

Lakewood Advisory Commission
Assignment 2019-04 – Vehicle Anti-Idling Proposal Report
Sustainability Committee
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8/25/2020

ASSIGNMENT: In an effort for the City of Lakewood to promote sustainable practices for protecting citizens' health and the environment, research ways to reduce vehicle idling within the community.

BACKGROUND:

Colorado has more vehicles than drivers – and 98% of those vehicles run on gas and diesel. (See Figure 1.) Those vehicles are a significant source of air pollution that harms public health: autos and trucks emit air pollutants, including particulate matter that lodges deep into our lungs, and other pollutants that form lung-damaging ozone. These air pollutants are harmful especially for vulnerable Lakewood citizens like the elderly, children, (who together make up at least 34.8% of Lakewood's population; see Figure 2) and our Lakewood neighbors with diabetes, heart and lung conditions.

The Clean Air Act (CAA) sets health-based standards for air pollutants: breathing air that exceeds a CAA air quality standard is harmful to human health. Colorado's Front Range, including Lakewood, does not comply with CAA's air quality standard for particulate matter and ozone. (See Figures 3, 4, and 5.) For the month of August 2020, the Denver/Boulder area has experienced multiple days of air quality so poor that it has been designated "Unhealthy" even for members of the general population. (See Figures 6 and 7.) And transportation is now the greatest source of Greenhouse Gas (GHG) emissions. (See Figure 8.) For the health of our citizens, the planet, and even our wallets, Lakewood can demonstrate leadership in sustainability and public health by adopting a simple habit that will reduce air pollution, save taxpayer money, and extend the life of our cars.

SUMMARY OF RESEARCH AND KEY FINDINGS:

Residents of the Front Range are frequently exposed to unhealthy levels of air pollution exacerbated by wildfires. Lakewood drivers contribute to Colorado air pollution, and Lakewood drivers can do their part so that all members of our community can breathe healthier air. And doing so is easy - every Lakewood driver can make a difference in cleaning up our air, and protecting public health, just by turning off their engine if they will be in one place for more than 30 seconds. Unnecessary idling wastes fuel, harms engines, and creates air pollution.

We think of Colorado roads as full of clean-energy vehicles – but the truth is that only 2% of Colorado cars are electric and hybrid! And the average age of a Colorado car is 12.8 years – older than the national average age for cars – 11.6 years. But it's easy to reduce air pollution from the cars we drive – just by avoid idling when we can. This report addresses frequently asked questions about the relationship between idling and public health – and what we can do about it.

Why is idling a problem?

Colorado vehicles emit multiple air pollutants:

- Carbon Monoxide (CO)
- Nitrous Oxide (NO_x)
- Volatile Organic Compounds (VOCs)
- Particulate Matter (PM)
- PM₁₀
- PM 2.5
- Ground-level Ozone (O₃)

As well as GHGs:

- CO₂
- Methane

Toxic air pollutants emitted from idling can harm the lungs and heart. Exhaust fumes have been linked to asthma, decreased lung function, cardiac disease, cancer and other serious health problems. Kids, the elderly and those with diabetes, heart and respiratory ailments are especially at risk.

What are the health impacts from breathing ozone?

- Ozone irritates mucous membranes of eyes and throat.
- High concentrations of ozone can impair lung function
- Ozone may induce respiratory symptoms in individuals with: Asthma, Emphysema, or reduced lung function.
- Ozone can reduce immune system capacity

(For a detailed list of the health impacts of exposure to ground-level ozone, see Figure 9.)

While your car is running, you're emitting harmful air pollutants. So, if your car would be parked for more than 30 seconds, shut it off. For example, when you're parked and waiting for passengers, or in a drive-up line, and especially when you're picking up kids.

Why is ozone particularly bad for kids, and the elderly?

- Children with and without asthma were found to be particularly susceptible to the effects of breathing ozone effects on lung function.
- The elderly are at greatest risk for ozone-related "mortality and hospitalization."
- But even people who spend time outdoors, such as "outdoor workers..., adolescents, and adults who engage in outdoor activities" are also harmed by breathing ozone.

What are the health impacts from breathing particulate matter?

High concentrations of PM can:

- Trigger asthma
- Reduce lung function
- Aggravate respiratory conditions
- May increase the long-term risk of cancer
- Or development of respiratory problems

(For a detailed list of the health impacts of exposure to particulate matter, see Figure 9.)

In the Front Range, levels of particulate matter are rising, which can harm public health. Reduce your impact by avoiding idling when you can, particularly when you're next to a school, or at a drive-up window.

What are the environmental impacts of idling?

- Idling releases CO, PM10 and 2.5, and ozone, which creates haze that obscures our view of the mountains
- Idling just one car for five minutes per day can emit as many as 25 pounds of harmful air pollutants and 260 pounds of carbon dioxide a year, the primary greenhouse gas that contributes to climate change.

Idling wastes money!

- One hour of idling burns ½ gallon of fuel.
- When you idle, you get ZERO miles per gallon.
- Idling just 5-10 minutes a day/yr. can add up to 1-2 tanks of fuel and literally burns money.

But won't turning the engine off and on waste fuel?

- No! For cars with fuel injection, (which includes almost all vehicles built since the late 1980s), idling for even 10 seconds uses more fuel than restarting the engine. Even with older cars, shutting off the car saves money otherwise spent on wasted gas.

Don't I need to idle to warm up my engine in the winter?

- Idling is not an effective way to warm up your vehicle. Modern engines only need to warm up for 30 seconds on cold days.
- idling your car for several minutes before driving creates extra air pollution, since your car's catalytic converter is not effective at reducing the pollution in your car's exhaust until it is sufficiently hot— generally only after driving a few minutes.
- Best way to warm up your car? Idle for 30 seconds, and then drive gently for the first few miles.

Doesn't turning the car off and on damage the car?

No, the Ford Motor Company advises:

Avoid idling more than 30 seconds when not in traffic. Frequent restarting has little impact on the battery and starter (less than \$10 a year worth of wear), whereas excessive idling can damage important engine components.

CONCLUSION:

The City can promote sustainability and protect the health of all Lakewood residents, including our vulnerable senior citizens, kids, and neighbors struggling with diabetes, lung and heart conditions, and in addition help citizens and the City to save money spent on personal and City-owned vehicles, just by promoting a simple idea: avoid unnecessary idling. Air pollution affects us all, and Lakewood can take the lead in letting our residents know how adopting one simple habit can help promote cleaner air.

Why should Lakewood adopt an anti-idling program? John Putnam, the State of Colorado's Director of Environmental Programs put it simply:

We're not going to have the ability to control the 90-degree days and the transport of wood smoke. This means we're going to have to reduce emissions that much more from our big sectors – transportation and oil and gas.¹

RECOMMENDATIONS:

1. To demonstrate the City of Lakewood's leadership in sustainability and public health, adopt measures that will educate and encourage Lakewood citizens and City employees to reduce unnecessary idling.
2. Provide anti-idling informational signs, using an anti-idling logo, at Lakewood Department of Motor Vehicle Offices, driving schools, Emission Testing centers, and respiratory clinics.
3. Implement an idling reduction policy for Lakewood City vehicles, which recognizes that while City trucks presently need to idle to power safety lights, all unnecessary idling should be discouraged as a waste of taxpayer fuel and dollars.
4. Add anti-idling information to the City's existing Sustainable Transportation website.
5. Encourage Lakewood schools to develop their own student-led anti-idling programs.
6. Encourage local businesses using drive-up takeout lines to provide posters asking customers to shut off their engines to reduce air pollution and protect the health of window employees exposed to car fumes.
7. Offer anti-idling talks at Ward meetings.
8. Request that the City research the costs/benefits of adding additional left and right turn signals and other traffic control measures to allow drivers to reduce time spent idling at traffic lights.

¹Steve Peoples, Michelle L. Price and Darlene Superville. "Wildfire haze, record heat and pollution combine to make Denver air quality dangerous for all." Interview with John Putnam, Director of the State of Colorado's Interview with *The Denver Post*, August 25, 2020.

<https://www.denverpost.com/2020/08/25/colorado-wildfire-smoke-pollution-ozone/>

APPENDICES / RESEARCH CONDUCTED:

Colorado Vehicle Registrations, 2018:

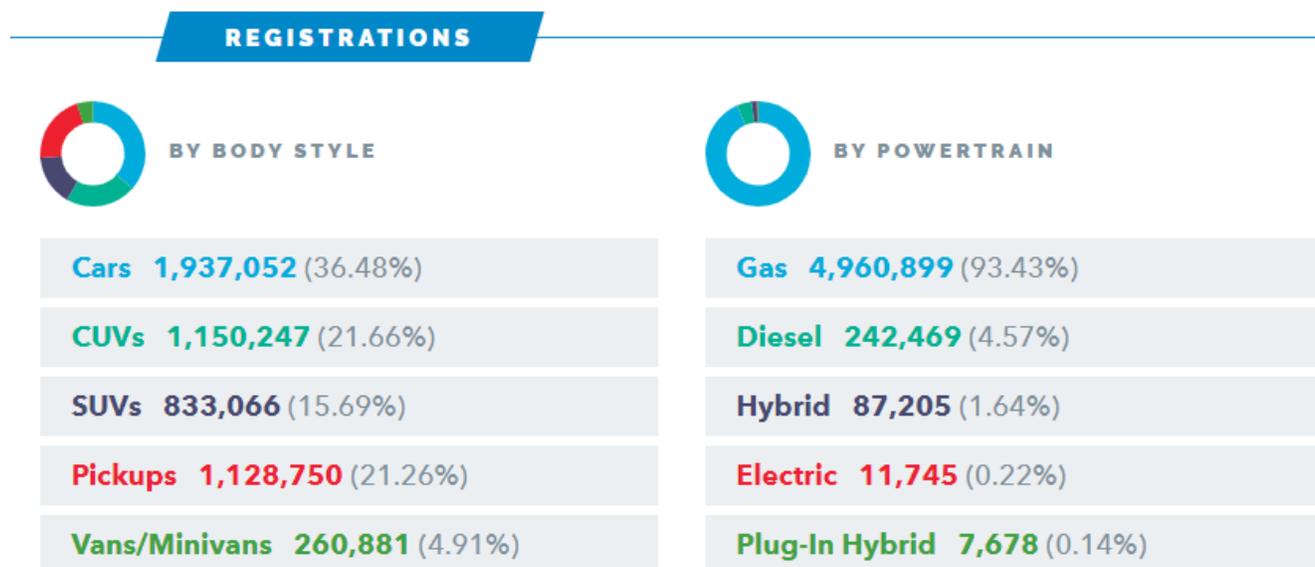


Figure 1: As of 2018, 98% of registered Colorado vehicles run on gas and diesel.

<https://autoalliance.org/in-your-state/CO>

Lakewood Population, 2019 Census Data

PEOPLE	
Population	
Population estimates, July 1, 2019, (V2019)	157,935
Population estimates base, April 1, 2010, (V2019)	142,600
Population, percent change - April 1, 2010 (estimates base) to July 1, 2019, (V2019)	10.8%
Population, Census, April 1, 2010	142,980
Age and Sex	
Persons under 5 years, percent	5.1%
Persons under 18 years, percent	18.9%
Persons 65 years and over, percent	15.9%

Figure 2: Lakewood population based on 2019 U.S. Census Data. Note that 34.8% of Lakewood’s population (the elderly and children under the age of 18) are classified as “Sensitive” to the impacts of air pollution, which means that they can suffer health impacts at lower levels of pollution than the general population.

<https://www.census.gov/quickfacts/fact/table/lakewoodcitycolorado/AGE775219>

Map of Front Range Nonattainment Area for Ozone:

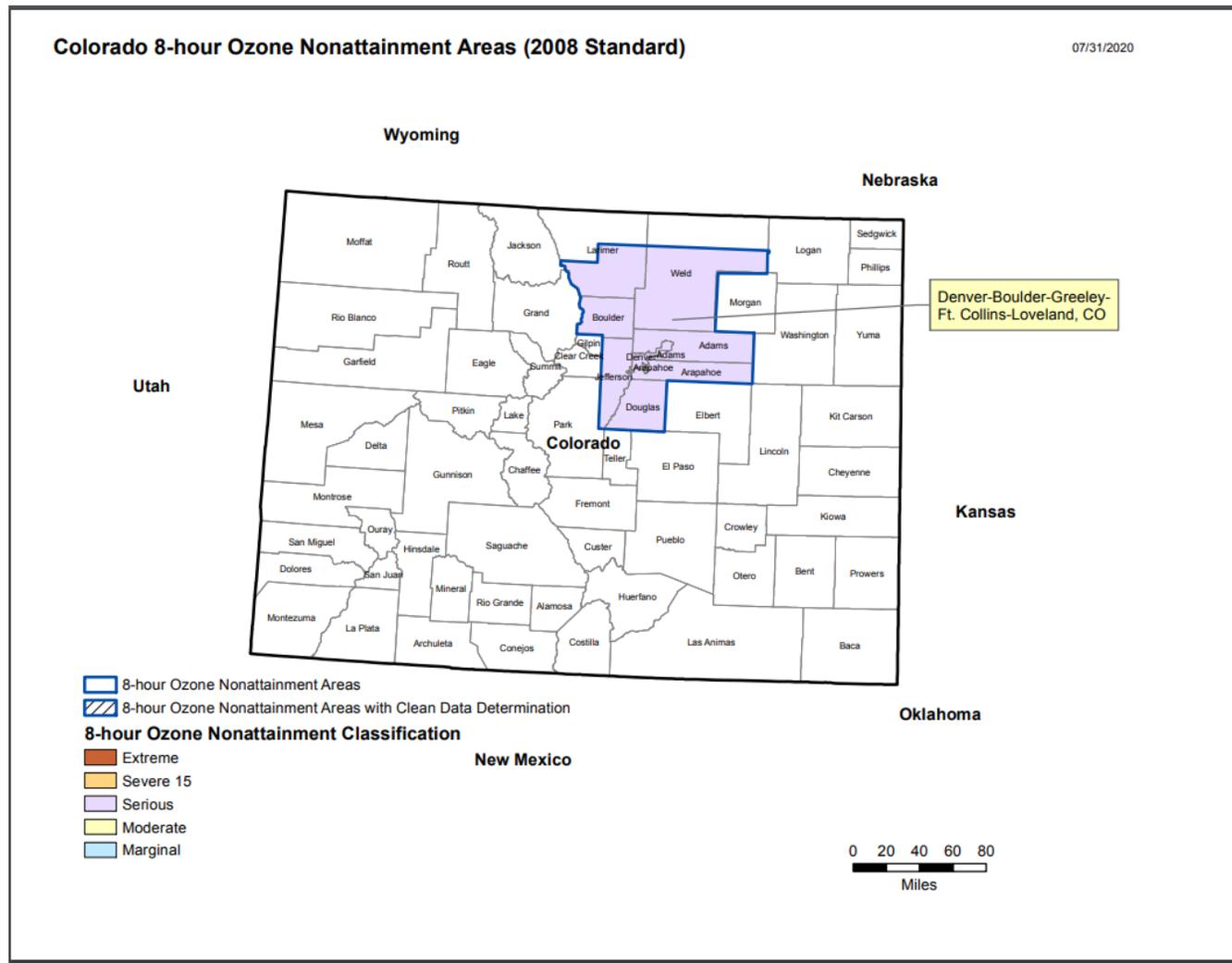


Figure 3: In 2019, Colorado failed to meet the 2008 health-based CAA Ozone standard, which is less stringent than the tougher standard passed in 2015.

Source: https://www3.epa.gov/airquality/greenbook/co8_2008.html

Colorado's Front Range violates the Clean Air Act standard for ozone – and it's getting worse:

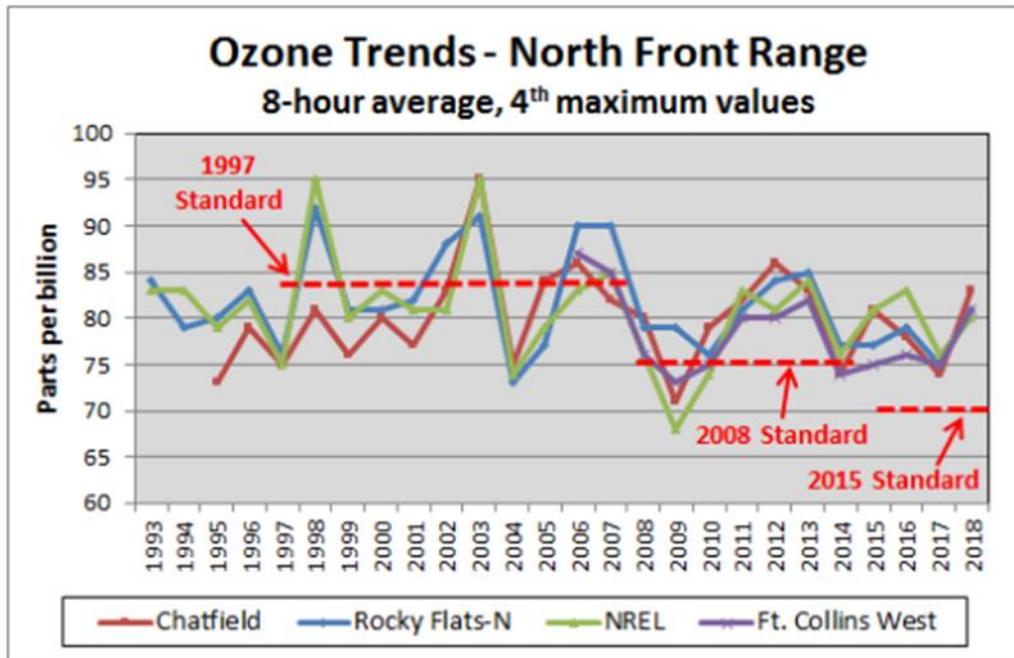


Figure 4: In 2018-2019, Colorado's ozone levels continued to rise well above even the laxer 2008 ozone standard – and the standard was tightened in 2015.

Source: AQCC's Report to the Public 2018-2019, p. 6.

<https://drive.google.com/file/d/1m37C55nLNfyXUTWPOQ7QEY8D5Un8GXff/view>

On the Front Range, levels of Particulate Matter are rising:

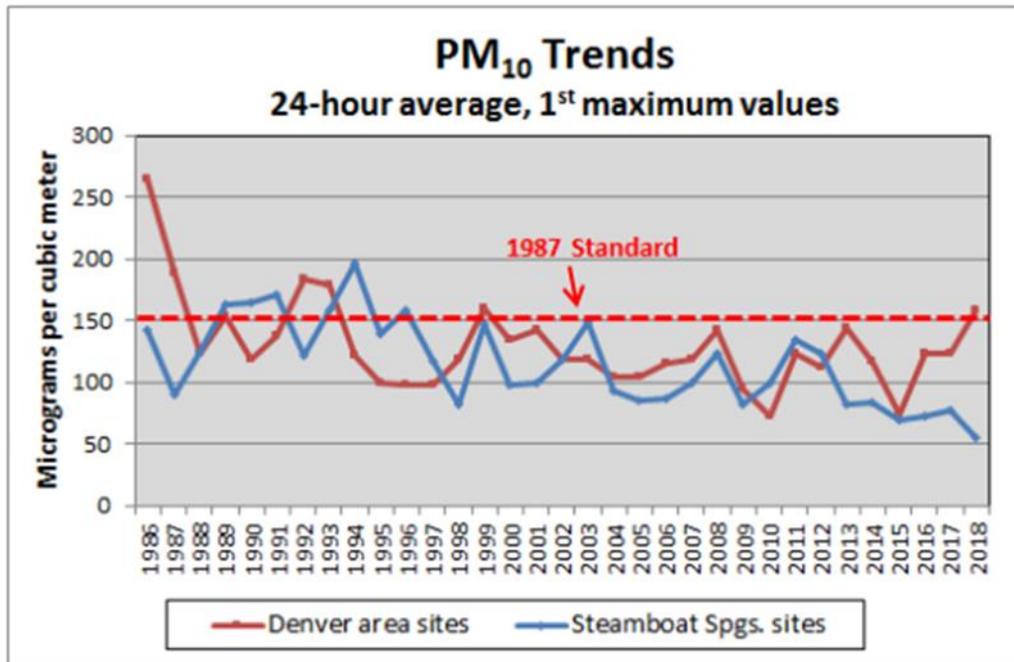


Figure 5: In the Denver area, levels of particulate matter have continued to rise since 2015.

Source: Source: AQCC's Report to the Public 2018-2019, p. 4.

<https://drive.google.com/file/d/1m37C55nLNfyXUTWPOQ7QEY8D5Un8GXff/view>

EPA's Air Quality Index (AQI): Human Health Impacts of Increasing Levels of Air Pollution

AQI Basics for Ozone and Particle Pollution

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 6: “Think of the AQI as a yardstick that runs from 0 to 500. The higher the AQI value, the greater the level of air pollution and the greater the health concern. For example, an AQI value of 50 or below represents good air quality, while an AQI value over 300 represents hazardous air quality.”

Members of “Sensitive Groups” include people with heart or lung diseases or diabetes, older adults, and children younger than 18 years old.

<https://www.airnow.gov/aqi/aqi-basics/>

Denver/Boulder AQI Levels, July- August 2020

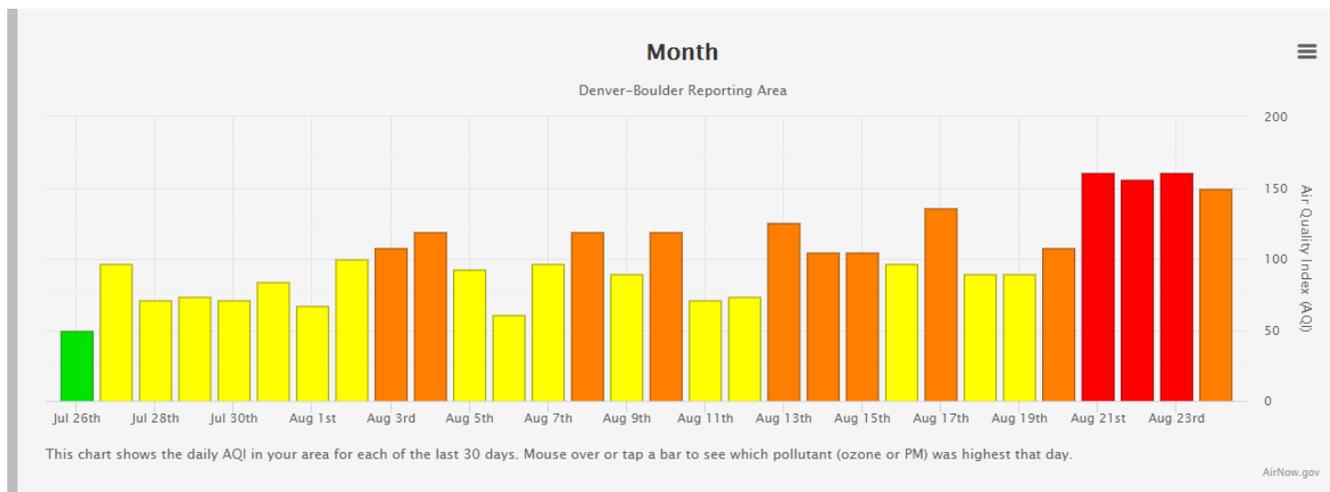
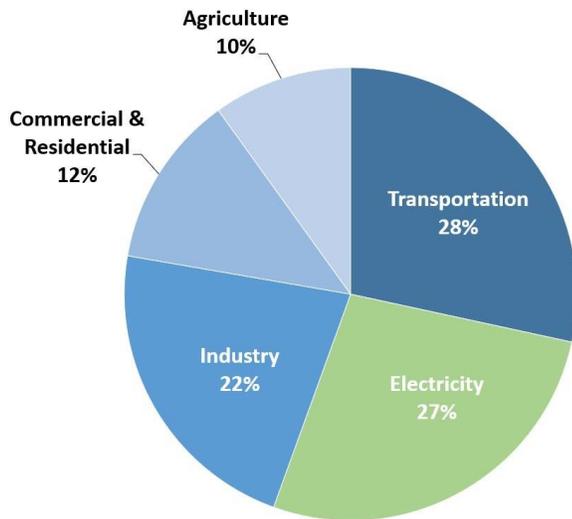


Figure 7: From July 26th to August 25 2020, the Denver/Boulder area had only a single day of “Good” air quality, 10 days of air quality that was “Unhealthy for Sensitive Populations,” and three days of air quality that was “Unhealthy” for the general population.

<https://www.airnow.gov/?city=Denver&state=CO&country=USA>; site last accessed 8/25/20.

Transportation is the Currently the Largest Single Source of GHGs:

Total U.S. Greenhouse Gas Emissions
by Economic Sector in 2018



U.S. Environmental Protection Agency (2020). Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2018

Figure 8: In addition to human health impacts, emissions from transportation, including vehicles, are the largest contributor to GHGs which cause climate change.

<https://www.epa.gov/>

Colorado Department of Public Health and Environment Summary of Health Impacts of PM and Ozone

Pollutant	Health Effects	Areas Affected	State & Federal Standards	Strategies to Reduce Pollutants
<p>Particulate Matter: Tiny particles of solid or semi-solid material found in the atmosphere, often referred to as dust.</p> <p>It is classified according to size:</p> <ul style="list-style-type: none"> • TSP = total suspended particles • PM₁₀ = particles smaller than 10 microns in diameter PM_{2.5} = particles smaller than 2.5 microns in diameter 	<p>Particulate matter can reduce lung function, aggravate respiratory conditions and may increase the long-term risk of cancer or development of respiratory problems.</p>	<p>PM₁₀ exceedances can occur when high winds cause blowing dust.</p> <p>PM_{2.5} exceedances can occur due to wintertime air inversions.</p> <p>All of Colorado is in attainment for the PM₁₀ standard and in attainment or maintenance for the PM_{2.5} standard. The following areas are in maintenance for PM_{2.5}: Aspen, Canon City, Denver Metro Area, Lamar, Pagosa Springs, Steamboat Springs, and Telluride.</p>	<p>PM_{2.5} Standards</p> <ul style="list-style-type: none"> • Annual average standard must not exceed 12 micrograms per cubic meter averaged over three years • 24-hour standard is 35 micrograms per cubic meter for the 3-year average of the 98th percentile value <p>PM₁₀ Standards</p> <p>24-hour standard of 150 micrograms per cubic meter cannot be exceeded more than once per year on average over three years.</p>	<p>Diesel Emissions Control Program, street sanding and street sweeping improvements, transportation planning, Basic and Enhanced Automobile Inspection and Maintenance Programs, new vehicle emission control equipment, travel reduction programs, residential burning controls, stationary source controls and pollution prevention programs, High Pollution Advisory Program, and power plant retirement.</p>
<p>Ozone: A highly reactive form of oxygen; it is not emitted directly from a source, rather it is formed from the reaction of pollutants with sunlight. Ground-level ozone (photochemical smog) should not be confused with stratospheric ozone - the protective ozone layer located in the upper atmosphere.</p>	<p>High concentrations of ozone can impair lung function; it may induce respiratory symptoms in individuals with asthma, emphysema or reduced lung function; it potentially can reduce immune system capacity; and it can act as an irritant to mucous membranes of eyes and throat.</p>	<p>All of Colorado is in attainment with both the 2008 and 2015 standards, except for the Denver/North Front Range 9-county area which is designated as a "moderate" non-attainment area under the 2008 standard and a "marginal" area under the 2015 standard.</p>	<p>An area will attain the standard when the 4th highest daily maximum 8-hour concentration, averaged over three years, is equal to or below 0.070 parts per million.</p>	<p>Automobile inspection and maintenance, new vehicle emission control equipment, gasoline transfer controls, low volatility gasoline, substitution of non-reactive hydrocarbons, solvent control and pollution prevention programs, stationary source controls including oil and gas equipment, VOC content of consumer products and architectural coatings, summertime ozone advisory program, power plant retirements.</p>
<p>Nitrogen Dioxide: A gas contributing to ozone production. It is a by-product of oxides of nitrogen emitted from combustion sources and motor vehicles.</p>	<p>Nitrogen dioxide can increase respiratory problems, cause mild symptomatic effects in asthmatic individuals and increase susceptibility to respiratory infections.</p>	<p>All of Colorado has met the standard.</p>	<ul style="list-style-type: none"> • Annual average standard: 0.053 parts per million • 1-hour standard: 100 parts per billion based on the 3-year average of the 98th percentile daily maximum values. 	<p>Colorado Air Quality Control Commission regulations control emissions of oxides of nitrogen from stationary sources, including engines, cement plants and power plants. Other strategies include motor vehicle emissions control equipment, and power plant retirements.</p>

Figure 9: Detailed summary of public health impacts of Particulate Matter and Ozone. AQCC Annual Report to the Public 2018-2019, p. 17

<https://drive.google.com/file/d/1m37C55nLNfyXUTWPOQ7QEY8D5Un8GXff/view>

RESEARCH FOLDER:

Information that is collected during the proposal process, including a PowerPoint with further information will be stored in the research folder and turned over to City staff when the project is complete.