CITY OF ANN ARBOR

February 2011

DRAFT Idling Reduction Ordinance

The City of Ann Arbor's ten Environmental Goals, developed by the Environmental Commission and adopted by City Council in 2007, provide a framework for environmental work within the city. The idling reduction ordinance will help the city make progress toward its clean air and stable climate goals, and may also benefit health-promoting urban environment, safe community, and viable ecosystem goals.

ANN ARBOR'S ENVIRONMENTAL GOALS	EFFECT OF IDLING REDUCTION ORDINANCE	
Clean Air - Eliminate air toxics, criteria pollutants, and persistent bioaccumulative toxins (PBT).		The ordinance will reduce emissions of criteria air pollutants including carbon monoxide, nitrogen oxides, and particulates, and will reduce the formation of ground-level ozone.
Clean Water - Ensure safe water for drinking, recreation, other uses, and other species.		
Efficient Mobility - Provide infrastructure and policies for efficient modes of transportation.		
Health-promoting Urban Environment - Ensure that the built environment promotes public health and improvements to the natural environment.		The ordinance may reduce vehicle-exhaust related health conditions within the city.
Local Food Sufficiency - Conserve, protect, and restore local agriculture and aquaculture resources.		
Responsible Resource Use - Promote zero waste.		
Safe Community - Eliminate damage to public health and property from natural and other hazards.		The ordinance may reduce particulate levels in the air.
Stable Climate - Eliminate net greenhouse gas emissions and other destabilizing climate impacts.		The ordinance will reduce greenhouse gas emissions and resultant impacts on climate.
Sustainable Energy - Use 100% renewable energy.		
Viable Ecosystems - Conserve, protect, and restore aquatic and terrestrial ecosystems.		The ordinance may reduce negative impacts of air pollution on city vegetation, including street trees.

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What is idling?

Idling occurs when a vehicle's main engine is running, but the vehicle is not moving.

What is unnecessary idling?

Idling is necessary at times. Powering heating and air conditioning in extreme weather conditions or running electronic and communication equipment in emergency vehicles are examples of necessary idling.

Unnecessary idling is an avoidable practice that occurs mostly out of habit. Situations in which unnecessary idling may occur include warming up a vehicle, dropping off or picking up children at school, loading or unloading cargo, pulling over to take a cell phone call, or waiting in line at a drive-thru window. Unnecessary idling produces little or no discernable benefits, and it releases harmful pollutants into the air, consumes fuel, and causes added wear and tear on vehicle components.

Why is unnecessary idling a concern?

Idling can strongly influence outdoor air quality at the local or community level. Unnecessary idling impacts human health, contributes to environmental degradation, and consumes natural and economic resources.

Health Impacts

- Air Toxics are a growing concern especially at schools. Recent studies have shown elevated levels of air toxics such as benzene at schools.
- Vehicle exhaust contains carbon monoxide (CO), nitrogen oxides (NOx), sulfur dioxide (SOx), hydrocarbons, and particulates. These airborne pollutants cause or aggravate pulmonary diseases, including asthma, lung cancer, bronchitis, acute respiratory infections, and emphysema.
- NOx and volatile organic compounds (VOCs) react in the presence of sunlight to form ground-level ozone. High levels of ground-level ozone can cause respiratory illness and distress and can trigger asthma attacks.
- Children are especially vulnerable to vehicle exhaust because their lungs are still in the development stage, they breathe on average 50% more air per pound of body weight than adults, they have a higher breathing rate than adults relative to their body weight and lung surface area, and they have narrower airways than adults. Numerous studies have shown that children's asthma symptoms increase as a result of exposure to car exhaust.[1]
- Given the vulnerability of children to vehicle exhaust, idling by school buses and passenger vehicles outside schools is a serious concern. A study in Connecticut determined levels of fine particulate matter around a school during school days was close to three times higher than the average daily levels for outdoor air in the surrounding community.[2]

Environmental Impacts:

- Unnecessary idling contributes to general environmental degradation by emitting greenhouse gases, hydrocarbons, nitrogen oxides (NOx), volatile organic compounds (VOCs) and particulate matter.
- Carbon dioxide and NOx are greenhouse gases contributing to global climate change.
- Ground-level ozone, formed by the interaction of NOx and VOCs in the presence of sunlight, impacts plants and ecosystems. It makes sensitive plants more susceptible to disease, insects, and other

[1] American Academy of Pediatrics Committee on Environmental Health. Ambient Air Pollution: Health Hazards to Children. Pediatrics. 2004; 114:1699-707.

[2] Wargo and Brown 2002. Children's Exposure to Diesel Exhaust on School Buses. Environmental and Human Health Institute, Inc. North Haven, CT.

stresses, and damages the leaves of trees and other urban plants, adversely impacting their appearance and function.

- NOx and other pollutants emitted in vehicle exhaust contribute to acid rain formation.

Economic Impacts

- Idling wastes fuel. An idling vehicle gets the worst fuel economy: zero miles per gallon. According to the U.S. EPA, it is more fuel efficient to turn off the engine and restart it if the vehicle will be idling for more than 30 seconds. [3] The wear on components from restarting the engine adds only $10/year to the cost of driving – money that is easily recovered through improved fuel economy.
- Idling to warm up a vehicle in cold weather wastes additional fuel and emits pollutants. According to the U.S. Department of Energy, current vehicles need no to warm up for no more than 30 seconds on a winter day.[4] The National Public Radio (NPR) Car Talk program's "Guide to Better Fuel Economy" suggests driving a car gently for the first few minutes is the best possible warm-up because it warms all of the vehicle components including the wheel bearings, tires, and suspension system, rather than just the engine. Idling for up to a minute in cold temperatures may be necessary for some older vehicles.[5]
- Idling increases wear and tear on vehicle components, often resulting in costly repairs. Common vehicle problems include oil contamination due to residue build-up on the cylinders, corrosion caused by excessive condensation collected in the exhaust system, and decreased peak engine operating temperature due to spark plug residue.

To date, what steps have been taken to reduce idling in Ann Arbor?

- City of Ann Arbor: In 2000, the Ann Arbor City Council adopted the Green Fleets policy with the goal of reducing total gasoline and diesel use by 10% by the year 2012. This policy prohibits unnecessary idling of all vehicles in the city's fleet, including idling to warm up a vehicle.
- University of Michigan (UM) Plant Operations: In 2000, UM Plant Operations included an idling guideline in its division policy guide. The guideline, effective immediately, requires all drivers of Plant Operations vehicles to turn off the ignition of their running vehicle if 1) they are going to be away from the vehicle for more than five minutes or 2) they don't know when they will return to the vehicle. Certain vehicles with diesel engines or special setups will be exempt from this policy when temperatures or situations require, and will be marked accordingly.
- Ann Arbor Transportation Authority (AATA):
- Ann Arbor Public Schools (AAPS):

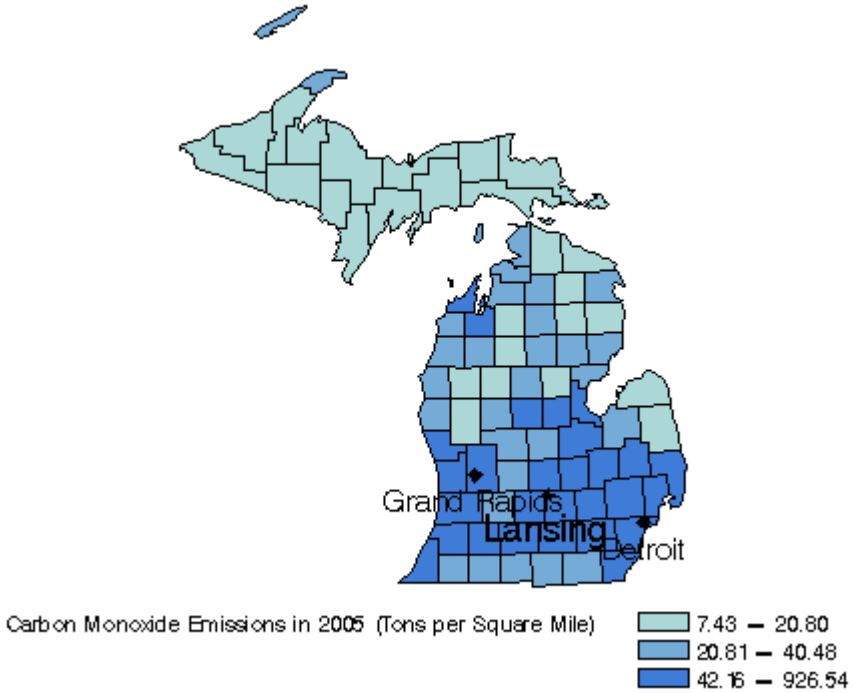
Why is the City of Ann Arbor considering an ordinance to regulate idling?

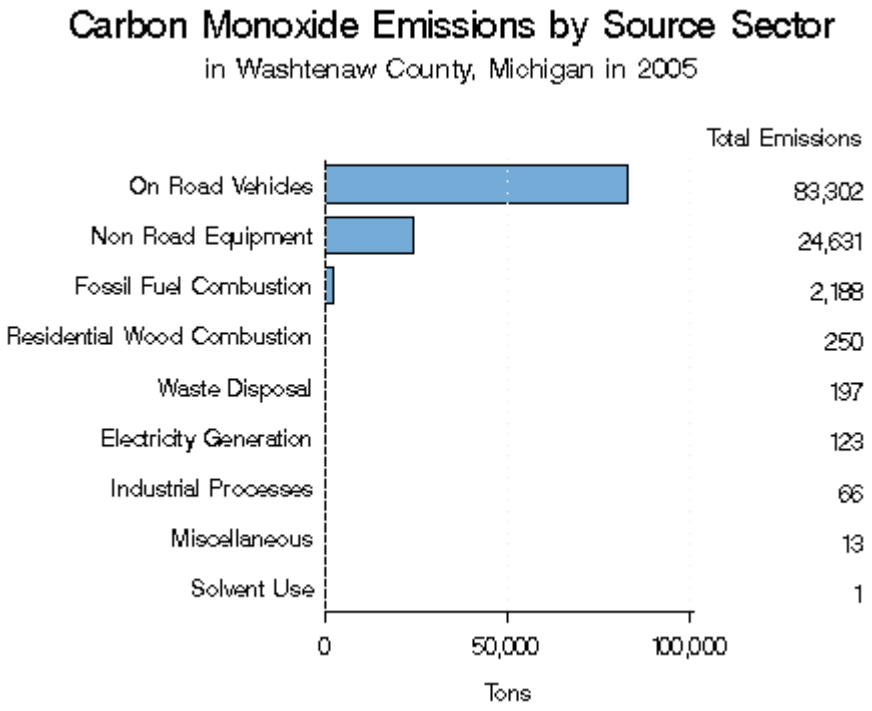
The City of Ann Arbor is considering an idling ordinance to address the health, environmental, and economic concerns discussed above, and to improve the quality of life within city limits by reducing the noise and odor associated with idling vehicles. Following a recommendation from the Environmental Commission, City Council directed staff to develop a draft idling reduction ordinance. Washtenaw county is out of attainment for the EPA NAAQS for PM2.5 and Ozone, and CO is an important precursor to ozone formation.

[3] U.S. Environmental Protection Agency. Your Car and Clean Air: What YOU can do to Reduce Pollution. Fact Sheet OMS-18. 1994. Accessed Oct. 28, 2009. < http://epa.gov/OMS/consumer/18-youdo.pdf>

[4] U.S. Department of Energy – Energy Efficiency and Renewable Energy. Energy Savers Tips. 2009. Accessed Oct. 28, 2009. < http://www1.eere.energy.gov/consumer/tips/printable_versions/driving.html>

[5] Car Talk. Car Talk's Guide to Better Fuel Economy. 2009. Accessed Oct. 28, 2009. <http://cartalk.com/content/features/fueleconomy/>





What vehicles would the idling reduction ordinance cover?

The idling reduction ordinance would apply to all motor vehicles, including, but not limited to, automobiles, motorcycles, buses, recreational vehicles, trucks, tractors, earth moving equipment, hoists, cranes, boats and other watercraft, snowmobiles, self-propelling lawn mowers, and off-road vehicles.

Why regulate passenger vehicles?

Although passenger vehicles emissions are cleaner than other vehicles, there are many more of them on the road. Collectively, unnecessary idling by passenger vehicles has a large impact on air quality. In addition, an

idling ordinance that covers passenger vehicles addresses a significant air quality concern: the high levels of particulates emitted during cold starts at cold ambient temperatures.

Particulate emissions from gasoline engines are typically very low. However, gasoline engines emit much higher levels of particulates when they run with a rich air/fuel ratio. Modern engines (i.e., vehicles built in the last 15 years) do not run rich very often – typically only during hard accelerations, if the engine has a malfunction, or during cold starts at cold temperatures.

It is important to distinguish between cold starts and cold temperatures. An engine's normal operating temperature is about 180 degrees (F), so any start after the engine has cooled off is referred to as a "cold start," even if ambient operating temperature is 90 or 100 degrees (F). That is still cold to the engine. When ambient temperature is above 50 degrees, modern engines do not start with a rich air/fuel ratio.

Cold temperatures are temperatures below 50 degrees (F). When ambient temperatures are below 50 degrees, fuel does not vaporize very well. Thus, to ensure an adequate amount of vaporized fuel for combustion, additional fuel is added during and after the cold start. This leads to a rich air/fuel mixture and much higher particulate emissions. The enrichment period ends as the engine warms up.

It is much harder to maintain combustion stability at idle than when the engine is operating under load. Thus, if an engine is idled immediately after a cold start at cold ambient temperatures, it can operate rich for an extended period of time and emits higher levels of particulates. However, if the vehicle is driven shortly after starting the engine, the engine enters a much more stable combustion region and the enrichment period ends much earlier.

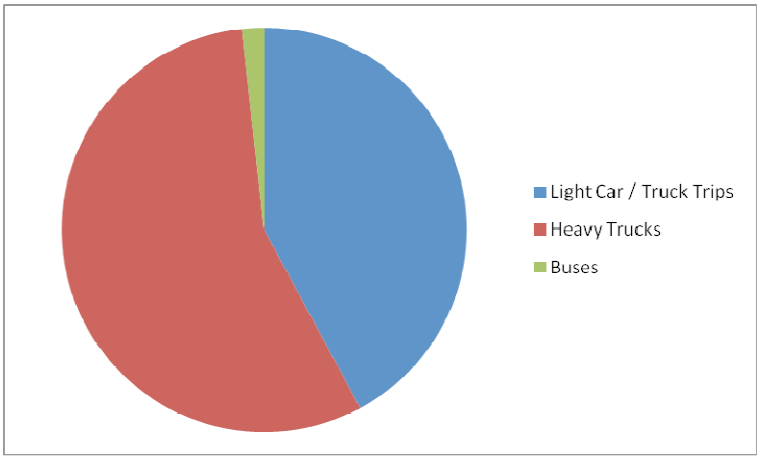
Consequently, idling a gasoline engine immediately after a cold start at cold ambient temperatures causes greatly elevated particulate emissions. Unfortunately, this is precisely the conditions in which drivers are most likely to idle for extended periods – to warm up the vehicle before driving off.

Washtenaw Area Transportation Authority estimates 440,000 trips per day for Ann Arbor alone. When you compare the relative pollution contribution for idling passenger vehicles and heavy duty vehicles, passenger vehicles are significant contributors. The following table estimates emissions by pollutant (grams/day) and vehicle type assuming 10% of the trips are idling for 10 minutes.

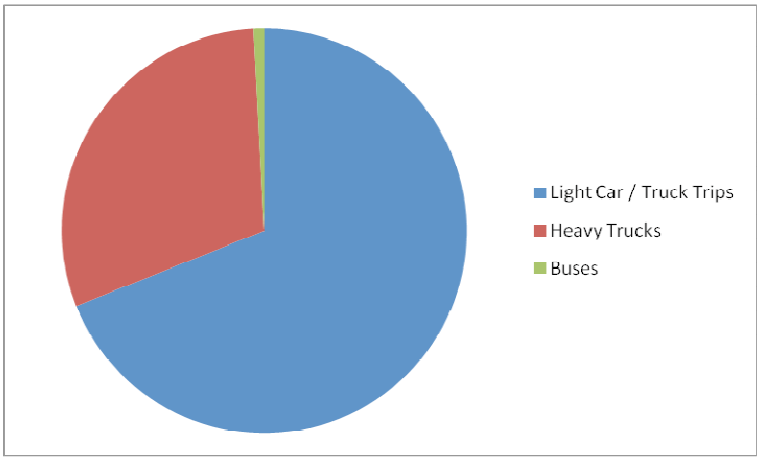
	Winter Day Trips	PM2.5 g/day	VOC g/day	CO g/day
Light Car / Truck Trips	440,000	**113**	**889**	**15255**
Heavy Trucks	22,000	**150**	**390**	**1086**
Buses	1,955	**5**	**11**	**29**

The proportional relationships are shown in the following three graphs.

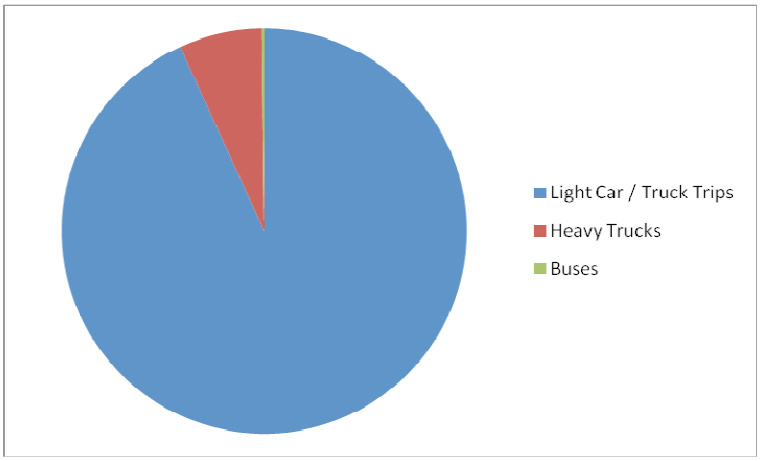
Proportion of particulate emissions under 2.5 microns (PM 2.5) from Light Duty Vehicles, Heavy Duty Vehicles, and Busses assuming 10% of vehicles idling for 10 minutes per trip



Proportion of volatile organic compound (VOC) emissions from Light Duty Vehicles, Heavy Duty Vehicles, and Busses assuming 10% of vehicles idling for 10 minutes per trip



Proportion of carbon monoxide (CO) emissions from Light Duty Vehicles, Heavy Duty Vehicles, and Busses assuming 10% of vehicles idling for 10 minutes per trip



What will the law require?

The law requires that if a vehicle is unoccupied it should not be idling and that occupied vehicles should not idle for more than 5 minutes. There are many exceptions allowed in the law for safety and emergency reasons. The law also states that other internal combustion engines (e.g., generators) should not be operating unless they are actively in use.

How will the idling reduction ordinance be implemented?

This is primarily an educational program to raise awareness, similar to the manufactured fertilizer ordinance.

Costs to implement include:

Signage at loading zones and public schools
Outreach to residents and fleets
Notification to owners of loading docks
Additional outreach in areas where idling is both prevalent and problematic (e.g., elementary schools, downtown loading areas)

How will the idling reduction ordinance be enforced?

After the ordinance goes into effect, there will be a six month grace period. During the grace period, educational tickets (with no fine) may be issued and placed on windshields of offending vehicles to build awareness of the new regulation. When the grace period is over, the idling reduction ordinance will be enforced.

What is the penalty for non-compliance with the idling reduction ordinance?

A vehicle operator, vehicle owner, or owner of a loading facility that violates the idling ordinance is responsible for the following penalties:

- The minimum fine for violation of the idling ordinance by an owner or operator is $100.
- For commercial vehicles, the minimum fine for each violation by a vehicle owner is $500, in addition to the minimum fine of $100 for the vehicle operator.
- For the owner of a loading facility, the minimum fine for each violation is $500.

These fines are within the reported range of values charged by other communities with local idling reduction ordinances (Table 2).

Have other communities implemented idling reduction ordinances?

Nationwide, idling reduction laws have been passed at the local, county, and state levels. Some laws are comprehensive (i.e., they impose idling restrictions on all vehicles), while others specifically target trucks, commercial vehicles, and/or buses. Several other communities have educational campaigns to encourage voluntary reductions in idling behavior. Table 2 includes a list of communities with local idling restrictions for all vehicles, similar to what the City of Ann Arbor is proposing. [6] Currently there are no other regulations that limit idling in Michigan.

[6] Adapted from Louisville, KY Idling Reduction Working Group. Review of Existing Restrictions. 2008. Accessed Oct. 28, 2009. < http://www.louisvilleky.gov/NR/rdonlyres/4542D82F-9A40-45F4-B048-4E96A11705DF/0/IdlingRestrictionReviewScopeDRAFT.pdf>

Review of Existing Local Idling Restrictions (through May 2008)

Jurisdiction	State	Idling Limit (minutes)	Enforcement	Penalty	Notes
Cook County (includes Chicago)	IL	0	-	$50.00	
Spokane	WA	1	-	-	Only in central business district
Flower Hill	NY	2	-	-	
Culpertino	CA	3	-	-	
Norwalk	CT	3	-	-	
District of Columbia	DC	3	patrol and complaint	$500.00	Dedicated group of inspectors patrol daily during ozone season
Bernards Township	NJ	3	-	$100.00	
Borough of South River	NJ	3	-	-	
Cape May	NJ	3	-	-	
Princeton Township	NJ	3	-	$100.00	
Bronxville	NY	3	-	-	
New York City	NY	3	-	-	
Rye	NY	3	-	-	
Scarsdale	NY	3	-	-	
Somers	NY	3	-	up to $100	
Tuckahoe	NY	3	-	up to $250	Also enforced in parking lots
Village of Mamaroneck	NY	3	-	-	
St. Louis County (near St. Louis)	MO	3	complaint	up to $1000	Penalty only issued in most severe cases. Other violators get warning and educational materials.
Port Chester	NY	3	-	-	
Yonkers	NY	3	-	-	
Fairfax County (near D.C.)	VA	3	-	-	
Town of Mamaroneck	NY	5	-	-	
Aspen	CO	5	patrol	-	
Cambridge	MA	5	patrol and complaint	-	
Bar Harbor	ME	5	-	-	
Ithaca	NY	5	-	up to $250	
New Rochelle	NY	5	-	-	
North Salem	NY	5	-	up to $500	
Northport	NY	5	-	up to $250	
Suffolk County (Long Island)	NY	5	-	-	
Burlington	VT	5	-	-	Enforced between Apr. 1 and Nov. 1
Fountain Valley	CA	10	-	-	
Denver	CO	10	-	-	
Borough of Emsworth	PA	10	-	-	
Palm Desert	CA	15	-	-	Adjacent to developed residential area
Winter Park	CO	15	-	up to $300	
Owatonna	MN	15	-	-	In residential districts
Brighton	NY	15	-	-	Within 10 feet of lot line
Township Falls	PA	15	-	-	Within 10 feet of lot line
Vail	CO	20	-	-	
Rawlins	WY	20	-	-	
Upper Providence Township	PA	60	-	$75-$600	60 minutes limit between 6AM and 9PM; 10 minutes limit between 9PM and 6AM

How did other communities publicize/implement their idling reduction programs?

Portland, OR
The "Idling gets you nowhere" campaign focuses mainly on public education.

Denver, CO is using public education campaign to bring about voluntary changes in behavior.
www.enginesoff.com

Engines **OFF!**
D E N V E R

New Jersey has a statewide idling reduction law. Information can be found at www.stopthesoot.org. This is an example of New Jersey's signage.

Massachusetts – Department of Environmental Protection Idling Reduction Toolkit

This is a great resource for implementing an idling reduction ordinance that includes example outreach materials including signs and logos.

Draft Ordinance (10/22/2009)

AN ORDINANCE TO AMEND THE CODE OF THE CITY OF ANN ARBOR BY ADDING A NEW CHAPTER WHICH NEW CHAPTER SHALL BE DESIGNATED AS CHAPTER 71 (IDLING REDUCTION) OF TITLE VI OF SAID CODE AND TO AMEND SECTION 1:17 OF CHAPTER 1 OF TITLE 1 OF THE CODE OF THE CITY OF ANN ARBOR

The City of Ann Arbor ordains:

Section 1. That Title VI of the Code of the City of Ann Arbor be amended by adding a new chapter, which shall be designated as Chapter 71 and shall read as follows:

CHAPTER 71
IDLING REDUCTION

6:500. Title

This chapter shall be known as the "Idling Reduction Ordinance" of the City of Ann Arbor.

6:501. Intent and Purpose

(1) City Council has determined that the unnecessary operation of internal combustion engines poses a number of public health concerns. In particular, airborne pollutants from engine emissions cause or aggravate pulmonary diseases, including asthma, lung cancer, bronchitis, acute respiratory infections, and emphysema. In addition to public health concerns, idling engines also impose economic costs, including wasted energy, consumption of non-renewable resources, and business and personal expenses for medical care and loss of productivity due to pollution-related illness. Idling engines also reduce citizens' quality of life due to noise, odor, and air pollution.

(2) City Council has determined that unnecessary idling contributes to general environmental degradation by emitting greenhouse gases, hydrocarbons, nitrogen oxides (NOx) and particulate matter, and that City Council has determined that although technological refinements have mitigated some of the adverse effects of internal combustion engines, their use continues to increase and many older engines continue in service, offsetting many of the benefits of new technology. City Council recognizes that activities within Ann Arbor impact the environment both locally and regionally.

(3) City Council is committed to eliminating air toxics, criteria pollutants and persistent bioaccumulative toxins (PBTs), as well as eliminating net greenhouse gas emissions and other destabilizing climate impacts.

(4) It is the intent and purpose of this chapter to regulate the operation of internal combustion engines within the City of Ann Arbor in order to protect public health and the environment, conserve energy and resources, promote economic efficiency, and improve quality of life.

6:502. Definitions

For the purposes of this chapter, the following words and phrases shall have the meanings described in this section:

(1) *Commercial vehicle* shall have the same meaning as in the Michigan Motor Vehicle Code, MCL 257.1 et. seq., as amended.

(2) *Idle* means to operate a motor vehicle's internal combustion engine while the vehicle is stationary.

(3) *Loading facility* means a place designed, designated or intended to transfer cargo to and from vehicles, including, but not limited to, distribution centers, air freight terminals, ports, and loading docks at retail stores.

(4) *Motor vehicle* means any vehicle that is propelled by an internal combustion engine, including, but not limited to, automobiles, motorcycles, buses, recreational vehicles, trucks, tractors, earth moving equipment, hoists, cranes, boats and other watercraft, snowmobiles, self-propelling lawnmowers, and off-road vehicles.

(5) *Official traffic control device* means a sign, signal, marking, or device, placed or erected by authority of a public body or official having jurisdiction, for the purpose of regulating, warning, or guiding traffic.

(6) *Operator* means a person who has actual control of an internal combustion engine.

(7) *Vehicle owne*r means any registered owner, lessee, licensee, or bailee of any vehicle.

6:503. Regulation of Motor Vehicle Idling

(1) No operator of a motor vehicle shall cause or permit the motor vehicle to idle:

(a) for any period of time while the motor vehicle is unoccupied; or

(b) for more than 5 minutes in any 60-minute period while the motor vehicle is occupied.

(2) Section 6:503(1) shall not apply in any of the following circumstances:

(a) a motor vehicle is forced to remain stationary because of an official traffic control device, direction of a law enforcement official, or traffic conditions beyond the operator's control, including traffic congestion, railroad crossings, construction zones, security checkpoints, and vehicle queues for drive-through goods and services;

(b) idling is necessary to operate defrosters, heaters, air conditioners, or other equipment to prevent a safety or health emergency;

(c) idling is necessary to provide heat to an occupied vehicle when the outside ambient temperature is below 0 degrees Fahrenheit;

(d) a motor vehicle designed to carry 16 or more passengers, idles to maintain comfortable cabin temperatures while non-driver passengers are on board for up to 5 minutes before a scheduled embarkation;

(e) idling is necessary to power heaters or air conditioners to maintain the comfort of vehicle occupants while waiting for assistance when a vehicle is immobilized due to mechanical problems beyond the operator's immediate control;

(f) an emergency or law enforcement vehicle, including police, fire, ambulance, public safety, and military vehicles, or any vehicle being used in an emergency capacity, idles in the course of or in preparation for its emergency or law enforcement duties;

(g) a licensed private security provider idles a vehicle in the course of performing security duties;

(h) an armored vehicle idles while in the course of business;

(i) idling is necessary to power auxiliary work equipment that is actively in use, including cargo refrigeration units, waste collectors/compacters, lifts, winches, pumps, compressors, drills, mixers, and safety and other construction equipment. Auxiliary work equipment does not include equipment primarily intended for vehicle cabin comfort, such as air conditioning, heating, radio, TV, or kitchen appliances;

(j) an occupied vehicle idles primarily for purposes of air conditioning or heating during a legally mandated rest or sleep period; where the vehicle has no functional alternative power source, e.g. an auxiliary power unit or generator, and is not within 25 miles of a parking facility with available truck stop electrification or shore power compatible with the vehicle's equipment;

(k) idling is necessary for any maintenance, service, repair, inspection, research and development, or diagnostics;

(l) an engine is operated in accordance with instructions from the manufacturer for proper operation;

(m) applicable federal, state or local law requires idling.

6:504. Regulation of Idling at Loading Facilities

No person shall cause a motor vehicle to idle for a period greater than 5 minutes while the motor vehicle is waiting to load or unload at a loading facility under the person's control.

6:505. Regulation of Generators, and Other Internal Combustion Engines

(1) Excluding motor vehicle engines, no internal combustion engine shall be operated except when it is providing power or electrical energy to equipment or a tool that is actively in use.

(2) Section 6:505(1) shall not apply in any of the following circumstances:

(a) engine operation is necessary to prevent a health or safety emergency;

(b) engine operation is necessary for any maintenance, service, repair, inspection, research and development, or diagnostics;

(c) an engine is operated in accordance with instructions from the manufacturer for proper operation;

6:506. Penalties

Each violation of this chapter shall be a civil infraction. An operator, vehicle owner, or owner of a loading facility that violates this law is responsible for penalties as follows:

(1) The minimum fine for each violation of this chapter by an owner or operator shall be $100. Where a responsible operator is not immediately apparent, there shall be a rebuttable presumption of responsibility on the part of the person in whose name the offending vehicle or engine is registered at the time of the violation.

(2) For commercial vehicles, the minimum fine for each violation of this chapter shall be $500 for a vehicle owner, in addition to a minimum fine of $100 for the vehicle operator.

(a) If the operator is also the vehicle owner, only an operator fine shall be issued.

(b) If the operator is operating the vehicle without the actual or implied consent of the vehicle owner, only an operator fine shall be issued.

(3) The minimum fine for each violation of this chapter by a loading facility shall be $500, payable by the owner of the loading facility.

6:507. Effective Date

This Chapter shall be effective on _____, 2010.

Section 2. That Section 1:17 of Title 1 of the Code of the City of Ann Arbor be amended to read as follows:

1:17. Code violation citations.

The administrators of the following services areas and the persons holding the positions or performing the functions listed within each services area are authorized to issue citations for violations of the indicated chapters of this Code. This designation of authority is in addition to that otherwise provided by law.

(1) *Community services area.*

(a) Planning and Development Services Unit (Chapters 2, 26, 27, 28, 33, 38, 47, 50, 55, 56, 57, 59, 60, 61, 62, 63, 65, 71, 79, 82, 94, 98, 99, 100, 101, 103, 104, 105, 106, 116 and 119):

Assistant land development coordinator.

Building inspectors.

Electrical inspectors.

Inspection supervisors.

Housing inspectors.

Mechanical inspectors.

Ordinance inspector.

Plan examiner.

Plumbing inspectors.

Zoning coordinator.

(b) Community television network - public information services unit (Chapter 32):

Cable administrator.

(2) *Public services area.*

(a) Field operations services unit (Chapters 26, 27, 28, 33, 38, 39, 40, 47, 49, 82, 106 and 119):

Field operations manager.

City forester.

Field operations supervisor.

Field operations technician.

Park ranger.

Natural area preservation manager.

Natural area preservation technician.

Conservation worker.

Outreach coordinator.

Conservation crew leader.

Field biologist.

(b) Wastewater Treatment Services Unit (Chapters 27, 28 and 33):

Wastewater treatment services manager.

Administrative assistant to wastewater treatment services manager.

(c) Systems planning unit (Chapters 33, 47, 55, 56, 57, 59, 60, 62, 63, 70, 98, 100, 104, 106, 116 and 119):

Environmental coordinator.

Fertilizer program administrator.

Land development coordinator.

(3) *Safety services area.*

(a) Fire services unit (Chapters 27, 93, 98, 99, 100, 101, 105, 111, 115, 116 and 126):

Fire chief.

Assistant fire chief.

Battalion chief.

Captain.

Lieutenant.

Driver operator.

Fire fighter.

Fire marshal.

Fire inspectors.

(b) Police services unit.

Community service assistants (Chapters 38, 39, 47, 49, 70, 71, 82, 85, 106, 107, 111, 114, 115, 119, 126 and 127)

Community standards officers/safety services area (Chapters 26, 30, 40, 47, 49, 56, 59, 61, 70, 71, 79, 82, 105, 106, 111 and 126).

Parking enforcement personnel (Chapters 30, 59 and 126).

Telecommunicator (Chapter 93).

(4) *Human Resources Services Unit (Chapters 23 and 112):*

Human resources manager.

Human rights coordinator.

Human rights investigator.