

FORT COLLINS
AIR QUALITY
PLAN

DECEMBER 2019

CONTENTS

Executive Summary	3
What Is Air Pollution?	3
Vision, Mission and Motivations	5
Principles and Policies	6
Strategies and Actions	8
Priority Air Pollutants and Associated Sources	9
Ozone Causing Pollutant Sources.....	11
Transportation Sources	12
Non-Road Engine Sources	14
Oil and Gas Production Sources	16
Indoor Air Quality.....	18
Environmental Regulation	20
Air Quality Monitoring.....	22
Climate Adaptation	24
Lead by Example	26
Appendix A – Priority Air Pollutants and Sources	28

Executive Summary

The quality of the air we breathe can affect our health, the environment and our climate future. Microscopic pollutants in both indoor and outdoor air are often invisible and can penetrate deep into our respiratory and circulatory system, damaging our lungs, heart and brain. In the environment, pollutants can affect ecosystems and contribute to a changing climate. While outdoor air quality in Fort Collins is generally perceived as good,¹ the City does not meet Federal health-based air quality standards for ozone,² and our continuing growth as a community brings additional challenges related to air quality impacts from transportation and other human caused sources.

This 2019 update to the 2011 Air Quality Plan is meant to be a guiding document for City of Fort Collins policies and programs that support the protection of public health and the environment through improvement in outdoor and indoor air quality. For more than 25 years, the City of Fort Collins has been actively involved in addressing air pollution at a local level, and working regionally to address air pollution on a larger scale. Additionally, City and community efforts to combat climate change are closely related to air quality improvements, as many of the same sources that emit greenhouse gases also emit air pollutants, and a changing climate may adversely affect air quality.

Air pollution is a complex issue with many contributing factors, and pollution does not follow jurisdictional boundaries. To help ensure that efforts to continually improve air quality will succeed, it will be important to continue a local, regional, state and national dialogue which supports innovation and collaboration at all levels. Priorities in this plan look ahead to near-term (1-2 years) and longer-term (3-5 years) strategies and programs, focusing on efforts to:

- Continue ongoing work to reduce emissions, while identifying and implementing ways to quantify, measure and track air quality benefits of greenhouse gas source reductions, and other emission reduction strategies;
- Plan for ozone attainment, by working locally to reduce pollution from sources such as gas and diesel vehicles and engines, and collaborating regionally to decrease transported pollution, such as impacts from oil and gas operations;
- Increase opportunities for community members to identify and manage pollutant sources in their homes and businesses, while leveraging potential air quality benefits of energy efficiency improvements; and
- Prepare for air quality impacts that may come from a changing climate, which can lead to increases in extreme events such as wildfires that can impact air quality locally and regionally.

AIR QUALITY PLAN DEVELOPMENT



Air Quality Forum, March 6, 2019

The first Air Quality Plan was adopted in 1993 and has undergone periodic updates and revisions every five to 10 years.³ This Air Quality Plan was developed in coordination with the City's 2019 comprehensive plan update, which includes long-term land use and transportation planning principles and policies. City Council adopted the revised City Plan on April 16, 2019, which includes the air quality principles, policies and strategies repeated here. Specific action items in this Plan are updated administratively, and informed by consultation efforts with the community, regional partners and stakeholders including:

- The 2017 Air Quality, Climate and Recycling Survey;⁴
- Consultation with the City's Air Quality Advisory Board and Natural Resources Advisory Board;
- A 2019 Community Air Quality Forum;⁵
- 2019 updates to City Council Air Quality Priorities; and
- Public comments received on the Draft Plan.

What is Air Pollution?

An air pollutant is a gas or particle substance in the air that can have adverse effects on human health and the environment. Long-term exposure to elevated levels of certain air pollutants has been associated with increased risk of cancer, premature mortality, and damage to immune, neurological, reproductive, cardiovascular and respiratory systems.⁶ People at greater risk of experiencing air pollution related health effects include older adults, children and those with heart or respiratory conditions.

Outdoor air pollution is influenced by local, regional and even global sources, as pollutants in the air can be widely distributed and transported. Pollution sources that affect outdoor air quality include those related to human activities, such as operating gas and diesel vehicles, coal-fired power generation and other residential, commercial and industrial activities. Pollution sources can also be naturally occurring, from sources such as wildfires and windblown dust.

Indoor air quality is also a major health concern, and it can often be worse than outdoor air. Poor indoor air quality has been tied to health issues such as asthma attacks, headaches, fatigue, trouble concentrating, and irritation of the eyes, nose, throat and lungs. Additionally, long-term exposure to indoor pollutants such as asbestos and radon can lead to lung cancer.⁷ Sources of indoor air pollutants include consumer products, such as paint, cleaning and personal care products, combustion sources such as ovens and fireplaces, and other household materials.



Testing for Carbon Monoxide during Healthy Homes Indoor Air Quality Assessment

Federal/State/City Roles

Under the Clean Air Act (CAA), the Environmental Protection Agency (EPA) is required to regulate emissions of pollutants that endanger public health and welfare. This includes regulation of common air pollutants, referred to as “criteria” pollutants. States are responsible for developing implementation plans to comply with federal regulatory standards for criteria pollutants, which include:

- Carbon monoxide (CO);
- Lead (Pb);
- Nitrogen dioxide (NO₂);
- Ozone (O₃);
- Particulate matter (PM_{2.5} and PM₁₀);⁸ and
- Sulfur dioxide (SO₂).

Climate Action Goals

Climate Action Planning activities have overarching goals aimed at reducing fossil fuel dependency and use, which has the added benefits of reducing air pollutants. The City originally adopted carbon emission goals in 1999, and in March 2015, accelerated community goals were unanimously adopted by the City Council.

In 2020, Climate, Energy and Waste policy planning documents will be updated and include a goal of 100% renewable energy for electricity by 2030.

20%

below 2005 levels by 2020

80%

below 2005 levels by 2030

Carbon neutral by

2050

Additional pollutants, such as Hazardous Air Pollutants (HAPs) include many hundreds of pollutants, such as benzene, that are suspected or known to cause cancer or other serious health problems. HAPs emissions are regulated at the federal and state level through air permits for specific sources.

While federal and state agencies have a critical regulatory role, action at the City level plays a vital role in promoting actions that can lead to protecting and improving air quality. Capacity areas supported by the City which can influence air quality include:

- Transportation and land use planning designed to limit fuel use and vehicle miles traveled;
- Adopting Climate Action Goals for greenhouse gas emissions, where sources of greenhouse gases are also sources of air pollutants;
- Developing and administering public information and outreach, incentive and engagement programs to promote awareness and action;
- Convening and collaborating with stakeholders including businesses, industry and other local and regional partners to limit pollution sources;
- Tracking and reporting air pollution data;
- Developing and implementing local air quality policies, programs and regulations;
- Participating in regulatory rulemaking at county, state and federal levels; and
- Leading by example, by integrating air quality impact considerations in City operations.

Vision, Mission and Motivations

Air Quality Vision



A community that is vigilant about protecting the quality of air we breathe and continually strives to improve it.

Air Quality Plan Mission



To protect human health and the environment through continuous improvements in air quality.

Air pollution is not a new problem, and in many respects, increased awareness, improvements in technology and new and evolving regulations have led to improvements. Continuing efforts are necessary, as Fort Collins faces challenges related to population growth and the associated air quality concerns that come with transportation demand, and other residential, commercial and industrial pollution sources commonly associated with urban environments. Some key motivations include:

- Fort Collins, along with the Denver/North Front Range region, does not comply with EPA health-based standards for ozone;
- Localized impacts of particle pollution from dust and smoke sources (e.g., construction and wood fires) can create nuisance issues and health concerns;
- Visible air pollution, where impairment is sometimes perceived as a “brown cloud,” is higher than regional standards approximately one in four days each year;
- Air quality surveys indicate that one quarter of Fort Collins’ households report a member with a respiratory ailment;⁹
- Studies show that people spend up to 90% of their time indoors, and indoor air pollution is often much worse than outdoor air pollution;¹⁰ and
- Climate change may contribute to increased air quality risks, such as increased emissions from wildfires, and more high heat days that can contribute to ozone formation.

Principles and Policies



Electric Lawn and Garden Equipment Demonstration

This section lists the principles and policies that guide the City organization's efforts in air quality. Principles and policies were adopted as part of City Plan—the City's comprehensive plan—while associated strategies and actions in this Air Quality Plan have been updated administratively.

Principle ENV 4 - Protect human health and the environment by continually improving air quality

The City has had a long-standing principle to continually improve air quality, which includes identifying and implementing opportunities to reduce sources of air pollutants. The policies here provide the guiding framework to support this principle.

POLICY ENV 4.1

Priority Air Pollutants

Focus on high-priority air pollutants, as identified in the Air Quality Plan, considering such criteria as health impacts, community concerns, air pollution trends, compliance with current state and federal standards and ability to affect improvements at the local level.

POLICY ENV 4.2

Air Pollutant Sources

Implement a full spectrum of options—including engagement, incentives and regulation—that focus on prevention of air pollution at the source.

POLICY ENV 4.3

Regional Pollution

Work with local and regional partners to identify and mitigate sources of transported pollutants that influence our local air quality.

POLICY ENV 4.4

Ozone Attainment

Support attainment of Federal standards for ozone by implementing programs and policies that reduce local emissions of ozone-causing pollutants and supporting legislation and policy that reduces regional transport of ozone and ozone-causing pollutants. Coordinate with key partners such as the Regional Air Quality Council (RAQC).

POLICY ENV 4.5

Indoor Air

Provide public information regarding potential indoor air quality concerns and promote behavior change and public action to reduce potential risks in homes, schools and workplaces.

POLICY ENV 4.6

Vehicles and Non-Road Engines

Promote efforts to reduce fuel consumption and associated pollutant emissions from vehicles and non-road engine sources, such as lawn and garden equipment.

POLICY ENV 4.7

Monitoring and Reporting

Monitor, characterize, track and report ambient air pollutant concentrations to increase awareness of air quality issues and better identify opportunities to improve local air quality conditions and reduce emissions.

Ozone Nonattainment

The Environmental Protection Agency (EPA) has classified the Denver Metro/North Front Range area as a nonattainment area for ozone. This means that, during hot summer months, the highest ozone levels exceed Federal health-based standards. As a result, the Colorado Air Pollution Control Division and the Regional Air Quality Council are engaged in extensive planning and implementation efforts, identifying both voluntary and mandatory air pollution control measures to reduce pollutants that contribute to ground-level ozone.



2018 HUD Secretary's Award for the City's Healthy Homes Program

Strategies and Actions

The strategies listed in this section were adopted as part of the 2019 City Plan update.¹¹ Associated implementation actions included in this Air Quality Plan are meant to be dynamic and guide the development of City programs, staff work plans, budget recommendations, grant proposals and other actions in response to community and Council priorities. More detailed work plans are updated biennially through the City's strategic planning and Budgeting for Outcomes (BFO) process.

Many ongoing air quality action items are currently in place, and will continue to be evaluated, improved and streamlined to make the most efficient use of funds. Additional action items are divided as follows:

- **Near-Term Focus Areas** – These actions are already underway or planned for implementation within one to three years.
- **Emerging Ideas** – These reflect new and innovative ideas identified through outreach and other planning activities. Actual implementation may be longer-term (>3 years) and will depend on capacity and resources.

Near-term and emerging actions items are also identified under **Sphere of Influence** as either **Direct** or **Indirect** control, depending on whether the item is mainly a City effort, or relies heavily on external collaboration and partnerships.

City of Fort Collins staff play a critical role in helping to implement City Plan strategies in the course of carrying out their regular duties. In the City organization, air quality planning is coordinated through the Air Quality Program, which is a division of the Environmental Services Department in the Sustainability Services Area. Near-term and emerging actions also identify key **internal partners** (i.e., City Departments) and key **external partnerships**, such as other local governments, state and federal government agencies, the private sector, academia, industry, advocacy groups and community members.



Priority Air Pollutants and Associated Sources



Strategy ENV-4a. Update the Air Quality Plan, including identification of priority air pollutants and sources.

Priority levels for pollutants and sources in Fort Collins are determined considering criteria such as health impacts, compliance with current state and federal standards, air pollution trends and ability to affect improvements at the local level. A summary of priority pollutants and sources, including ozone, particulate matter and indoor air pollutants, is included in Appendix A. Current strategies and near and longer-term focus areas are summarized below.

IMPLEMENTATION ACTIONS - ONGOING

- **Pollutant Trends** - Air pollution is monitored continuously and data reports, which summarize the number of high pollution days and pollutant trends in Fort Collins, are prepared annually.¹²
- **Emissions Summaries** - Municipal and citywide community emissions inventories are used to track greenhouse gas emissions, as

related to climate goals. County level emission summaries for other pollutants are generated by the Colorado Department of Public Health and Environment (CDPHE) and used to inform local programs.

- **Air Quality Survey** - The Environmental Services Department conducts periodic Air Quality/Climate/Recycling Surveys to identify community members' beliefs and attitudes about environmental issues, help staff assess current programs and gather input to prioritize planning and outreach efforts.¹³
- **Air Quality Advisory Board** - The Air Quality Advisory Board is appointed by City Council, and advises the City Council regarding policies, plans, and programs to improve and maintain the City's air quality. This Board regularly reviews and responds to evolving air quality priorities and issues.

POLLUTANT AND SOURCE PRIORITIES IMPLEMENTATION ACTIONS – NEW AND EMERGING

NEAR-TERM FOCUS AREAS	DESCRIPTION
<p>REGIONAL COLLABORATION</p> <p>Leverage updated ozone attribution studies to further identify ozone reduction strategies that are most important for Larimer County and the City of Fort Collins.</p> <p>In 2019 and 2020, the Regional Air Quality Council (RAQC) will update emissions profiles and ozone attribution summaries as part of efforts required by the EPA to meet Federal standards for ozone.</p>	<p>Lead City Entity: Environmental Services Sphere of Influence: Indirect External Partners: RAQC, CDPHE, NFRMPO</p>
<p>CALCULATE IMPACTS</p> <p>Quantify and track air pollutant emission reductions related to climate policy goals and timeframes. Progress towards greenhouse gas goals has many synergies and benefits for air quality, especially for fossil-fuel based emission sources such as transportation and energy generation.</p>	<p>Lead City Entity: Environmental Services Sphere of Influence: Direct Internal Partners: Planning, Development & Transportation, Utility Services External Partners: RAQC, CDPHE, PRPA</p>
<p>NEIGHBORHOOD ENGAGEMENT</p> <p>Collaborate with neighborhoods, through to identify air quality priorities and engage the community at a neighborhood scale in design and implementation of projects to reduce air quality impacts.</p> <p>The City’s Sustainable Neighborhoods program¹⁴ is a model that could be utilized to provide a platform for engagement in sustainability efforts by facilitating neighborhood level workshops, projects and events.</p>	<p>Lead City Entity: Community Development & Neighborhood Services Sphere of Influence: Indirect Internal Partners: Environmental Services External Partners: HOAs</p>
EMERGING IDEAS	DESCRIPTION
<p>BUSINESS ENGAGEMENT</p> <p>Coordinate City efforts to work with local business to understand an individual business’ pollution impact, and help identify and support pollutant reduction goals. This could also include ways to highlight engaged businesses, such as recognition events or other promotion of efforts.</p>	<p>Lead City Entity: Environmental Services Sphere of Influence: Indirect Internal Partners: Utility Customer Accounts Division, Economic Health Office External Partners: Local businesses</p>
<p>STUDENT ENGAGEMENT</p> <p>Engage professors, teachers and students to participate in developing and implementing environmental strategies related to air quality improvements.</p>	<p>Lead City Entity: Environmental Services Sphere of Influence: Indirect External Partners: PSD, CSU, FRCC, Non-Government Organizations (e.g., EarthForce)</p>



Ozone Exhibit, Fort Collins, CO

Ozone Causing Pollutant Sources

Ground-level ozone is an air pollutant that, at high levels, irritates respiratory organs and affects plant growth. Ozone is not emitted directly into the air, but rather when pollutants such as nitrogen oxides (NOX) and Volatile Organic Compounds (VOCs) react in sunlight to produce ozone. The highest ozone levels are usually recorded in summer months on hot, stagnant days with little wind.

Ozone levels measured in Fort Collins, and along much of the northern Front Range, exceed health-based National Ambient Air Quality Standards (NAAQS) set by the EPA. Because the region violates EPA Standards, the State is required to model and implement plans to control ozone, and the Regional Air Quality Council (RAQC) leads regulatory planning efforts to reduce these emissions.¹⁵



SYNERGIES

Many synergies exist between actions to mitigate ozone causing air pollution that have other beneficial outcomes besides the health benefits of improving air quality. Cutting down on ozone precursor emissions also cuts greenhouse gas emissions, which contribute to climate change. Reductions in transportation emissions may also reduce congestion and improve livability within the city.

Locally, it is important to increase awareness of the health effects of ozone and reduce local contributing sources. Sections here identify strategies and actions for the top three major source contributors, including transportation, non-road engines and oil and gas production.

Transportation Sources



Strategy ENV-4b. Promote lower-emission vehicles, reduce VMT and idling time, and collaborate regionally on strategies to reduce vehicle emissions.

Locally, transportation sources are the second largest contributor to ozone causing pollutants, and the second largest contributor to the City's greenhouse gas emission inventory. As the population in Fort Collins and along the northern Front Range continues to increase, strategies and actions that support reduced Vehicle Miles Traveled (VMTs) along with improved vehicle efficiencies and cleaner sources of energy for electric vehicles are key to reducing pollution.

IMPLEMENTATION ACTIONS - ONGOING

Transportation and Land Use Planning. In 2019, the City completed updates to City Plan, Transportation Master Plan and the Transit Master Plan. As noted in the updated City Plan, the City will continue to implement transportation and land planning efforts in ways that reduce emissions by reducing the need to drive (e.g., denser multi-use development) and enhancing opportunities for alternative modes of transportation (e.g., walking, biking and transit). In 2019, the City also completed an Electric Vehicle Readiness Roadmap to capitalize on the importance of shifting fuel and technologies. Continued planning will include updates to the City's Bicycle and Pedestrian Plans.

Efficient Transportation Systems. The City of Fort Collins encourages increasing mode shifts from vehicles to walking, biking and transit. Support for this includes pedestrian and bike projects such as the low stress bike network and completing sidewalk gaps. Other efforts to positively impact emissions include congestion management, arterial and intersection improvements, roundabouts and adaptive signal timing.¹⁶

Anti-idling campaigns. The City conducts vehicle idling campaigns aimed at reducing unnecessary idling, and associated engine emissions. Anti-idling signs are available by request for any school or local business, and the City will send outreach letters in response to complaints about excessive idling in neighborhoods. Planning and zoning requirements also limit the number of drive-thru businesses, which can contribute to emissions from idling.

Clean Vehicles. At the state level, there is a commitment to maintaining progress on clean vehicles,¹⁷ which was supported by the City of Fort Collins and other local governments in the region. In 2018, this included adoption of a Colorado Low Emission Vehicle (LEV) program, requiring that all new light and medium-duty vehicles meet LEV standards beginning with Model Year 2022. In 2019, the State adopted Zero Emission Vehicles (ZEV) standards, which requires an increasing percent of light duty ZEVs beginning with Model Year 2023.



Sign provided to schools and businesses upon request

TRANSPORTATION SOURCES IMPLEMENTATION ACTIONS - NEW AND EMERGING

NEAR-TERM FOCUS AREAS

DESCRIPTION

CALCULATE IMPACTS

Quantify air quality impacts for transportation planning scenarios and alternatives.

In 2017, Fort Collins developed a Transportation Air Quality Impacts Guidance Manual intended to guide processes which evaluate, analyze and document the benefits and tradeoffs of transportation investments as they relate to air quality.

Lead City Entity: Planning Development & Transportation

Sphere of Influence: Direct

Internal Partners: Environmental Services

ELECTRIC VEHICLE READINESS ROADMAP

Implement the City's Electric Vehicle Readiness Roadmap, which outlines short-term, medium-term and long-term strategies to become EV ready as a community. Near-term implementation actions include improving awareness of benefits and tax incentives, and making charging stations more accessible.

Lead City Entity: Planning Development & Transportation

Sphere of Influence: Direct

Internal Partners: Sustainability Services, Operations Services

External Partners: RAQC, NFRMPO, CSU, NCCC, PRPA, CEO

EMERGING IDEAS

TRANSPORTATION DEMAND MANAGEMENT

Partner with regional stakeholders to create a Transportation Management Association (TMA), to develop additional Transportation Demand Management (TDM) tactics that target regional reductions in VMTs and improved vehicle efficiencies.

Lead City Entity: Planning, Development & Transportation

Sphere of Influence: Indirect

Internal Partners: Economic Health Office, Environmental Services

External Partners: NFRMPO, CSU, Larimer County, regional municipalities, local business associations

TRANSPORTATION EQUITY

Collaborate with City and external stakeholders to analyze existing transportation equity-related plans, policies, and programming, and develop a work plan related to advancing transportation equity at the City.

Lead City Entity: Planning, Development & Transportation

Sphere of Influence: Indirect

Internal Partners: Sustainability Services

External Partners: Larimer County

INCENTIVES

Offer incentives, such as free bus passes, when air quality forecasts predict high ozone concentrations to encourage alternatives to single passenger vehicles. This would be combined with efforts to increase access to and awareness of air quality alert days.

Lead City Entity: Environmental Services

Sphere of Influence: Direct

Internal Partners: Larimer County

TRANSPORTATION RELATED PRICING

Evaluate opportunities and trade-offs for potential implementation of transportation related pricing, such as congestion pricing, paid on-street parking and a VMT tax.

Lead City Entity: Planning, Development & Transportation

Sphere of Influence: Direct

Internal Partners: Environmental Services

Non-Road Engine Sources



Strategy ENV-4c. Incentivize and promote use of electric or low-emission alternatives to non-road gas and diesel engines such as lawn and garden maintenance equipment, for residential, municipal and commercial use.

A non-road engine is an internal combustion or gas turbine engine used for purposes other than a vehicle operated on public roadways. This includes a wide range of uses such as for equipment used for lawn and garden maintenance, snow removal, and portable energy generators. Locally, non-road engine sources are the third largest local contributor to ozone causing pollutants, where pollution from these types of engines comes from the by-products of the combustion process (exhaust) and from evaporation of the fuel itself.

IMPLEMENTATION ACTIONS - ONGOING

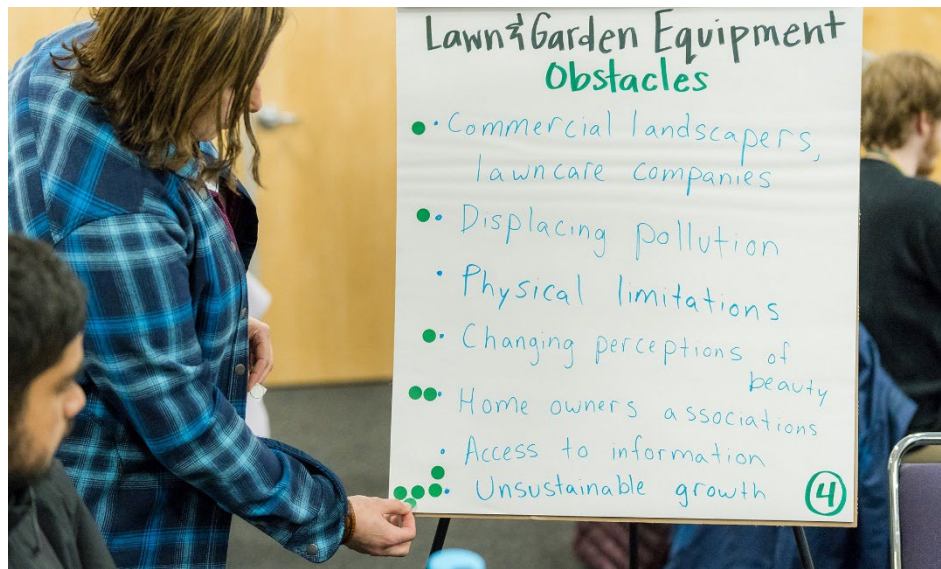
Residential lawn and garden equipment purchase and exchange program.

Since 2009, the City has supported rebates to purchase new electric lawn and garden equipment and recycle gas-powered equipment.¹⁸

City-owned Commercial lawn and garden equipment on public lands.

Beginning in 2016, the City secured grants and allocated funds to accelerate the replacement of City-owned commercial grade gas-powered lawn and garden equipment with electric (battery) powered equipment. In addition to reducing municipal emissions, these efforts will be leveraged to demonstrate feasibility for the private sector, as some of the technology is relatively new. Operator feedback has been that electric equipment has met operational needs, reduces noise, reduces the odor of evaporative emissions from gasoline, and in some cases outperforms gas powered alternatives.

Low Maintenance Landscapes. The City offers programs that educate, support and incentivize a switch from the traditional lawn landscape to more regionally appropriate landscapes that reduce yard maintenance, which also reduces emissions from gas-powered lawn and garden maintenance equipment.¹⁹



Collecting feedback on electric lawn and garden equipment programs at the March 6, 2019 Air Quality Forum

NON-ROAD ENGINE SOURCES IMPLEMENTATION ACTIONS - NEW AND EMERGING

NEAR-TERM FOCUS AREAS

DESCRIPTION

PURCHASING POLICY

Update purchasing policies for work contracted by the City to increase weighting and emphasis on sustainability factors in Request for Proposals (RFPs), such as use of electric lawn and garden equipment for the City's third-party contracts.

Lead City Entity: Financial Services
Sphere of Influence: Direct
Internal Partners: Environmental Services
External Partners: City service providers

BUSINESS ENGAGEMENT

Implement engagement opportunities with commercial landscapers and the community to demonstrate feasibility of electric equipment, such as showcasing City maintained low- to zero-emission landscaping efforts.

Lead City Entity: Environmental Services
Sphere of Influence: Indirect
Internal Partners: Parks Planning & Development
External Partners: Commercial landscaping businesses

EMISSION REDUCTION CALCULATIONS

Calculate emission reduction impacts, fuel savings and returns on investments associated with conversions to electric residential and commercial grade lawn and garden equipment.

Lead City Entity: Environmental Services
Sphere of Influence: Direct
Internal Partners: Parks Planning & Development
External Partners: RAQC

EMERGING IDEAS

INFRASTRUCTURE

Install and maintain infrastructure to provide electric power options at City facilities for food trucks and other small engine sources. The prominence of food trucks in Fort Collins comes with portable power needs, which often includes gas or diesel generators. Some food truck events and gatherings are conducted in City recreation areas, such as City Park and Fossil Creek Community Park.

Lead City Entity: Parks Planning & Development
Sphere of Influence: Direct
Internal Partners: Environmental Services, Utility Services
External Partners: Food truck businesses

INCENTIVES

Incentivize the purchase of commercial grade electric lawn and garden equipment for the private sector.

Lead City Entity: Environmental Services
Sphere of Influence: Direct
Internal Partners: Parks Planning & Development
External Partners: RAQC

NEIGHBORHOOD ENGAGEMENT

Promote use of electric lawn and garden equipment at the neighborhood level by supporting development of neighborhood equipment rental or resource sharing programs.

Lead City Entity: Environmental Services
Sphere of Influence: Indirect
Internal Partners: Community Development and Neighborhood Services
External Partners: Neighborhoods/HOAs/Property Managers

Oil and Gas Production Sources



Strategy ENV-4d. Support reductions in oil and gas production and development related emissions, update the local Operators Agreement and collaborate regionally on strategies to reduce emissions.

Studies have shown that regional emissions transported from oil and gas operations, such as Volatile Organic Compound (VOC) emissions from pipes, valves and storage tanks, are one of the largest contributors to high ground level ozone measurements in Fort Collins. Additionally, Fort Collins community members have expressed continuing concern about the human and environmental health impacts from oil and gas operations, particularly from the hydraulic fracturing treatment used on most Colorado wells.

IMPLEMENTATION ACTIONS - ONGOING

State Regulations. Oil and gas development in Colorado are regulated by the Colorado Oil and Gas Conservation Commission (COGCC) with air emissions regulated by the Colorado Department of Health and Environment (CDPHE) Air Pollution Control Commission (APCC). With the passage of Senate Bill 19-181 on April 3, 2019, the City has engaged in several new rulemakings at the State level related to protecting public health, safety, welfare, the environment and increasing the scope of local authority.

Local Government Designee Program. The City participates in the COGCC's Local Governmental Designee (LGD) program, which establishes a point of contact between the COGCC and individual counties and municipalities. The LGD is notified of activities such as submittal of new permits, can request extension of public comment periods for permit applications, and can participate in COGCC hearings. Both the City and Larimer County have LGDs as points of contact, and the LGDs share information regarding oil and gas activity in the City's Growth Management Area (GMA).

Land Use Code. The City's Land Use Code includes setback requirements for new development around existing wells and other oil and gas infrastructure (called reciprocal setbacks). These rules were updated in 2018. Conversely, the COGCC regulations include setbacks for the proximity of new wells to existing development.

Operators Agreement. Currently, the City administers and Operators Agreement with the sole oil and gas operator that is within City limits. The agreement contains requirements for air sampling and other Best Management Practices (BMPs) for existing and new wells associated with this operator within Fort Collins' City limits.



OIL AND GAS PRODUCTION SOURCES IMPLEMENTATION ACTIONS – NEW AND EMERGING

NEAR-TERM PROGRAMS

DESCRIPTION

LAND USE CODE

Implement updates to the Land Use Code to provide additional clarity for siting of new oil and gas wells and infrastructure, including consideration of comprehensive updates to complement or replace requirements in the current Operators Agreement.

Lead City Entity: Planning, Development & Transportation
Sphere of Influence: Direct
Internal Partners: Environmental Services, City Attorney's Office, City Council

EMERGENCY MANAGEMENT PLAN

Work with oil and gas facility operator to update an emergency management plan outlining a coordinated inter-agency response for spills or other events.

Lead City Entity: Office of Emergency Management
Sphere of Influence: Direct
Internal Partners: Environmental Services, Environmental Regulatory Affairs
External Partners: PFA, Larimer County, O&G Operators, COGCC

REGIONAL COLLABORATION

Collaborate with Larimer County to update and implement regulations in and near the GMA, and on City-owned property outside of City limits such as Soapstone Natural Area and Meadow Springs Ranch.

In 2019, Larimer County formed an Oil and Gas Task Force to develop County level regulations to supplement State regulations that mitigate impacts on land use and public health and address industry changes.

Lead City Entity: Planning, Development & Transportation
Sphere of Influence: Direct
Internal Partners: Environmental Services, Natural Areas
External Partners: COGCC, Larimer County

EMERGING IDEAS

LEGACY WELLS

Mitigate or eliminate surface impacts from existing active and abandoned wells within residential neighborhoods in City limits and the GMA.

While the oil and gas field in northeastern Fort Collins is small, there are a few wells in the region that are older oil wells (last drilled in 1992) which pre-date current regulations and residential development in the area.

Lead City Entity: Planning, Development & Transportation
Sphere of Influence: Direct
Internal Partners: Environmental Services
External Partners: COGCC, O&G Operators

Indoor Air Quality



Strategy ENV-4e. Implement programs designed to inform residents about potential indoor air quality concerns and mitigation opportunities, through programs such as the volunteer based Healthy Homes Indoor air quality assessments, radon awareness, testing and mitigation, and energy-efficiency programs.

Indoor air quality refers to the air quality within and around buildings and structures, especially as it relates to the health and comfort of occupants. Indoor pollutants like radon, mold, particles and chemicals can build up to unhealthy levels, leading to the findings that indoor air quality can be up to 5 times worse than outdoor air quality.²⁰ The indoor environment is a place where individuals can be empowered to have more control, and the City supports programs which enable community members to manage pollutant sources in their homes.

IMPLEMENTATION ACTIONS - ONGOING

Healthy Homes Indoor Air Quality Assessments.

Since 2011, the healthy homes program²¹ has provided resources to help address indoor air quality issues related to adverse health effects by recommending low cost or no cost solutions for common indoor air quality issues. The City recruits, trains, supports and recognizes volunteer Master Home Educators to provide free, in-person indoor air quality assessments. An online “Do-It-Yourself” assessment is also available. In 2018, Healthy Homes became a nationally recognized as a recipient of the HUD Secretary’s Award for Healthy Homes in the category of Policy and Innovation.



Radon Awareness, Testing, and Mitigation.

The City has supported radon outreach, testing and mitigation programs for more than two decades. This includes provision of low-cost test kits, requiring that information on the risks of radon exposure be provided during home purchases, and requiring passive radon mitigation standards in new buildings.²²



INDOOR AIR QUALITY IMPLEMENTATION ACTIONS - NEW AND EMERGING

NEAR-TERM FOCUS AREAS

DESCRIPTION

ENERGY EFFICIENCY AND INDOOR AIR QUALITY

Align energy efficiency and indoor air quality programs to streamline and optimize steps to make homes more comfortable, healthy and efficient. Improving the energy efficiency of buildings usually involves air sealing and other weatherization techniques, which can create or exacerbate indoor air quality issues if not properly ventilated.

Lead City Entity: Environmental Services
Sphere of Influence: Direct
Internal Partners: Utility Services

EQUITY AND INCLUSION

Improve accessibility to indoor air quality improvement opportunities by targeting outreach and engagement opportunities towards the Spanish-speaking community, the elderly and low to moderate-income homeowners and renters.

Lead City Entity: Environmental Services
Sphere of Influence: Direct
Internal Partners: Utility Services
External Partners: PSD, Larimer County

EMERGING IDEAS

CONSUMER PRODUCTS

Increase awareness and promotion of behavior changes around selection and use of consumer products to reduce VOCs, which contribute to indoor air pollution and outdoor ozone formation. Common consumer products that are formulated with VOCs include paint, cleaning products and personal care products.

Lead City Entity: Environmental Services
Sphere of Influence: Indirect
External partner: Local businesses

VOLUNTEER TRAINING

Develop online training curriculum to make the Healthy Homes Volunteer training curriculum more accessible and available year-round. Currently, volunteers are recruited and trained annually during several evening sessions.

Lead City Entity: Environmental Services
Sphere of Influence: Direct

CALCULATE IMPACTS

Develop qualitative and quantitative tools that demonstrate the overall impact on health and well-being of indoor air quality improvements for community members in their homes and businesses.

Lead City Entity: Environmental Services
Sphere of Influence: Direct
Internal Partners: Utility Services
External Partners: CSU

Environmental Regulation



Strategy ENV-4f. Develop and implement effective, enforceable air quality policies and regulations at the local level, where local regulations make sense to augment any federal, state or County regulations.

Local regulations are important when there are gaps in existing State and Federal regulations, or opportunities that are better addressed locally. The City's Environmental regulation efforts include enforcing compliance, and regularly reviewing and updating policies as gaps and opportunities are identified and best practices evolve. Promoting compliance generally involves providing education, outreach and other assistance to encourage voluntarily compliance before a regulatory response is initiated.

IMPLEMENTATION ACTIONS - ONGOING

Air quality complaints. City staff investigate and respond to air quality complaints and concerns. Often, this can mean identifying appropriate county or state requirements and compliance resources.

City Regulations. City regulations related to air quality include limitations on smoking in public areas, radon disclosure requirements for home transactions, and requirements for control of dust emissions. City code also prohibits public air pollution nuisances, including specific limitations on nuisances related to outdoor wood burning fires.

Industry Agreements. Emissions from industrial sources are regulated at the federal and state level, but businesses are often interested in proactive measures and agreements with the City to reduce pollutant sources. The City currently administers a Memorandum of Understanding (MOU) with an asphalt manufacturer, and an Operators Agreement (OA) with an oil and gas operator. These types of agreements are developed cooperatively with the respective industrial sources.

Regional Policy. Annually, the City updates a Legislative Policy Agenda; a broad set of policy statements meant to convey position on regional legislative policy issues that affect our community. In 2019, this included policy statements related to air quality that guided City engagement in legislative action at the state level related to vehicle regulations, and oil and gas development.

ENVIRONMENTAL REGULATION IMPLEMENTATION ACTIONS – NEW AND EMERGING

NEAR-TERM FOCUS AREAS

DESCRIPTION

OUTDOOR RESIDENTIAL WOOD BURNING

Evaluate implementation of new 2019 updates to air pollution nuisance code related to outdoor residential wood burning. In 2019, code updates included a 10 p.m. curfew on outdoor wood burning fires, and a 15-foot setback requirement for locating wood fires away from adjacent property lines.

Lead City Entity: Environmental Services
Sphere of Influence: Direct
Internal Partners: Community Development and Neighborhood Services
External Partners: PFA

FUGITIVE DUST

Update training and technical assistance resources to support compliance with municipal code related to fugitive dust, or particulate matter that has become airborne by wind or human activities.

A Fugitive Dust Ordinance, adopted in 2016 and updated in 2018, requires owners and operators of dust generating activities to incorporate best management practices to reduce off-property transport of fugitive dust.

Lead City Entity: Environmental Services
Sphere of Influence: Direct
Internal Partners: Environmental Regulatory Affairs, Community Development and Neighborhood Services, Engineering
External Partners: Larimer County, CDPHE

EMERGING IDEAS

RADON

Explore additional policy options related to radon testing, disclosure and notification requirements for real estate and rental transactions. In 2018, a radon working group identified several specific regulatory options of interest related to testing, disclosure and notification.

Lead City Entity: Environmental Services
Sphere of Influence: Direct
Internal Partners: City Attorney's Office, City Council
External Partners: Larimer County, CDPHE

AIR POLLUTION NUISANCES

Develop further clarity on the operational definition of a public air pollution nuisance and provide additional resources for community members to address private nuisances.

City jurisdiction applies to public nuisances, which affect an entire community or many people, as opposed private nuisance effects an individual or the property rights of a small number of people. The City often hears concerns about private nuisances and could provide additional resources for community members to better address these concerns.

Lead City Entity: Environmental Services
Sphere of Influence: Indirect
Internal Partners: Community Development and Neighborhood Services

Air Quality Monitoring



Strategy ENV-4g. Support implementation and expansion of the air quality monitoring network to track and report on air quality indicators

Monitoring and reporting pollution data contributes to increased awareness of air quality issues and identifies opportunities to improve local air quality conditions. Measured data are also used to forecast future air quality impacts, such as ozone alert days, and to determine compliance with Federal and State standards. Air quality monitoring data, real-time visibility camera images and air quality alerts are available through www.fcgov.com/airquality

IMPLEMENTATION ACTIONS - ONGOING

Criteria Pollutants. Criteria pollutants, or pollutants with Federal air quality standards, are monitored per EPA requirements by the CDPHE. In Fort Collins, this includes ozone and particulate matter. While the State has primary responsibility of monitoring outdoor air pollution per Federal standards, the City works with the State to track and report air pollution data and provide recommendations for updates to State monitoring plans.

Air Quality Exhibit. In 2018, a new ozone monitoring and education exhibit was installed as a feature at the Gardens on Spring Creek. This site includes real time displays of ozone, particulates and weather information such as precipitation, temperature and relative humidity.

Visibility Monitoring. Visual qualities of the atmosphere are some of the most obvious indicators of air quality, with haze episodes sometimes known as “brown clouds.” Indicators of visibility (e.g., light extinction) have been measured in Fort Collins continuously since 1993. A visibility camera system was added in 2016, which provides images showing the real-time visible impacts of smoke or haze.

Night Sky. Night sky visibility can be affected by both light pollution and air pollution. In 2018 the City deployed the Sky Quality Meters at air quality monitoring sites. These meters establish a measurement of light pollution as a baseline upon which future efforts related to reductions in light pollution can be measured.

City as a Platform. The concept of “City as a Platform” revolves around a growing understanding that new communication and collaboration frameworks are needed between community members and the public and private sectors in order to foster greater sustainability, inclusion, and innovation. Regarding air quality, university and private sector businesses are increasingly collaborating with Cities to leverage municipal infrastructure to test monitoring equipment. As an example, in 2018, CSU worked collaboratively with the City to test innovative community-scale monitoring equipment in downtown Fort Collins as part of a grant through the National Oceanic and Atmospheric Administration (NOAA).

AIR QUALITY MONITORING IMPLEMENTATION ACTIONS – NEW AND EMERGING

NEAR-TERM FOCUS AREAS

VISIBILITY EXHIBIT

Develop an education exhibit related to air quality and visibility. This will leverage real-time images from a visibility camera that was installed at the Fort Collins Museum of Discovery in 2019.

DESCRIPTION

Lead City Entity: Environmental Services
Sphere of Influence: Direct
Internal Partners: Cultural Services
External Partners: CSU, CIRA, NPS

EMERGING IDEAS

COMMUNITY-SCALE MONITORING

Enable the expansion of community-scale monitoring. As air quality monitoring instrumentation becomes more inexpensive and portable, the City could explore ways to facilitate participatory approaches to gather and report more spatially representative data to better identify localized impacts.

Lead City Entity: Environmental Services
Sphere of Influence: Indirect
Partners: CDPHE, CSU

OZONE MONITORING

Implement regulatory monitoring recommendations that might allow for better understanding of upwind background, and regional transport of pollutants. In 2017, an NCAR report evaluated contributions to ozone in Fort Collins, and recommended additional monitoring considerations such as the addition of a NOX monitor, and relocation of one of the City's ozone monitors.

Lead City Entity: Environmental Services
Sphere of Influence: Indirect
External Partners: CDPHE, NCAR

VISIBILITY PERCEPTION STUDY

Update visibility standard, using a citizen science-based visibility perception study. A non-regulatory visibility standard currently used in Fort Collins is based on a 1989 Denver study, which was based on perception of “acceptable” vs. “unacceptable” visibility or haze conditions. An updated study would refresh metrics and be more specific to the judgment of Fort Collins community members for Fort Collins viewsheds.

Lead City Entity: Environmental Services
Sphere of Influence: Direct
External Partners: CDPHE, CIRA, NPS

PARTICULATE MATTER COMPOSITION

Install monitors that measure the composition of fine particulate matter, or PM_{2.5}. Understanding PM_{2.5} composition can help define strategies to reduce particle pollution. This could include exploration of opportunities to leverage national monitoring networks.

Lead City Entity: Environmental Services
Sphere of Influence: Indirect
External Partners: CDPHE

Climate Adaptation



Strategy ENV-4h. Implement programs for adaption to potential air quality impacts from climate change, such as increased risk of smoke from wildland fires.

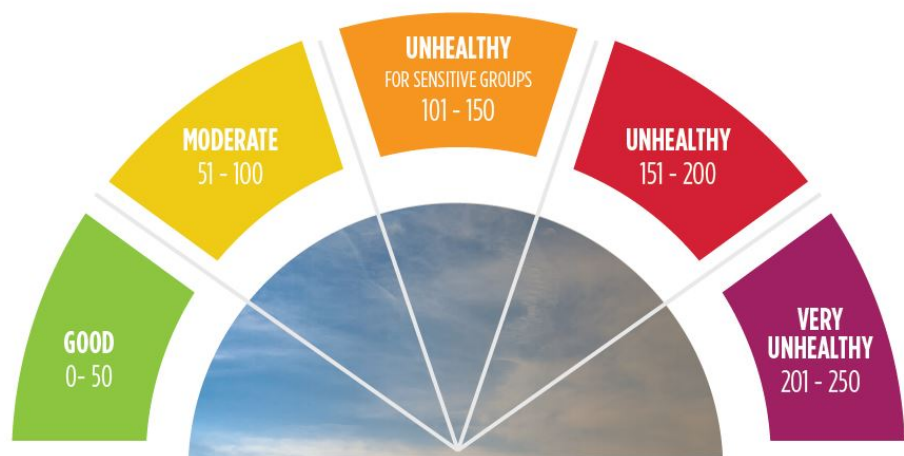
The relationship between air quality and climate change is complex, yet clearly connected. Climate change effects, such as a hotter drier climate, can affect air quality in a number of ways. Impacts to air quality include increased frequencies of high heat days and increased risk of wildfires, which contribute to regional ozone and particle pollution events. Adaptation strategies to improve the community's climate resilience include increasing awareness of health risks associated with smoke events, sharing information about pollution events, and providing tools for community members to protect themselves during poor air quality events.

ONGOING ACTIONS

Regional Collaboration. The City works with regional partners to identify and mitigate the risk of wildland fires in and around Fort Collins and the GMA. In 2012, the City collaborated with PFA, Larimer County and the U.S. Forest Service during the High Park Fire, to deploy particulate monitoring equipment, and connect the community to resources and information about smoke forecasts and health-related impacts.

Parks and Recreation Pilot Program. In 2016, the City's Recreation Department began using the EPA Air Quality Index (AQI) to understand the health concerns and effects related to poor air quality. The department uses the AQI to make informed decisions about moving community recreation programs and activities indoors or cancelling when air quality is expected to be poor.

AQI (AIR QUALITY INDEX)



The Air Quality Index is a tool used by the EPA to communicate current and forecasted air pollution levels, and potential impacts.

CLIMATE ADAPTATION IMPLEMENTATION ACTIONS – NEW AND EMERGING

NEAR-TERM PROGRAMS

DESCRIPTION

WILDFIRE SMOKE RESPONSE PLAN

Develop internal communications protocol and an outreach plan to streamline the process of informing community members of health-risks related to smoke and connecting them to information to better prepare and respond to air quality impacts before, during and after a wildfire.

Lead City Entity: Environmental Services
Sphere of Influence: Direct
Internal Partners: Office of Emergency Management
External Partners: PFA, CDPHE, Larimer County

OUTREACH AND EDUCATION

Implement Air Quality Index (AQI) outreach and awareness campaigns to better connect the community to air quality alerts and action days, which are provided by the CDPHE when ozone or particulate concentrations are forecast to be high.

Lead City Entity: Environmental Services
Sphere of Influence: Direct
External Partners: RAQC, CDPHE, Larimer County

CITY-WIDE

Develop community guidance to assist event planners in decision making that is responsive to forecasted or measured air pollution events. This would be based on guidance used by the City's recreation department.

Lead City Entity: Environmental Services
Sphere of Influence: Direct
Internal Partners: Parks and Recreation
External Partners: CSU, PSD

WILDFIRE RESPONSE MONITORING PLAN

Identify additional monitoring resources that could be deployed to better characterize particulate pollution impacts during a wildfire event.

Lead City Entity: Environmental Services
Sphere of Influence: Direct
External Partners: NPS, USFS, CDPHE, Larimer County, CSU

EMERGING IDEAS

HOME ASSESSMENTS

Use the Epic Certificate process to identify homes that have been professionally air sealed and are equipped with appropriate filtration systems to potentially mitigate impacts from wildfire smoke.

Lead City Entity: Utilities
Sphere of Influence: Direct
Internal Partners: Environmental Services

SMOKE SHELTERS

Identify and inventory public buildings which have appropriate filtration to mitigate wildfire smoke.

Lead City Entity: Utilities
Sphere of Influence: Indirect
Internal Partners: Utilities

Lead by Example



Strategy ENV-4i. Implement municipal policies to lead by example in efforts to reduce and mitigate emissions associated with City operations, such as energy efficiency programs, anti-idling, and low-emission fleet and lawn and garden equipment purchasing policies.

The City strives to lead by example in efforts to improve local air quality, by reducing air pollution emissions affected by City operations. In 2019, the City developed the Municipal Sustainability and Adaptation Plan (MSAP), which is the employee roadmap for operating and building a healthy and sustainable organization, including objectives to lead by example in reducing emissions from energy generation, fossil fuel combustion and other activities.

IMPLEMENTATION ACTIONS - ONGOING

Municipal Lawn and Garden Equipment. The MSAP outlines a strategy to “Convert municipal small engines, such as lawn and garden equipment, to be fossil fuel free.” Since 2017, the City has received \$55K in grant funding from the Regional Air Quality Council (RAQC) to pilot use of commercial grade electric lawn and garden equipment and accelerate progress towards a full fleet of electric powered equipment for municipal lawn and garden maintenance.

Municipal Fleet. The MSAP outlines a strategy to “Increase electric vehicles in the City fleet by making 100% of light duty vehicle purchases plug-in electric by 2025.” Fort Collins’ Fleet Services division was named a Top 10 Leading Fleet in 2018 by the Government Fleet and American Public Works Association. This award recognizes public-sector fleets for their leadership, efficiency and vision. Additionally, the Northern Colorado Clean Cities (NCCC) presented the City of Fort Collins with the 2018 Leading Public Fleet for the Year for reducing fuel use from the municipal fleet.

Employee Vehicle Use. The City has strategies to “Support City employees to lead by example in sustainable vehicle use and commuting.” This includes an idling policy that prohibits unnecessary idling of longer than 30-seconds for City vehicles and equipment with internal combustion engines.

Transit. In April 2019, the City was awarded nearly \$1.5 million from the Colorado Department of Transportation through the Volkswagen Settlement Trust. This funding will go toward three small alternative fuel buses and the replacement of two diesel buses with battery electric buses and two electric vehicle charger stations.

City Buildings. Indoor clean air spaces are important in City buildings both for City staff and for visiting community members. In 2018, the City’s Natural Resources Department began testing radon levels in City buildings and installed mitigation systems where high radon values were measured.

LEAD BY EXAMPLE IMPLEMENTATION ACTIONS – NEW AND EMERGING

NEAR-TERM FOCUS AREAS

DESCRIPTION

SUSTAINABLE PURCHASING

Update sustainable purchasing practices that encourage mitigation of air pollution impacts from third-party City contacts for City services.

Lead City Entity: Sustainability Services
Sphere of Influence: Direct
Internal Partners: Financial Services

CITY TRANSPORTATION SYSTEMS

Continue progress towards a goal for the City fleet to make 100% of light duty vehicle purchases plug-in electric by 2025.

Lead City Entity: Operations Services
Sphere of Influence: Direct
External Partners: RAQC, CDOT, COE

LAWN AND GARDEN EQUIPMENT

Define goals to continue progress towards a fully electric lawn and garden maintenance fleet.

Lead City Entity: Parks
Sphere of Influence: Direct
Internal Partners: Environmental Services
External Partners: RAQC

EQUIPMENT DECOMMISSIONING

Evaluate equipment decommissioning practices for surplus City property, such as gas -powered equipment, to determine appropriate disposal methods that limit potential future contributions to emissions.

Lead City Entity: Parks
Sphere of Influence: Direct
Internal Partners: Environmental Services

NEW/EMERGING IDEAS

CITY BUILDINGS

Assess indoor air quality in City buildings, which in part will identify and prioritize facility updates and repairs related to potential improvements. Building resiliency analysis could also identify potential improvements to protect indoor air environments from outdoor air impacts, such as smoke from wildfires.

Lead City Entity: Operations Services
Sphere of Influence: Direct
Internal Partners: Utilities, Environmental Services
External Partners: CSU

Appendix A – Priority Air Pollutants and Sources

In order to determine the focus of strategies, policy changes, and air quality program implementation, the City of Fort Collins evaluates common air pollutants and sources to determine priorities, considering such criteria as health impacts, air pollution trends, compliance with current state and federal standards, ability to effect improvements at the local level, and community and Council priorities.

Based on the evaluation of these criteria, levels of concern are assigned for common outdoor and indoor air pollutants. Tables A-1 and A-2, below, summarize each pollutant and associated concern levels. Note that some of the same pollutants, such as carbon monoxide (CO), have different levels of concern outdoors as compared to indoors.

TABLE A-1. CITY OF FORT COLLINS CONCERN LEVELS FOR COMMON OUTDOOR AIR POLLUTANTS

POLLUTANT	LEVEL OF CONCERN	SUPPORTING INFORMATION
OZONE (O₃)	High	<p>Ozone exposure reduces lung function and causes respiratory symptoms, such as coughing and shortness of breath. Ground-level ozone forms when emissions of NO_x and VOCs react in the presence of sunlight.</p> <p>Fort Collins, along with the Denver/North Front Range region, is not in compliance with the U.S. Environmental Protection Agency (EPA) health-based standards for ozone. Ozone was identified as a City Council priority in 2019.</p>
PARTICULATE MATTER (PM_{2.5} AND PM₁₀)	High	<p>Exposures to fine particles (PM_{2.5}) can cause harmful effects on the cardiovascular system including heart attacks and strokes. Fine particles are also the main cause of reduced visibility (haze). To a lesser extent, larger particles (PM₁₀) also contribute to health impacts and visibility degradation.</p> <p>Fort Collins measurements show some moderately high days in winter, when temperature inversions trap pollutants closer to the ground. Sources of dust and wood smoke also cause localized and regional health and nuisance concerns. Particulate Matter was identified as a City Council priority in 2019.</p>
GREENHOUSE GASES (GHGs)	High	<p>GHGs are gases in the atmosphere that can absorb or emit heat. Carbon dioxide (CO₂) is most abundant GHG which is influenced by activity such as burning fossil fuels (e.g., coal, gasoline, and natural gas).</p> <p>While CO₂ is not directly associated with health effects, science attributes a warming of the Earth’s atmosphere to an increase in levels of CO₂ and other GHGs. The City of Fort Collins tracks community and municipal emissions of GHGs, with a goal of carbon neutrality by 2050.</p>

TABLE A-1. CITY OF FORT COLLINS CONCERN LEVELS FOR COMMON OUTDOOR AIR POLLUTANTS

POLLUTANT	LEVEL OF CONCERN	SUPPORTING INFORMATION
NITROGEN DIOXIDE (NO₂)	Medium	<p>NO₂ contributes to health effects, particle formation, ozone formation and acid rain.</p> <p>EPA regulations for power plants have contributed to reduced NO₂ nationally and local concentrations are expected to be below EPA health-based standards. NO₂ is a priority because it contributes to ozone nonattainment status.</p>
VOLATILE ORGANIC COMPOUNDS (VOCs)	Medium	<p>VOCs contribute to ozone formation and include Hazardous Air Pollutants (HAPs), where HAPs are known or suspected to cause cancer or other serious health effects.</p> <p>VOCs and HAPs are not routinely measured, and emissions are controlled through EPA and State regulations and permitting processes. VOCs are a priority due to potential impacts from HAPs, and contributions to ozone nonattainment status.</p>
CARBON MONOXIDE (CO)	Low	<p>At high concentrations, CO is a poisonous gas. The entire U.S. currently meets CO air quality standards, largely because of EPA emissions standards for new motor vehicles.</p>
SULFUR DIOXIDE (SO₂)	Low	<p>SO₂ contributes to health effects, particle formation and acid rain. It is primary emitted from industrial sources such as coal-fire power plants (high sulfur fuels/coal).</p> <p>EPA regulations for power plants have contributed to reduced SO₂ nationally and local concentrations are expected to be below EPA health-based standards.</p>
LEAD (Pb)	Low	<p>Nationally, average lead concentrations decreased dramatically after the EPA's regulations reduced the lead content in on-road motor vehicle gasoline.</p>

TABLE A-2. CITY OF FORT COLLINS PRIORITY LEVELS FOR COMMON INDOOR AIR POLLUTANTS

POLLUTANT	LEVEL OF CONCERN	SUPPORTING INFORMATION
RADON	High	<p>Radon is an invisible, odorless, radioactive gas that can accumulate in homes due to the natural decay of uranium in the soil.</p> <p>Radon is the second leading cause of lung cancer in US. In Fort Collins, more than half of tests return values higher than the EPA recommended action level for mitigation. Radon was identified as a City Council priority in 2019.</p>
VOCs	Medium	<p>VOCs can accumulate indoors through use of cleaning products, paint, air fresheners, gasoline/fuels and other products.</p>
PARTICLE POLLUTION	Medium	<p>High concentrations of particles can accumulate indoors due to combustion (e.g., cooking and candles), dust, and mold.</p>
CARBON MONOXIDE (CO)	Medium	<p>CO is a by-product of incomplete combustion. Common sources indoors include water heaters, space heaters, gas stoves, furnaces, and vehicle exhaust from attached garages. High levels can accumulate indoors and cause carbon monoxide poisoning. Use of CO monitors is an effective way that CO poisoning can be avoided.</p>
LEAD	Low	<p>Lead is a highly toxic metal that may cause a range of health problems, especially in young children. When lead is absorbed into the body, it can cause damage to the brain and other vital organs.</p> <p>Lead was commonly used in paint until banned in 1978. Lead can be found in household dust from sources such as deteriorating lead-based paint. High lead levels are sometimes found in older homes. Levels should be tested by trained, certified professionals.</p>

Local Air Pollution Trends

Regulated pollutants, sometimes referred to as “criteria pollutants” are pollutants which have concentration standards or limits, as determined by the EPA. Regulated pollutants monitored in Fort Collins include O₃, PM and CO.²³ Figure A-1 presents a timeline of concentrations measured in Fort Collins, as compared to EPA standards. Monitored pollutants trends indicate that:

- O₃ values continue to exceed the national standard.
- None of the monitored pollutants show an increasing trend in recent years, despite a growing population.
- CO is well below the EPA standard and shows a decreasing trend.
- Annual PM_{2.5} averages show a slightly decreasing trend, but at time spikes in 24-hour concentrations approach the national standard.
- PM₁₀ levels are stable, and below the national standard.

FORT COLLINS AIR QUALITY CONCENTRATION AVERAGES

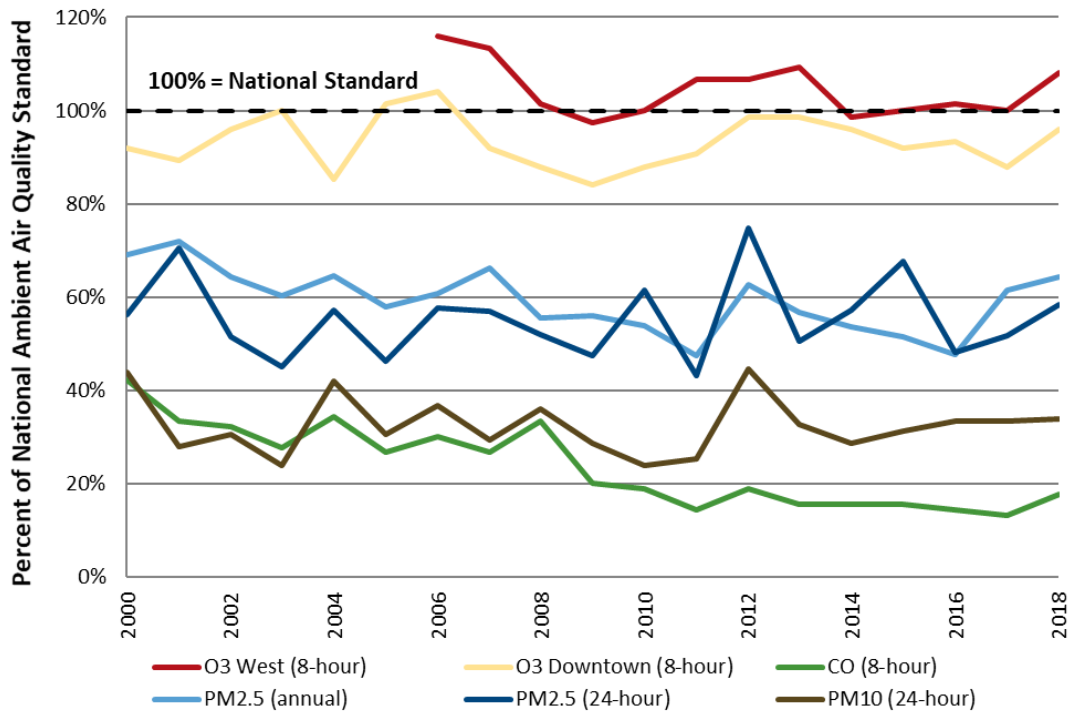


Figure A-1. Monitored Pollutant Trends in Fort Collins, Colorado.

Ambient Air Pollution Sources

Air pollutants are emitted from a variety of sources. Some pollutants are released directly into the atmosphere while other pollutants are formed in the air from chemical reactions. Table A-3 presents a summary of emissions for Larimer County, as updated in 2016.²⁴ As the table shows, pollutants are emitted by a variety of sources and some sources emit more than one pollutant. Major sources represented include:

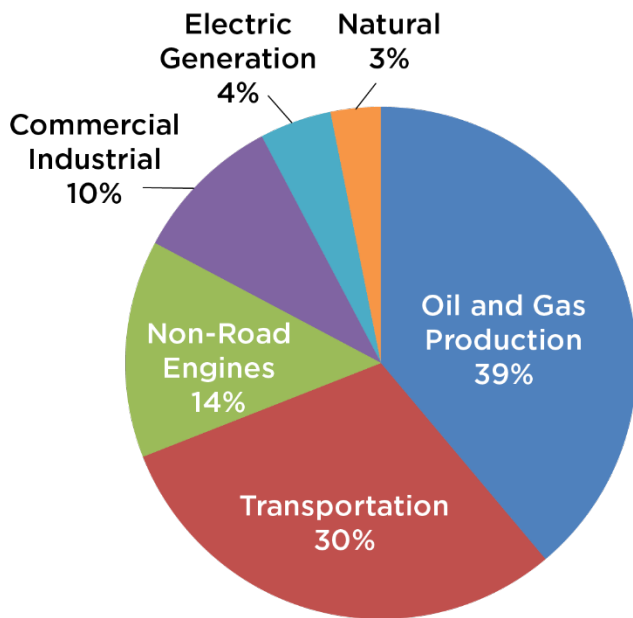


Figure A-2. Estimated source contributions to ozone formation in Fort Collins.²⁵

- **Transportation Sources** – Includes vehicles such as cars and trucks, and other engine sources such as recreational and construction equipment.
- **Commercial/Industrial** – Includes large industrial facilities and electric power plants, and smaller industrial, non-industrial and commercial facilities
- **Nonpoint Sources** – Includes aggregates of emissions estimates for sources that are individually too small in magnitude to report as stationary/fixed sources. Examples include residential heating, commercial combustion, asphalt paving, and commercial and consumer solvent use.
- **Oil and Gas** – Emissions from the exploration and development of oil and gas mineral resources.
- **Wildfires/Rx Burning** – Emissions from natural fires and permitted prescribed (Rx) fires.
- **Residential Wood Combustion** – Includes emissions from residential wood-burning appliances such as wood stoves.
- **Windblown Dust** – Natural dust, not associated with human activities.
- **Fugitive Dust** – Dust emitted due to human activity, such as dust associated with construction and earthmoving activities.

TABLE A-3. LARIMER COUNTY EMISSIONS SUMMARY

POLLUTANT	CO	NOX*	VOC*	SO2	CH4	PM2.5	PMC**
tons/year	58,342	10,253	11,765	1,040	4,779	2,545	6,338
CATEGORY							
TRANSPORTATION	85%	71%	54%	3%	7%	13%	0%
COMMERCIAL/INDUSTRIAL	2%	23%	10%	92%	73%	14%	4%
NONPOINT	0%	4%	17%	0%	1%	5%	0%
OIL AND GAS PRODUCTION	0%	1%	6%	0%	13%	0%	0%
WILDFIRES/RX BURNING	5%	1%	6%	3%	2%	5%	0%
RESIDENTIAL WOOD COMBUSTION	7%	1%	6%	1%	5%	23%	0%
WINDBLOWN DUST	0%	0%	0%	0%	0%	5%	19%
FUGITIVE DUST	0%	0%	0%	0%	0%	34%	77%

*Ground-level ozone (O3) forms when emissions of NOx and VOCs react in the presence of sunlight.

**PMC, or coarse particulates, includes particles measured between 2.5 and 10 microns in diameter.

Notably, while the table summarizes sources that originate within Larimer County, many sources that contribute to air pollution in Fort Collins originate from outside the County. Ground-level ozone, for example, forms when emissions of NO_x (NO and NO₂) and VOCs react in the presence of sunlight.

Figure A-2 presents the sources modeled to contribute to ozone measurements in Fort Collins from regional sources in the Denver Metro/North Front Range non-attainment area, which includes Adams, Arapahoe, Boulder, Broomfield, Denver, Douglas, Jefferson and parts of Larimer and Weld counties. The major sources include oil and gas production, transportation sources and non-road engines (such as lawn and garden equipment).

ENDNOTES

- ¹ In the City of Fort Collins 2017 Citizen Survey, 83% of respondents rated the air quality as “excellent” or “good.” <https://www.fcgov.com/airquality/survey.php>
- ² Since 2004, the City of Fort Collins has been part of the Denver Northern Front Range non-attainment area for ozone, meaning that measurements here are sometimes higher than federal health-based standards. <https://www.colorado.gov/pacific/cdphe/ozone-planning-chronology>
- ³ <http://www.fcgov.com/airquality/plans-policies.php>
- ⁴ Air Quality survey results are available at <http://www.fcgov.com/airquality/survey.php>.
- ⁵ The Air We Breathe: A Community Conversation on Air Quality report is available at <https://www.fcgov.com/airquality/reports>
- ⁶ U.S. EPA, 2007. The Plain English Guide to the Clean Air Act. EPA-456/K-07-001. Available at <http://www.epa.gov>
- ⁷ <https://www.osha.gov/SLTC/indoorairquality/>
- ⁸ PM_{2.5} is particulate matter less than 2.5 micrometers in diameter and PM₁₀ is particulate matter less than 10 micrometers in diameter.
- ⁹ <https://www.fcgov.com/airquality/survey.php>
- ¹⁰ <https://www.epa.gov/indoor-air-quality-iaq>
- ¹¹ The Comprehensive City Plan is available at <https://www.fcgov.com/planfortcollins/>
- ¹² Air quality reports are available at <https://www.fcgov.com/airquality/reports>
- ¹³ Full survey reports are available at <https://www.fcgov.com/airquality/survey.php>
- ¹⁴ More information available at <https://www.sustainableneighborhoodnetwork.org/fortcollins>
- ¹⁵ <http://raqc.org/>
- ¹⁶ <https://www.fcgov.com/transportation/>
- ¹⁷ On June 19, 2018, Governor Hickenlooper sign Executive Order B 2018 006, Maintaining Progress on Clean Vehicles.
- ¹⁸ www.fcgov.com/airquality/rebate
- ¹⁹ <https://www.fcgov.com/utilities/residential/conserves/water-efficiency/xeriscape>
- ²⁰ <https://www.epa.gov/report-environment/indoor-air-quality>
- ²¹ www.fcgov.com/healthyhomes/
- ²² www.fcgov.com/airquality/radon
- ²³ Data from local air quality monitors is available at <https://www.colorado.gov/airquality/>
- ²⁴ Emissions data represent the 2011b emissions platform as provided through the Intermountain West Data Warehouse at <http://views.cira.colostate.edu/tsdw/>
- ²⁵ Data from Denver 2017c Local Source Analysis, available through <http://views.cira.colostate.edu/tsdw>

ACRONYMS

AGZA	American Green Zone Alliance
AQI	Air Quality Index
BMP	Best Management Practice
CDOT	Colorado Department of Transportation
CDPHE	Colorado Department of Public Health and Environment
CEO	Colorado Energy Office
CIRA	Cooperative Institute for Research in the Atmosphere
COGCC	Colorado Oil and Gas Conservation Commission
CSU	Colorado State University
EPA	Environmental Protection Agency
FRCC	Front Range Community College
GMA	Growth Management Area
HOA	Homeowners Association
HUD	Housing and Urban Development
LEV	Low Emission Vehicle
LGD	Local Government Designee
MSAP	Municipal Sustainability and Adaptation Plan
NAAQS	National Ambient Air Quality Standards
NCCC	Northern Colorado Clean Cities
NFRMPO	North Front Range Metropolitan Planning Organization
NOX	Oxides of Nitrogen
NPS	National Park Service
O₃	Ozone
PM	Particulate Matter
PM₁₀	Subset of particulate matter with aerodynamic diameters less than or equal to 10 µm (micrometers)
PM_{2.5}	Subset of particulate matter with aerodynamic diameters less than or equal to 2.5 µm (micrometers)
PRPA	Platte River Power Authority
PSD	Poudre School District
RAQC	Regional Air Quality Council
RFP	Request for Proposal
USFS	United States Forrest Service
VMT	Vehicle Miles Travelled
VOC	Volatile Organic Compounds
ZEV	Zero Emission Vehicle