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, and our neighbors with asthma. 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 2, 3, and 4.) And transportation is now the greatest source of Greenhouse Gas (GHG) emissions. For the health of our citizens, the planet, and even our wallets, Lakewood can adopt simple measures that will reduce air pollution, extend the life of our cars, and improve public health.

SUMMARY OF RESEARCH AND KEY FINDINGS:
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 (NOx)
- 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 respiratory ailments are especially at risk. (see Figure 5.)

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

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

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.

*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 asthma, as well as help citizens and the City to save money spent on personal and City-owned vehicles, just by promoting a simple idea: avoid unnecessary idling.

**RECOMMENDATIONS:**
1. 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.
2. 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.
3. Encourage Lakewood schools to develop their own student-led anti-idling programs.
4. 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.
5. Offer anti-idling talks at Ward meetings.
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
Map of Front Range Nonattainment Area for Ozone:

![Map of Front Range Nonattainment Area for Ozone](image)

**Figure 2:** In 2019, Colorado failed to meet the 2008 health-based CAA Ozone standard, which is less stringent than the tougher standard passed in 2015.

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

Figure 3: 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.
https://drive.google.com/file/d/1m37C55nLNfyXUTWPOQ7QEy8D5Un8GXff/view
On the Front Range, levels of Particulate Matter are rising:

*Figure 4: In the Denver area, levels of particulate matter have continued to rise since 2015. Source: AQCC’s Report to the Public 2018-2019, p. 4.*

https://drive.google.com/file/d/1m37C55nLNfyXUTWPOQ7QEy8D5Un8GXff/view
Pollutant standards and health effects summary

Federal and state air quality standards, health effects, areas affected in Colorado, and control strategies can be found in the table below.

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Health Effects</th>
<th>Areas Affected</th>
<th>State &amp; Federal Standards</th>
<th>Strategies to Reduce Pollutants</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Particulate Matter:</strong></td>
<td>Particulate matter can reduce lung function, aggravate respiratory conditions and may increase the long-term risk of cancer or development of respiratory problems.</td>
<td><strong>PM&lt;sub&gt;10&lt;/sub&gt;</strong> exceedances can occur when high winds cause blowing dust. <strong>PM&lt;sub&gt;2.5&lt;/sub&gt;</strong> exceedances can occur due to wintertime air inversions. All of Colorado is in attainment for the <strong>PM&lt;sub&gt;10&lt;/sub&gt;</strong> standard and in attainment or maintenance for the <strong>PM&lt;sub&gt;2.5&lt;/sub&gt;</strong> standard. The following areas are in maintenance for <strong>PM&lt;sub&gt;2.5&lt;/sub&gt;</strong> - Aspen, Canon City, Denver Metro Area, Lamar, Pagosa Springs, Steamboat Springs, and Telluride.</td>
<td><strong>PM&lt;sub&gt;2.5&lt;/sub&gt;</strong> Standards • Annual average standard must not exceed 12 micrograms per cubic meter averaged over three years • 24-hour standard is 25 micrograms per cubic meter for the 3-year average of the 98th percentile value <strong>PM&lt;sub&gt;10&lt;/sub&gt;</strong> Standards 24-hour standard of 150 micrograms per cubic meter cannot be exceeded more than once per year on average over three years.</td>
<td>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.</td>
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<td><strong>Ozone:</strong></td>
<td>High concentrations of ozone can impair lung function; it may induce respiratory problems 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.</td>
<td>All of Colorado is in attainment with both the 2008 and 2010 Standards, except for the Denver/North Front Range 9-county area which is designated as a &quot;moderate&quot; non-attainment area under the 2008 standard and a &quot;marginal&quot; area under the 2015 standard.</td>
<td>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.</td>
<td>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.</td>
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<tr>
<td><strong>Nitrogen Dioxide:</strong></td>
<td>Nitrogen dioxide can increase respiratory problems, cause mild symptoms in asthmatic individuals and increase susceptibility to respiratory infections.</td>
<td>All of Colorado has met the standard.</td>
<td>• 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.</td>
<td>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.</td>
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Figure 5: The public health impacts of Ozone and Particulate Matter.
https://drive.google.com/file/d/1m37C55nLNFyXUTWPOQ7QEy8D5Un8GXFf/view

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RESEARCH FOLDER:
Information that is collected during the proposal process that is non-essential will be stored in the research folder and turned over to City staff when the project is complete.