figure 15, shows how the ratio of NOx and VOCs in the atmosphere controls ozone reactions.

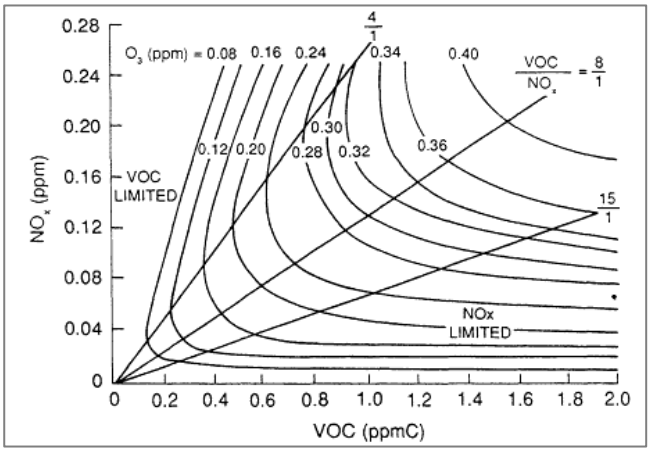


Figure 15 – Typical ozone isopleths used in Empirical Kinetic Modeling Approach (EKMA)

NOx is a light brown gas formed most often from the reaction of nitrogen and oxygen during combustion process, including at power plants, boilers, and in internal combustion engines such as cars and trucks, as well as many smaller sources. It can also be formed naturally in the soil, as well as from lightning. However man-made, or "anthropogenic," sources tend to be much greater. Figure 16 shows point sources of NOx within the Louisville Metropolitan Statistical Area (MSA).

[89] Source: Fitzky et al., *The Interplay Between Ozone and Urban Vegetation – BVOC Emissions, Ozone Deposition, and Tree Ecophysiology*; Front. For. Glob. Change, 06 September 2019. https://doi.org/10.3389/ffgc.2019.00050.
[90] *See, e.g.*, National Research Council. 1991. *Rethinking the Ozone Problem in Urban and Regional Air Pollution*. Washington, DC: The National Academies Press. https://doi.org/10.17226/1889.

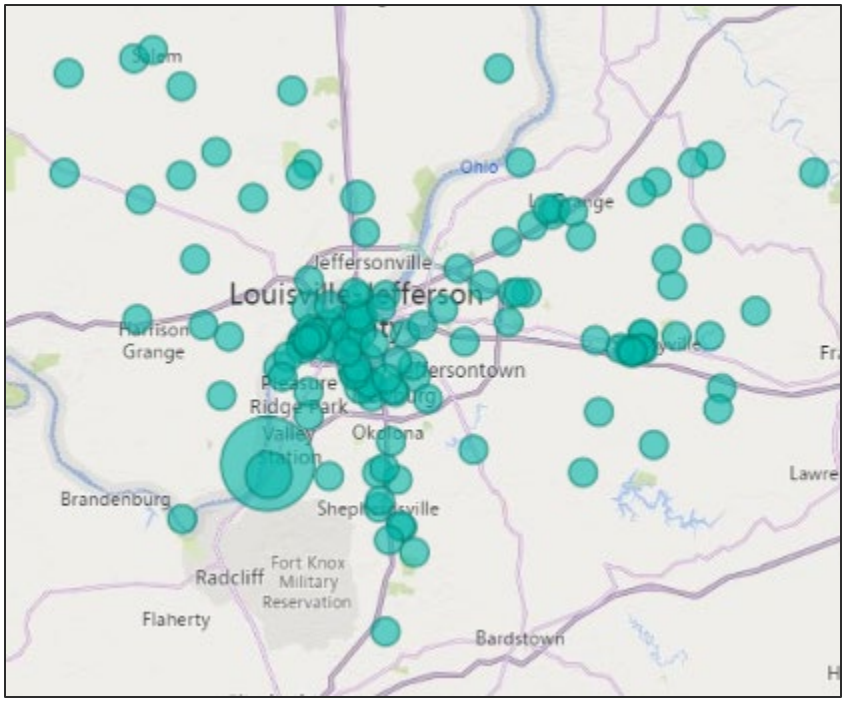


Figure 16 – NOx Point Sources, Louisville MSA[91]

VOCs come from even more numerous sources than NOx and include both anthropogenic and naturally occurring ("biogenic") sources. Many scents and odors are from VOCs, including scents such as paint and other solvents, gasoline and other petroleum products, and cleaners, as well as plant smells such as pine forests. Biogenic sources tend to far exceed anthropogenic sources with respect to the quantity of VOC emissions in an area, particularly in the eastern United States. Further adding to the complexity of understanding VOC emissions, there are thousands of different VOCs, which react to form ozone at different rates (faster or slower) and to different yields (more or less ozone formed per unit of VOC).[92] Point sources of VOCs in the Louisville MSA are shown in Figure 17.

[91] Source: LMAPCD, *Emissions Inventory Dashboard*, https://app.powerbi.com/view?r=eyJrIjoiMTBkYmNiYWYtZDI4NyooODNmLTllYjAtYjkxYjIyN2I2ZTgwIiwidCI6IjRmOTg2MTliLTIwMmQtNDEzZi04Y2NmLTM2MWQ1NzIxM2JjZCIsImMiOjF9.

[92] *See, e.g.*, Carter, William P.L., 2009. *Updated Maximum Incremental Reactivity Scale and Hydrocarbon Bin Reactivities For Regulatory Applications*. California Air Resources Board. https://ww3.arb.ca.gov/research/reactivity/mir09.pdf.

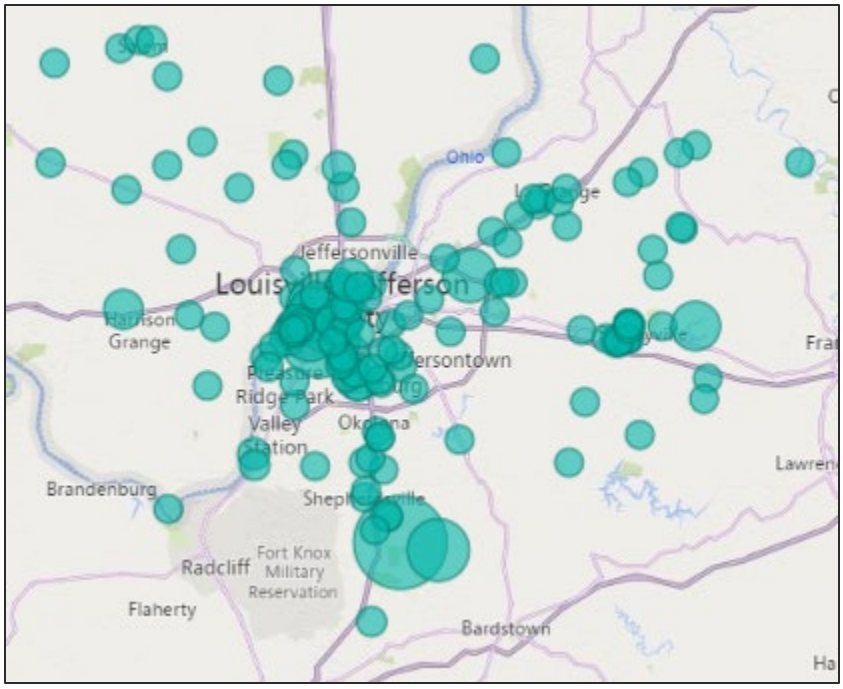


Figure 17 – VOC Point Sources, Louisville MSA[93]

The fact that VOCs from biogenic sources overwhelm NOx sources in the region usually means that most of the southeastern United States is understood to be "NOx-limited", because the abundance of VOCs makes limitations on the amount of anthropogenic VOCs less effective than limitations on the amount of anthropogenic NOx in reducing ozone formation.[94]

Previous modeling efforts have verified this but have shown that the balance between NOx and VOCs may be more closely balanced in Louisville. Modeling performed for 11 southeastern states by the Georgia Institute of Technology in 2014 shows that while a 30% reduction in NOx emissions in Georgia or Tennessee, for instance, would result in a 6 to 10 ppb reduction in peak ozone levels, the same reductions would result in approximately 4 to 7 ppb reduction in peak ozone across Kentucky, with results at Louisville Metro monitors all showing less than 6 ppb reductions in peak ozone. Conversely,

[93] Source: LMAPCD, *Emissions Inventory Dashboard*, https://app.powerbi.com/view?r=eyJrIjoiMTBkYmNiYWYtZDI4NyooODNmLTllYjAtYjkxYjIyN2I2ZTgwIiwidCI6IjRmOTg2MTliLTIwMmQtNDEzZi04Y2NmLTM2MWQ1NzIxM2JjZCIsImMiOjF9.

[94] Georgia Institute of Technology. 2014. *Final Report, Emissions and Air Quality Modeling for SEMAP*. Forest Park, GA: Southeastern States Air Resource Managers, Inc.. http://semap.ce.gatech.edu/sites/default/files/files/SEMAP-Revised-Final-Report_Final.pdf.

30% reductions in VOC emissions resulted in less than 1 ppb, and generally under 0.40 ppb, reductions in peak ozone at every modeled location in Georgia and Tennessee. In Kentucky, the same VOC reductions resulted in anywhere from under 0.20 ppb reductions in peak ozone, to over 1 ppb in Louisville.[95] Similarly, results of EPA modeling show almost no benefit from VOC reductions across most of the southeastern U.S., but at least a slight benefit in the Louisville area.[96]

Ozone Formation Study

GOALS

Previous modeling efforts discussed above were conducted on a regional or even national level, with a resolution of 12 km grid cells. Furthermore, it was based on emissions data collected prior to significant changes in Louisville, including the scaling back of operations at the Duke Gallagher coal-fired power plant in New Albany, Indiana; the addition of controls at LG&E's Mill Creek Generating Facility; and the replacement of the Cane Run coal-fired plant with a combined-cycle natural gas fired plant.

For these reasons, APCD decided to issue a Request for Proposals (RFP) for sensitivity modeling to be conducted specifically for the Louisville area, to determine the extent to which ozone formation in the area was NOx- or VOC-limited. The RFP was issued in late 2018, and the firm Ramboll was selected to conduct the study.

METHODOLOGY

As requested by the RFP, the final proposal as accepted was to conduct two major tasks, and a third optional task. The two primary tasks were to, first, develop a suitable platform, including emissions inventory, for modeling and then, second, to use that inventory and additional brute force modeling to evaluate NOx and VOC sensitivity. The third optional task, which has not been exercised by APCD, was for development of a Louisville-specific VOC reactivity scale.

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[95] *Id.* at 5-21 to 5-24.
[96] EPA Office of Air Quality Planning and Standards, Air Quality Modeling Group. 2017. *Supplemental Information for Ozone Advance Areas Based On Pre-Existing National Modeling Analyses*. https://www.epa.gov/sites/production/files/2017-05/documents/national_modeling.advance.may_2017.pdf.

The development of the emissions inventory and modeling domain is described in the Emissions Inventory Report.[97] The starting point for the modeling was U.S. EPA's 2016 beta modeling platform, released in 2019. That platform contains national meteorological modeling inputs formatted for the Weather Research and Forecast (WRF) Model, as well as inputs for Sparse Matrix Operator Kernel Emissions (SMOKE) modeling of emissions. The primary modeling domain was restricted to roughly a rectangle covering the state of Kentucky (see Figure 18). Ramboll and APCD worked together to improve the emissions for the Louisville area in several ways. Onroad emissions were updated using newer inputs from the Kentuckiana Regional Planning & Development Agency (KIPDA), our regional MPO, for the nonattainment area, to perform modelling using EPA's MOVES model. Nonpoint emissions were updated for the following sectors based on the information and local source knowledge of APCD: Bulk Gas Terminals/Plants; Waste Disposal: Publicly Owned Treatment Works (POTW); Industrial Natural Gas Combustion; and Land Clearing Debris.[98]

Ramboll developed a modeling protocol to lay out the plan for modeling, with input from APCD.[99] Modeling was conducted using WRF and SMOKE for meteorological and emissions modeling combined with Comprehensive Air Quality Model with Extensions (CAMx), a publicly available, state-of-the-art photochemical modeling system developed by Ramboll. Base case and brute force model runs used an approach called "flexi-nesting" that interpolates the 12-km meteorology and emissions to the 4-km Louisville domain that provides a more refined estimate of the NOx and VOC point source and mobile source emissions. *See* Figure 18, showing the 12-km and 4-km flexi-nested grid. After modeling the base case, an extensive model performance evaluation (MPE) was conducted that compared modeling results to monitoring values.

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[97] Ramboll US Corporation. 2019. *Ozone Formation Study: Emissions Inventory Report*. Louisville, Ky. Louisville Metro Air Pollution Control District. https://louisvilleky.gov/sites/default/files/air_pollution_control_district/documents/allother/2019/lmapcdozonestudy_ei_report_v2_15aug2019.pdf.

[98] *See Id.* at 2-4 for a summary of the updates made.

[99] Ramboll US Corporation. 2019. *Ozone Formation Study: Modeling Protocol*. Louisville, Ky. Louisville Metro Air Pollution Control District. https://louisvilleky.gov/sites/default/files/air_pollution_control_district/documents/allother/2019/lmapcdozonestudy_modelingprotocol_final.pdf.

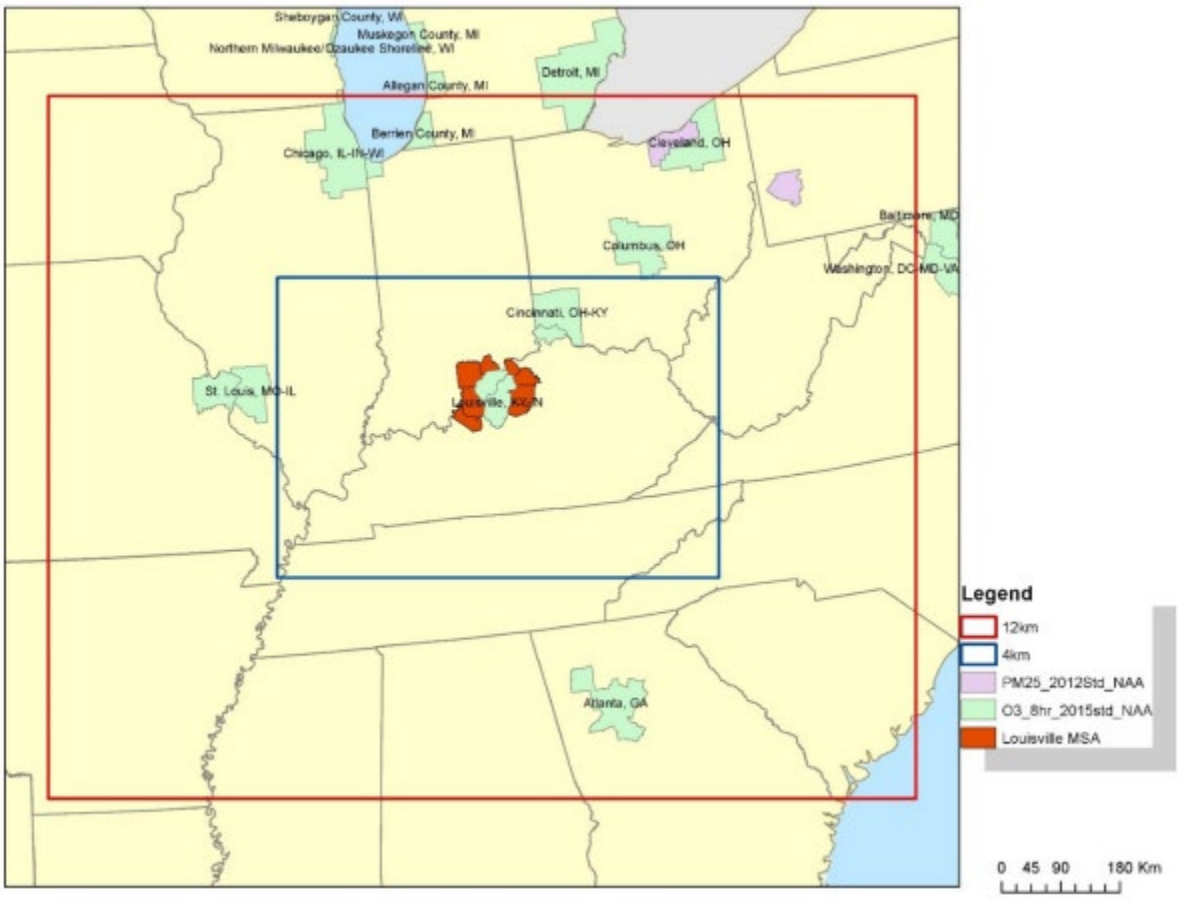


Figure 18 – Location of the CAMx 4-km & 12-km Modeling Domains[100]

After base case modeling, additional brute force runs were used to evaluate the relative effectiveness in reductions in NOx and VOC emissions. Specifically, the model was run with a 25% reduction in anthropogenic NOx emissions across the Louisville modeling domain, and again with a 25% reduction in anthropogenic VOC emissions, and the results were compared. [101]

[100] Source: Ramboll US Corporation. 2019. *Ozone Formation Study: Model Performance Evaluation and NOx/VOC Sensitivity*. Louisville, Ky. Louisville Metro Air Pollution Control District. At 29. (Hereinafter: "Ozone Study Final Report").
https://louisvilleky.gov/sites/default/files/air_pollution_control_district/documents/allother/2019/revisedfinal_lmapcd_mpe_11192019.pdf.

[101] Ramboll US Corporation. 2019. *Ozone Formation Study: Modeling Protocol*. Louisville, Ky. Louisville Metro Air Pollution Control District.
https://louisvilleky.gov/sites/default/files/air_pollution_control_district/documents/allother/2019/lmapcdozonestudy_modelingprotocol_final.pdf.

FINDINGS

The results of both the MPE and the sensitivity analysis are described in the *Ozone Formation Study: Model Performance Evaluation and NOx/VOC Sensitivity* (hereinafter: "Ozone Study Final Report").[102] On the whole, the MPE showed that normalized mean bias (NMB) and normalized mean error (NME) generally were within EPA guidelines, although at certain monitor locations during certain time periods performance varied, often over-estimating ozone concentrations during peak ozone season at sites other than the Cannons Lane monitoring site. The performance at the Cannons Lane site is of particular importance since it is most often the design value monitor (*i.e.*, the local site with the highest design value).[103] *See* Figure 19, comparing modeled results to monitored results.

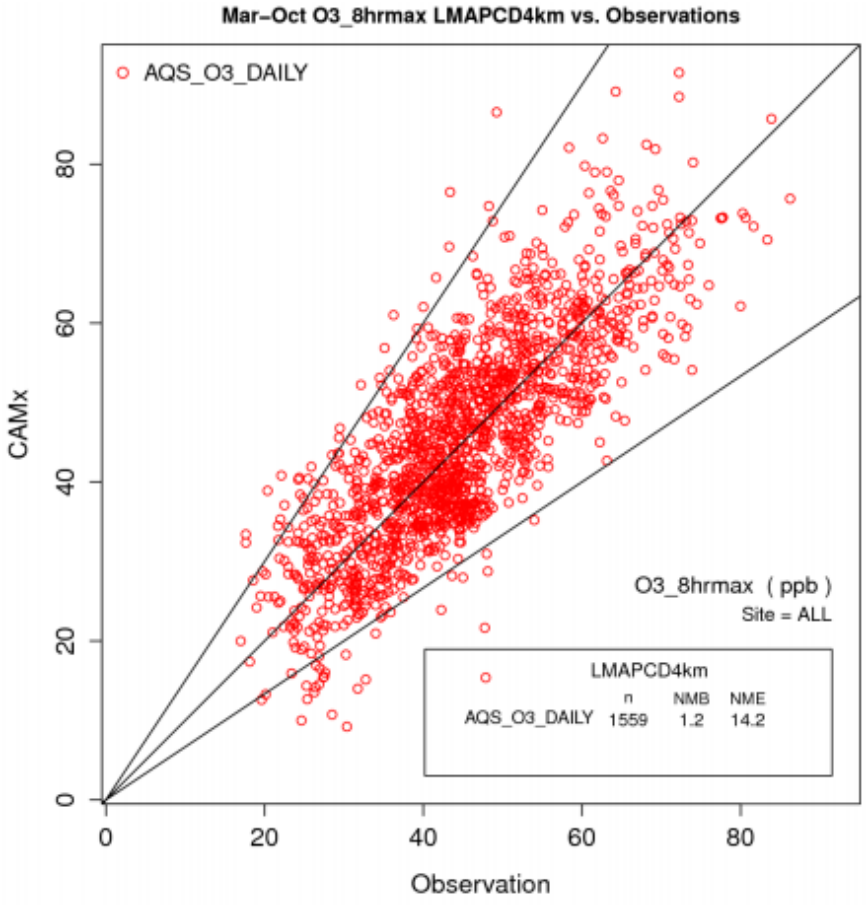


Figure 19 – Scatter Plot of MDA8 Ozone.[104]

[102] Ozone Study Final Report at 29.
[103] The MPE is described in detail in Section 5 of the Ozone Study Final Report, at pp. 47-77.
[104] Source: Ozone Study Final Report at 9.

The results of the brute force runs generally agreed with previous modeling, showing greater reductions in peak ozone from reductions in NOx across in the domain, particularly in the further southeastern region, which was the focal point of previous modeling. However, the NOx-limited conditions tended to be least apparent in the Louisville urban core, including near the Cannons Lane monitor, showing as little as 1 to 3 ppb benefit in areas from the 25% domain-wide NOx reduction. The peak maximum daily 8-hour average (MDA8) for the top 10 ozone days modeled in Jefferson County with this reduction was 70.7 ppb, at the same location as the peak in the base case, and represented a 3.8 ppb reduction from the base case.[105] In some very limited circumstances, modeling even showed the uncommon event of disbenefits from NOx reductions, as NOx levels were large enough and conditions just right for NOx to be acting as an ozone sink in the ozone cycle. However, these limited hours on a few specific days were largely overwhelmed by the benefits of NOx reductions.[106]

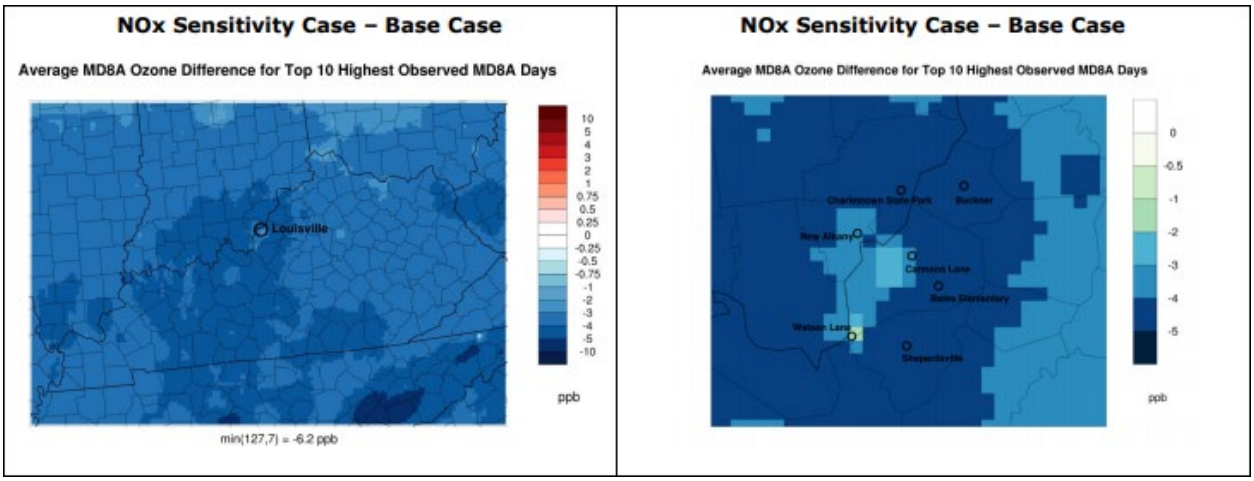


Figure 20 – Base Case v NOx Sensitivity Case, Average Top 10 ozone days, 2016[107]

The VOC sensitivity modeling (25% reduction in anthropogenic VOCs domain-wide) shows almost no effect on MDA8 ozone levels across much of the modeling domain. However, in many of the urban areas modeled, in particular Jefferson County, a slight but consistent benefit from VOC reduction was shown, with a maximum benefit over the urban core of Louisville of up to 1.3 ppb.[108]

[105] *Id.* at 78.
[106] *Id.* at 81-82.
[107] Source: *Id.* at 79.
[108] *Id.* at 81.

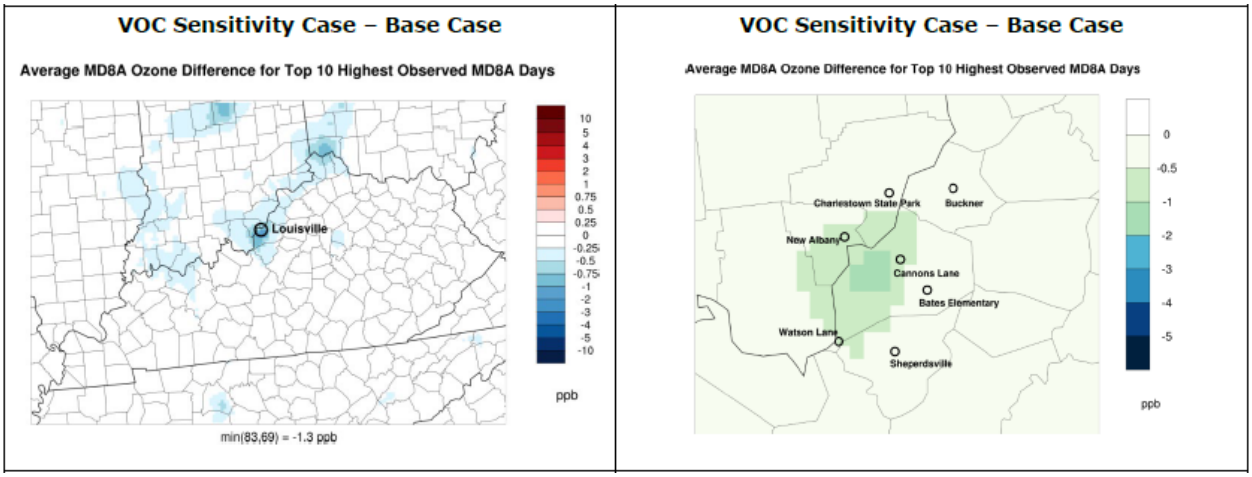


Figure 21 – Base Case v VOC Sensitivity Case, Average Top 10 ozone days, 2016[109]

Overall, the results of the modeling showed greater benefits from NOx reductions, but not to such an extent that the area is exclusively NOx-limited. VOC reductions showed a modest but consistent benefit for reducing peak ozone levels.

The Ozone Study Final Report also made several recommendations for further study. Several recommendations included further refinements to the inventory such as using speciated VOCs where available, comparing the platform used to a further version released by the EPA, and comparison of 2016 to other years emissions, particularly with regard to "event" emissions such as from upset conditions at facilities in the area. Furthermore, Ramboll recommended considering additional brute force runs limiting the 25% reductions in NOx/VOCs to anthropogenic emissions solely within Jefferson County, as the balance between the two is much closer within the county and may result in an even closer balance in effectiveness in reductions between the two pollutants. Finally, Ramboll also recommended additional analysis which APCD has preliminarily conducted, such as looking at meteorological and emissions conditions on days that stood out in the modeling, such as the highest ozone days, days where NOx disbenefits were found, and days where the model drastically over or under-predicted monitored ozone levels. APCD was unable to draw any definitive conclusions from the preliminary analyses.

[109] Source: *Id.* at 80.

MPSG Background & Process

MPSG OVERVIEW

In November 2019, the APCD convened a broad range of stakeholders (see Appendix A for list of participating organizations) to discuss current air quality challenges and develop recommendations for our community's next steps to improve local air quality and reduce health impacts associated with air pollution exposure. There are several reasons to bring our air quality stakeholders to the table in this way, including an expectation from our community based on past APCD practice. Whether for the purpose of generating strategies to reduce ozone, fine particulates, or exposure to air toxics, APCD stakeholder work has been a regular step in our community's discussion of air quality improvements. This convening followed the framework set by these previous efforts by ensuring that representatives for emission source sectors as well as community and health advocates were invited to the table to share their expertise and unique perspectives on Louisville's air quality challenges and the strategies available to improve overall community health outcomes associated with air pollution exposure.

The area's current status as nonattainment for the 2015 8-hour Ozone National Ambient Air Quality Standard (NAAQS) was the focus of the Multipollutant Stakeholder Group (MPSG) work. However, community goals for fine particulates and air toxics were also discussed and co-benefits to reduce health impacts from these pollutants sought. This was a variation on past APCD stakeholder convenings where only a single pollutant type was examined but is in keeping with the direction that air quality planning organizations are moving and with our community's public health goals.

The APCD will use emission reduction recommendations in the creation of a Multipollutant Air Quality Strategy document to guide its work in the coming years, including potential additions to the area's federally enforceable State Implementation Plan (SIP) if required. Community outreach and education recommendations will help guide APCD communication and engagement efforts in coming years and provide framework for ongoing collaborations among our stakeholders. Recommendations outside of the scope of APCD's work will be provided to the relevant entity with APCD support wherever possible.

MPSG GOALS

1. Develop recommendations to reduce emissions of ozone precursors in order to come into attainment of the 2015 8-hour Ozone NAAQS, with a focus on strategies that may achieve co-benefits of air toxics and fine particulate reductions.

2. Identify quantifiable emission reduction strategies – voluntary and regulatory – from the following source sectors: Point, Area, Mobile.
3. Identify voluntary programs and community initiatives to reduce emissions and exposure in order to reduce health risks.
4. Recommend programs, collaborations, etc. that will raise awareness of air quality impacts of local activities and the health impacts associated with them.

MPSG PROCESS

In order to ensure participation by a broad range of interested stakeholders, organizations were invited to participate (either invitee or delegates) in the MPSG discussion. This included regulated entities and sector representatives from sources that were identified through emissions inventory review as the largest sources of ozone precursors; government entities with responsibilities around transportation and land use planning, public health, and economic development; community advocacy groups that have spoken out on air quality and environmental justice concerns; and other resources for health, air quality, and community engagement knowledge. More than 36 organizations answered this call and participated in the MPSG process. Two Air Pollution Control Board members co-chaired the MPSG, Stephen Sullivan, the Board vice chair, and Dr. Geoffery Cobourn, providing leadership and encouragement for the stakeholder's work.

Beginning in November 2019, three sessions of the full MPSG were convened at the Edison Center where APCD's offices are located. Call-in and online presentation viewing opportunities were set-up for those that were unable to join the group in person. At these convenings APCD staff provided attendees in-depth information on current air quality data, modelling, and regulatory requirements (in particular, the 2015 8-hour Ozone standard NAAQS requirements) to develop a common baseline understanding among the stakeholders. The information shared at these meetings, as well as additional background resources, were posted to a page on the APCD website dedicated to this process: www.louisvilleky.gov/government/air-pollution-control-district/apcd-multipollutant-stakeholder-group. Also included on this page is an Emissions Inventory Dashboard, which allowed users to explore

the 2014 NEI for all counties the Louisville MSA (since updated to include both 2011 and the newly released 2017 inventory data).[110]

After this shared foundation of current air quality understanding was built up, MPSG participants were introduced to the committee structure for the next phase of their work – developing recommendations to help guide next steps in addressing air quality in Louisville. Committees included: Point Source, Area Source, Mobile Source, Health, and Outreach and Education.

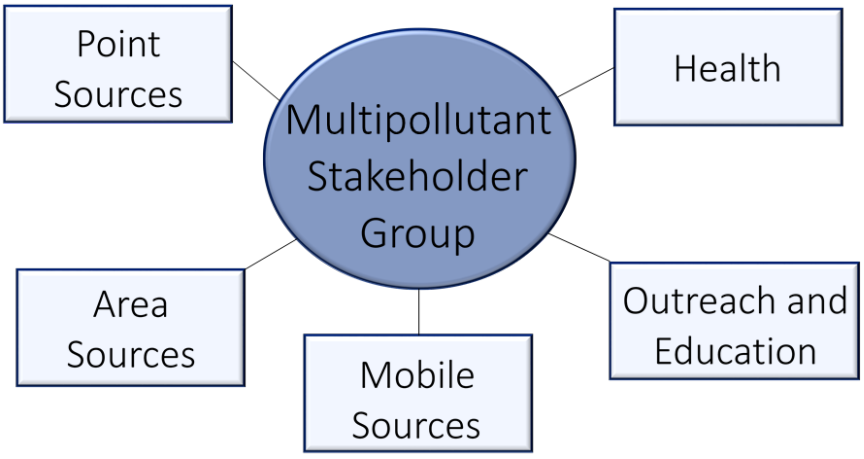


Figure 22 – MPSG Committee Structure

APCD staff presented committee structure, shared expectations, and proposed goals for their efforts, stakeholders self-selected committee assignments. Stakeholder organizations were encouraged to send representatives to more than one committee as desired and all were asked to share the committee sign-up link throughout their networks in an effort to bring additional participants into the committees' processes to develop recommendations. There were more than 60 participants among the committees. The committees then met roughly every other week through the beginning of March, each meeting 6 or 7 times in a total of 37 meetings. Committees discussed the source sector or topic with which they were charged and developed recommendations for emission reduction strategies, outreach and engagement opportunities around air quality and health impacts, and additional lines of inquiry for how our

Figure 23 – Outreach and Education Committee Meeting, January 2020

[110] *See*, LMAPCD, *Emissions Inventory Dashboard*, https://app.powerbi.com/view?r=eyJrIjoiMTBkYmNiYWYtZDI4NyooODNmLTllYjAtYjkxYjIyN2I2ZTgwIiwidCI6IjRmOTg2MTliLTIwMmQtNDEzZi04Y2NmLTM2MWQ1NzIxM2JjZCIsImMiOjF9.

community can protect public health from air pollution impacts. More than 90 recommendations were developed in this process.

At the end of March, the initial MPSG representatives and all committee participants were invited back to a full reconvening for two final sessions at which each Committee's work was presented. Due to the COVID-19 pandemic, this reconvening shifted to online/phone-in only events with two Webex meetings held to present the committee's recommendations and provide an opportunity for discussion. Each session was attended by 50 to 60 stakeholders. After each session a survey form was sent to all participants listing the recommendations presented (Point, Area, and Mobile Source Committees presented first, followed by the Health and Outreach and Education committees at the second meeting). These emailed surveys asked our participants to prioritize a certain number of the recommendations in each committee's list (dependent on the overall number of recommendations). Though all recommendations will be reviewed for implementation next steps, prioritization is helpful in understanding which rose to the top for stakeholders as often resource constraints (i.e., financial, staffing, timelines) make it necessary to choose where to focus efforts first. These forms were also a chance for participants to provide feedback, implementation ideas, and partnership opportunities to the District on recommendations from all committees in addition to the one(s) in which they participated.

APCD Program Planning staff then developed this report detailing the process, information shared, and recommendations of the committees. This Final Report of the MPSG process and resulting recommendations will be presented to the Louisville Metro Air Pollution Control Board, the Mayor's Office, Louisville Forward staff, and other community partner groups as opportunity allows.

MPSG COMMITTEES AND GOALS

While committees were encouraged to discuss and revise goals as they felt appropriate, the following initial goals were presented to the committees to guide their discussion.

POINT SOURCE COMMITTEE

- Evaluate most current emissions inventory to identify and assess sources of ozone precursors at point sources.

- Identify and assess control measures for control of ozone and precursors at point sources that are currently in place or planned.
- Evaluate Ozone Formation Study modeling results to:
    - Identify additional possible voluntary control strategies for reaching attainment of the 8-hour Ozone NAAQS by 2021 deadline.
    - Evaluate possible additional control measures for informal RACT/RACM assessment.
- Evaluate the sufficiency of current APCD Regulations to meet the requirements of the 2015 8-hour Ozone Nonattainment Area SIP Requirements Rule and consider and recommend updates to these rules.
- Assess recommended strategies for co-benefits to fine particulate and air toxic emission reductions.

AREA SOURCE COMMITTEE

- Evaluate most current emissions inventory to identify and assess sources of ozone precursors from area sources.
- Identify and assess control measures for control of ozone and precursors from area sources that are currently in place or planned.
- Evaluate Ozone Formation Study modeling results to:
    - Identify additional possible voluntary control strategies from area source sectors for reaching attainment of the 8-hour Ozone NAAQS by 2021 deadline.
    - Evaluate possible additional control measures.
- Evaluate sufficiency of APCD compliance activities for area source emissions accountability (*e.g.*, inspections, record keeping and reporting).
- Assess recommended strategies for co-benefits to fine particulate and air toxic emission reductions.

MOBILE SOURCE COMMITTEE

- Evaluate most current emissions inventory to identify and assess sources of ozone precursors from mobile sources.
- Identify and assess control measures for control of ozone and precursors from mobile sources that are currently in place or planned.

- Review best practices from other cities and present case studies on how those cities reduced emissions from mobile sources.
- Evaluate potential localized mobile source exposures in congested or heavily travelled road segments.
- Look for additional strategies to reduce emissions within Louisville Metro Government's own fleet and other large fleets operating locally.
- Assess recommended strategies for co-benefits to fine particulate and air toxic emission reductions.

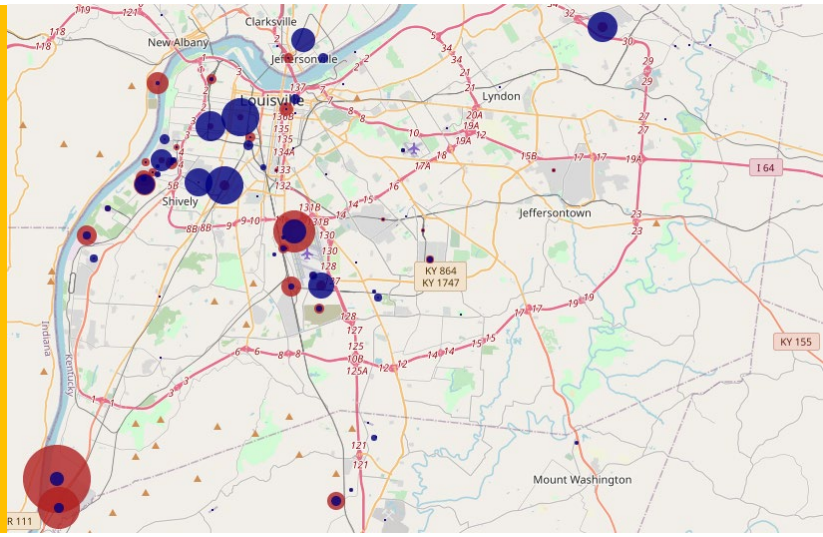
HEALTH COMMITTEE

- Identify health risks to Louisville Metro residents from exposure to ozone, fine particulates, and air toxics.
- Evaluate the potential for ozone, fine particulate, and air toxics reductions to improve health and monetize public health benefits where possible.
- Assess the disparate impacts of these pollutants on minority and low-income residents.
- Identify additional questions or areas of study to help inform the community on how to reduce exposure to air pollution and mitigate potential health impacts.

OUTREACH AND EDUCATION COMMITTEE

- Review current public outreach efforts to communicate Louisville's nonattainment status for 2015 ozone NAAQS and recommend additional strategies to raise awareness of the need for air quality improvement.
- Identify audiences for sharing information and conducting more engagement around air quality and its impact on health.
- Propose community partnerships to promote air quality and environmental health awareness.
- Propose new programs in the vein of Idle Free Louisville or Lawn Care for Cleaner Air that give citizens opportunity and information to reduce their own emissions contribution and health impacts from air quality.
- Support/amplify the messaging of other groups that promote lowering air emissions and limiting exposure to emissions (Every Commute Counts, Kentuckiana Air Education (KAIRE), TARC, Greenheart Project, Trees Louisville, etc.).

Point Source Committee



POINT SOURCE COMMITTEE

OVERVIEW

As with the other Committees, the Point Source Committee was primarily defined by the definition used for the National Emissions Inventory (NEI). According to U.S. EPA "NEI point sources include emissions estimates for larger sources that are located at a fixed, stationary location. Point sources in the NEI include large industrial facilities and electric power plants, airports, and smaller industrial, non-industrial and commercial facilities." The Point Committee did not generally consider airports, however, as the primary emissions from airports are from aircraft, which are not regulated under the same authority as other point sources, but like other moving and mobile sources are instead generally regulated through manufacturer emissions standards under Title II of the CAA.[111]

Generally, point sources in the Louisville area fit into the categories described above. The top ten sources of NOx and VOCs in the Louisville Metro area are shown in the following charts.

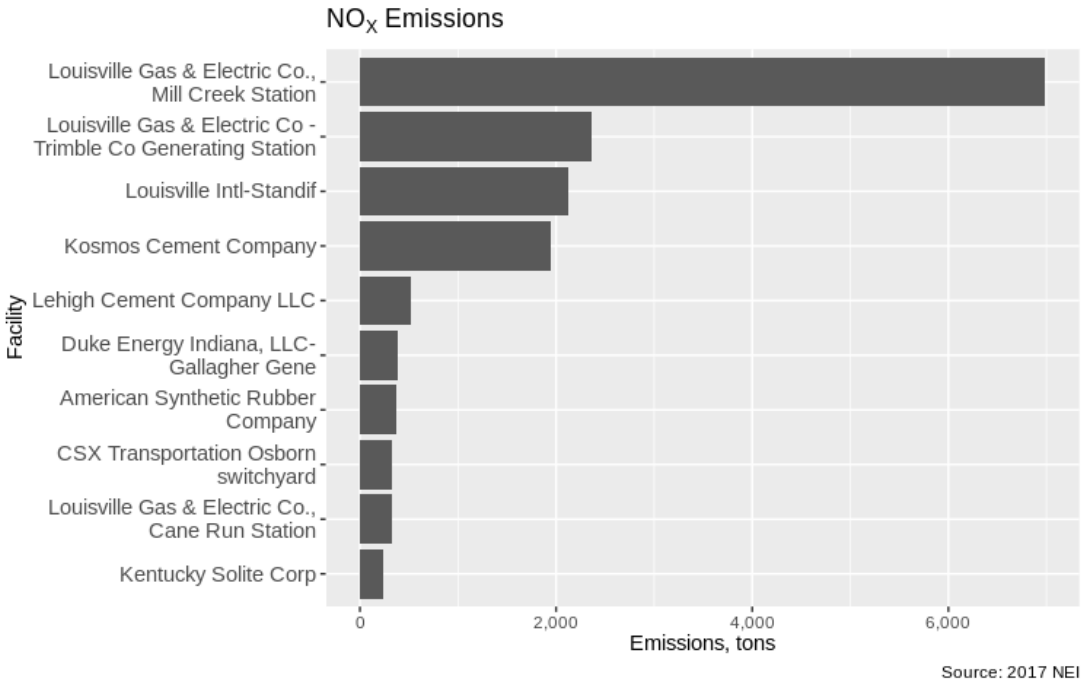


Figure 24 – Top 10 NOx-emitting facilities, Louisville MSA[112]

[111] *See* U.S. EPA, *Regulations for Emissions from Aircraft*, https://www.epa.gov/regulations-emissions-vehicles-and-engines/regulations-emissions-aircraft.

[112] Data source: 2017 NEI facility-level by pollutant, ftp://newftp.epa.gov/air/nei/2017/data_summaries/2017v1/2017neiApr_facility.zip

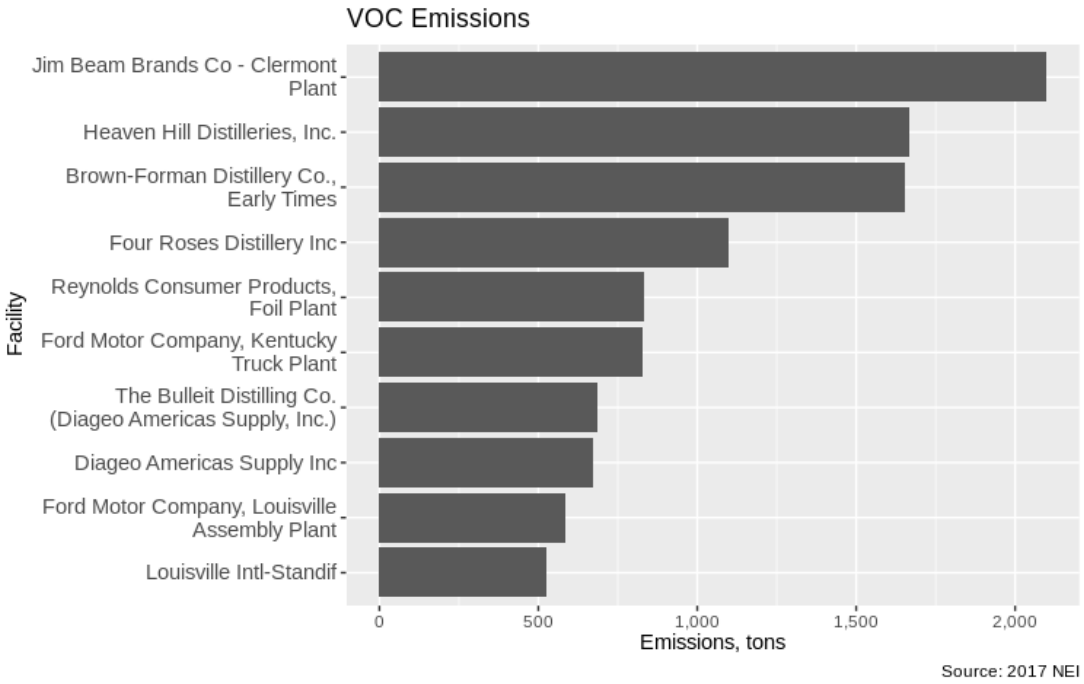


Figure 25 – Top 10 VOC-emitting Facilities, Louisville MSA[113]

GOALS

The initial goals of the Committee were outlined in the MPSG Overview above. At the first two Committee meetings, these initial goals were proposed to the group by the Committee's APCD coordinator, discussed by attendees, and no changes or amendments were suggested by any members. The goals of the Committee therefore remained:

1. Identify and assess control measures for control of ozone and precursors at point sources that are currently in place or planned.
2. Evaluate Ozone Formation Study modeling results to:
    a. Identify additional possible voluntary control strategies for reaching attainment of the 8-hour Ozone NAAQS by the 2021 deadline.
    b. Evaluate possible additional control measures for informal RACT/RACM assessment.
3. Evaluate the sufficiency of current APCD Regulations to meet the requirements of the 2015 8-hour Ozone Nonattainment Area SIP Requirements Rule and consider and recommend updates to these rules.

[113] Source: *Id.*

4. Assess recommended strategies for co-benefits to fine particulate and air toxic emission reductions.

EXISTING PROGRAMS/EXAMPLE REDUCTION STRATEGIES

Point sources are regulated and controlled through programs at the national, state, and local level. As such, it was important for this group to review existing controls and understand their impacts on emissions levels now and the foreseeable future. This discussion addresses the first goal of for this Committee's work.

The Clean Air Act contains much of the framework for regulating point sources, including the Good Neighbor Provision (CAA §110(a)(2)(D)(i)(I)); New Source Review (NSR) (CAA Title 1 Part C (Prevention of Significant Deterioration (PSD)) & Part D (Nonattainment New Source Review (NNSR))); Reasonably Available Control Technology (RACT)/Reasonably Available Control Measures (RACM) (CAA §182(b)(1))[114]; New Source Performance Standards (NSPS) (CAA §111); National Emissions Standards for Hazardous Air Pollutants/Maximum Available Control Technology Standards (NESHAP/MACT) (CAA §112). Each of these programs is administered at the state and/or local level.

In addition, the District has several programs that implement more general provisions of the Clean Air Act, such as the Standards of Performance for Existing and New Affected Facilities in Parts 6 & 7 of APCD's Regulations, respectively. Finally, the local Strategic Toxic Air Reduction (STAR) program (APCD Regulations 5.20 - 5.30) goes beyond the requirements of the Clean Air Act, requiring major point sources, and some smaller sources, to evaluate their emissions of toxic air contaminants and reduce as necessary.

Finally, a number of reductions in ozone precursors and other pollutants have been the result of market forces, or legal settlements. For instance, many coal-fired boilers (both Electric Generating Units

[114] RACT/RACM is required for ozone nonattainment areas classified as moderate or above. APCD has implemented RACT/RACM (including adoption of Control Technique Guidelines (CTGs) and Alternative Control Techniques (ACTs) (*see* https://www.epa.gov/ground-level-ozone-pollution/control-techniques-guidelines-and-alternative-control-techniques) in LMAPCD Regulations 6 (https://louisvilleky.gov/government/air-pollution-control-district/apcd-regulations-part-6-standards-performance-existing) & 7 (https://louisvilleky.gov/government/air-pollution-control-district/apcd-regulations-part-7-standards-performance-new-affected) due to prior nonattainment designations.

(EGUs) and facility-level boilers) have shut down or converted to natural gas, or made plans to do so, in recent years due primarily to market forces. Additional plant shutdowns and controls have come about due to legal settlements over violations at those plants, or as a part of global settlements. Locally, the two remaining non-EGU facilities with coal boilers have both applied to install new natural gas boilers intended to replace aging coal boilers.

COMMITTEE PROCESS & DATA REVIEW

Like the other committees, the Point Committee was coordinated by a member of APCD staff, Byron Gary, APCD Regulatory Coordinator. At the first meeting, the coordinator proposed that a chair from outside APCD be selected by the Committee to help guide the decision-making process and build consensus around the process and eventual recommendations. After the first meeting, a survey was sent out evaluating interest in topics to discuss in future meetings and soliciting nominations for the chair position. Although one nomination was received for chair, logistics and scheduling for the nominee ended up preventing the nominee from taking on the role. Ultimately, no chair was selected, and the committee coordinator served as the facilitator for the committee discussion. Following feedback from the survey, additional discussions were organized for the group around a deep dive into the emissions inventory and around ozone modeling. The remaining sessions were used for recommendation-building.

In the emissions inventory session, the coordinator presented detailed information on the emissions inventory. First, the interactive Emissions Inventory Dashboard[115] created by the District from 2014 NEI data was demonstrated. The underlying data for point sources was made available to the Committee via a shared Google Drive and discussed at the session. Discussion focused on known and planned changes, particularly among top emitters, with committee members discussing current controls at plants, as well as planned changes at plants within Louisville and nearby. It was decided that a spreadsheet of emissions from sources within the domain of the Ozone Formation Study (OFS, discussed above in Section IV.d.) would be used to develop a stakeholder-sourced list of known and planned controls from major sources. Table 2 shows a selection from the stakeholder-sourced

[115] *See* a version 2.0 of the dashboard containing additional data released since the first dashboard was created here: https://app.powerbi.com/view?r=eyJrIjoiMTBkYmNiYWYtZDI4NyooODNmLTllYjAtYjkxYjIyN2I2ZTgwIiwidCI6IjRmOTg2MTliLTIwMmQtNDEzZi04Y2NmLTM2MWQ1NzIxM2JjZCIsImMiOjF9.

spreadsheet, showing the top 10 point sources of NOx within the OFS modeling domain, their 2017 NOx emissions in tons, with columns for Current Controls, Planned Controls/Shutdown, and Date columns with some stakeholder input.

Source Name	2017 NEI	Current Controls	Planned Controls/Shutdown	Date
NEW MADRID POWER PLANT MARSTON	12238.78			
Duke Energy Indiana LLC - Gibson Genera	11385			
INDIANA MICHIGAN POWER DBA AEP ROCKPO	11268.04	SCR (Unit 1)	SCR (Unit 2)	June 1, 2020
Tennessee Valley Authority (TVA) - Shawnee Fossil Plant	10078.95			
AES Ohio Generation LLC, Killen Generating Station (0701000060)	9136.75		shutdown	2018
Zimmer Power Station (1413090154)	8966.88			
Indianapolis Power and Light Petersburg	8373.19		shutdown (units 1 & 2)	2021/2023
General James M. Gavin Power Plant (0627010056)	7830.77			

Table 2 – Selection from Stakeholder-sourced spreadsheet

An additional session on ozone modeling included a detailed presentation from Air Pollution Control Board member and University of Louisville professor, Geoffrey Cobourn, Ph.D., on ozone forecast modeling, as well as an APCD staff presentation on different types of ozone formation modeling and past modeling that covered the area. Dr. Cobourn's presentation included a detailed discussion of the statistical model he and a student had developed and published research around, including the various inputs used. Different types of photochemical modeling were introduced, including brute force modeling, such as that done in the OFS, and source apportionment modeling. Previous modeling studies including the Southeastern Modeling, Analysis, and Planning (SEMAP) project, and previous modeling by the EPA, both of which generally showed the southeastern U.S. to be predominantly NOx-limited.[116]

[116] *See* Precursors & Formation, above, under Ozone – Deeper Dive.

The final three meetings centered on developing recommendations. The Committee began the fourth meeting by breaking into three groups (two in person and one by phone), each taking one of the first three goals of the Committee for discussion. Each group took time to brainstorm recommendations relating to that goal, in the context of the final goal of assessing recommended strategies for co-benefits to fine particulate and air toxic emission reductions. These brainstormed recommendations formed the basis for draft recommendations that were evaluated by the Committee as a whole to determine whether a consensus could be developed to keep, strengthen, or remove each. On the consensus of the entire committee, a final list of recommendations was developed by the Committee coordinator and evaluated for final amendments at the last meeting of the Committee. Final amendments were sent out to the entire Committee by email, and no additional changes were suggested.

POINT SOURCE COMMITTEE RECOMMENDATIONS

The Committee developed 11 total recommendations, several with related sub-recommendations, presented below. They were presented to the entire MPSG upon reconvening and sent out in a survey tool requesting prioritization of five priority recommendations and feedback from the full MPSG. An overview of the results of the survey and discussion of the feedback follows.

1. The District should keep and help maintain the Stakeholder-sourced spreadsheet of known and planned reductions in the domain of the Ozone Formation Study.

2. The District should start a program to recognize companies for voluntary efforts to reduce ozone precursor and other emissions. Recognition should be given through certificates or badges for different levels or tiers of reductions, awarded before the Louisville Metro Air Pollution Control Board.

3. The District should encourage participation by sources in voluntary programs such as KY EXCEL[117], Kentucky Pollution Prevention Center[118], and the Louisville Metro Energy Project

[117] *See* https://eec.ky.gov/Environmental-Protection/Compliance-Assistance/Pages/KY-EXCEL.aspx.
[118] *See* http://kppc.org/.

Assessment District (EPAD) program[119], including through the recognition program in Recommendation 2.

4. The District should encourage action by Point Sources on Air Quality Alert Days. (*These recommendations were considered as a whole in the survey to the full MPSG.*)
    a. The District should ensure that environmental contacts for permitted sources are directly notified by email of Air Quality Alert Days.
    b. The Committee also recommends sources have an Air Quality Alert Day Plan, which voluntarily commits to avoiding, deferring, or delaying certain actions such as startups, shutdowns, maintenance, and testing on Air Quality Alert Days whenever possible.
    c. The District should recognize companies that submit Air Quality Alert Day Plans, including through the recognition program in Recommendation 2.

5. The District should develop "Best Practices" materials to be posted in point source workplaces to educate employees on how to minimize emissions and impacts.

6. The District should consider additional ozone modelling efforts. (*These recommendations, while related, were considered separately in the survey to the full MPSG as they require competing resources and would be separate projects.*)
    a. The District should consider conducting additional photochemical modeling which evaluates sensitivity to Louisville-specific emissions reductions through additional brute-force runs.
    b. The District should also consider additional photochemical modeling which evaluates the relative contribution either of different sources or geographic areas through source-apportionment modeling.
    c. In any further modeling, the District should improve/refine the emissions inventory with the most accurate local data to the greatest extent possible. See Area Source Recommendation #1.

[119] *See* https://louisvilleky.gov/government/sustainability/epad-program.

7. The District should evaluate ozone exceedances through analysis using tools available to it, such as looking at HYSPLIT[120] back trajectories. Additional analysis could be made available through reports, such as the Georgia Annual Ozone Exceedance Reports.[121]

8. The District should evaluate the Emissions Statements rule (Regulation 1.06) for compliance with EPA's SIP Requirements Rule, and update if necessary.

9. In rulemaking for Nonattainment New Source Review (NNSR), the District should compare Regulation 2.04 to minimum federal standards in 40 C.F.R. Part 51, and make explicit where the Regulation is currently more stringent and where it is deficient. The District should consider the full range of options, including conformity with the minimum federal standards, highlighting Clean Air Act (CAA) requirements including CAA §§110(l) & 193. The District should allow ample opportunity for Stakeholder and public input, including through Advanced Notice of Proposed Rulemaking (ANPR) that includes the detailed comparison to minimum federal standards, public meetings, and extended opportunities for comment.

10. The District should evaluate Reasonably Available Control Technology/Reasonably Available Control Measures (RACT/RACM) in advance of the marginal attainment deadline of August 2021, to understand reasonably available control technologies that could be considered in the event of reclassification. (*These recommendations, while related, were considered separately in the survey to the full MPSG as they may require individual rule-making efforts.*)
    a. In evaluating RACT/RACM the District should compare actions in other jurisdictions, such as Pennsylvania's RACT III action, and consider setting presumptive RACT for NOx emissions from various sources through regulation considering such actions in other jurisdictions.
    b. The District should also evaluate whether the reactivities of various VOCs could be accounted for in determining RACT/RACM. Considerations should include how reactivity-based RACT/RACM would be accounted for in the State Implementation Plan

[120] *See* https://www.arl.noaa.gov/hysplit/hysplit/.
[121] *See* https://airgeorgia.org/ozoneexceedancereport.html.

(SIP), and in Nonattainment New Source Review (NNSR) offsetting. This process should include opportunity for input from Stakeholders and the Public.

c. The District should consider adding regulations for CTGs for source sectors in the District covered by a CTG, but not already covered by District regulations, especially those adopted or updated by U.S. EPA since 2006 such as those for offset lithography printing and industrial solvent cleaning. In evaluating source sectors for regulation, the District should consider any additional industry standards and improvement since the issuance of CTGs.

11. The District should evaluate the effect of the EPA's January 25, 2018, guidance memorandum titled "Reclassification of Major Sources as Area Sources Under Section 112 of the Clean Air Act" (Major Maximum Achievable Control Technology (MACT) to Area, or MM2A) memorandum[122], and Proposed Rule, Reclassification of Major Sources as Area Sources Under Section 112 of the Clean Air Act, 84 Fed. Reg. 36,304 (July 26, 2019).[123]

IDENTIFIED PRIORITY RECOMMENDATIONS

The survey of the full MPSG requested members select their top five recommendations for this committee. Based on feedback from the full MPSG, the top four overall prioritized recommendations were **Recommendation 4** regarding the District encouraging action by Point sources on Air Quality Alert days (with three sub-recommendations, as a whole, eight votes); **Recommendation 10.a.**, that in evaluating RACT/RACM the District should compare actions in other jurisdictions, such as Pennsylvania's RACT III action, and consider setting presumptive RACT for NOx emissions from various sources through regulation considering such actions in other jurisdictions (individually, seven votes); and **Recommendations 6.b. and 6.c.**, recommending the District consider additional photochemical modeling that evaluates the relative contribution either of different sources or geographic areas through source-apportionment modeling, and that in any further modeling, the District should improve/refine the emissions inventory with the most accurate local data to the greatest extent possible (individually, 5 votes each). The survey of the full MPSG requested members select their top

[122] *See* https://www.epa.gov/stationary-sources-air-pollution/guidance-reclassification-major-sources-area-sources-under-section.
[123] *See* https://www.epa.gov/stationary-sources-air-pollution/reclassification-major-sources-area-sources-under-section-112-clean.

five recommendations for this committee. **Recommendations 1, 7, and 9** tied for fifth overall, each receiving 4 votes.

DISCUSSION OF FEEDBACK

The Point Committee Recommendations received 19 comments total on its 11 recommendations, which are contained in full in Appendix B. Five of these comments were on Recommendation 10., primarily recommending that in evaluating additional control measures the District should make sure to consider the effectiveness of similar measures in other jurisdictions, as well as the results of the OFS, and adopt only the most effective measures. The next most commented on was Recommendation 6.; these comments were generally supportive of additional modeling ozone formation in the region. Remaining comments primarily involved suggestions on the implementation of recommendations, which will be available to implementing entities, primarily APCD, going forward. Comments on Recommendation 1, regarding the stakeholder-sourced spreadsheet of known and planned reductions, suggested metrics for evaluation of progress on reductions. It should be noted that the Recommendation is for the District to maintain the spreadsheet, which catalogues known and planned reductions within the domain of the OFS, which extends well beyond the jurisdiction of APCD, and even outside the Commonwealth of Kentucky.

Area Source Committee

AREA SOURCE COMMITTEE

OVERVIEW

Area sources, by default, are all nonpoint sources. The EPA defines nonpoint sources as "sources which individually are too small in magnitude to report as point sources."[124] Area Sources include nonpoint industrial sources, as well as commercial, residential, and biogenic sources (*e.g.*, plants and soil). The District issues permits and registrations to some area sources using the following categories:

- Federally Enforceable District Origin Operating Permit (FEDOOP), an industrial synthetic minor permit
- Minor Source Permit
- Registered Source
- Exempt Source

The permitting thresholds for these categories are outlined in the Table 3 below.

Source Type	Permit Type	Threshold Limits
Exempt Source	**None/Exempt Source**	• Uncontrolled Potential to Emit (PTE) < 1000 lbs per year of a HAP • Uncontrolled PTE ≤ 5 tons per year (tpy) of a Regulated Air Pollutant (RAP) **and** • The source is **not** subject to 40 CFR 60, 61, or 63 • Operates only one of the affected facilities listed in Appendix A of Reg. 1.02
	Registration	• Uncontrolled PTE >1000 lbs per year of a HAP • Uncontrolled PTE ≥5 tpy of a RAP • May accept limits to meet PTE requirements • Source **is** subject to 40 CFR 60, 61, or 63
		• Uncontrolled PTE <10 tpy of a HAP

[124] U.S.EPA, *National Emissions Inventory (NEI)*, https://www.epa.gov/air-emissions-inventories/national-emissions-inventory-nei

Minor Source	**Minor Source**	• Uncontrolled PTE < 25 tpy of combined HAPs • Uncontrolled PTE <100 tpy of a RAP
	FEDOOP-SE (STAR Exempt)	• Potentially a major source, but emissions limited to minor source thresholds • Does not apply to source categories: gasoline dispensing, parts washers with secondary reservoirs, motor vehicle refinishing (2 links), and dry cleaners • PTE Limited to <5 tpy of a HAP • PTE Limited to <12.5 tpy of combined HAPs • PTE Limited to <25 tpy of a RAP
	FEDOOP	• Potentially a major source, but emissions limited to below major source thresholds

Table 3 – Area Source Permitting Categories in Louisville

The number of APCD-regulated area sources amongst the permit categories are listed below:

- Exempt Sources—248
- Registered Sources—315
  - Emergency Generators—142
  - Cell Phone Towers—82
- Minor Sources—140
- FEDOOP (STAR Exempt)—47
- FEDOOP—21

The most common industrial area sources in the Louisville MSA include body shops, dry cleaning, printing and related graphic arts, woodworking, and spray coating. Converse to point sources, industrial area sources tend to have higher emissions of VOC over NOx. See Figure 26 for a graph depicting emissions (using NEI data) of all source categories. Figure 27 shows sector-specific data for both NOx and VOC emissions. Solvent usage is attributed to the top three sector categories for VOC emissions (Industrial Processes NEC, Consumer and Commercial Use, and the Graphic Arts), and while not all of the facilities that fall under these three categories are considered area sources, a substantial portion of them are classified as area sources. Overall, solvent usage accounts for a substantial portion of area

source VOC emissions amongst industrial, commercial, and residential sources. Industrial solvent usage is typically associated with VOC-containing products used in a process, such as paints, coatings, varnishes, dry cleaning solvents (*e.g.*, perchloroethylene), inks, toners, and solvents used in cleaning processes. Commercial solvent usage is typically associated with products used for cleaning, such as parts washers in automotive repair shops. Residential area VOC source emissions can also be attributed to cleaning products, but also personal care products, which typically contain VOCs. The residential sector also contributes NOx emissions from fuel combustion for heating and cooking,

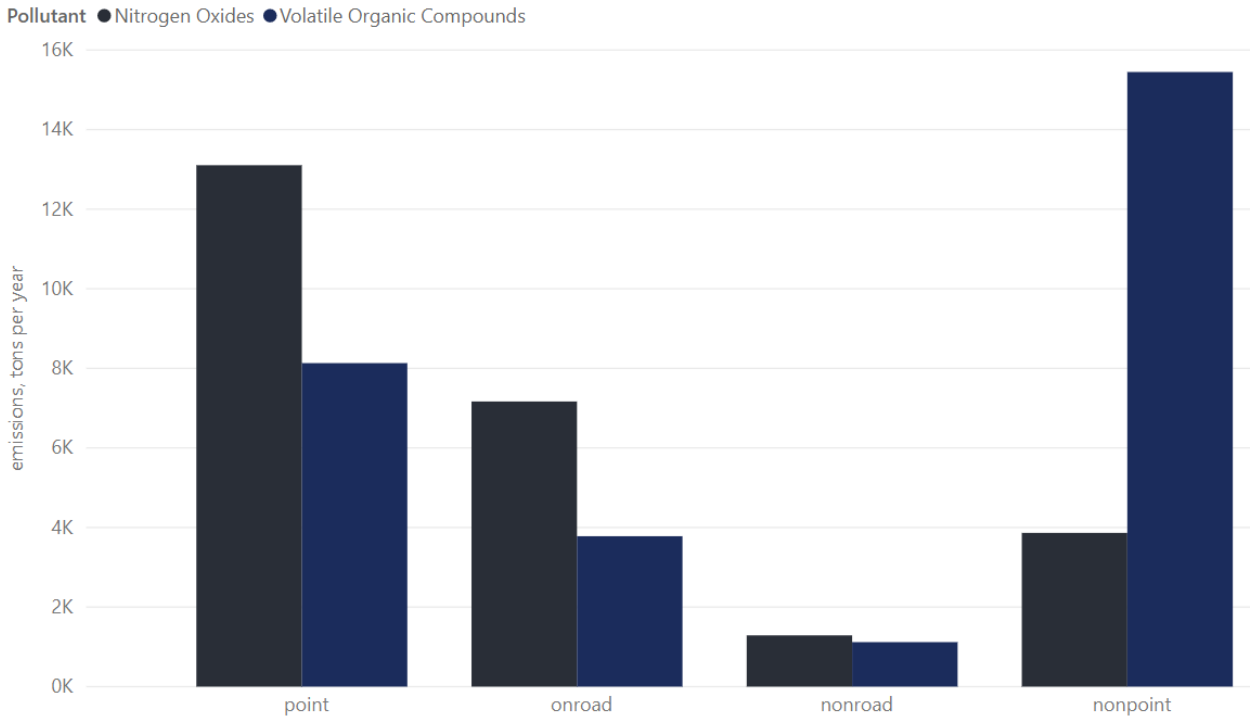


Figure 26 – NOx and VOC emissions by category in 2017 NEI[125]

[125] Source: LMAPCD, *Emissions Inventory Dashboard*, https://app.powerbi.com/view?r=eyJrIjoiMTBkYmNiYWYtZDI4NyooODNmLTllYjAtYjkxYjIyN2I2ZTgwIiwidCI6IjRmOTg2MTliLTIwMmQtNDEzZi04Y2NmLTM2MWQ1NzIxM2JjZCIsImMiOjF9.

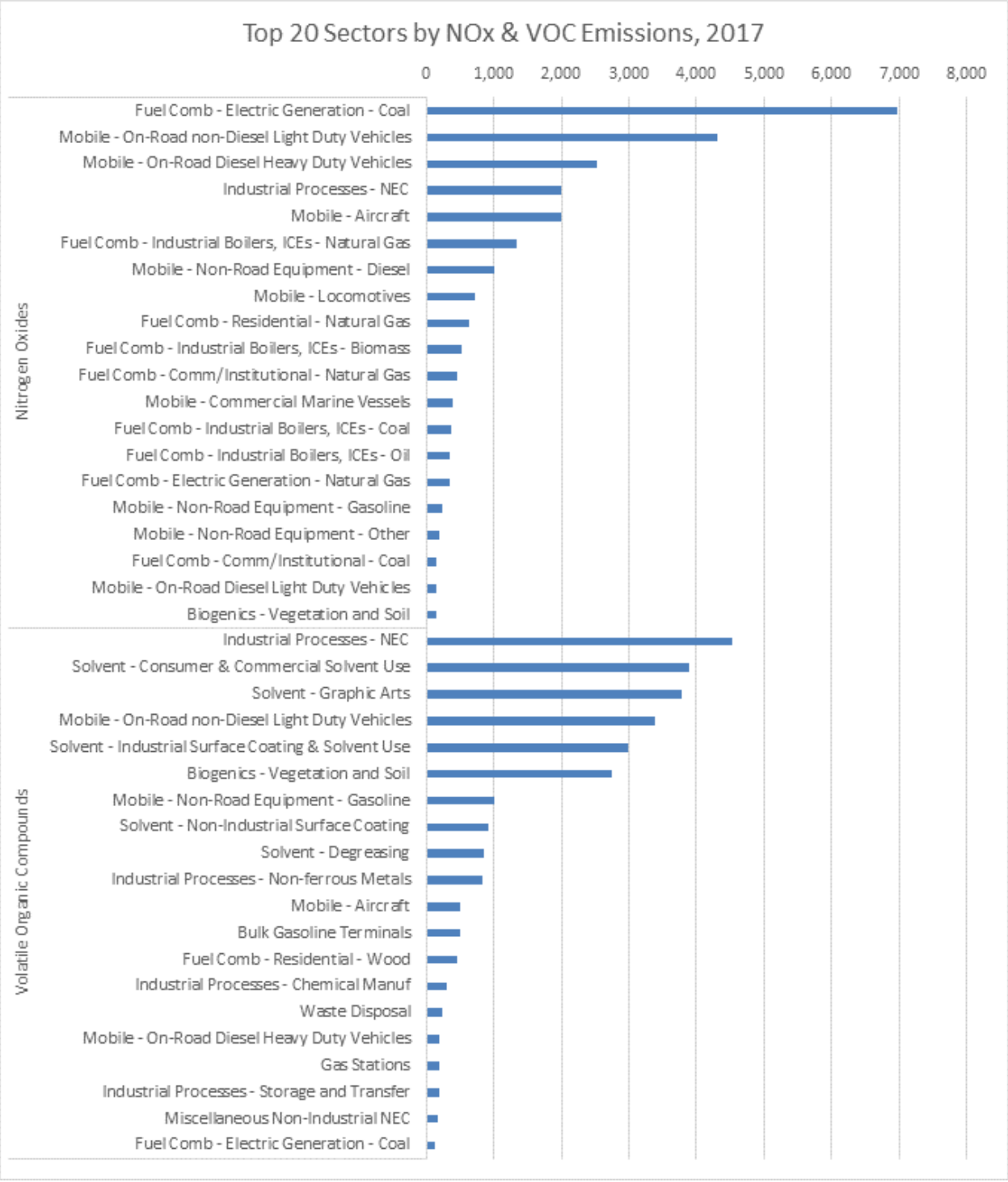


Figure 27 – NOx and VOC emissions by sector in Louisville Metro in 2017 NEI[126]

[126] Data source: 2017 NEI All Sectors summary, ftp://newftp.epa.gov/air/nei/2017/data_summaries/2017v1/2017neiApr_county_tribe_allsector.zip

GOALS

The initial goals for the Committee were developed amongst the District MPSG planning team with the MPSG Area Source Committee coordinator. The goals were presented to the MPSG Area Source Committee members in the initial meetings, during which time the Committee did not elect to make any changes or amendments to the proposed goals. Thus, the Committee goals remained as follows:

- Evaluate most current emissions inventory to identify and assess sources of ozone precursors from area sources
- Identify and assess control measures for control of ozone and precursors from area sources that are currently in place or planned
- Evaluate Ozone Formation Study modeling results to identify additional possible voluntary control strategies from area source sectors for reaching attainment of the 8-hour Ozone NAAQS by 2021 deadline
- Evaluate possible additional control measures
- Evaluate sufficiency of APCD compliance activities for area source emissions accountability (*e.g.*, inspections, record keeping and reporting)
- Assess recommended strategies for co-benefits to fine particulate and air toxic emission reductions

EXISTING PROGRAMS/EXAMPLE REDUCTION STRATEGIES

Many area sources are regulated by the Clean Air Act (CAA) on federal, state, and local levels. In addition to air quality permits and registrations, numerous area source industrial facilities are subject to federal New Source Performance Standards (NSPS) and National Emissions Standards for Hazardous Air Pollutants (NESHAP) depending on the types of equipment and/or processes used at the facility.

There are numerous federal, state, and local programs that have been developed to provide technical assistance to regulated facilities, commercial sources, and the general public. The Small Business Environmental Assistance Program (SBEAP) was established to provide detailed technical assistance to small businesses that may need assistance navigating unfamiliar environmental regulations and/or may not be able to afford to hire a consultant to conduct calculations needed for the permitting process.[127]

[127] *See* https://nationalsbeap.org/.

SBEAP is funded via Title V funds per CAA §507. Every state and numerous local agencies, including APCD, has at least one SBEAP point of contact. There is a statewide SBEAP housed at the Kentucky Department of Environmental Protection's (KYDEP) Division of Compliance Assistance (DCA).

SBEAP specifically targets small businesses because many area sources also fall into the small business category. SBEAP defines small businesses as independently owned and operated with 100 or fewer employees, and not a major source (i.e., point source) of air emissions. While SBEAP professionals offer free detailed technical services exclusively to small businesses, they are also able to provide compliance assistance and pollution prevention advice to all sources. Typically, this involves development of informational literature, offering compliance-related courses, workshops, and seminars, as well as conducting a range of other outreach and educational opportunities.

The Kentucky Pollution Prevention Center (KPPC) provides free detailed technical assistance to all industries regardless of size.[128] KPPC is part of the University of Louisville's J.B. Speed School of Engineering and their services are available statewide. The professionals at KPPC frequently collaborate with KY EXCEL and the APCD and DCA SBEAP professionals for educational and outreach projects and events.

KPPC's outreach focuses on developing strategies for pollution prevention, energy efficiency, Lean Manufacturing, compressed air efficiency strategies, and more. KPPC will conduct onsite assessments in addition to offering training and technical services that assist facilities with developing more sustainable practices. Both KPPC and SBEAP services are free, confidential, and non-regulatory.

In addition to the services available to area sources, there have been some previous stakeholder groups that also evaluated area sources, such as the STAR Program Regulation 5.30 Stakeholder Group in 2007 and the Fine Particle Task Force in 2008.

[128] *See* http://kppc.org/.

The final report from the STAR Program Regulation 5.30 Stakeholder Group[129] focused on specific sectors and processes, such as perchloroethylene dry cleaners, waste oil furnaces, wastewater treatment facilities, and gas stations. The recommendations outlined suggestions for equipment usage and upgrades in addition to suggesting future analyses related to industrial tank and drum cleaning, architectural surface coating, and autobody repair shops. Please see that final report for a detailed list of the final recommendations.

The final report from the Fine Particle Task Force[130] grouped point and area sources together under a single committee. In terms of area sources, the Stationary and Area Source Committee focused on energy efficiency projects; streamlining and prioritizing the permitting process outreach, education, and collaboration with industry sector representatives; open burning; woodstoves and fireplaces; wood boilers; and charbroiling, commercial cooking, and charcoal grilling. Please see that final report for a detailed list of the final recommendations.

COMMITTEE PROCESS & DATA REVIEW

The Area Source Committee was coordinated by a staff person at APCD, Jayme Csonka, APCD Small Business Compliance Assistance Coordinator. The appointment of a committee chair from outside of the District was discussed at the first three MPSG Area Source Committee meetings with intention to have someone guide the processes for making decisions and consensus building amongst the Committee. A committee chair was not appointed by the Committee, so consensus building was organized by the APCD coordinator who used survey tools to develop the structure and agendas for the six committee meetings.

The first meeting entailed a review of the work done in area source-centric committees during previous APCD stakeholder group projects. The Committee received an overview of APCD permitted and registered sources, a breakdown of the predominant industry sectors, a review of known & planned programs and initiatives, and a discussion of the Committee's goals.

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[129] *See* LMAPCD, *Strategic Toxic Air Reduction Regulation 5.30 Stakeholder Group Report and Plan of Action*, https://louisvilleky.gov/sites/default/files/air_pollution_control_district/documents/allother/2007/rapa530final20070919.pdf.

[130] *See* LMAPCD, *Fine Particle Air Quality Task Force Report and Plan of Action*, https://louisvilleky.gov/sites/default/files/air_pollution_control_district/documents/allother/2007/aqtfpmrapafinal.pdf.

The second meeting was a deeper dive into some of the more predominant industry sectors in Louisville: body shops, dry cleaning, and the printing and related graphic arts industries. A detailed discussion took place over the common materials used by these sectors, as well as possible alternatives to some of these materials, their advantages and potential caveats. Additionally, the Committee was shown a series of maps that outlined the geographic distribution of these sectors across Jefferson County to evaluate possible trends and/or clusters of sector-specific emissions.

The third meeting entailed an overview of potential emissions from the largest area source sectors. APCD permit writers were invited to the meeting to present the information and inform the discussion. Unlike point sources, area sources do not report their actual emissions to the EPA, so the National Emissions Inventory (NEI) uses census-based information to develop estimates on annual area source emissions by sector. Thus, actual reported emissions data was not available to the Committee. Instead, potential emissions were discussed under the pretense that they were likely overestimated to account for if the facility were to operate at full capacity 24 hours per day and 365 days per year. This analysis of local sources by comparison to the NEI prompted a lot of discussion on the accuracy of the emissions factors used by EPA when developing the NEI. These emission factors were a frequent topic of discussion amongst Committee members in all the subsequent meetings.

The fourth meeting covered potential financing mechanisms for any suggested recommendations that would entail financial burden on facilities or individuals. A guest speaker from the Louisville Metro Office of Advanced Planning and Sustainability was invited to share information about Louisville's Energy Project Assessment District (EPAD) program[131], the Kentucky version of a Property Assessed Clean Energy (PACE) program[132], which are authorized in more than 35 states. The EPAD program is mechanism for property owners to finance loans for energy efficiency, renewable energy, and water conservation measures. These loans are administered by the Jefferson County Sheriff in a manner similar to property tax bills. Following the presentation on the EPAD program, committee members also reviewed a number of grant, loan, and investment options available from local, state, federal, and private funding sources.

[131] *See* https://louisvilleky.gov/government/sustainability/epad-program.
[132] *See* https://www.energy.gov/eere/slsc/property-assessed-clean-energy-programs.

The fifth and sixth meetings were dedicated to reviewing the information discussed in previous meetings, as well as developing and finalizing recommendations. A portion of the fifth meeting was also dedicated to a deeper analysis of residential and commercial sources of air emissions. Overall, there was consensus amongst all committee members on the validity of the recommendations. Once the list of recommendations was finalized by meeting attendees, a confidential survey was sent to all committee members to provide feedback and suggestions for the recommendations.

RECOMMENDATIONS

A total of seven different recommendations were developed by the Committee, some of which contained sub-recommendations or sector-specific examples. These recommendations are listed below. Upon finalizing the list, the recommendations were presented to the entire MPSG during the first reconvene meeting. After the meeting, the recommendations were compiled into a survey for the entire MPSG to review, provide feedback, and rank in accordance to priority. A discussion of the feedback is in the following section.

1. The APCD should update the emissions inventory for area sources to allow for more comprehensive assessment of sectors that may need higher priority for both regulatory and non-regulatory outreach activities based on their sector-specific emissions. The goal of this project would be to improve the accuracy of the emissions inventory and refine the focus of assistance and outreach activities.

EXAMPLES

- Identify a statistically significant population of area sources and obtain emission data from them so the results could be extrapolated.
- An emission census of printers was conducted in the Salt Lake City area in 2012 as part of a collaboration between The Utah Division for Air Quality, EPA Region VII, and the Specialty Graphics Imaging Association. The methodology is outlined in the final unpublished report.

2. The APCD should encourage work practice changes/upgrades for equipment, technology, chemicals, and input materials at area sources. The APCD staff should conduct outreach and educational activities to inform various sectors of their options. If these changes have financial constraints, the outreach should include identifying funding opportunities that will facilitate the

adoption of new technologies and/or equipment. Research on funding mechanisms should be an ongoing and continuous process.

TECHNOLOGY EXAMPLES

- Dry cleaning facilities replacing perchloroethylene machines with machines that use alternative solvents (*e.g.*, DF-2000 or Green Earth) or converting to a wet cleaning process
- Solvent management and best practices
- Adopt best practices for using parts washers
- Research options for using alternative solvents with reduced VOC content
- Wipers (towels, rags) management and best practices
- Upgrade to more efficient equipment
- Digital technology adoption in printing industry

FUNDING MECHANISMS EXAMPLES

- Small Business Loans
- Pollution Prevention Grants
- Venture Investments
- Angel Investments

3. The APCD Industrial Compliance Section should increase or enhance its compliance assistance, outreach, and inspection activities to all area sources.

EXAMPLES

- Modifying inspection intervals at minor source facilities so inspections occur on an ongoing basis.
    - Each year, 20% of minor sources are inspected, resulting in all minor sources being inspected every 5 years
- Developing up-to-date guidance documents for facilities, such as
    - Fact Sheets
    - Guide Books
- Offering compliance-related classes, seminar, webinars, or other relevant educational opportunities
- Continuing support for the development of the Small Business Environmental Compliance Assistance Program

4. Louisville Metro Government should encourage energy efficiency projects and investments in the industrial, commercial, and residential sectors through outreach to facilities managers, building owners, and homeowners. When possible, funding opportunities and other financial incentives should be identified.

FINANCIAL INCENTIVES EXAMPLES

- Low- or no-interest loans
- Grant funding
- Tax incentives
- Reimbursement opportunities
- Cost-matching opportunities
- Benchmarking opportunities

PROJECT EXAMPLES

- Conducting an energy audit and following through on recommendations
    - The Kentucky Pollution Prevention Center will perform industrial audits
- Value stream mapping
- Investing in a smart or programmable thermostat
- Upgrading to energy efficient windows
- Insulation projects
- Lighting upgrades
- Compressed air efficiency
- Investing in heat pumps (geothermal, electric) with furnace backup
- Investment in solar technology or other alternative energy

5. The APCD should encourage the development of Ozone Action Plans at industrial facilities and supporting voluntary efforts from commercial and residential sources on Air Quality Alert Days.

EXAMPLES

- Continue and expand media announcements suggesting no mowing, less driving, and refueling in evening hours
- Request that permitted emergency generators do not conduct testing on Air Quality Alert Days

- When possible, facilities should consider delaying higher emission activities or modifying their hours of operation to periods outside of peak ozone production
- Develop and distribute educational materials during compliance assistance and inspection activities

6. The APCD should promote better practices with industrial usage of solvents and VOC-containing products.

EXAMPLES

- Coordinate with industrial groups and facilities to encourage adoption of green cleaning policies
- Promotion of facilities and consumers choosing products from the EPA Safer Choice List for non-industrial process cleaning
- Coordinate with industrial facilities to develop a list of best practices for solvent usage (both manufacturing process and non-process general cleaning)
- Consult facilities with existing policies on best practices for examples
- Encourage facilities to seek LEED and other related energy efficiency certifications

7. Louisville Metro Government and the APCD should promote better practices with commercial and consumer usage of solvents and VOC-containing products (*e.g.*, personal care and cleaning products)

EXAMPLES

- Coordinate with residential outreach entities (*e.g.*, Metro Department of Public Health and Wellness) to educate the general public on green cleaning methods using safe and effective cleaning and personal care products
- Promotion of consumers choosing products from the EPA Safer Choice List for commercial and household cleaning
- The APCD should expand content related to consumer solvent and VOC-containing personal care products to the "Clearing the Air" workshop series

IDENTIFIED PRIORITY RECOMMENDATIONS

Following the receipt of feedback from the full MPSG, the Area Source Committee recommendation with greatest priority is **Recommendation 1**, regarding the refinement of the emissions factors used in the NEI estimates for Louisville Metro. Following that, **Recommendation 4** was given second priority, in which Louisville Metro Government should work to better promote energy efficiency measures across all industrial, commercial, and residential sectors. **Recommendations 2 & 5** received an equal number of votes for third priority. Recommendation 2 emphasized the encouragement of industrial equipment upgrades and/or product switches for reduced emissions and energy conservation. Recommendation 5 promotes the adoption of Ozone Action Plans during Air Quality Alert Days. The final choice for prioritization was **Recommendation 6** that encourages industrial sources to engage in better practices with solvents and other VOC-containing products.

Overall, there is a theme amongst the prioritized recommendations. Other than the top priority to refine the data used for developing the NEI, the prioritized recommendations emphasize voluntary efforts to reduce emissions via equipment upgrades, product switches, development of best practice strategies, and energy conservation. It was also repeatedly mentioned that financial incentives and financing opportunities should be identified whenever possible.

DISCUSSION OF FEEDBACK

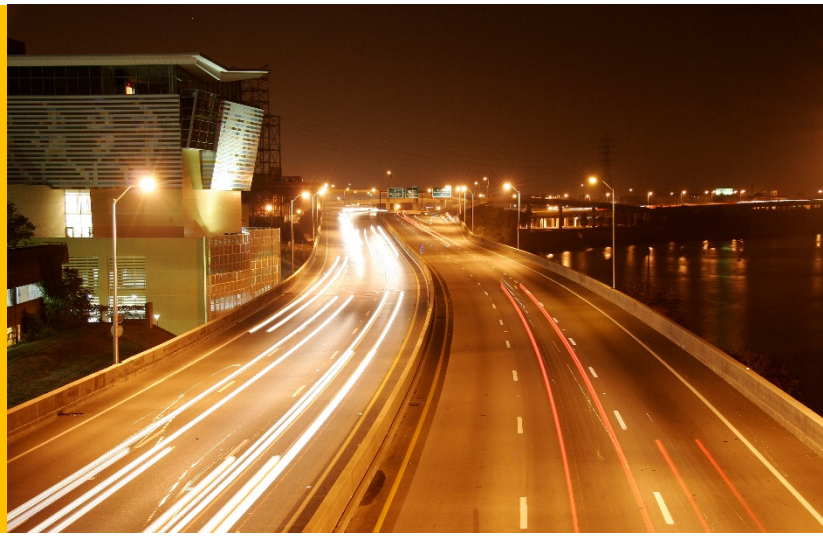
The MPSG Area Source Committee received 23 comments total from the feedback survey issued to all stakeholder participants. There is a complete list of all comments available in Appendix B. Much of the commentary were statements supporting the content of the recommendations or pointing out recommendations that were aligned with the work of other MPSG committees and local agencies.

The recommendations that had feedback with requests for clarification were Recommendation 2, Recommendation 3, Recommendation 3b., Recommendation 4, Recommendation 5, and Recommendation 6. The content of Recommendation 3 suggests increased/enhanced compliance inspection and assistance activities. One of the sub-recommendations suggests modifying the interval at which compliance inspections from the APCD occurs at minor source facilities. The recommendation suggested that these inspections should happen on an on-going basis over a five-year period, rather than all inspections happening over a brief interval once every five years. To clarify, this

recommendation is not suggesting that individual facilities receive more frequent inspections. Individual facilities would still be inspected once every five years, but instead of all facilities undergoing an inspection during a single interval, these inspections would be spaced out so that 20% of inspections occur annually with 100% of inspections being completed over a 5-year period. The idea is that minor sources, their technologies, and the regulatory landscape are dynamic. By conducting inspections each year instead of once every five years, the APCD Industrial Compliance team (who performs the inspections) will receive and maintain greater insight to the needs of minor sources. This insight will help improve the quality of outreach and educational materials through better understanding.

Clarification for some of the comments received for Recommendation 2, Recommendation 3b, Recommendation 4, Recommendation 5, and Recommendation 6 can be addressed together. Each of these recommendations had comments addressing concerns for the enforceability of these recommendations. To clarify, these recommendations are all suggestions for voluntary actions and do not outline the basis for developing new, enforceable regulations. Outreach and education efforts can be made to inform entities of potential advantages to following through on these recommendations, but they are not requirements that could be legally enforced.

Mobile Source Committee



MOBILE SOURCE COMMITTEE

OVERVIEW

The MPSG Mobile Source Committee was convened to develop recommendations on how the community can reduce emissions from mobile sources in Jefferson County. Mobile sources of air pollution include most forms of transportation such as onroad vehicles like automobiles and trucks, as well as nonroad transportation such as trains and airplanes. The nonroad category also includes mobile equipment that is non-transportation related, including agriculture and construction machinery like tractors and backhoes, as well as small engines like lawn mowers and string trimmers. While mobile sources by nature move around an area and contribute to general ambient air quality throughout the county, certain areas where mobile sources operate in large numbers, such as highways, can cause areas of higher emissions exposure for people who live, work, or attend school in close proximity[133]. In this way, mobile source emission reductions can be an important strategy for improving public health.

These sources emit large amounts of pollutants such as CO, NOx, $PM_{2.5}$, VOCs, and air toxics. NOx and VOCs, as precursor emissions that contribute to ozone formation, were the focus of much of the Mobile Source Committee discussion due to Louisville's current nonattainment status for the 8-hour ozone NAAQS. Mobile sources are significant contributors of both of these precursor pollutants. Figure 28 shows the contributions of both NOx (in black) and VOCs (in blue) by onroad and nonroad sources according to the 2017 NEI.

[133] U.S. EPA, *Near Roadway Air Pollution and Health: Frequently Asked Questions*, https://nepis.epa.gov/Exe/ZyPDF.cgi/P100NFFD.PDF?Dockey=P100NFFD.PDF.

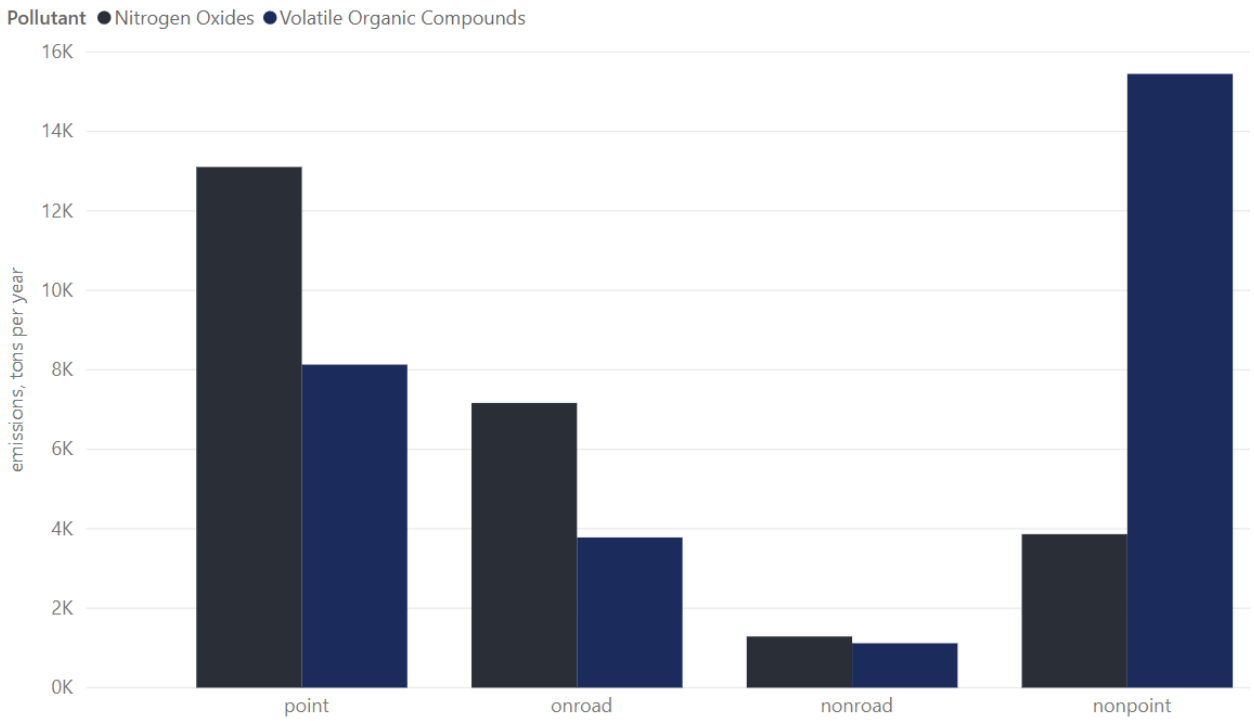


Figure 28 – NOx and VOC emissions by category in 2017 NEI[134]

Looking further into the source sector breakdown of 2017 NEI data, the variety of mobile source contributions is clear. Onroad light-duty non-diesel vehicles and heavy-duty diesel vehicles are the second and third highest contributing sectors of NOx. When looking at VOCs from mobile sources, diesel engines play a far smaller role, but onroad non-diesel light duty vehicles and nonroad equipment powered with gasoline are the fourth and seventh highest contributors respectively. Figure 29 provides context for these sector's contributions to Jefferson County's overall emissions inventory.

[134] Source: LMAPCD, *Emissions Inventory Dashboard*, https://app.powerbi.com/view?r=eyJrIjoiMTBkYmNiYWYtZDI4NyooODNmLTllYjAtYjkxYjIyN2I2ZTgwIiwidCI6IjRmOTg2MTliLTIwMmQtNDEzZi04Y2NmLTM2MWQ1NzIxM2JjZCIsImMiOjF9

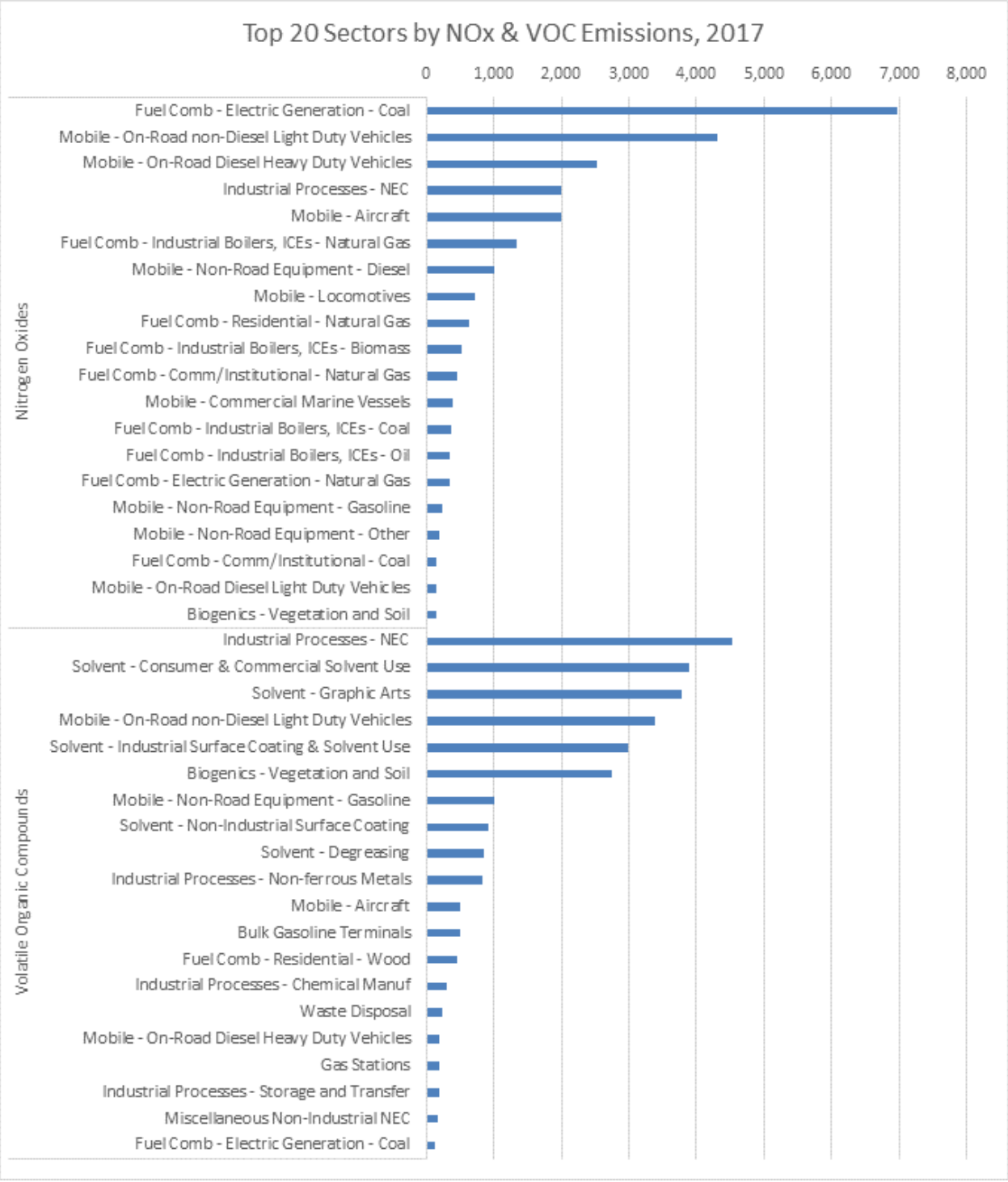


Figure 29 – NOx and VOC emissions by sector in Louisville Metro in 2017 NEI[135]

[135] Data source: 2017 NEI All Sectors summary, ftp://newftp.epa.gov/air/nei/2017/data_summaries/2017v1/2017neiApr_county_tribe_allsector.zip

GOALS

The committee's goals were developed by APCD staff prior to the first meeting and subsequently adopted by the committee. The goals were revisited periodically in meetings, but they did not explicitly lead the groups' discussions. Throughout the time the committee met, the discussion was guided by topics the committee wanted to learn more about.

- Evaluate most current emissions inventory to identify and assess sources of ozone precursors from mobile sources.
- Identify and assess control measures for control of ozone and precursors from mobile sources that are currently in place or planned.
- Review best practices from other cities and present case studies on how those cities reduced emissions from mobile sources.
- Evaluate potential localized mobile source exposures in congested or heavily travelled road segments.
- Look for additional strategies to reduce emissions within Louisville Metro Government's own fleet and other large fleets operating locally.
- Assess recommended strategies for co-benefits to fine particulate and air toxic emission reductions.

EXISTING PROGRAMS/EXAMPLES OF REDUCTION STRATEGIES

Mobile sources are primarily regulated at the federal level meaning reduction programs and strategies must come from the federal level or be of a voluntary nature, though local and state jurisdictions may require certain fuel formulations that reduce mobile source emissions. Some examples of local mobile source reduction strategies include idling reduction, using reformulated gasoline (RFG), and electric vehicle (EV) advocacy.

Idling Reduction

Idling for more than 10 seconds uses more fuel and produces more emissions that contribute to smog and climate change than stopping and restarting your engine does. [136] In addition, when people idle, they often do so where others will be directly exposed to emissions (*e.g.*, schools, parking lots, drive

[136] U.S. Department of Energy, *Idling Reduction for Personal Vehicles*, https://afdc.energy.gov/files/u/publication/idling_personal_vehicles.pdf.

thru windows). Idling also wastes fuel (and money) and puts undue wear on a vehicle's engine. There are three main types of idling reduction strategies:

1. General Outreach – Kentuckiana Air Education's (KAIRE) Idle Free Louisville campaign is an example of general outreach.[137]
2. Targeted Outreach – KAIRE's Idle Free Louisville campaign also has more specific areas of focus: Idle Free Neighborhoods, Idle Free Schools, and Idle Free Businesses.[138] These are all examples of targeted outreach.
3. Regulatory – Louisville does not have a regulation banning idling. Other communities such as Minneapolis, Minnesota[139] have idling ordinances. Their anti-idling ordinance restricts idling of cars and other gas or diesel-powered vehicles to no more than three minutes in a one-hour period. Another portion of the ordinance limits idling of buses, trucks, and other diesel-powered vehicles to no more than five minutes in a one-hour period.

Reformulated Gasoline

RFG is blended to burn more cleanly than conventional gasoline. It is used in Louisville to help reduce both ground-level ozone and air toxics. In 1995, Kentucky voluntarily opted into the RFG program to reduce the volatility of commercial gasoline during the summer ozone season.[140] Louisville and parts of Bullitt and Oldham counties rely on RFG as part of the plan required for maintaining the 1997 8-hour ozone NAAQS.[141] As such, it is a required control measure under the federal Clean Air Act. Today, RFG use reduces 35 tons of VOCs and 37 tons of NOx emissions each ozone season in Louisville and smaller amounts in Bullitt and Oldham counties.[142] RFG is our only locally enforceable mobile source control.

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[137] *See* https://helptheair.org/.
[138] *See* https://helptheair.org/how-you-can-help/#resources.
[139] Minneapolis, Minnesota Code of Ordinances, Title 3 – Air Pollution and Environmental Protection, Chapter 58 – Idling, https://library.municode.com/mn/minneapolis/codes/code_of_ordinances?nodeId=COOR_TIT3AIPOENPR_CH58ID
[140] *See* U.S. EPA, *Reformulated Gasoline*, https://www.epa.gov/gasoline-standards/reformulated-gasoline.
[141] *See* U.S. EPA, *Approval and Promulgation of Implementation Plans and Designations of Areas for Air Quality Planning Purposes; Kentucky: Redesignation of the Kentucky Portion of the Louisville 8-Hour Ozone Nonattainment Area to Attainment for Ozone*, 72 Fed. Reg. 20,966 (Apr. 27, 2007). https://www.federalregister.gov/documents/2007/04/27/E7-8114/approval-and-promulgation-of-implementation-plans-and-designations-of-areas-for-air-quality-planning.
[142] LMAPCD, *The Facts About Reformulated Gas*, https://louisvilleky.gov/sites/default/files/air_pollution_control_district/documents/allother/2019/rfg_in_louisville_single_pages.pdf.

The Northern Kentucky region recently opted out of using RFG, [143]so the idea has been discussed by both the Kentucky State Legislature and Louisville Metro Council for Louisville to do the same.[144], [145] Because it is a federal control measure, removing RFG in the Louisville area would require a demonstration that the increase in emissions will not interfere with or prevent the area from reaching attainment. All such reductions must be quantifiable, surplus, permanent, and enforceable.

Electric Vehicle Advocacy

There are two local EV advocacy efforts we would like to highlight in this section: Drive Clean Louisville and Evolve KY.

DRIVE CLEAN LOUISVILLE

Drive Clean Louisville[146] is a cross-functional team planning for and exploring opportunities related to electric vehicles and clean fuel transportation for our government and community. The team develops projects for grant funding and policy development with a focus on reducing tailpipe emissions from light- and heavy-duty mobile sources throughout Louisville Metro. This includes strategies to increase cleaner alternatives to traditional fossil fuels (i.e. gasoline and diesel) and/or engines that include the most effective emission control technologies.

In 2017, the Drive Clean Louisville Team conducted an Electric Vehicle Survey[147] to better understand challenges to the promotion and adoption of EVs in Louisville. The survey generated over 500 responses and identified the cost of purchasing EVs, concerns about driving range, and the availability of charging stations as the largest barriers to increasing EV adoption. LMG also created a

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[143] U.S. EPA, *Regulation of Fuels and Fuel Additives: Removal of the Reformulated Gasoline Program From the Northern Kentucky Portion of the Cincinnati-Hamilton Ozone Maintenance Area*, 84 Fed. Reg. 2,453 (Feb. 7, 2019). https://www.govinfo.gov/content/pkg/FR-2019-02-07/pdf/2019-01320.pdf

[144] Kentucky General Assembly, *House Joint Resolution 8*, Feb, 20, 2020. https://apps.legislature.ky.gov/record/20rs/hjr8.html.

[145] Louisville Metro Council, *A Resolution Calling on Mayor Fischer to Expedite Necessary Actions by Metro Air Pollution Control District to End the Mandated Use of Reformulated Gas in Louisville Quantify and Analyze Specified Information Related to RFG Requirements and Report Their Findings To Council (As Amended)*, R-158-19, *available at* https://louisville.legistar.com/View.ashx?M=F&ID=8090372&GUID=FD022EF0-7844-4467-BDBD-9E1110872EB2.

[146] *See* https://louisvilleky.gov/government/air-pollution-control-district/drive-clean-louisville.

[147] LMAPCD, *Louisville Metro Government Electric Vehicle Survey: Final Report*, https://louisvilleky.gov/sites/default/files/air_pollution_control_district/documents/allother/2020/final_ev_survey_report_20190423.pdf.

crowdsourcing application in conjunction with the survey to identify locations for future charging station infrastructure. More than 200 respondents helped identify dozens of locations around the city, including sites within local parks, high schools, libraries and shopping centers. LMG will use this information to explore different ways to incentivize electric vehicle ownership, expand EV charging infrastructure, and increase public outreach about EVs.

EVOLVEKY

Evolve KY's core mission is to inform the public about the benefits of electric vehicles and to encourage the growth of EVs in our community.[148] Furthering the first goal, it seeks to partner with local businesses to set up fee-free level 2 electric chargers. Ultimately, it aims to create a large network of EV users, encourage the widespread adoption of EV use, and expand EV infrastructure in the Kentuckiana region.

COMMITTEE PROCESS AND DATA REVIEW

The committee met seven times (the final meeting via Webex) and discussed many topics including, but not limited to electric vehicles and electric vehicle infrastructure, RFG, Congestion Mitigation and Air Quality (CMAQ) program funding prioritization, idle reduction, parking requirements, and emissions reductions in public fleets. Committee meetings were led by the facilitator, APCD Environmental Coordinator, Bradley Coomes, and presentations were made by both APCD staff and other committee members. Committee members consisted of professionals representing KIPDA; Every Commute Counts; LG&E; Mercer Transportation; Transit Authority of River City (TARC); Louisville Regional Airport Authority; Frost, Brown, Todd; Sierra Club; Louisville Metro Office of Advanced Planning and Sustainability; AECOM; Greater Louisville Inc.; the Louisville Metro Air Pollution Control Board; and the APCD staff.

The first few meetings of the committee typically consisted of presentations by the committee facilitator, other APCD staff, or another member of the committee on the topics listed in the preceding paragraph. Topics that the committee wanted to learn more about would be researched by the facilitator, APCD staff, or other committee member and usually presented at the following meeting. APCD Environmental Coordinator Craig Butler was integral to the committee's discussions and

[148] *See* https://www.evolveky.org/.

recommendation forming process as he presented at multiple meetings on mobile emissions inventory and fleet data.

ON-ROAD MOBILE SOURCE EMISSION REDUCTIONS
RFG vs Conventional Fuel; Anti-Idling
Jefferson County, KY 2020

Reductions	Tons Per Summer Day NOx	VOC	CO
CG - RFG	0.34	0.49	12.16
Anti-Idling	0.06	0.01	0.41
Total OnRoad County Emissions Inventory	29.15	14.02	132.98
Reductions as a Percent of Total OnRoad Inventory			
CG - RFG	1.15%	3.53%	9.14%
Anti-Idling	0.21%	0.08%	0.31%
TOTAL	1.37%	3.61%	9.45%

Using EPA MOVES model with historic worst-case summer (July) metereology

Figure 30 – On-Road Mobile Source Emissions Reductions

The committee was interested in the mobile emissions reductions for RFG and anti-idling measures in Jefferson County. Mr. Butler researched this topic and provided the information to the left during a presentation. Figure 30 demonstrates that reductions from RFG make up 1.15% of the total onroad inventory for NOx, 3.53% of the onroad inventory for VOCs, and 9.14% of the onroad inventory for CO. Reductions from anti-idling measures make up 0.21% of the total onroad inventory for NOx, 0.08% for VOCs, and 0.31% for CO.

Figures 31, 32, and 33 below show 2020 Jefferson County NOx, VOC, and CO emissions for heavy duty trucks and passenger vehicles in grams per mile. The data showed the committee that both heavy duty

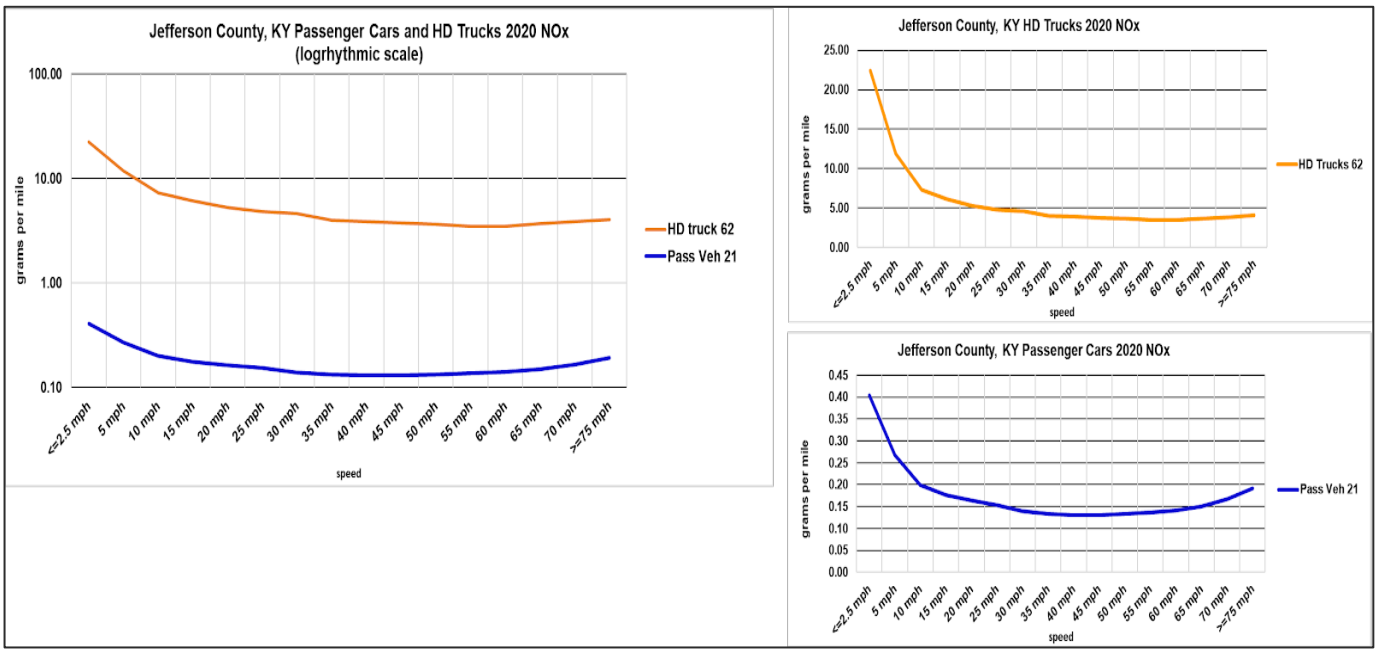

Figure 31 – Jefferson County Passenger Cars and HD Trucks 2020 NOx Emissions Grams per Mile

trucks and passenger vehicles emit more pollution when accelerating from being stopped than when driving at a more constant, cruising speed. This discussion later informed Recommendation 7, which concerns improving traffic signal synchronization.

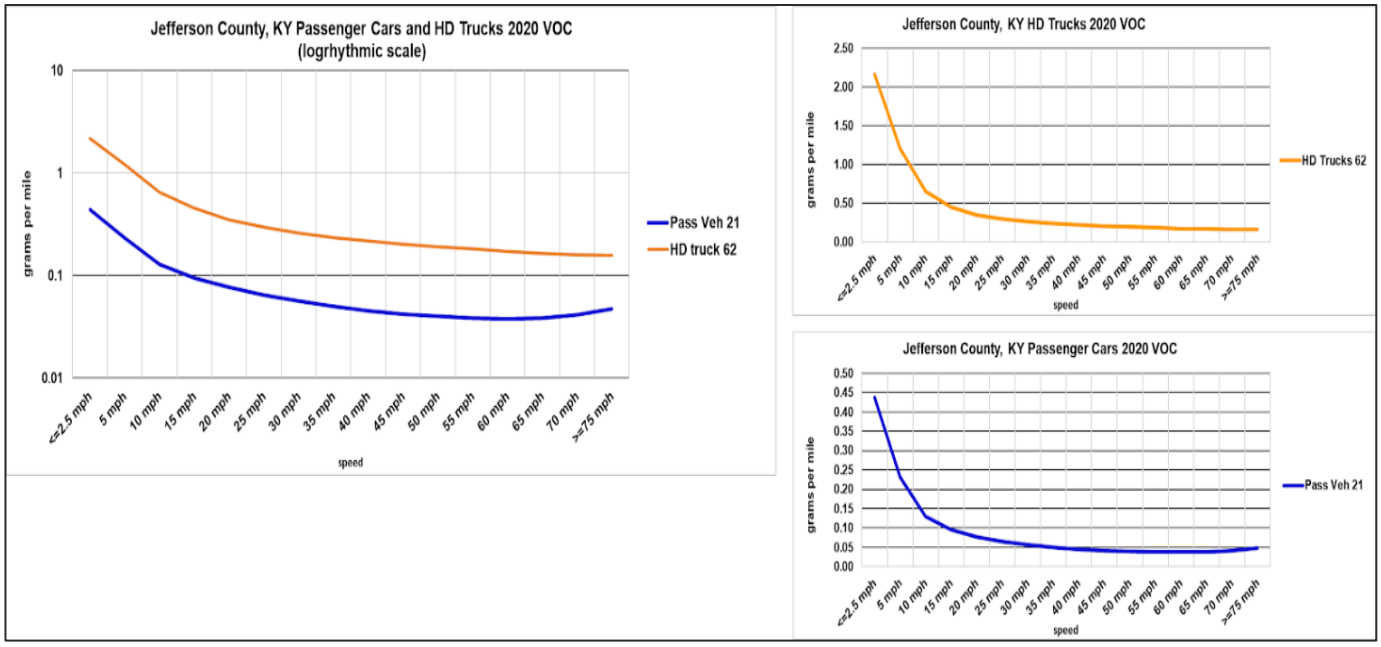

Figure 32 – Jefferson County Passenger Cars and HD Trucks 2020 VOC Emissions Grams per Mile

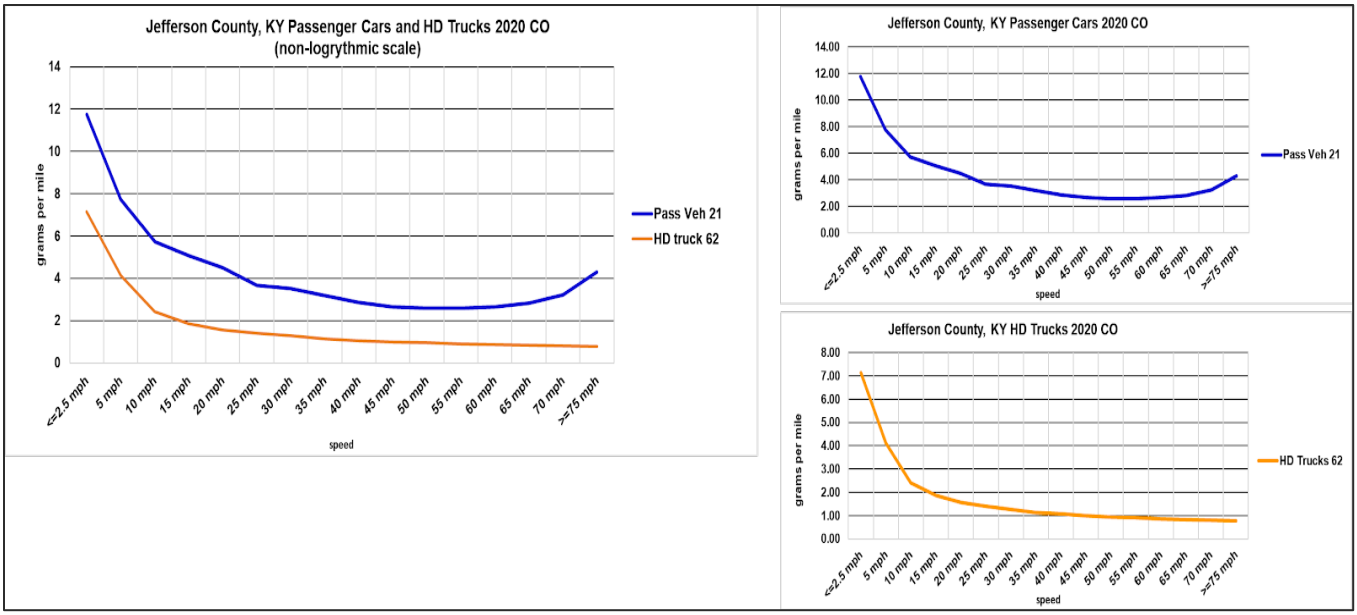

Figure 31 – Jefferson County Passenger Cars and HD Trucks 2020 CO Emissions Grams per Mile

Figure 34 is taken from a presentation on EVs and EV infrastructure. It demonstrates some of the barriers to EV ownership the 2017 Electric Vehicle Survey[149] found. Information like this informed the committee's recommendation development process, leading to 9 recommendations.

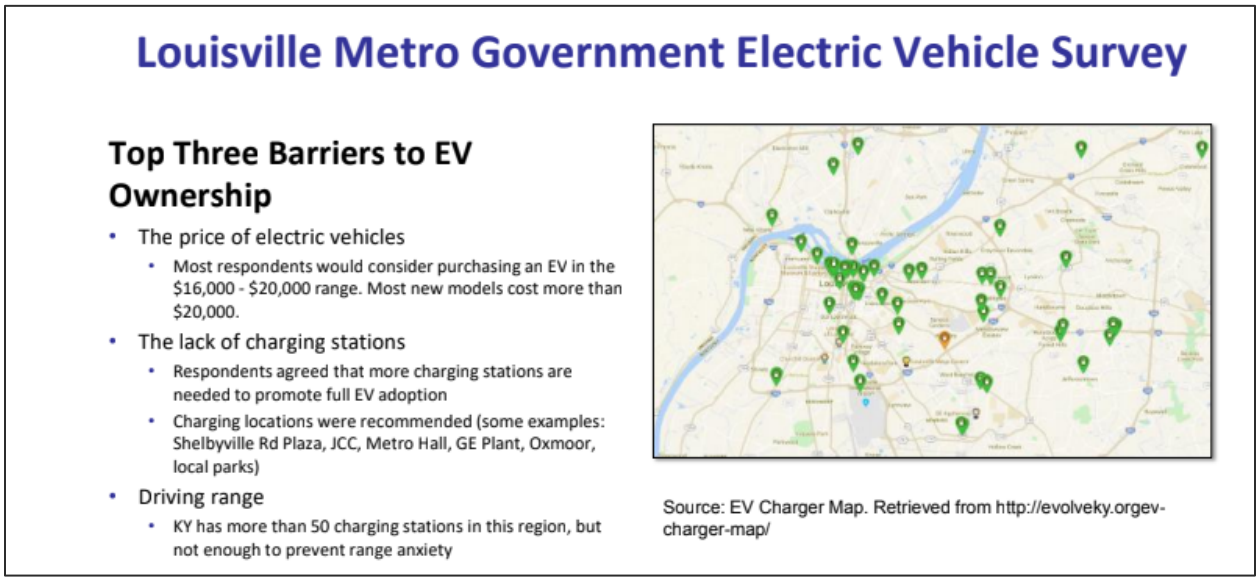

Figure 32 – Louisville Metro Government Electric Vehicle Survey

[149] LMAPCD, *Louisville Metro Government Electric Vehicle Survey: Final Report*, https://louisvilleky.gov/sites/default/files/air_pollution_control_district/documents/allother/2020/final_ev_survey_report_20190423.pdf.

The last three meetings saw the committee move toward recommendation brainstorming and then crafting specific recommendations. The group took inspiration in recommendation crafting from several documents and groups including the Louisville Metro Air Quality Task Force Report[150], the Idling Reduction Working Group Advisory Report[151], Louisville's Draft Greenhouse Gas Emissions Reduction Plan[152], the Partnership for a Green City Climate Action Report[153], Removing Barriers to EV Adoption by Increasing Access to Charging Infrastructure (Seattle Office of Sustainability)[154], Pennsylvania Electric Vehicle Roadmap[155], The Facts About Reformulated Gasoline (APCD)[156], and feedback from the MPSG Health Committee.

RECOMMENDATIONS

The Committee crafted 12 main recommendations, but with many of those also containing sub-recommendations. They were presented to the full MPSG upon reconvening along with a survey requesting that eight recommendations be prioritized. The recommendations are presented below along with the MPSG's prioritized selections and feedback.

1. Expand Electric Vehicle (EV) adoption and expand EV infrastructure. [157]

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[150]LMAPCD, *Louisville Metro Air Quality Task Force Report,* https://louisvilleky.gov/sites/default/files/air_pollution_control_district/documents/allother/2006/finalaqtf_report.pdf.
[151]LMAPCD, *Idling Reduction Working Group Advisory Report,* https://louisvilleky.gov/sites/default/files/air_pollution_control_district/documents/allother/2008/irwgadvisoryreportfinal20081015.pdf.
[152]Prepared for Louisville Metro Government by Stantec Consulting Services, Inc., *Louisville Greenhouse Gas Emissions Reduction Plan,* https://louisvilleky.gov/sites/default/files/advanced_planning/draft_ghg_erp_20191031.pdf .
[153]Partnership for a Green City, *Partnership for Green City Climate Action Report,* https://louisvilleky.gov/sites/default/files/sustainability/pdf_files/climateactionreport2009.pdf
[154] Seattle Office of Sustainability and Environment, *Removing Barriers to Electric Vehicle Adoption by Increasing Access to Charging Infrastructure,* http://www.seattle.gov/Documents/Departments/OSE/FINAL%20REPORT_Removing%20Barriers%20to%20EV%20Adoption_TO%20POST.pdf.
[155] Prepared for the Pennsylvania Department of Environmental Protection by the Meister Consultants Group, *Pennsylvania Electric Vehicle Roadmap,* http://files.dep.state.pa.us/Energy/OfficeofPollutionPrevention/StateEnergyProgram/PAEVRoadmap.pdf.
[156]LMAPCD, *The Facts About Reformulated Gas*, https://louisvilleky.gov/sites/default/files/air_pollution_control_district/documents/allother/2019/rfg_in_louisville_single_pages.pdf.
[157] While this recommendation focuses on increasing use of electric vehicles (including plug-in hybrids), the committee recognized the emissions benefits of encouraging the use of conventional hybrid and other low/no emission vehicles as well.

a. Louisville Metro Government should implement a strategy to expand electric vehicle and bicycle charging networks in publicly accessible locations. They should also partner with developers, building owners and managers, and parking managers to add new charging stations. This will increase market confidence by signaling a clear direction towards investment in EVs in Metro Government. Benchmarks should be set by which progress can be measured.
b. Louisville Metro Government should enable and encourage utilities to leverage their expertise and relationships to customers to jumpstart the EV market in a way that maximizes benefits to ratepayers and society.
c. Louisville Metro Government should support higher levels of EV market share by helping consumers and fleets afford the incremental cost of EVs by raising awareness of available tax credits, rebates, grants, and other funding sources.
d. Louisville Metro Government should increase consumer awareness of EV technology, costs, performance, and available incentives.
e. Louisville Metro Government should engage, educate, and encourage car dealers to raise consumer awareness and EV sales.
f. All governmental and public entities should increase fleet EV adoption levels to increase environmental benefits from vehicles with high vehicle miles traveled (VMT) rates; increase consumer awareness by electrifying fleets that are consumer facing such as carshare, car rental, or shared mobility company fleets.
g. Louisville Metro Government should support existing programs that reduce costs for ratepayers, reduce charging costs for EV owners that charge during off-peak times, and remove barriers to DC Fast Charging (DCFC) deployment.
h. Louisville Metro Government should increase EV infrastructure investment and availability at workplaces and multi-family residences, through an education and outreach program to developers, employees and residents.
i. Louisville Metro Government should review the Land Development Code for further opportunities to incentivize the installation of EV infrastructure.

2. Keep reformulated gasoline (RFG) use in the ozone nonattainment area if analysis shows continued emissions reduction benefits. Reanalyze these benefits after the area comes into attainment of the ozone standard.

Recognizing the actions of the Kentucky General Assembly and the Louisville Metro Council calling for an analysis of the air quality benefits of RFG over conventional gas, the APCD should analyze the emissions reductions RFG provides in the ozone nonattainment area. Those benefits should be maintained until the area is redesignated by the EPA as Attainment of the 2015 8-hour ozone National Ambient Air Quality Standards (NAAQS). At such time, and if equivalent emission reduction strategies are available, the APCD should work with the Kentucky Division for Air Quality to request that the requirement for RFG in the region be removed from the State Implementation Plan (SIP). This will require a demonstration that the increase in emissions that may result from the widespread use of conventional gasoline in the current nonattainment area will not interfere with or prevent the area from maintaining attainment of the NAAQS. Increases in emissions from the removal of RFG will have to be offset with new quantifiable, permanent, and enforceable VOC and NOx reductions sufficient to maintain compliance with the NAAQS.

3. Funding for mobile source emissions reductions should be prioritized for areas that are designated nonattainment of the NAAQS.
    a. Louisville Metro Government should advocate that federal transportation funds allocated through the state and intended to improve air quality, such as Congestion Mitigation and Air Quality program (CMAQ) funds, be spent primarily in areas with a current nonattainment status.
    b. Louisville Metro Government should encourage the Kentucky Division for Air Quality to petition the EPA to redesignate the 1979 ozone maintenance areas to attainment.
    c. Louisville Metro Government should encourage local lawmakers to introduce resolutions to prioritizing funding sources such as CMAQ funds for nonattainment areas.

4. Louisville Metro Government and other community partners should voice support for releasing the use of VW Settlement Funds as soon as possible in Jefferson County, including funding to support Transit Authority of River City (TARC) bus replacements with newer, cleaner engines.

5. Louisville Metro Government should evaluate parking requirements for revisions that would encourage mobile source emission reductions strategies.
    a. Louisville Metro Government should investigate strategic parking supply restrictions and congestion pricing for single-occupancy vehicles.
    b. Louisville Metro Government should consider the following changes to existing parking regulations with the Land Development Code, particularly regarding reductions in minimum parking requirements:
        i. Eliminate all minimum parking requirements for all form districts and land uses, complemented by reduced parking maximums that can be classified by form district and land use in order to reduce the use of single occupancy vehicles.
        ii. Increase the reduction for proximity to transit (currently a 10% reduction). This could manifest in various ways, including:
            1. Flat increase to 20%
            2. Increase to 30% within certain distance of a permanent transit shelter
            3. Numerical or percentage reduction if applicant builds/pays for a new transit shelter
        iii. Create a reduction for carpool/vanpool spaces.
        Example: Reduce minimum parking requirement by 2 spaces for every carpool/vanpool space (carpool/vanpool space counts for 1 required space).
        iv. Create a reduction for EV charging spaces.
        Example: Reduce minimum parking requirement by 2 spaces for every EV charging space (EV charging space counts for 1 required space).

6. Park and ride/rideshare incentives
    a. Louisville Metro Government should support opportunities for ridesharing and short-term vehicle use.
    b. Louisville Metro Government should incentivize new and support existing park and ride lots/car sharing options/other rideshare infrastructure (bike lockers, support services, etc.) through the Land Development Code.

7. Louisville Metro Government should improve and expand traffic signal synchronization throughout Louisville Metro to reduce average commute time and idling, prioritizing highly congested areas.

8. Seek out emissions reductions in public fleets (*e.g.*, Louisville Metro Government, Jefferson County Public Schools)
    a. Louisville Metro Government should analyze the Metro fleet and create a plan to improve fleet emissions through diesel retrofit or replacement along with the use of alternative fuels, hybrids, and electric vehicles.
    b. The APCD should work with public and private fleet owners operating in Louisville Metro through education, incentives, and grants to aggressively retrofit or replace both onroad and nonroad fleets with state-of-the-art technology.
    c. All government and public entities should adopt a high-efficiency vehicle purchasing policy.
    d. All government and public entities should prioritize and actively pursue funds for replacement vehicles using funding sources such as the Diesel Emissions Reductions Act (DERA).

9. Encourage idle reduction strategies in public and private fleets.
    a. The APCD should work with entities such as schools to reduce unnecessary engine idling.
    b. Louisville Metro Government should encourage significant coordination among the Kentucky Transportation Cabinet (KYTC), Indiana Department of Transportation (INDOT), local transportation officials, and private fleets during major highway repair or construction to develop plans to minimize traffic backups and delays to reduce idling and toxic emissions.
    c. The APCD should reinforce the message that it is important to minimize the idling of all mobile source internal combustion engines, including, but not limited to, those fueled by gasoline, diesel, biodiesel blends, vegetable oil, propane, and compressed natural gas.

d. All Louisville/Jefferson County public entities should implement practices and policies to reduce unnecessary idling and acquaint their employees and the public with said practices and policies.
e. Public and private partners should be sought for overnight parking for long haul trucks that include plug in options so that trucks can power their vital systems without the need to idle their engines.

10. Louisville Metro Government should review the research on the comparative benefits of traffic control measures and transit/multimodal strategies on air quality impacts from traffic.

11. The APCD should collaborate with the Kentuckiana Regional Planning and Development Agency (KIPDA) to use available data (*e.g.*, StreetLight) to study the impacts of traffic on air quality.

12. Louisville Metro Government should commission a study to identify high- potential areas for the construction of new or the expansion of existing, dedicated pedestrian or cyclist pathways.

IDENTIFIED PRIORITY RECOMMENDATIONS

After the reconvening of the full MPSG, participants were asked to prioritize the committees' recommendations. Since the Mobile Source Committee had so many recommendations, respondents were asked to select their top eight recommendations (in no preferential order). What follows is a list of the eight most-selected recommendations:

1(a). Louisville Metro Government should implement a strategy to expand electric vehicle and bicycle charging networks in publicly accessible locations. They should also partner with developers, building owners and managers, and parking managers to add new charging stations. This will increase market confidence by signaling a clear direction towards investment in EVs in Metro Government. Benchmarks should be set by which progress can be measured.

1(c). Louisville Metro Government should support higher levels of EV market share by helping consumers and fleets afford the incremental cost of EVs by raising awareness of available tax credits, rebates, grants, and other funding sources.

1(f). All governmental and public entities should increase fleet EV adoption levels to increase environmental benefits from vehicles with high vehicle miles traveled (VMT) rates; increase consumer awareness by electrifying fleets that are consumer facing such as carshare, car rental, or shared mobility company fleets.

2. Keep reformulated gasoline (RFG) use in the ozone nonattainment area if analysis shows continued emissions reduction benefits. Reanalyze these benefits after the area comes into attainment of the ozone standard.

4. Louisville Metro Government and other community partners should voice support for releasing the use of VW Settlement Funds as soon as possible in Jefferson County, including funding to support Transit Authority of River City (TARC) bus replacements with newer, cleaner engines.

7. Louisville Metro Government should improve and expand traffic signal synchronization throughout Louisville Metro to reduce average commute time and idling, prioritizing highly congested areas.

8(a). Louisville Metro Government should analyze the Metro fleet and create a plan to improve fleet emissions through diesel retrofit or replacement along with the use of alternative fuels, hybrids, and electric vehicles.

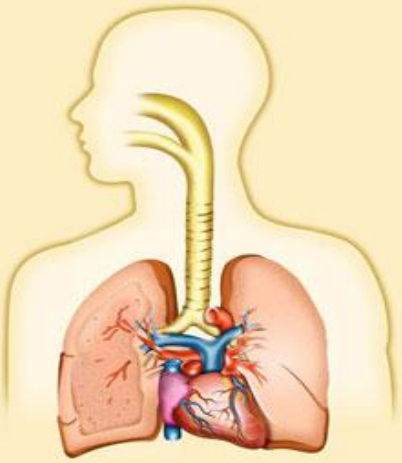
8(b). The APCD should work with public and private fleet owners operating in Louisville Metro through education, incentives, and grants to aggressively retrofit or replace both onroad and nonroad fleets with state-of-the-art technology.

DISCUSSION OF FEEDBACK

After the reconvening of the full MPSG, participants were also asked to provide feedback on the committees' recommendations. The full list of comments can be found in Appendix C of this document. Some of the main themes of the feedback were leveraging national programs to help local efforts, ensuring the decision-making process is data-driven, making sure all mobility options (walking, cycling, public transit, etc.) are included in infrastructure improvements, regional project coordination, and tying air quality goals to reductions in greenhouse gases.

Specifically, one commenter noted (addressing Recommendations 11 and 12), "LMG should continue to encourage walkability as a strategy for reduction of emissions and improvements in public health and positive contribution to GHG emission reductions." Another commenter felt very pessimistic about Recommendation 5.b.i. (eliminating all parking requirements from all form districts) saying, "Unfortunately, this won't get passed by Metro Council. I think we've reduced parking requirements as much as is achievable at this time." Lastly, one commentator felt that LG&E would make a great partner in reaching some of the goals set forth in our recommendations on EVs and EV infrastructure (specifically, Recommendations 1 (a), 1 (c)., and 1 (f).

HEALTH COMMITTEE



HEALTH COMMITTEE

OVERVIEW

The MPSG Health Committee was formed to discuss the health impacts of ambient air pollution on health and to develop recommendations that could, potentially, further reduce the health risks associated with air pollution. This committee included members from the community (*e.g.,* healthcare professionals, industry professionals, etc.), LMG representatives, academics, and others. The Committee was co-facilitated by two APCD staff members, Byron Gary, APCD Regulatory Coordinator and Torend Collins, APCD Environmental Coordinator. The Committee reviewed known and planned programs, analyzed data, and used consensus building to develop recommendations.

GOALS

To frame the discussion for recommendation development, the Committee received the following goals:

- Identify health risks to Louisville Metro residents from exposure to ozone, fine particulates, and air toxics.
- Evaluate the potential for ozone, fine particulate, and air toxics reductions to improve health and monetize public health benefits where possible.
- Assess the disparate impacts of these pollutants on minority and low-income residents.
- Identify additional questions or areas of study to help inform the community on how to reduce exposure to air pollution and mitigate potential health impacts.

The APCD drafted these goals to assist the Committee throughout the process. However, the Committee was encouraged to modify, change, reject, or accept these goals as their consensus dictated. The Committee agreed to use the goals as drafted as the blueprint for recommendation development.

EXISTING PROGRAMS/EXAMPLE REDUCTION STRATEGIES

The Health Committee reviewed four examples to better understand what programs currently exist and what other efforts are being made to understand and address the health effects of ambient air pollution.

Air Quality Index

A tool developed by the EPA to report daily air quality calculated for five major criteria pollutants (ground-level ozone, particulate matter, including $PM_{2.5}$ and PM_{10}, carbon monoxide, sulfur dioxide and nitrogen dioxide), the Air Quality Index (AQI)[158] is a valuable resource used by the public. The AQI helps the public understand how ambient air can impact an individual's health.

Daily AQI Color	Levels of Concern	Values of Index	Description of Air Quality
Green	Good	0 to 50	Air quality is satisfactory, and air pollution poses little or no risk.
Yellow	Moderate	51 to 100	Air quality is acceptable. However, there may be a risk for some people, particularly those who are unusually sensitive to air pollution.
Orange	Unhealthy for Sensitive Groups	101 to 150	Members of sensitive groups may experience health effects. The general public is less likely to be affected.
Red	Unhealthy	151 to 200	Some members of the general public may experience health effects; members of sensitive groups may experience more serious health effects.
Purple	Very Unhealthy	201 to 300	Health alert: The risk of health effects is increased for everyone.
Maroon	Hazardous	301 and higher	Health warning of emergency conditions: everyone is more likely to be affected.

Figure 33 – Air Quality Index

The Committee reviewed information about the AQI to better understand the role it plays in protecting public health. Committee members learned how the AQI is structured — divided into six categories with each category corresponding to a different level of air quality and health concern — and how the color system helps individuals easily determine how air quality impacts their defined group (*i.e.* sensitive groups).

2017 Health Equity Report

The Committee facilitators then presented information and data gathered from the Center for Health Equity 2017 Health Equity Report.[159] A report for policy makers and the community, the Health Equity Report identified 21 health outcomes and examined 11 root causes leading to these outcomes faced by residents in the Louisville Metropolitan area. These root causes include environmental quality, transportation, built environment, and neighborhood development, all factors in air quality and an individual's exposure to air pollution. The Health Equity Report also demonstrates how root causes have different impacts at every life stage and how they can have cumulative effects over time.

[158] U.S. EPA, *Air Quality Index*, https://www.airnow.gov/aqi/aqi-basics/.
[159] Louisville Metro Center for Health Equity, *2017 Health Equity Report*, https://louisvilleky.gov/government/center-health-equity/health-equity-report.

A review of the Health Equity Report also showed the Committee how health impacts affect the most vulnerable communities, which fostered a future discussion around recommendations speaking directly to the health effects air pollution on vulnerable communities in Louisville. The Committee's review of the Health Equity Report also provided examples of "best practices and resources" the community, local government and leaders could implement to create long-term solutions to reduce asthma and other health issues in the community.

University of Louisville Green Heart Project

Next, the Committee viewed a presentation given by Dr. Rachel Keith, University of Louisville Assistant Professor and member of the Green Heart Project (GHP)[160] Medical Team. The GHP is an urban greening project within the Health, Environment and Action in Louisville (HEAL) Study — a study exploring how trees, shrubs, and other plants can positively impact the health of a neighborhood and the people living within the defined neighborhood.

The Committee reviewed information about how the GHP plans to improve the health of participants in the study area and reviewed the methodology behind implementing the process. Committee members also engaged in discussion with Dr. Keith about the existing relationship between health effects and the planting of trees. Dr. Keith provided the Committee with additional insight as to how the study may assist with improving the health of other Louisville residents residing in similar communities.

EPA Environmental Justice Collaborative Problem-Solving (EJCPS) Cooperative Agreement

Lastly, the Committee reviewed information about the EPA Environmental Justice Collaborative Problem-Solving (EJCPS) Cooperative Agreement[161]. The EJCPS Cooperative Agreement is a funding opportunity supporting community-based organizations as they strive to develop/implement community-driven solutions addressing environmental and/or public health issues. By reviewing the

[160] University of Louisville, https://greenheartlouisville.com/.
[161] U.S. EPA, *Environmental Justice Collaborative Problem-Solving Cooperative Agreement,* https://www.epa.gov/environmental-justice/environmental-justice-collaborative-problem-solving-cooperative-agreement-0.

EPA EJCPS Cooperative Agreement, the Committee got a better sense of the funding opportunities available to assist with potential collaborative projects between the District and the community.

COMMITTEE PROCESS & DATA REVIEW

The Health Committee was co-coordinated by two members of APCD staff. Each of the meetings involved discussion of background data and information, as well as Committee process or recommendation development. At the second meeting of the Health Committee Dr. Robert Powell, a retired physician and former chair of the Louisville Metro Air Pollution Control Board, was nominated as chair and agreed upon by a consensus of the Committee members. Sessions after that largely involved presentations from coordinators and guests on existing data and programs, and the remainder being guided by the Chair or another committee member in discussing process going forward and recommendation development.

Data Review

Programs and data reviewed include the EPA National Air Toxics Assessment (NATA), the Air Louisville Study, the Health Equity Report, the Green Heart Project, and modeling by the EPA using its BenMAP program.

The NATA is a triennial effort by the EPA to model emissions of air toxics nationally and estimate their impacts.[162] Modeling of cancer risks from air toxics for 2005, representing the year the Strategic Toxic Air Reduction Program (STAR) was adopted by the APCD, and from 2014, the most-recent year completed, were presented and compared to demographic data (see Figures 36 and 37 showing 2014 risk and 2010 census data), showing the progress made but disproportionate impacts remaining for minority populations.

[162] U.S. EPA, *NATA Overview*, https://www.epa.gov/national-air-toxics-assessment/nata-overview.

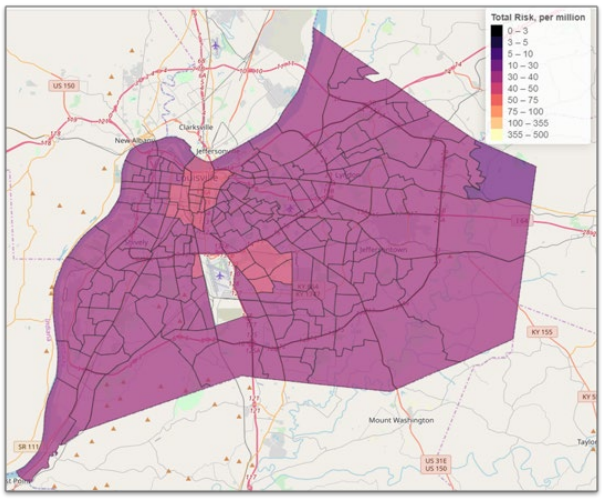


Figure 34 – 2014 NATA Total Cancer Risk

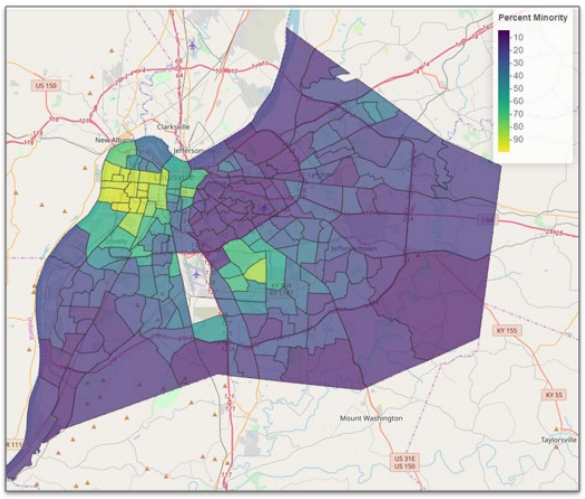


Figure 35 – 2010 Census, Percent Minority Population

The Air Louisville study was discussed as well.[163] This was a study which "enrolled 1,147 citizens of Louisville and, using medication sensors from Propeller Health, tracked where, when and why they had asthma or COPD symptoms." The authors of the study then correlated the results with various factors, including air pollution concentrations. An overview of the study and results were presented to the Committee, including that rescue medication (*i.e.*, inhaler) use "happened more often on days with higher temperatures and pollutant levels, including: Nitrogen dioxide (NO_2), ozone (O_3) and sulfur dioxide (SO_2)."

Results from the 2017 Health Equity Report were shared, showing the disproportionate incidence of asthma and cancer in south and west Louisville (Figures 38 & 39) were shared. In addition, coordinators discussed the Health Equity Report's use of root cause analysis and the socio-ecological model categorizing causes from individual through to public policy.

[163] Air Louisville, https://www.airlouisville.com/.

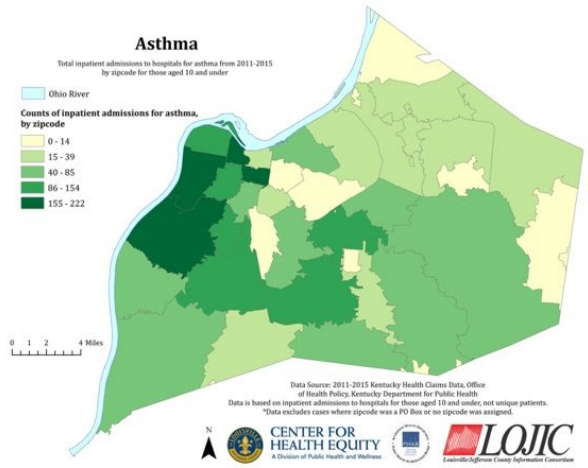


Figure 36 – 2017 Health Equity Report, Total Inpatient Hospital Admissions for Asthma, 2011-2015

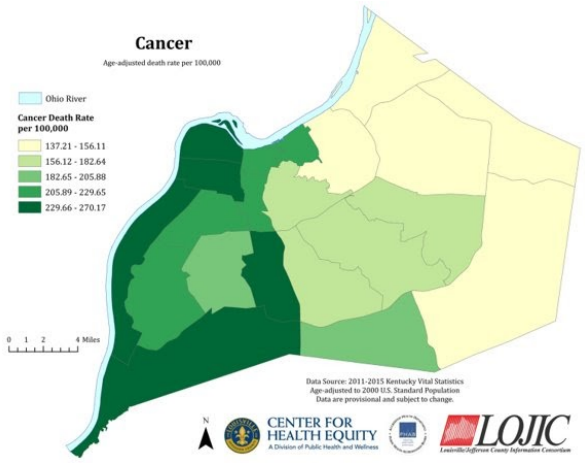


Figure 37 – 2017 Health Equity Report, Age-adjusted Cancer Death Rate per 100,000

Presentations from outside presenters included Dr. Rachel Keith of the Green Heart Project Medical Team, discussed above, as well as from Dr. Ali Kamal of the EPA Office of Air Quality Planning and Standards (OAQPS) on modeling conducted for the District of the health benefits of particulate matter reductions between 2014 and 2018 using the EPA's BenMAP model[164].

Dr. Keith outlined the various components of the Green Heart Project, including:

- Geographic area - south Louisville
- Community outreach
- HEAL - clinical portion
- Air monitoring & other parameters (*e.g.*, sound and meteorology)
- Different designs for buffer
- Greening study – tree canopy and other vegetation coverage

Dr. Kamal showed how the EPA modeled the community-wide reduction in fine particulates using monitoring data (Figure 40) and used this to model the avoided health outcomes of the reductions in Jefferson County (Figure 41).

[164] U.S. EPA, *Environmental Benefits Mapping and Analysis Program – Community Edition (BenMAP-CE)*, https://www.epa.gov/benmap.

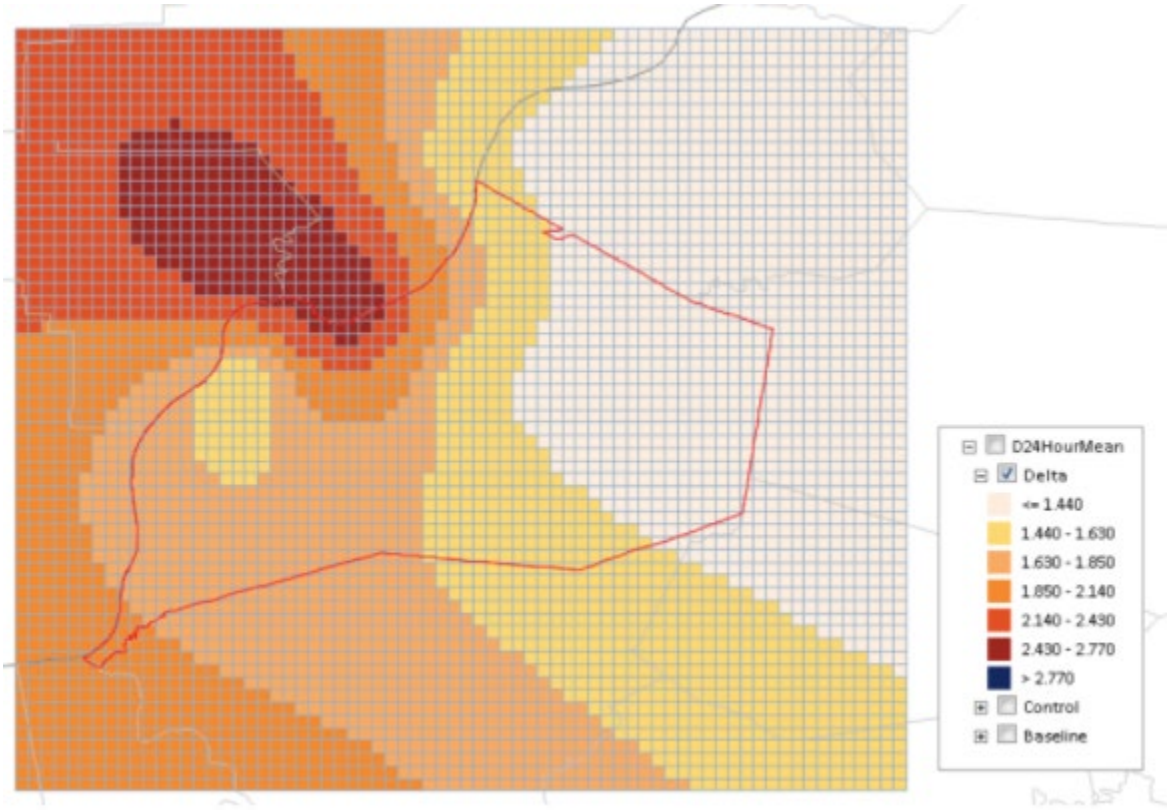


Figure 38 – Modelled Reductions in PM2.5, 2014-2018, U.S. EPA

$PM_{2.5}$-Related Health Effects	Avoided Incidence
Avoided Premature Deaths per Year	
Krewski et al. (2009) (adult)	73
Lepeule et al. (2012) (adult)	165
Woodruff et al. (1997) (infant)	0.5
Number of Avoided Cases per Year	
Hospital admissions—respiratory (all ages)	6.1
Hospital admissions—cardiovascular (age > 18)	8.5
Emergency department visits for asthma (all ages)	43
Acute bronchitis (age 8–12)	82
Lower respiratory symptoms (age 7–14)	1,050
Upper respiratory symptoms (asthmatics age 9–11)	1,500
Asthma exacerbation (age 6–18)	2,100
Lost work days (age 18–65)	7,700
Minor restricted-activity days (age 18–65)	45,700
Number of Avoided Non-Fatal Heart Attacks per Year (age >18)	
Peters et al. (2001)	68
Pooled estimate of four studies	7.4

Figure 39 – Modelled Health Benefits from PM2.5 Reductions between 2014 and 2018, U.S. EPA

Process

Coordinators presented recommendations relating to health from previous stakeholder groups around air quality, including the 2007 Strategic Toxic Air Reduction Regulation 5.30 Stakeholder Group Report and Plan of Action[165], and the 2008 Fine Particle Air Quality Task Force Report and Plan of Action[166]. These helped inform the topics around which recommendations of the Committee were built. In addition, committee member Russell Barnett, M.S., University of Louisville Superfund Research Program and Christina Lee Brown Envirome Institute, furthered of the process of developing recommendations by offering an outline of different subject areas around which recommendations could be developed, such as around the different pollutants affecting health outcomes (*e.g.*, ozone and particulate matter), the different health outcomes themselves (*e.g.*, respiratory and cardiovascular), focusing recommendations around certain geographic areas, or looking at the impacts of indoor air quality.

For recommendation development, the Committee began with the outline developed by Mr. Barnett. The Committee agreed that rather than separating out the topics listed there, or focusing on only one, the Committee should form recommendations addressing those topics in an integrated fashion. The Committee began from there and moved through the topics to begin developing recommendations, cross-referencing how they related to each of the topics in the outline.

Specific recommendation development began with the Committee reviewing recommendations of previous stakeholder groups again, as well as a list of recommendations that had occurred in previous meetings of the Health Committee as developed by the coordinators with input from Chairman Powell. A list of draft recommendations was reviewed at the final meeting, with Committee members deciding by consensus on recommendations to keep or remove from the Committee's final list of recommendations and agreeing on final language changes. The coordinators made final edits after this last meeting and sent out to the full Committee by email for feedback.

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[165] LMAPCD, *Fine Particle Air Quality Task Force Report and Plan of Action*, https://louisvilleky.gov/sites/default/files/air_pollution_control_district/documents/allother/2007/aqtfpmrapafinal.pdf.

[166] LMAPCD, *Strategic Toxic Air Reduction Regulation 5.30 Stakeholder Group Report and Plan of Action*, https://louisvilleky.gov/sites/default/files/air_pollution_control_district/documents/allother/2007/rapa530final20070919.pdf.

RECOMMENDATIONS

The Health Committee developed 12 total recommendations, one with related sub-recommendations, presented below. They were presented to the entire MPSG upon reconvening and sent out for a survey requesting selection of five priority recommendations and feedback from the full MPSG. Overview of the results of the survey and discussion of the feedback follows.

1. The District should investigate opportunities to enhance the official monitoring network. Places that should be investigated for additional monitoring or sensors should include a focus on communities disproportionately impacted by air pollution, hotspots indicated in EPA's National Air Toxics Assessment (NATA), as well as around known sources of toxics and fine/ultrafine particulates.

2. The District should ensure community involvement is integral to planning the enhanced monitoring network and when making plans for further analysis (*e.g.*, California AB 617).

3. The University of Louisville and Metro Health and Wellness should investigate forming a "bio-bank" to voluntarily collect samples from those admitted to the hospital to analyze for analytes of toxics and possibly identify hotspots in communities.

4. The Louisville Metro Government should mandate the use and incorporation of environmental and health impacts in planning decisions such as those guided by the Comprehensive Plan. Updates to the Land Development Code which require analysis of air quality impacts (including cumulative impacts) or monitoring, particularly in low- income, minority, or near sensitive populations should be studied (*e.g.*, California AB 617, Minnesota Green Zones).

5. The Louisville Metro Government should advocate that federal transportation funds intended to improve air quality, such as the VW settlement funds and CMAQ funding, be spent primarily in areas with current nonattainment status.

6. The Louisville Metro Government should consider how much a project can decrease the health impacts associated with air pollution when choosing projects eligible for CMAQ funding.

7. The Louisville Metro Government should prioritize urban heat island (UHI) mitigation strategies that also improve air quality such as vegetative solutions.

8. The Louisville Metro Government Office of the Mayor should create and house a "Natural and Built Environment Steering Group." (*This recommendation was considered as a whole in the survey to the full MPSG.*)

    a. The Steering Group should house a clearinghouse of reports and studies relating to the natural and built environment in Louisville, with the goal of harmonizing across redundant initiatives and coordinating resources.

    b. The Steering Group should review decisions within Metro that impact the Natural and Built Environment and make recommendations on harmonizing such decisions with recommendations from various reports.

9. The District should provide recommendations for the next Health Equity Report focused on air impacts in vulnerable communities or at-risk populations.

10. The Louisville Metro Government should encourage the study of the health impacts of indoor air quality.

11. The Louisville Metro Government should encourage the study of the health impacts of ambient air quality.

12. The Louisville Metro Government should strongly advocate for the consideration of public health impacts in utility decisions by the Public Service Commission (PSC).

IDENTIFIED PRIORITY RECOMMENDATIONS

Based on feedback from the full MPSG, the top prioritized recommendations were **Recommendation 12** regarding LMG advocating for consideration of public health impacts in utility decisions by the PSC (11 votes); **Recommendation 1** that the District should investigate opportunities to enhance its official monitoring network (10 votes); **Recommendation 5** that LMG should advocate that CMAQ funds be

spent in nonattainment areas (10 votes); and **Recommendation 7** that LMG should prioritize UHI mitigation strategies that also improve air quality such as vegetative solutions (9 votes).

DISCUSSION OF FEEDBACK

Most comments on the Health Committee's recommendations were generally supportive of the recommendations. Some offered additional implementation recommendations. For instance, one commenter suggested that any additional monitoring considered by the District should focus on ozone and PM, and priority should be given to placements near places such as schools. Another suggested use of a stakeholder process in implementation of Recommendation 4 regarding and incorporation of environmental and health impacts in planning decisions. One commenter suggested using heat island monitors already in place in implementing Recommendation 5. Yet another suggested that the potential "Natural and Built Environment Working Group" from Recommendation 8 should start by evaluating all major LMG initiatives of the past 5 years.

Other commenters expressed surprise that some recommendations were not already implemented, for example Recommendation 6 that LMG should consider health benefits of CMAQ projects ("Haven't we been?!"). Yet others expressed skepticism that projects could be implemented. For instance, regarding the bio-bank recommended in Recommendation 3, one commenter expressed skepticism that it could be used to discover hot spots due to how much people travel within the region. Another seemed to express skepticism at the political outlook for Recommendation 12, regarding consideration of public health impacts in PSC decisions.

One commenter stated that "[t]he use of the word 'should' is non-definitive" and suggested replacing with "shall" or other more "actionable" language. It should be noted that as recommendations of the MPSG Health Committee, these are not commitments of the District, which is the reason for the choice of words as suggested by Committee members. The same commenter further stated regarding Recommendation 5 that CMAQ funds be directed to nonattainment areas, that "[n]onattainment does not necessarily equate to protecting public health." Information to this effect was presented at several the Health Committee meetings; however, the rationale discussed for this recommendation was that currently CMAQ funds are often directed within Kentucky to areas that do not have the same air quality issues that Louisville does as a current nonattainment area for ozone. Finally, this commenter stated in regard to Recommendation 8 that LMG create a "Natural and Built Environment Steering Group", that

"[t]he Envirome Institute at UofL already has created a clearing house of research on environment health issues in Louisville." This should serve as a helpful resource should such a Steering Group be formed by LMG.

Outreach & Education Committee

OUTREACH AND EDUCATION COMMITTEE

OVERVIEW

Figure 40 – MPSG Outreach and Education Committee Meeting, December 2019

Engaging, educating, and providing different mediums for the community to learn—and be better informed of the District's work—is essential to improving air quality in Louisville. As a result, the Outreach and Education Committee was formed to help the APCD explore and develop methods for sharing information about air quality with the Louisville Metro community. Torend Collins, APCD Environmental Coordinator facilitated the work of this committee. The Committee, unique in nature, used its expertise, background, and experience in community engagement to review examples of community engagement/education efforts—everything from the District's current efforts to engage and educate the public, to other examples used to provide additional information about air quality. Through meetings, conversations, and consensus-building the Committee created engagement opportunities and educational resources that can improve and enhance the publics' access to information about air quality in Louisville.

GOALS

To frame the discussion for recommendation development, the Committee adopted goals proposed by District staff. They are as follows:

1. Review current efforts to communicate Louisville's nonattainment status for ozone and recommend additional strategies to raise awareness of the need for air quality improvement.
2. Identify audiences for sharing information and conducting more engagement around air quality and its impact on health.
3. Propose community partnerships to promote air quality and environmental health awareness.
4. Propose new programs that give citizens opportunity and information to reduce their own emissions contribution and health impacts from poor air quality.

5. Support/amplify the messaging of other groups that promote lowering air emissions and limiting exposure to emissions.

In addition, the Committee developed the following goal during the recommendation development process:

6. Create a conduit for community feedback, input, funding opportunities, and donations.

With goals in hand, the Committee set off to first evaluate current measures used by the District to engage and educate community.

EXISTING PROGRAMS AND EXAMPLE REDUCTION STRATEGIES

To better understand the District's current efforts to educate and inform community about Louisville's air, the Outreach and Education Committee reviewed three distinct examples. First, the Committee reviewed the District's *Clearing the Air* workshop series.[167] Revived in 2018, *Clearing the Air* seeks to increase the public's accessibility of information related to the District's work, increase the District's awareness of community concerns and provide accurate information about air quality in Louisville, including the challenges *and* successes. Through interactive workshops, *Clearing the Air* offers an informal setting for an in-depth, information exchange between the District and the community. The Committee reviewed presentations on air quality subject matter including, but not limited to, *Air Quality and Your Health*—a workshop discussing the impacts air pollution has on human health, *Louisville's Air Quality*, *Environmental Justice and the STAR Program*, and *Odors in Louisville.*

Figure 41 – Clearing the Air Workshops, 2018 & 2019

[167] LMAPCD, *Clearing the Air Community Workshop Series,* https://louisvilleky.gov/government/air-pollution-control-district/clearing-air-community-workshop-series.

Figure 42 – Louisville Air Watch

Additionally, to further understand the District's current efforts to educate and engage the public, the Committee reviewed information/data from Louisville Air Watch[168] website. A place where community can gain access to real-time air quality data from EPA-approved air monitors located throughout [169], Louisville Air Watch is a valuable resource. The air monitoring data reported to the website correlates with the Air Quality Index (AQI).[170] The five major air pollutants monitored each have a national air quality standard set by the EPA to protect the public's health.

Lastly, the Committee reviewed information shared through the District's Kentuckiana Air Education Program (KAIRE)[171]. Established in 2001, KAIRE "educates the public about the benefits of clean air, with an emphasis on the voluntary steps individuals can take to make a difference in the fight against air pollution." Specifically, KAIRE: 1) increases awareness of the impact individual choices have on local air quality, 2) encourages behavioral change, 3) provides programs centered around idling (Idle Free Schools/Businesses/Neighborhoods), and 4) promotes key issues on environmental and health impacts.

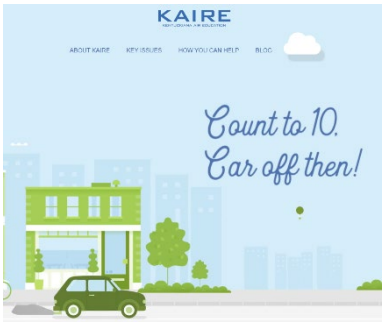


Figure 43 – www.helptheair.org

[168] LMAPCD, *Louisville Air Watch,* https://airqualitymap.louisvilleky.gov/.
[169] U.S. EPA, *Air Quality Basics,* https://www.airnow.gov/aqi/aqi-basics/.
[170] The five major air pollutants are as follows: ground level ozone, particle pollution (also known as particulate matter, including PM2.5 and PM10), carbon monoxide, sulfur dioxide, and nitrogen dioxide.
[171] Kentuckiana Air Education, *About KAIRE,* https://helptheair.org/.

COMMITTEE PROCESS AND DATA REVIEW

Data Review

To determine other methods for sharing air quality information with community, the Committee reviewed survey data from the *Clearing the Air* workshop series and KAIRE.

CLEARING THE AIR WORKSHOP SERIES – COMMUNITY ENGAGEMENT SURVEY

The Community Engagement Survey ("Survey") sought to obtain information from the public to assist the District with constructing the workshop series. The Survey sought to:

1. Prioritize topics from frequently discussed issues.
2. Provide a snapshot of current perceptions as it pertains to air quality.
3. Determine the best ways/methods to share information sought by the public about air quality in Louisville.

The Committee reviewed Survey responses to discern how concerned the community is about air pollution and to better understand how workshop topics were chosen.

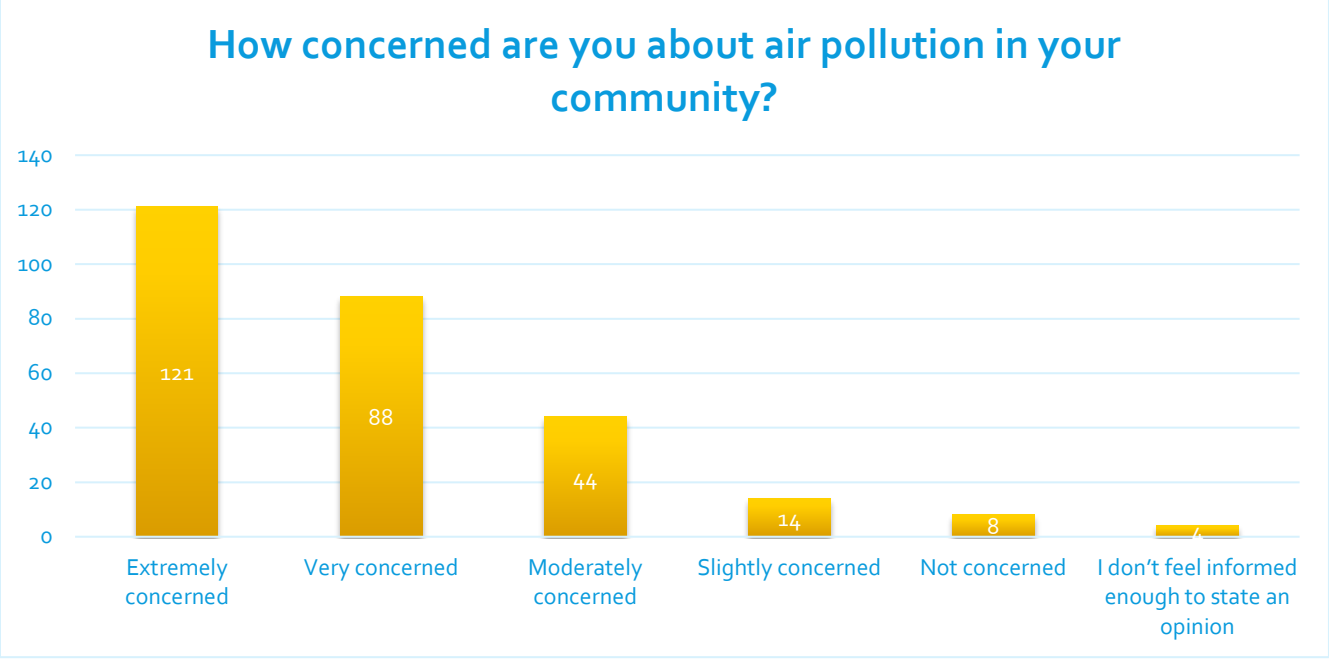


Figure 44 – Community Engagement Survey 2018, APCD

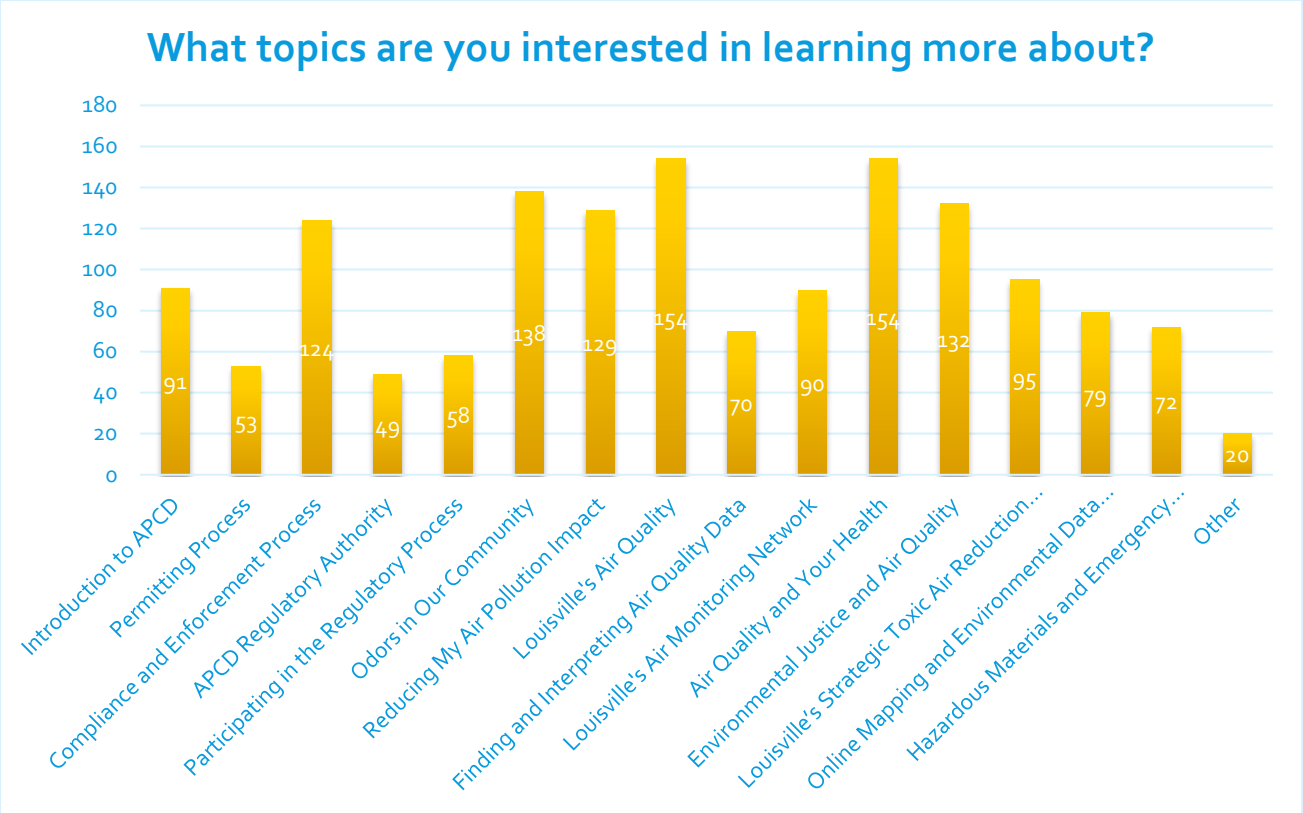


Figure 45 – Community Engagement Survey 2018, APCD

The graphs above from the District's 2018 Community Engagement Survey, and other responses, provided the Committee with a clearer picture of how the District constructed the *Clearing the Air* community workshop series. Reviewing the data also provided the Committee insight as to what air quality information the public wants to receive.

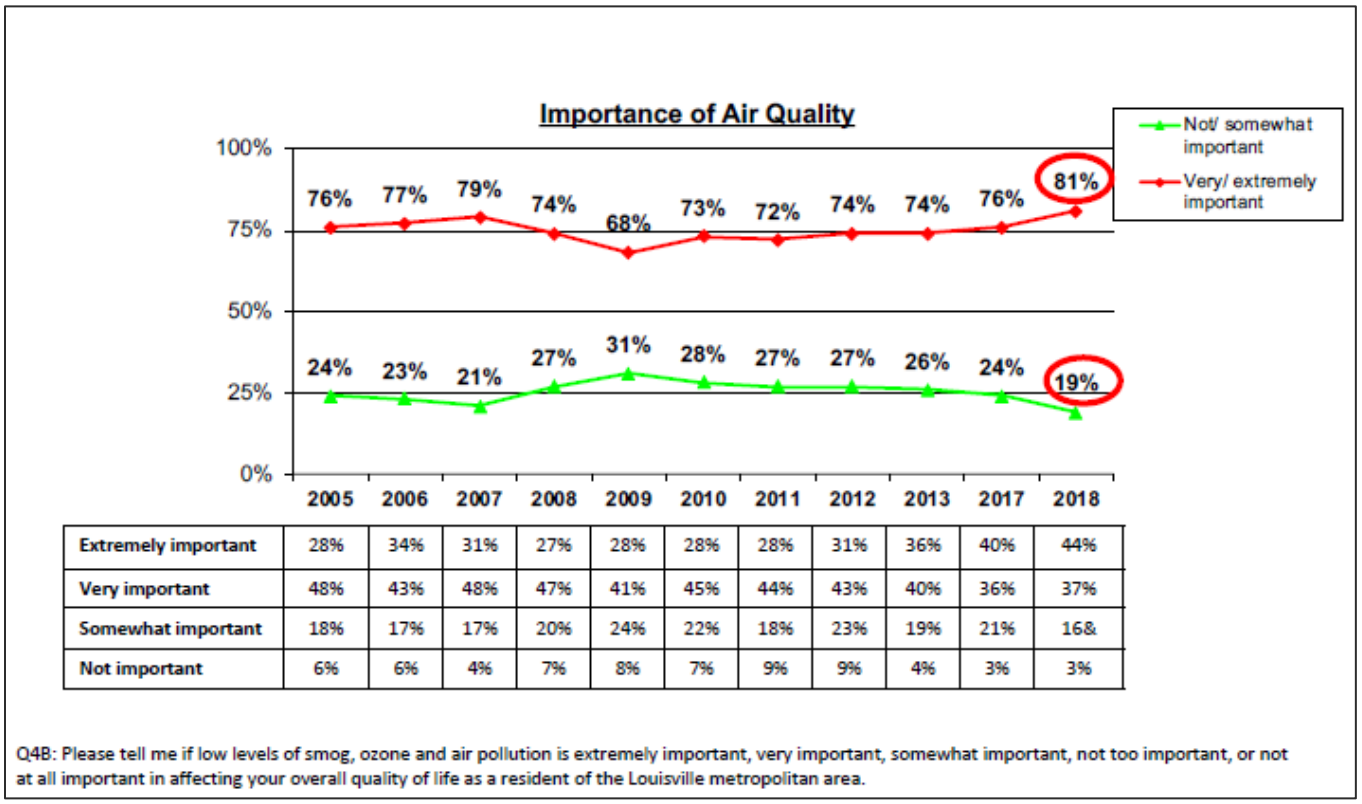
KAIRE PROGRAM – 2018 QUANTITATIVE ONLINE SURVEY

The Committee reviewed the KAIRE program's 2018 Quantitative Online Survey results. The purpose of the survey was to review 2018 Quantitative Survey results and compare the findings against past tracking studies for the program. Specifically, the survey sought to:

- Gauge changes in the following categories:
    - Perceptions of air quality
    - Awareness of air quality messages
    - Knowledge of air quality issues
    - Adoption of target behaviors
- Evaluate the stages of change

- Determine messaging statements that resonated most with KAIRE audience

When reviewing data from the KAIRE survey, the Committee focused on survey questions that addressed the following: perceptions of air quality; awareness of air quality messages; and knowledge of air quality issues. A detailed presentation and discussion followed for each survey question. From the discussion the Committee gained a better understanding of how respondents (*e.g.*, drivers 18 years of age or older, residing in the Louisville metropolitan area and southern Indiana) felt about the importance of having clean air, their awareness and understanding of KAIRE's air quality messaging (*e.g.*, Did they recall hearing air quality messaging? Is air quality in Louisville a major problem?), and whether respondents knew about the KAIRE program and the information it provides.



Extremely important	28%	34%	31%	27%	28%	28%	28%	31%	36%	40%	44%
Very important	48%	43%	48%	47%	41%	45%	44%	43%	40%	36%	37%
Somewhat important	18%	17%	17%	20%	24%	22%	18%	23%	19%	21%	16&
Not important	6%	6%	4%	7%	8%	7%	9%	9%	4%	3%	3%

Q4B: Please tell me if low levels of smog, ozone and air pollution is extremely important, very important, somewhat important, not too important, or not at all important in affecting your overall quality of life as a resident of the Louisville metropolitan area.

Figure 46 – 2018 Quantitative Online Survey Results, KAIRE Program

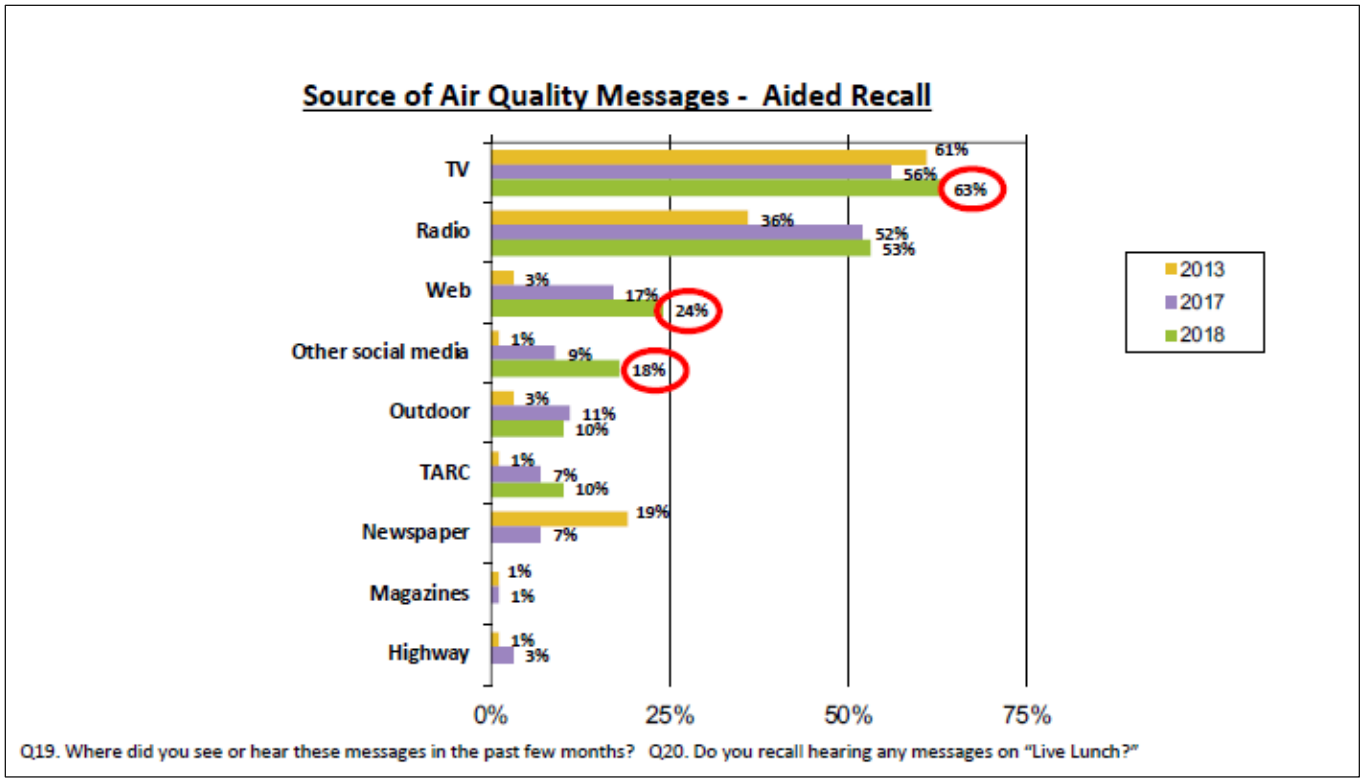


Figure 47 – Quantitative Online Survey Results 2018, KAIRE Program

Committee Process

The Outreach and Education Committee began its work with discussion of the goals and process for the group's work. Within the first two meetings, two co-chairs were nominated and accepted, Mikal Forbush, Education and Engagement Director at the Center For Neighborhoods, and Allison Smith, Ph.D., Brownfields Coordinator, Louisville Metro Office of Advanced Planning and Sustainability. After discussion of Committee goals and thoroughly reviewing program examples and accompanying data, the Committee used the final four meetings (January 24, February 7, February 19, and March 3, 2020) to develop recommendations.

First, the Committee moved to address Goals 2 and 3 at the same time since they were similar in nature. From that discussion, the Committee created an "Engagement Efforts" Excel spreadsheet. The Committee concluded the spreadsheet would serve as a resource hub the District could reference when determining which channels to use when disseminating information about air quality in Louisville. The list contained contact information (*i.e.*, name, email address, etc.) for individuals working with local

organizations, community groups, agencies, businesses, and other entities that may want to receive more information about Louisville's air.

For Goals 1, 4, and 5, the Committee utilized "recommendation development worksheets" to steer the conversation. The worksheets, suggested by a Committee Co-Chair, provided a framework for brainstorming and building consensus. After breaking into smaller groups to develop recommendations for Goals 1, 4, and 5, the full Committee reconvened to share what came from the small group.

Goal 6 was added after the Committee reviewed all the recommendations. The Committee determined the proposed goals did not adequately afford the public a forum for sharing air quality-related project ideas, grant opportunities, or other input to the District. As a result, the Committee drafted Goal 6 to provide the District with an alternate method for receiving ideas, comments and feedback from the public.

Through a "Keep, Strengthen, Remove" consensus building exercise, the Committee reviewed all recommendations developed for Goals 1, 4, 5, and 6. The exercise helped the Committee generate the final recommendations listed in the next section.

RECOMMENDATIONS

The Committee's list includes 29 total recommendations, with one recommendation containing related sub-parts that were considered as standalone recommendations. The recommendations, which the Committee structured under Goals 1, 4, 5, and 6, are as follows:

Goal 1: The APCD should develop additional strategies to communicate Louisville's nonattainment status for ozone.

1. Attending/speaking/presenting at community organizations.
2. Engaging media partners for education and outreach.
3. Working closer with Metro Council members to strategically distribute information.
4. Providing Air Quality Index (AQI) information in Neighborhood Places

5. Developing air quality information specifically tailored to industry (*i.e.*, APCD permitted entities) to help industry employees better understand the importance of air quality awareness and Air Quality Alert days.
6. Working with local schools, libraries and after school programs to ensure air quality info (local specific) is available for inclusion in science curriculum.
7. Participating in Air Quality Youth Summit, in-person or virtual.
8. Using billboards and other visual advertising.
9. Getting Air Quality Index (AQI) information to healthcare professionals (*e.g.*, doctors with asthma patients, patients with COPD, etc.).
10. Utilizing the NextDoor app and other social media platforms.
11. Encourage Air Quality Alert day notifications be included in other Metro department and agency communications.

Goal 4 – The APCD should propose new programs that give citizens opportunity and information to reduce their own emissions contribution and health impacts from poor air quality.

1. Provide presenters and content for more diverse conferences to share air quality information.
2. Develop air quality information in short videos/virtual series (*e.g.*, Enviro-minutes).
3. Create a program where APCD hosts Air Quality Hours at local businesses (*e.g.*, Green Drinks, "AQ is Important: Prove me wrong!", or "Beer with a Scientist"). Create trivia night content on/about air quality.
4. Host a "Festival of the Environment."
5. Increase consumer awareness of the following: (*These recommendations were considered separately by the full MPSG for prioritization.*)
    a. EV technology, costs, performance, and available incentives.
    b. Air quality friendly transportation options.
    c. Solar panels technology, costs, performance, and available incentives.

Goal 5: Support/amplify the messaging of other groups that promote lowering air emissions and limiting exposure to emissions.

1. Translate air quality messaging into other languages.
2. Personalize air quality messaging so it appeals to broader audiences.

3. Set-up a calendar of tabling events to attend and share air quality information with attendees beyond the usual demographic.
4. Advise the District to continue convening (*i.e.,* quarterly) the MPSG Outreach and Education Committee to continue assisting APCD with its engagement, outreach and education efforts.
5. Use infographics.
6. Use social media platforms and the internet to cross-post messaging.
7. Identify other groups' messaging and sculpt our message to resonate.

Goal 6: Create a conduit for community feedback, input, funding opportunities and donations.

1. Develop a webpage to receive information, projects, program ideas and requests.
2. Develop a Request For Proposal (RFP) process for the Air Pollution Control Board Air Quality Trust Fund[172] to increase awareness of the Trust as a funding source for potential air quality projects.
3. Develop materials (*i.e.,* surveys, questionnaires) used to obtain feedback from the community that can be shared at on-the-go tabling events (*e.g.,* community festivals, health fairs, etc.).
4. The District should identify and promote newer technologies for APCD permitted entities and industry (and help to identify funding mechanisms).

IDENTIFIED PRIORITIZED RECOMMENDATIONS

Final recommendations in hand, the Committee presented its work to the full MPSG. The District then sent the full MPSG a survey to determine which recommendations the District should prioritize for each goal. The survey requested respondents choose four recommendations from Goal 1, three recommendations from Goals 4 and 5, and two recommendations from Goal 6. Below are the results. Two of the four recommendations for Goal 6 received the same number of votes.

[172] Here, the Committee is referencing the Air Pollution Control Board "Air Quality Trust Fund" established in KRS Chapter 77.127. The statute specifies that the "…special trust fund to be known as the "air quality trust fund" to be used for conducting and funding air quality research and development projects, special nonrecurring air quality projects, and air quality education programs approved by the air pollution control board to assist in implementing the policies and purposes of this chapter." See also, Louisville Metro Air Pollution Control District Regulation 1.17, *Air Quality Trust Fund*, https://louisvilleky.gov/sites/default/files/air_pollution_control_district/documents/regulations/1-17v1.pdf.

Goal 1: Review current efforts to communicate Louisville's nonattainment status for ozone and recommend additional strategies to raise awareness of the need for air quality improvement.

- **Recommendation #2** – Engage media partners for outreach and education

Goal 4: Propose new programs that give citizens opportunity and information to reduce their own emissions contribution and health impacts from poor air quality.

- **Recommendation #2** – Develop air quality information in short videos/virtual series (*e.g.* Enviro-Minutes)

Goal 5: Support/amplify the messaging of other groups that promote lowering air emissions and limiting exposure to emissions.

- **Recommendation #5** – Use infographics

Goal 6: Create a conduit for community feedback, input, funding opportunities and donations.

- **Recommendation #2** – Develop an RFP process for the Air Pollution Control Board Air Quality Trust Fund to increase awareness of the Trust as a funding source for potential air quality projects
- **Recommendation #4** – The District should identify and promote newer technologies for APCD-permitted entities and industry (and help to identify funding mechanisms)

DISCUSSION OF FEEDBACK

Many responses further emphasized the importance of implementing the recommendations. For example, in feedback about Goal 1, Recommendation #6 (*Working with local schools, libraries and after school programs to ensure air quality info (local specific) is available for inclusion in science curriculum)* a respondent shared the following sentiments:

> "This will allow for the integration of science in real world applications and educate students about the significance of air pollution."

In addition, feedback from the survey also expanded some recommendations. For example, in feedback pertaining to Goal 4, Recommendation #1 (*Provide presenters and more diverse conferences to share air quality information)*, one respondent suggested developing a "speakers bureau." While another respondent suggested the District, "[i]dentify trusted sources of information in communities most impacted by poor air quality and develop relationships with those sources to ensure that AQI information is provided to at risk populations in the community."

Overall, feedback from the recommendations were supportive and contained little, if any, criticism.

Next Steps

NEXT STEPS

APCD has already begun sharing these recommendations with peer agencies within LMG and with EPA. While some of the recommendations developed by the MPSG Committees are within APCD's power to implement solely, many, perhaps even most, will require partners in other departments of LMG, among the regulated sources, academia, and the community-at-large. Actions at all levels of our community, from government to individual, are necessary in order to continue reducing air pollution and to ensure future generations of Louisville residents have healthy air for breathing, no matter what neighborhood they live in. The recommendations of the Multipollutant Stakeholder Group reflect that reality – from regulations and policy (including funding decisions) at the local and state level, to voluntary efforts at industrial facilities on Air Quality Alert Days and raising awareness of how individuals can reduce our air pollution contributions and each of our exposures to poor air quality. This framework of addressing community challenges at all levels is well illustrated in the 2017 Health Equity Report (HER).[173] Their visual of the socio-ecological model has been a helpful tool in discussing steps that can be taken by governmental agencies, businesses and institutions, and individuals to address public health concerns and improve health outcomes across our city.

Figure 48 – Socio-Ecologic Model as illustrated in the HER

As many of the recommendations and the discussion leading to their development reflects, some of these efforts are already underway and some have yet to be initiated. Indeed, since the completion of the MPSG's final convening, there have been several efforts that reflect this ongoing commitment to clean air. In April 2020, the Air Pollution Control Board approved an Enforceable Board Order with LG&E.[174] In this voluntarily negotiated agreement, LG&E commits to maintaining total NOx emissions from Mill Creek Station's four electric generating units at or below 15 tons per day during the current

[173] Louisville Metro Center for Health Equity, *2017 Health Equity Report*, https://louisvilleky.gov/government/center-health-equity/health-equity-report.
[174] Louisville Metro Air Pollution Control Board, *Enforceable Board Agreement*, https://louisvilleky.gov/sites/default/files/air_pollution_control_district/documents/boardorders/20200415-enforceable-board-agreement-lge.pdf.

ozone season (April 1, 2020 through October 31, 2020). This agreed to level represents reductions of the observed NOx emissions from these units on ozone exceedance days from 2016 through 2019. On those days, the sum of NOx emissions from these units ranged from just over 15, to as high as 36 tons per day. The agreement will maintain NOx emissions below those observed on exceedance days in recent years. While this agreement represents a significant reduction, it remains to be seen whether this level of NOx reduction at this one NOx source will be adequate to maintain ozone formation below the NAAQS.

Reflecting recommendations of both the Health and Outreach and Education Committees, APCD recently partnered on an application to EPA's State Environmental Justice Cooperative Agreement Program. This recurring grant program was focused this year on responding to COVID-19 impacts in environmental justice communities. The proposed project is a partnership including Louisville Metro Public Health and Wellness, APCD, Louisville Metro Office of Advanced Planning and Sustainability, Metropolitan Housing Coalition, Louisville Primary Care Associates, and IDEAS xLab, a local arts non-profit. This collaboration will undertake community engagement to develop effective, culturally appropriate messaging around indoor air quality as a healthy housing issue. Recognizing that our lungs do not distinguish between outdoor air, the focus of APCD's work, and indoor air, APCD's commitment includes engaging community around indoor air quality and how it can be affected, for better or worse, by outdoor air quality. Further, this also offers an opportunity to work with new partners to develop outreach and engagement strategies that can be applied across many program areas. The artists at IDEAS xLAB, the medical professionals in the Louisville Primary Care Association, and the housing advocates that comprise the Metropolitan Housing Coalition will provide new outlets and frameworks for APCD's messaging, especially how to access and understand the AQI and what it means for each resident's health and daily activities. To support this initiative APCD will provide outreach materials around the AQI and other APCD programs that will support our residents in understanding and improving indoor air quality. This includes information about ambient odor reporting and response, because we recognize that many neighborhoods, including several of those in which this project will focus outreach efforts, are subject to odor sources such as sewage treatment or industrial facilities. APCD's commitment to this project also includes staff time to support the planning and delivery of outreach programs.

Another initiative underway since the final MPSG convening in Spring 2020 is the Drive Clean Louisville Team's Green Fleets Challenge.[175] The Green Fleet Challenge is a voluntary program aimed to increase the adoption and use of battery electric vehicles and plug-in hybrid electric vehicles in Louisville Metro. We are inviting local businesses, companies, and non-profit organizations to commit to increase the number of BEVs and/or PHEVs in their fleet to match the number of BEVs/PHEVs currently within LMG's fleet. This program and other efforts of the Drive Clean Louisville Team are a direct reflection of the array of electric vehicle recommendations developed by the Mobile Source Committee. Those recommendations will continue to guide further efforts from this team as their work advances the clean vehicle goals of LMG and the community-at-large.

Air pollution control is a public health imperative. As is also explained in the HER and in the MPSG Health Committee's work discussed previously in the report, environmental quality is a key root cause of several of the adverse health outcomes seen in our community. The HER identified and focused on air quality specifically as being associated with asthma and cancer rates. However, health research, including work being done at the University of Louisville, also finds associations between air pollution (fine particulates in particular) and cardiovascular disease and diabetes, as well as a host of other and emerging health conditions. With this understanding of the continued health impacts to our community from air pollution, APCD will incorporate the generous feedback and specific recommendations of the MPSG into its strategic planning and program development efforts. We cannot solve our community's air pollution problems in a vacuum and will continue to call upon our regulated sectors, government partners, and the community-at-large to work with us toward meeting our community air quality goals. Likewise, APCD must also answer our community's call for progressive clean air programs and continued implementation and enforcement of existing regulatory frameworks. Together, we can reduce air pollution emissions and exposure, improving the lives of all Louisville residents.

[175] LMAPCD, *Drive Clean Louisville*, https://louisvilleky.gov/government/air-pollution-control-district/drive-clean-louisville.

APPENDIX A: PARTICIPATING ORGANIZATIONS

LIST OF PARTICIPATING ORGANIZATIONS

AECOM
American Lung Association of Kentucky
Brown-Forman
Building Industry Association of Louisville (BIA)
Center for Neighborhoods
Cintas
Develop Louisville
Dow Chemical
Envirome Institute
Every Commute Counts
Ford Motor Company
Frost Brown Todd
GLI Energy and Environment Advisory Committee
Heaven Hill
JCPS Transportation Services
Kentucky Division for Air Quality
Kentucky Paint Council
Kentucky Resources Council
KIPDA
Kosmos Cement Company
LG&E/KU
Louisville Health Advisory Board, Respiratory Health Committee
Louisville Medical Center, Inc.
Louisville Metro Air Pollution Control Board
Louisville Metro Department of Public Health and Wellness
Louisville Metro Economic Development Department
Louisville Metro Office of Advanced Planning and Sustainability
Louisville Regional Airport Authority
Mercer Transportation
Metro Housing Coalition
Metropolitan Sewer District
Mindel Scott
Reynolds Consumer Products
Sierra Club
Specialty Graphics Imaging Association
TARC
University of Louisville
West Jefferson County Community Task Force
Zeon Chemicals

APPENDIX B: RECOMMENDATIONS

MPSG RECOMMENDATIONS

Point Source Committee Recommendations

*Identified priority recommendations are in **bold**.*

1. **The District should keep and help maintain the Stakeholder-sourced spreadsheet of known and planned reductions in the domain of the Ozone Formation Study.**
2. The District should start a program to recognize companies for voluntary efforts to reduce ozone precursor and other emissions. Recognition should be given through certificates or badges for different levels or tiers of reductions, awarded before the Louisville Metro Air Pollution Control Board.
3. The District should encourage participation by sources in voluntary programs such as KY EXCEL, Kentucky Pollution Prevention Center, and the Louisville Metro Energy Project Assessment District (EPAD) program, including through the recognition program in recommendation 2.
4. **The District should encourage action by Point Sources on Air Quality Alert Days.** *(These recommendations were considered as a whole in the prioritization survey.)*
    a. **The District should ensure that environmental contacts for permitted sources are directly notified by email of Air Quality Alert Days.**
    b. **The Committee also recommends sources have an Air Quality Alert Day Plan, which voluntarily commits to avoiding, deferring, or delaying certain actions such as startups, shutdowns, maintenance, and testing on Air Quality Alert Days whenever possible.**
    c. **The District should recognize companies which submit Air Quality Alert Day Plans, including through the recognition program in Recommendation 2.**
5. The District should develop "Best Practices" materials to be posted in point source workplaces to educate employees on how to minimize emissions and impacts.
6. The District should consider additional ozone modelling efforts. *(These recommendations, while related, were considered separately in the prioritization survey as they require competing resources and would be separate projects.)*

a. The District should consider conducting additional photochemical modeling which evaluates sensitivity to Louisville-specific emissions reductions through additional brute-force runs.
b. **The District should also consider additional photochemical modeling which evaluates the relative contribution either of different sources or geographic areas through source-apportionment modeling.**
c. **In any further modeling, the District should improve/refine the emissions inventory with the most accurate local data to the greatest extent possible. *See* Area Source Recommendation #1.**

7. **The District should evaluate ozone exceedances through analysis using tools available to it, such as looking at HYSPLIT back trajectories. Additional analysis could be made available through reports, such as the Georgia Annual Ozone Exceedance Reports.**
8. The District should evaluate the Emissions Statements rule (Regulation 1.06) for compliance with EPA's SIP Requirements Rule, and update if necessary.
9. **In rulemaking for Nonattainment New Source Review (NNSR), the District should compare Regulation 2.04 to minimum federal standards in 40 C.F.R. Part 51, and make explicit where the Regulation is currently more stringent and where it is deficient. The District should consider the full range of options, including conformity with the minimum federal standards, highlighting Clean Air Act (CAA) requirements including CAA §§110(l) & 193. The District should allow ample opportunity for Stakeholder and public input, including through Advanced Notice of Proposed Rulemaking (ANPR) which includes the detailed comparison to minimum federal standards, public meetings, and extended opportunities for comment.**
10. The District should evaluate Reasonably Available Control Technology/Reasonably Available Control Measures (RACT/RACM) in advance of the marginal attainment deadline of August 2021, to understand reasonably available control technologies which could be considered in the event of reclassification. *(These recommendations, while related, were considered separately in the prioritization survey as they may require individual rule-making efforts.)*
    a. **In evaluating RACT/RACM the District should compare actions in other jurisdictions, such as Pennsylvania's RACT III action, and consider setting presumptive RACT for NO_X emissions from various sources through regulation considering such actions in other jurisdictions.**

b. The District should also evaluate whether the reactivities of various VOCs could be accounted for in determining RACT/RACM. Considerations should include how reactivity-based RACT/RACM would be accounted for in the State Implementation Plan (SIP), and in Nonattainment New Source Review (NNSR) offsetting. This process should include opportunity for input from Stakeholders and the Public.

c. The District should consider adding regulations for CTGs for source sectors in the District covered by a CTG, but not already covered by District regulations, especially those adopted or updated by U.S. EPA since 2006 such as those for offset lithography printing and industrial solvent cleaning. In evaluating source sectors for regulation, the District should consider any additional industry standards and improvement since the issuance of CTGs.

11. The District should evaluate the effect of EPA's January 25, 2018 guidance memorandum titled "Reclassification of Major Sources as Area Sources Under Section 112 of the Clean Air Act" (Major Maximum Achievable Control Technology (MACT) to Area, or MM2A) memorandum, and Proposed Rule, Reclassification of Major Sources as Area Sources Under Section 112 of the Clean Air Act, 84 Fed. Reg. 36,304 (July 26, 2019).

Area Source Committee Recommendations

*Identified priority recommendations are in **bold***

1. **APCD should update the emissions inventory for area sources to allow for more comprehensive assessment of sectors that may need higher priority for both regulatory and non-regulatory outreach activities based on their sector-specific emissions. The goal of this project would be to improve the accuracy of the emissions inventory and refine the focus of assistance and outreach activities. A proposed method would identify a statistically significant population of area sources and obtain emission data from them so the results could be extrapolated.**
2. **APCD should encourage work practice changes/upgrades for equipment, technology, chemicals, and input materials at area sources. APCD's staff should conduct outreach and educational activities to inform various sectors of their options. If these changes have financial constraints, the outreach should include identifying funding opportunities that will facilitate the adoption of new technologies and/or equipment. Research on funding**

mechanisms should be an ongoing and continuous process. Some examples of projects include:

a. Dry cleaning facilities replacing perchloroethylene machines with machines that use alternative solvents (*e.g.*, DF-2000 or Green Earth) or converting to a wet cleaning process
b. Solvent management and best practices
    i. Adopt best practices for using parts washers
    ii. Research options for using alternative solvents with reduced VOC content
c. Wipers (towels, rags) management and best practices
d. Upgrade to more efficient equipment
    i. Digital technology adoption in printing industry
e. Some examples of funding mechanisms include:
    i. Small Business Loans
    ii. Pollution Prevention Grants
    iii. Venture Investments
    iv. Angel Investments

3. APCD's Industrial Compliance Section should increase or enhance its compliance assistance, outreach, and inspection activities to all area sources. *(These recommendations, while related, were considered separately in the prioritization survey as they may require competing resources and would be separate projects.)*
    a. Modifying inspection intervals so inspections occur on an ongoing basis
        i. Each year, 20% of area sources are inspected, resulting in all sources being inspected every 5 years
    b. Developing up-to-date guidance documents for facilities, such as
        i. Fact Sheets
        ii. Guidebooks
    c. Offering compliance-related classes, seminar, webinars, or other relevant educational opportunities
    d. Continuing support for the development of the Small Business Environmental Compliance Assistance Program

4. **Louisville Metro Government should encourage energy efficiency projects and investments in the industrial, commercial, and residential sectors through outreach to facilities managers, building owners, and homeowners. When possible, funding opportunities and other financial incentives should be identified.**

   Examples include:

   a. Low or no interest loans
   b. Grant funding
   c. Tax incentives
   d. Reimbursement opportunities
   e. Cost-matching opportunities
   f. Benchmarking opportunities

   Examples of projects and investments include:

   a. Conducting an energy audit and following through on recommendations
      i. Kentucky Pollution Prevention Center will perform industrial audits
   b. Value stream mapping
   c. Investing in a Smart or Programmable Thermostat
   d. Upgrading to energy efficient windows
   e. Insulation projects
   f. Lighting upgrades
   g. Compressed air efficiency
   h. Investing in heat pumps (geothermal, electric) with furnace backup
   i. Investment in solar technology or other alternative energy

5. **APCD should encourage the development of Ozone Action Plans at industrial facilities and supporting voluntary efforts from commercial and residential sources on Air Quality Alert Days.** *(These recommendations were considered as a whole in the prioritization survey.)*
   a. **Continue and expand media announcements suggesting no mowing, less driving, and refueling in evening hours.**
   b. **Request that permitted emergency generators do not conduct testing on Air Quality Alert Days.**
   c. **When possible, facilities should consider delaying higher emission activities or modifying their hours of operation to periods outside of peak ozone production.**

d. **Develop and distribute educational materials during compliance assistance and inspection activities.**

6. **APCD should promote better practices with industrial, commercial, and consumer usage of solvents and VOC-containing products.** *(These recommendations were considered as a whole in the prioritization survey.)*
    a. **Coordinate with industrial groups and facilities to encourage adoption of green cleaning policies.**
    b. **Promotion of facilities and consumers choosing products from the EPA Safer Choice List for non-industrial process cleaning.**
    c. **Coordinate with industrial facilities to develop a list of best practices for solvent usage (both manufacturing process and non-process general cleaning).**
    d. **Consult facilities with existing policies on best practices for examples.**
    e. **Encourage facilities to seek LEED and other related energy efficiency certifications.**
7. Louisville Metro Government and APCD should promote better practices with commercial and consumer usage of solvents and VOC-containing products (*e.g.*, personal care and cleaning products). *(These recommendations were considered as a whole in the prioritization survey.)*
    a. Coordinate with residential outreach entities (*e.g.*, Department of Public Health and Wellness) to educate the general public on green cleaning methods using safe and effective cleaning and personal care products.
    b. Promotion of consumers choosing products from the EPA Safer Choice List for commercial and household cleaning.
    c. APCD should expand content related to consumer solvent and VOC-containing personal care products to the "Clearing the Air" workshop series.

Mobile Source Committee Recommendations

*Identified priority recommendations are in **bold***

1. **Expand Electric Vehicle (EV) adoption and expand EV infrastructure.** *While the recommendations below focus on the increase in use of electric vehicles (including plug-in hybrids), the committee recognized the emissions benefits of encouraging the use of conventional hybrid and other low/no emission vehicles as well.

a. **Louisville Metro Government should implement a strategy to expand electric vehicle and bicycle charging networks in publicly accessible locations. They should also partner with developers, building owners and managers, and parking managers to add new charging stations. This will increase market confidence by signaling a clear direction towards investment in EVs in Metro Government. Benchmarks should be set by which progress can be measured.**
b. Louisville Metro Government should enable and encourage utilities to leverage their expertise and relationships to customers to jumpstart the EV market in a way that maximizes benefits to ratepayers and society.
c. **Louisville Metro Government should support higher levels of EV market share by helping consumers and fleets afford the incremental cost of EVs by raising awareness of available tax credits, rebates, grants, and other funding sources.**
d. Louisville Metro Government should increase consumer awareness of EV technology, costs, performance, and available incentives.
e. Louisville Metro Government should engage, educate, and encourage car dealers to raise consumer awareness and EV sales.
f. **All governmental and public entities should increase fleet EV adoption levels to increase environmental benefits from vehicles with high vehicle miles traveled (VMT) rates; increase consumer awareness by electrifying fleets that are consumer facing such as carshare, car rental, or shared mobility company fleets.**
g. Louisville Metro Government should support existing programs that reduce costs for ratepayers, reduce charging costs for EV owners that charge during off-peak times, and remove barriers to DC Fast Charging (DCFC) deployment.
h. Louisville Metro Government should increase EV infrastructure investment and availability at workplaces and multi-family residences, through an education and outreach program to developers, employees and residents.
i. Louisville Metro Government should review the Land Development Code for further opportunities to incentivize the installation of EV infrastructure.

2. **Keep reformulated gasoline (RFG) use in the ozone nonattainment area if analysis shows continued emissions reduction benefits. Reanalyze these benefits after the area comes into attainment of the ozone standard.**

Recognizing the actions of the Kentucky General Assembly and the Louisville Metro Council calling for an analysis of the air quality benefits of RFG over conventional gas, APCD should analyze the emissions reductions RFG provides in the ozone nonattainment area. Those benefits should be maintained until the area is redesignated by EPA as Attainment of the 2015 8-hour ozone National Ambient Air Quality Standards (NAAQS). At such time, and if equivalent emission reduction strategies are available, APCD should work with the Kentucky Division for Air Quality to request that the requirement for RFG sale in the region be removed from the State Implementation Plan (SIP). This will require a demonstration that the increase in emissions that may result from the widespread use of conventional gasoline in the current nonattainment area will not interfere with or prevent the area from maintaining attainment of the NAAQS. Increases in emissions from the removal of RFG will have to be offset with new quantifiable, permanent, and enforceable VOC and NOx reductions sufficient to maintain compliance with the NAAQS.

3. Funding for mobile source emissions reductions should be prioritized for areas that are designated nonattainment of the NAAQS. *(These recommendations should be considered as a whole.)*
    a. Louisville Metro Government should advocate that federal transportation funds allocated through the state and intended to improve air quality, such as Congestion Mitigation and Air Quality program (CMAQ) funds, be spent primarily in areas with a current nonattainment status.
    b. Louisville Metro Government should encourage the Kentucky Division of Air Quality to petition the Environmental Protection Agency (EPA) to redesignate 1979 ozone maintenance areas to attainment.
    c. Louisville Metro Government should encourage local lawmakers to introduce resolutions to prioritize funding sources such as CMAQ funds for nonattainment areas.
4. **Louisville Metro Government and other community partners should voice support for releasing the use of VW Settlement Funds as soon as possible in Jefferson County, including funding to support Transit Authority of River City (TARC) bus replacements with newer, cleaner engines.**
5. Louisville Metro Government should evaluate parking requirements for revisions that would encourage mobile source emission reductions strategies. *(These recommendations were*

considered separately in the prioritization survey as they may require revisions to different parts of the LDC, or be in conflict with each other if all were pursued.)

a. Louisville Metro Government should investigate strategic parking supply restrictions and congestion pricing for single-occupancy vehicles.

b. Louisville Metro Government should consider the following changes to existing parking regulations with the Land Development Code, particularly regarding reductions in minimum parking requirements:

   i. Eliminate all minimum parking requirements for all form districts and land uses, complemented by reduced parking maximums that can be classified by form district and land use in order to reduce the use of single occupancy vehicles.

   ii. Increase the reduction for proximity to transit (currently a 10% reduction). This could manifest in various ways, including:

      1. Flat increase to 20%
      2. Increase to 30% within certain distance of a permanent transit shelter
      3. Numerical or percentage reduction if applicant builds/pays for a new transit shelter

   iii. Create a reduction for carpool/vanpool spaces

      1. Example: Reduce minimum parking requirement by 2 spaces for every carpool/vanpool space (carpool/vanpool space counts for 1 required space).

   iv. Create a reduction for EV charging spaces

      1. Example: Reduce minimum parking requirement by 2 spaces for every EV charging space (EV charging space counts for 1 required space).

6. Park and Ride/Rideshare Incentives

   a. Louisville Metro Government should support opportunities for ridesharing and short-term vehicle use.

   b. Louisville Metro Government should incentivize new and support existing park and ride lots/car sharing options/other rideshare infrastructure (bike lockers, support services, etc.) through the Land Development Code.

7. **Louisville Metro Government should improve and expand traffic signal synchronization throughout Louisville Metro to reduce average commute time and idling, prioritizing highly congested areas.**

8. Seek out emissions reductions in public fleets (*e.g.*, Louisville Metro Government, Jefferson County Public Schools). *(These recommendations were considered separately in the prioritization survey as different entities would be responsible for implementation.)*
    a. **Louisville Metro Government should analyze the Metro fleet and create a plan to improve fleet emissions through diesel retrofit or replacement along with the use of alternative fuels, hybrids, and electric vehicles.**
    b. **The Air Pollution Control District (APCD) should work with public and private fleet owners operating in Louisville Metro through education, incentives, and grants to aggressively retrofit or replace both onroad and nonroad fleets with state-of-the-art technology.**
    c. All government and public entities should adopt a high-efficiency vehicle purchasing policy.
    d. All government and public entities should prioritize and actively pursue funds for replacement vehicles using funding sources such as the Diesel Emissions Reductions Act (DERA).
9. Encourage idle reduction strategies in public and private fleets. *(These recommendations were considered separately in the prioritization survey as different entities would be responsible for implementation.)*
    a. APCD should work with entities, such as schools, to reduce unnecessary engine idling.
    b. Louisville Metro Government should encourage significant coordination among the Kentucky Transportation Cabinet (KYTC), Indiana Department of Transportation (INDOT), local transportation officials, and private fleets during major highway repair or construction to develop plans to minimize traffic backups and delays to reduce idling and toxic emissions.
    c. APCD should reinforce the message that it is important to minimize the idling of all mobile source internal combustion engines, including, but not limited to, those fueled by gasoline, diesel, biodiesel blends, vegetable oil, propane and compressed natural gas.
    d. All Jefferson County public entities should implement practices and policies to reduce unnecessary idling and acquaint their employees and the public with said practices and policies.

e. Public and private partners should be sought for overnight parking for long haul trucks that include plug in options so that trucks can power their vital systems without the need to idle their engines.

10. Louisville Metro Government should review the research on the comparative benefits of traffic control measures and transit/multimodal strategies on air quality impacts from traffic.
11. APCD should collaborate with the Kentuckiana Regional Planning and Development Agency (KIPDA) to use available data (*e.g.*, StreetLight) to study the impacts of traffic on air quality.
12. Louisville Metro Government should commission a study to identify high-potential areas for the construction of new or the expansion of existing, dedicated pedestrian or cyclist pathways.

Health Committee Recommendations

*Identified priority recommendations are in **bold**.*

1. **The District should investigate opportunities to enhance the official monitoring network. Places that should be investigated for additional monitoring or sensors should include a focus on communities disproportionately impacted by air pollution, hotspots indicated in EPA's National Air Toxics Assessment (NATA), as well as around known sources of toxics and fine/ultrafine particulates.**
2. The District should ensure community involvement is integral to planning the enhanced monitoring network and when making plans for further analysis (*e.g.*, California AB 617).
3. The University of Louisville and Metro Health and Wellness should investigate forming a "bio-bank" to voluntarily collect samples from those admitted to the hospital to analyze for analytes of toxics and possibly identify hotspots in communities.
4. **The Louisville Metro Government should mandate the use and incorporation of environmental and health impacts in planning decisions such as those guided by the Comprehensive Plan. Updates to the Land Development Code which require analysis of air quality impacts (including cumulative impacts) or monitoring, particularly in low-income, minority, or near sensitive populations should be studied (*e.g.*, California AB 617, Minnesota Green Zones).**
5. **The Louisville Metro Government should advocate that federal transportation funds intended to improve air quality, such as the VW settlement funds and CMAQ funding, be spent primarily in areas with current nonattainment status.**

6. The Louisville Metro Government should consider how much a project can decrease the health impacts associated with air pollution when choosing projects eligible for CMAQ funding.
7. **The Louisville Metro Government should prioritize urban heat island (UHI) mitigation strategies that also improve air quality such as vegetative solutions.**
8. The Louisville Metro Government Office of the Mayor should create and house a "Natural and Built Environment Steering Group." *(This recommendation was considered as a whole in the prioritization survey.)*
    a. The Steering Group should house a clearinghouse of reports and studies relating to the natural and built environment in Louisville, with the goal of harmonizing across redundant initiatives and coordinating resources.
    b. The Steering Group should review decisions within Metro that impact the Natural and Built Environment and make recommendations on harmonizing such decisions with recommendations from various reports.
9. The District should provide recommendations for the next Health Equity Report focused on air impacts in vulnerable communities or at-risk populations.
10. The Louisville Metro Government should encourage the study of the health impacts of indoor air quality.
11. The Louisville Metro Government should encourage the study of the health impacts of ambient air quality.
12. **The Louisville Metro Government should strongly advocate for the consideration of public health impacts in utility decisions by the Public Service Commission (PSC).**

Outreach and Education Committee Recommendations

*The Committee developed recommendations under each of the Committee's goal. Each goal notes in **bold** the priority recommendations identified.*

GOAL 1: APCD should develop additional strategies to communicate Louisville's nonattainment status for ozone.

1. Attending/speaking/presenting at community organizations.
2. **Engaging media partners for education and outreach.**
3. Working closer with Metro Council members to strategically distribute information.

4. Providing Air Quality Index (AQI) information in Neighborhood Places.
5. Developing air quality information specifically tailored to industry (*i.e.,* APCD permitted entities) to help industry employees better understand the importance of air quality awareness and Air Quality Alert days.
6. **Working with local schools, libraries and after school programs to ensure air quality info (local specific) is available for inclusion in science curriculum.**
7. Participating in an Air Quality Youth Summit, in-person or virtual.
8. Using billboards and other visual advertising.
9. **Getting Air Quality Index (AQI) information to healthcare professionals (*e.g.*, doctors with asthma patients, patients with COPD, etc.).**
10. **Utilizing the NextDoor app and other social media platforms.**
11. **Encourage Air Quality Alert day notifications be included in other Metro department and agency communications.**

GOAL 4: APCD should propose new programs that give citizens opportunity and information to reduce their own emissions contribution and health impacts from poor air quality.

1. Provide presenters and content for more diverse conferences to share air quality information.
2. **Develop air quality information in short videos/virtual series (*e.g.*, Enviro-minutes).**
3. Create a program where APCD hosts Air Quality Hours at local businesses (*e.g.*, Green Drinks, "AQ is Important; Prove me wrong!", or "Beer with a Scientist").
4. Create trivia night content on/about air quality.
5. Host a "Festival of the Environment."
6. Increase consumer awareness of the following: *(These recommendations were considered separately in the prioritization survey.)*
    a. **EV technology, costs, performance, and available incentives.**
    b. **Air quality friendly transportation options.**
    c. **Solar panels technology, costs, performance, and available incentives.**

GOAL 5: Support/amplify the messaging of other groups that promote lowering air emissions and limiting exposure to emissions.

1. **Translate air quality messaging into other languages.**
2. Personalize air quality messaging so it appeals to broader audiences.
3. Set-up a calendar of tabling events to attend and share air quality information with attendees beyond the usual demographic.

4. Advise the District to continue convening (*i.e.*, quarterly) the MPSG Outreach & Education Committee to continue assisting APCD with its engagement, outreach and education efforts.
5. **Use infographics.**
6. **Use social media platforms and the internet to cross-post messaging.**
7. Identify other groups' messaging and sculpt our messages to resonate.

Goal 6: Create a conduit for community feedback, input, funding opportunities and donations.

1. Develop a webpage to receive information, projects, program ideas and requests.
2. **Develop an RFP process for the Air Pollution Control Board (APCB) Trust to increase awareness of the Trust as a funding source for potential air quality projects.**
3. Develop materials (*i.e.*, surveys, questionnaires) used to obtain feedback from the community that can be shared at on-the-go tabling events (*e.g.*, community festivals, health fairs, etc.).
4. **The District should identify and promote newer technologies for APCD permitted entities and industry (and help to identify funding mechanisms).**

APPENDIX C: RECOMMENDATION FEEDBACK

FEEDBACK FROM RECOMMENDATION SURVEYS

POINT SOURCE

Recommendation 1

Comment: *Not only is it important that such a spreadsheet of known and planned reductions be made prominently available to the public and to decision-makers, along with the expected schedule for meeting each of those respective targets, but in order to encourage accountability, this tool should also be regularly updated to track progress that is made against such anticipated reductions.*

Comment: *This should include metrics: targets for reduction, progress, timeline.*

Recommendation 2

Comment: *There should only be one level of recognition as having several can cause confusion and could show bias against a lower level participant as they may be resource constrained and can't achieve enough reductions to qualify for a higher level. There does need to be other criteria regarding what activities qualify for recognition.*

Comment: *The organizers of this program could potentially partner with the Louisville Energy Alliance for a joint event that recognizes buildings for both their energy efficiency improvements (i.e. Kilowatt Crackdown) and their efforts to reduce ozone precursors.*

Recommendation 3

Comment: *Leverage existing programs rather than create a LM specific program by working with other agencies and groups.*

Comment: *There needs to be a program to educate business and industry about these programs and a way to recognize those that participate in them.*

Recommendation 4

Comment: *Instead of sources developing individual plans/programs, APCD should develop a simple commitment form that outlines specific actions that sources can sign up for. Keep it simple and standardized.*

Comment: *The effectiveness of voluntary measures such as these depends greatly on the degree of communitarian spirit in the District. A measure of how much such efforts can be relied upon for real reductions is simply according to how "SIPable" they are. Furthermore, since the current ozone NAAQS does not reflect the more stringent levels that would be health protective for all, more systemic approaches to pollution control are more desirable rather than only focusing on something that only "shaves the peaks."*

Recommendation 6

Comment: *There needs to be a better understanding of the impact of the actions that can be taken in the District and how they influence the ozone levels. (6.a. & b.)*

Comment: *Start by ensuring that current emissions inventory is as accurate as possible, then seek to refine modeling based on accurate data targeted to those source categories that have the greatest reduction opportunities. (6.c.)*

Comment: *Yes, there needs to be a much more accurate understanding of the actual contributions by the sources in the District as the EPA data is not accurate. (6.c.)*

Recommendation 7

Comment: *Use these results to help define additional actions that sources can take in the future to prevent ozone exceedances.*

Recommendation 9

Comment: *Recommend ANPR contain draft text of a Revised Regulation 2.04 so detailed comments from stakeholders can be submitted from the start of the regulation change process. An ANPR without draft text of revised regulation 2.04 will limit its effectiveness for this rule making process.*

Recommendation 10

Comment: *Any efforts here should be based on what the data tells us in terms of sources with greatest reduction potential.*

Comment: *Ensure that actions taken by other jurisdictions resulted in measurable improvements in ozone and precursor emissions. (10.a.)*

Comment: *Since the area is NOx limited, the District needs to implement NOx control measures more so than VOC control measures as the NOx reductions will have a much greater impact on reducing ambient ozone concentrations. (10.a.)*

Comment: *Additional regulations need to be consistent with rules in other jurisdictions. This would include regulations developed based on CTGs, (10.a.)*

Comment: *Additional regulation on VOC sources should only be added if the District's air quality designation is revised to Moderate. (10.c.)*

Recommendation 11

Comment: *Yes, this should be applied to VOC sources as well.*

AREA SOURCE

Recommendation 1

Comment: *LM needs improved data to ensure that efforts are focused on sources with greatest opportunity for improvement.*

Comment: *Yes, there needs to be a much more accurate understanding of the actual contributions by the sources in the District as the EPA data is not accurate.*

Recommendation 2

Comment: *While this kind of work deserves support, it is important for all to understand better how reliably they lead to substantial voluntary emission reductions, or put another way, how "SIPable" these measures are.*

Comment: *Providing funding to small business to encourage them to adopt less polluting technologies or work practices will accelerate emission reductions.*

Recommendation 3

Comment: *The goals of the inspections need to made clear, including what the magnitude of the consequences are expected to be for emissions control. (3.a.)*

Comment: *I'm assuming that this increases the frequency of inspections. (3.a.)*

Comment: *Review and adopt materials from other jurisdictions or trade associations before creating new documents. (3.b.)*

Comment: *Educating small businesses about their compliance requirements and opportunities to reduce emissions is essential to reduce emissions. (3.b.)*

Comment: *I would hope that 3b would be included with 3c, but if not, I think 3c would be more impactful. (3.c.)*

Comment: *The SBAP program is critical to educating small businesses about compliance obligations and approaches to reducing emissions in a nonthreatening manner. (3.d.)*

Recommendation 4

Comment: *Ensure that any program includes measurement and verification process to document that ozone and precursor emissions have been reduced.*

Comment: *While this kind of work deserves support, it is important for all to understand better how reliably they lead to substantial voluntary emission reductions, or put another way, how "SIPable" these measures are. Benchmarking, establishment of meaningful emission reduction goals, tracking progress and establishing mechanisms for accountability are all important to ensure such an initiative entails.*

Comment: *Advanced Planning and Sustainability is planning to take this on so I'm not prioritizing it here.*

Comment: *Reducing energy demand reduces emissions of both VOCs and NOx and ultimately saves operating costs, which is a win-win scenario.*

Comment: *This aligns with Louisville's Greenhouse Gas Emissions Reduction Plan.*

Recommendation 5

Comment: *Coordinate with Point source recommendation #4, and develop a standardized commitment form for sources to complete and return.*

Comment: *The effectiveness of voluntary measures such as these depends greatly on the degree of communitarian spirit in the District. A measure of how much such efforts can be relied upon for real reductions is simply according to how "SIPable" they are. Furthermore, since the current ozone NAAQS does not reflect the more stringent levels that would be health protective for all, more systemic approaches to pollution control are more desirable rather than only focusing on something that only "shaves the peaks."*

Comment: *I would give this one a priority if I could vote for more than 5! Encouraging and rewarding voluntary initiates will result in emission reductions much faster than a regulatory approach.*

Comment: *This seems like it could be paired nicely with Recommendation #4 in the Point Source list.*

Recommendation 6

Comment: *Better management of solvents will reduce VOC emissions.*

Comment: *If the District pursues this recommendation, the coatings industry can engage with the District on green cleaning practices. If the District chooses to move forward with the Industrial Cleaning Solvent CTG we have concerns about the exemptions. We are more than happy to work with District on a possible rule making, including outlining our concerns.*

Recommendation 7

Comment: *Put initial focus on LM agencies and other large entities (like JCPS) where policies and practices can be implemented across a large number of buildings, and results can be used as a case study for other sources and building owners.*

Comment: *Serious consideration needs to be given to regulating consumer products that contain VOCs or generate NOx (BBQ, burning, HVAC, etc.) as consumer use generates a significant amount of air pollution emissions and is unhealthy as people are exposed to many of these materials in their home.*

MOBILE SOURCE

Recommendation 1

Comment: *LG&E could be a partner (1.a., c., & f.)*

Comment: *Leverage existing national EV programs and targets, and tie any strategy to achieving other goals such as GHG reduction. (1.a.)*

Comment: *For LM and JCPS fleets, ensure that EV program documents expected fuel and maintenance savings, and verifies savings after implementation. (1.f.)*

Recommendation 2

Comment: *Periodic updates of the quantitative benefit of RFG should be shared to help guide future decisions on RFG based on solid benefit-cost assumptions. If AQ benefits are deemed to be minimal now or in the near future, the cost to society remains high in the form of increased cost of fuel.*

Recommendation 4

Comment: *Suggest TARC and JCPS buses as priority.*

Recommendation 5

Comment: *Unfortunately, this won't get passed by Metro Council. I think we've reduced parking requirements as much as is achievable at this time. (5.b.i.)*

Recommendation 6

Comment: *I think Every Commute Counts is doing a good job of getting this out there. (6.a.)*

Comment: *Ensure that overall mobility improvements are included (bicycle, pedestrian, buses, etc.) (6.b.)*

Recommendation 8

Comment: *Ensure data is used to prioritize fleets and vehicle type for any replacement plan. (8.a.)*

Comment: *We're working on an environmental purchasing policy that requires new fleet purchases be as efficient as is practical….mostly all electric but hybrids for some users. (8.a.)*

Comment: *This would seem to encompass some of the other potential steps in #8, and be a good first step to help to guide which one of the others make the most sense. (8.a.)*

Comment: *Use APCD to gather information on incentives and grants, and coordinate application among agencies/fleets using priority developed in 8a. (8.b.)*

Comment: *Already working on it. (8.c.)*

Recommendation 9

Comment: *Target elimination of idling, especially near schools where emissions have a known negative health impact. (9.a.)*

Comment: *With reluctance to select one option among all of these, please consider the suggestion that APCD consider "entities" broadly here, to include not just schools, but also trucking firms, construction firms, transit agencies, etc.--in short, a wide variety of public and private entities. (9.a.)*

Comment: *This might need to end up being coordinated regionally with the lack of existing truck parking in Jefferson County. (9.e.)*

Recommendation 10

Comment: *Establishment of essential baseline data consistent with the real world is critical to direct energies toward solutions the make sense, and to avoid efforts that are unlikely to produce significant benefit. Multimodal strategies, in our understanding, should also include infrastructure opportunities for pedestrians and cyclists.*

Recommendation 11

Comment: *LMG should continue to encourage walkability as a strategy for reduction of emissions and improvements in public health and positive contribution to GHG emission reductions.*

Comment: *Establishment of essential baseline data consistent with the real world is critical to direct energies toward solutions the make sense, and to avoid efforts that are unlikely to produce significant benefit. Multimodal strategies, in our understanding, should also include infrastructure opportunities for pedestrians and cyclists.*

Comment: *The Office of Advanced Planning and Sustainability is currently trying to do this for COVID-19.*

Recommendation 12

Comment: *LMG should continue to encourage walkability as a strategy for reduction of emissions and improvements in public health and positive contribution to GHG emission reductions.*

Comment: *Establishment of essential baseline data consistent with the real world is critical to direct energies toward solutions the make sense, and to avoid efforts that are unlikely to produce significant benefit. Multimodal strategies, in our understanding, should also include infrastructure opportunities for pedestrians and cyclists.*

HEALTH COMMITTEE

Recommendation 1

Comment: *Initial monitoring focus should be on ozone and precursors, as well as PM to ensure implemented projects have a positive impact on emissions. Ensure that priority is given for monitors near places such as schools.*

Comment: *This seems to be both important and achievable.*

Comment: *The use of the word "should" is non definitive. Replace with "shall" (regarding Recommendations 1-4).*

Recommendation 3

Comment: *This sounds very interesting, but I'm not sure, given how much people travel within the region, whether it could be useful with regard to hotspots.*

Recommendation 4

Comment: *I think that recommendation 7 would also be covered/considered under this.*

Comment: *Recommend the use of a stakeholder process to propose clear definitions and measurements for environmental and health impacts to be included in the decision making process.*

Comment: *I'm surprised this isn't already mandated.*

Comment: *Louisville Comprehensive Plan 2040 has five guiding principles: connectivity, health, authenticity, sustainably, and equity. These five goals offer a balanced approach to livability given that each community has its own needs and character. This livability element of the plan was expanded with the stated goal that the built environment would support "the natural environment by considering air, water and soil quality while allowing for appropriate growth and development."*

The plan as it is currently written also calls for consideration of "impacts on human health, quality of life and the environment including prevailing meteorological conditions and the potential to transport noxious odors, particulates and emissions when reviewing new developments and redevelopments." Under the plan, special attention is "paid to air and water quality when residences, schools, parks or vulnerable populations will be impacted."

The plan also calls for a mitigation of "impacts to areas that are disproportionally affected." Nevertheless, environmental issues are balanced against "a framework and policy context [of] a healthy economic climate."

In the Comprehensive Plan much of the underlying research has been developed through a set of constructs termed "the Social Determinants of Health" (SDOH). The SDOH's study how social and neighborhood conditions come together to impact healthy outcomes. These conditions include "access to proven health protective resources like clean air, healthy food, recreational space, opportunities for high-quality education, living wage employment, and decent housing..." Much consideration is "given to green infrastructure and the urban tree canopy as a way to improve environmental quality, resilience to changing climate, and the health outcomes of residents." Its policies also address "reducing carbon emissions, incentivizing energy efficiency, and promoting waste reduction and expanded recycling." This is achieved through a variety of mechanism including, "design elements that address the urban heat island effect and energy efficiency, such as the planting and preservation of trees, cool roofs and green infrastructure, for new development"

Moreover, the Land Development code already contains relevant provisions like Chapter 10, Part 2 Landscape Design, which seeks to reduce noise pollution, air pollution, visual pollution, air temperatures, and the glare associated with heat islands through "[a] well designed landscape." The Land Development Code, at least in part, also seeks to strike a balance between the supply of off-street parking, improved mobility, promotion the use of alternative modes of transportation, support of existing and new economic development, maintenance of air quality, and enhancement of the urban form. (see Downtown Form District 1). Specifically, in terms of traffic, the Land Development code specifies that applicants must undertake an assessment of the potential air quality and traffic impact if the project entails new construction or land use changes which meet the thresholds established in the current version of the "Guidelines for Traffic Impact Studies and Air Quality Analysis in Jefferson County, Kentucky." The assessment is intended to identify potential adverse impacts and make recommendations regarding mitigation. Nevertheless, the code also offers some flexibility in urban planning, recognizing that "[a]lthough most mitigation measures that improves traffic flow also improves air quality, this is not true for all mitigation measures," because the code implicitly recognizes that

blanket regulations and mandates do not always offer the necessary flexibility that land use planning requires.

Recommendation 5

Comment: *Nonattainment areas need a larger proportion of assistance in reducing air pollutants and they typically have the greatest concentration of people so it will result in the greater impact.*

Comment: *Yes. And thank you.*

Comment: *Nonattainment does not necessarily equate to protecting public health. We are currently seeing air standards rolled back, when the science documents the need to tighten them. And there are no standards for some air pollutants such as VOCs. Recommend that the APCD prepare a report on air pollutants and their health risks and direct funds to those chemicals/pollutants with highest health risks.*

Recommendation 6

Comment: *There should be a way to ensure the funding is being leveraged to ensure the greatest reductions in air pollution is being realized.*

Comment: *Ensure that clear definitions and measurements for health impacts are established before using this as a project selection criteria.*

Comment: *Haven't we been?!*

Comment: *Do they not already do this?*

Recommendation 7

Comment: *Reducing residual heat and increasing vegetation will reduce pollution and ozone formation.*

Comment: *All LMG mitigation strategies should be coordinated across agencies and prioritize strategies that impact multiple outcomes for environment and health.*

Comment: *The outcomes are direct and observable.*

Comment: *We need to use the heat island monitors already in place to identify the scope and severity of the UHI. As projects are implemented we can then measure their effectiveness.*

Comment: *There are many challenges facing the Louisville Metro area and Metro government, notably large budget constraints. Currently, Louisville Metro's government manages the*

impact of a $35 million deficit, driven largely by repeated 12 percent annual increases in the city's state pension costs – all while minimizing the impact on Louisville's most vulnerable. The capital budget is now the smallest in five years, with investments focused primarily on maintenance and affordable housing – with the stated priority being public safety. And, with each challenge comes a call for reprioritization. With so many competing interests such as mobility, infrastructure, economic growth, development, and environmental preservation, the answer seems to be to balance the needs of each individual community rather than a focus on the mitigation of any singular issue.

Recommendation 8

Comment: *All major LMG initiatives of the past 5 years (GHG, Move Lvl, etc.) should be reviewed to identify where policies and strategies intersect, and where consolidation can help advance the work more quickly by focusing resources on priority areas.*

Comment: *The Envirome Institute at UofL already has created a clearing house of research on environment health issues in Louisville*

Comment: *As mentioned above, Metro government's budget and resources are already stretched thin. If there are resources available, those resources could be better used by other agencies, which are already struggling with staffing and funding, starting with those which create the greatest impact to our community.*

Moreover, the planning and zoning process already allows for neighborhood meetings and technical studies "based on site conditions or potential impact of the development, or as needed to determine compliance with…regulations." Those studies can include: traffic, air quality, wetland analysis, geo-technical studies, and hydro-geologic analysis. A steering group would only create a redundant layer in a government whose resources are already overtaxed - and where there are already protective mechanisms in place through the Land Development Code. All the while, the added layer of oversight will likely cause delays to the housing and development markets which fuel our local economy.

Recommendation 10

Comment: *Indoor air pollutants are a significant source of outdoor pollutants and can be as large as some stationary sources.*

Comment: *As written I do not see any actionable request. We have plenty of studies on the health impact of indoor air quality, we do not need more studies. Suggest that APCD establish an education outreach program on indoor air, that APCD place indoor air monitors in all Metro buildings (there are a number of low cost monitors available) and collect the data and prepare an annual report to Metro Council, and establish a citizen science network of indoor air monitors in homes to collect information on exposure.*

Recommendation 11

Comment: *There are plenty of studies on the health impacts of ambient air quality. The APCD should prepare a study of the health impacts of ambient air in Louisville.*

Recommendation 12

Comment: *I would be surprised if there will be many opportunities at this point. But this should be pro forma anyway.*

Comment: *Does anyone think that "strongly advocate" is more meaningful that "should encourage"? Both are non actionable.*

OUTREACH & EDUCATION COMMITTEE

Goal 1, Recommendation 1

Comment: *This should include libraries and schools.*

Comment: *I think educating our community in the broadest possible ways so that they understand the impacts of their own and our collective decisions on health.*

Goal 1, Recommendation 2

Comment: *This can have the greatest impact on communicating messages to the community.*

Goal 1, Recommendation 4

Comment: *This should include the NextDoor app.*

Goal 1, Recommendation 5

Comment: *This should include infographics and other visual means to communicate the impact of air quality, as well as opportunities for industry and individuals to improve AQI.*

Goal 1, Recommendation 6

Comment: *This will allow for the integration of science in real world applications and educate students about the significance of air pollution.*

Comment: *Again, keep information simple but factual and include information on how kids and families can make improvements. Maybe focus on no-idle programs or reducing the number of kids driven to school separately by parents?*

Goal 1, Recommendation 7

Comment: *Is this a new separate Youth Summit?*

Goal 1, Recommendation 8

Comment: *This can be a cost effective manner to get the public to take voluntary measures to reduce ozone precursors. In addition to billboards, there are many electronic signs such as those on the highway and other public places where messages can be displayed.*

Comment: *Billboards lower the quality of life by being eyesores. They are also an outdated communication strategy.*

Goal 1, Recommendation 9

Comment: *Ensure that health care providers know how to use the information and how to help communicate it to their patients. Include health care service providers such as pharmacies in communication efforts as well.*

Comment: *Providing the AQI to healthcare professionals would be worthless. Need to provide professional training and education on how air quality impacts health, what to look for, what tests to run. Need to provide system that allows healthcare professionals to quickly identify air toxins at specific workplaces and areas.*

Goal 1, Recommendation 10

Comment: *This can be a cost effective manner to get the public to take voluntary measures to reduce ozone precursors.*

Goal 1, Recommendation 11

Comment: *LMG agencies should identify a set of coordinated actions that each will take, including communications, when AQI is projected to reach harmful levels.*

Goal 4, Recommendation 1

Comment: *A speakers bureau can be developed and made available.*

Comment: *Identify trusted sources of information in communities most impacted by poor air quality and develop relationships with those sources to ensure that AQI information is provided to at risk populations in the community.*

Goal 4, Recommendation 2

Comment: *Many people now want to consume information in a video format and these videos can be widely distributed to many groups for incorporation into programs.*

Comment: *Ensure that any short videos are able to be shared across multiple social media platforms, and that content is appropriate and provided to employers, schools, and other community entities that can be enlisted to help spread the word.*

Comment: *Yes, and share as broadly as possible on social media. Very effective tool.*

Comment: *Distribute through social media*

Goal 4, Recommendation 5

Comment: *This sounds enticing, but I think there would be some overlap with the annual Sustainability Summit (Louisville Sustainability Council) and Party for the Planet (Louisville Zoo). Might be able to piggy-back on these events to increase awareness about air quality.*

Comment: *This is already being done by the Louisville Environmental Council and a number of other organizations, but all of them are reaching only those who are already receptive to the message.*

Goal 4, Recommendation 6

Comment: *Educating consumers is critical so they can make well informed decisions on actions that can reduce air pollution. (All)*

Comment: *Improved communication of "friendly" transport options should be coordinated with transit and other LMG agencies, and improvements to those methods of transport must also be identified and implemented (ex. more bike lanes) (6.b.)*

Comment: *Item b. incorporates item a., or could. Both b. and c. can be powerful, and outcomes could be measured statistically, though correlation will be relatively weak.*

Comment: *There is a lot of information available on all of these topics, but they are not accessed. I just bought an EV and visiting 3 dealers none knew anything about available incentives. Putting out information does not mean that we will see changes in purchasing behavior.*

Goal 5, Recommendation 1

Comment: *English is not always the first language for many populations and translating messages into other languages will have a greater impact as these populations will be better able to understand the significance of taking actions to prevent pollution.*

Comment: *Initial focus should be on Spanish (if not already completed), followed by other languages using data on where residents are from.*

Goal 5, Recommendation 2

Comment: *Emphasize the relationship between exposure, damage to lungs, and increased risk from exposure to infection.*

Goal 5, Recommendation 3

Comment: *This is a great nontraditional way to communicate messages and receive feedback from members of the community.*

Goal 5, Recommendation 5

Comment: *Visual communication can be very powerful so that it can educate individuals to take voluntary actions to reduce air pollution.*

Comment: *Communication should be simple and factual, using more visuals than words.*

Comment: *I love clear, simple infographics. Attention spans are continually shrinking.*

Goal 5, Recommendation 6

Comment: *Start by identifying key partners and establishing relationships to ensure that messages are shared in both directions - should include community groups as well as other NGO focused on environment or health.*

Comment: *As ambivalent as I am about them, they are here for good, massive, and powerful.*

Goal 6, Recommendation 1

Comment: *Materials should be developed for tabling events to help inform the community this webpage exists. Webpage should include surveys and questionnaires.*

Comment: *Start with a specific problem statement with a limited scope to test the concept. This feedback mechanism should be shared across LMG, so identify existing systems that could be repurposed instead of creating something new.*

Goal 6, Recommendation 2

Comment: *There are many good ideas to reduce air pollution, but lack funding and this would allow for an easier way to access funding.*

Comment: *Invite local ingenuity, yes.*

Goal 6, Recommendation 3

Comment: *See #1*

Goal 6, Recommendation 4

Comment: *Educating industry on options to reduce pollution along with funding opportunities can be very productive.*

Comment: *Maintaining an evolving list of best practices and cutting edge technologies would help industries by providing a single place to go for information – could also be used to engage UL and UK research teams on opportunities for research.*

Comment: *Measurable impacts.*

Comment: *The KY Pollution Prevention Center has been doing this for over 2 decades. The APCD should provide funding to them to increase their efforts in air emission controls.*