Georgia Department of Natural Resources
Environmental Protection Division
Air Protection Branch

October 8, 2008– **Working Draft in Progress**

Eliminating Unnecessary Idling of Heavy-Duty Vehicles in Georgia

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1. BACKGROUND

1.1 Stakeholders

This document is intended to facilitate communications as part of engaging stakeholders interested in efforts to eliminate unnecessary idling of heavy-duty vehicles in Georgia. The term unnecessary idling does not appear in the draft rule. However, the phrase "eliminate unnecessary idling" accurately describes the intent, which is to eliminate idling that occurs even though there are reasonably available alternatives that reduces air pollution. This rule is not intended to preclude idling when no reasonable alternative exists for the vehicle to serve its intended purpose. Georgia Environmental Protection Division (EPD) is in the process of developing this rule to reduce idling and consequently improve air quality. Fully understanding the nature and amount of idling activities is a real challenge because there are so many people involved with idling activities, which is why the stakeholder process is so important. Reducing idling of heavy-duty vehicles is not a "magic bullet" to fixing our air quality problems, but it is one step in a very difficult journey to protect and improve air quality. With this in mind, EPD believes beneficial emission reductions can be achieved by eliminating unnecessary idling of heavy-duty vehicles with minimal cost.

EPD is currently discussing an emission control strategy for locomotives. Locomotive idling is a concern and will be addressed. However, this stakeholder process will defer locomotive idling until the comprehensive locomotive control strategy has been sufficiently developed.

Included in this document is proposed rule language evolving through a stakeholders process. There is no intent to preclude the possibility of other alternative language, which may be used to appropriately craft the rule to achieve the overall objectives of protecting air quality. This is a working document in progress that will be dynamic and updated regularly as EPD's knowledge and understanding improves. EPD has limited resources. Consequently, we are dependent on stakeholders to help us better understand idling in Georgia and assist with devising a reasonable, fair and effective rule. Appendix B contains a list of stakeholders.

Unless otherwise specified, terms shall have their common meaning, which may be found in a dictionary such as the *American Heritage College Dictionary* or on line at www.wikipedia.org. The reader should find consistency between the terms in this document and those terms used by the United States Environmental Protection Agency (U.S. EPA).

1.2 Justification for Reducing Unnecessary Idling of Heavy-Duty Vehicles

Elimination of unnecessary idling of heavy-duty vehicles is expected to be a cost effective way to address air quality problems faced by Georgia consistent with state's public policy. According to the Georgia Air Quality Act (O.C.G.A. § 12-9-2 (2006)), the state's policy is as follows:

> § 12-9-2. Declaration of public policy
> "It is declared to be the public policy of the State of Georgia to preserve, protect, and

> improve air quality and to control emissions to prevent the significant deterioration of air quality and to attain and maintain ambient air quality standards so as to safeguard the public health, safety, and welfare consistent with providing for maximum employment and full industrial development of the state."

Elimination of unnecessary idling of heavy-duty vehicles will help Georgia comply the Federal Clean Air Act. The Federal Clean Air Act Title 1 Part C - *Prevention of Significant Deterioration* and Part D - *Plans for Nonattainment Areas* requires EPD to assure attainment areas continue to meet ambient air quality standards and establish plans to bring any areas not meeting the ambient air quality standards into compliance.

The draft state energy plan further supports EPD's efforts to eliminate unnecessary idling of heavy-duty vehicles as follows:

> *State Energy Plan for Georgia*,
> **Strategy 3.3 – *Use and Support Idle Reduction Technologies***
> "Idle reduction technologies reduce the fuel that idling vehicles consume and the pollutants they emit. These technologies can effectively be applied to both over-the-road freight carriers and urban transit vehicles. Long-distance truck drivers who carry freight often idle their engines at truck stops because they need power for heating, cooling or other in-truck appliances or uses. Truck Stop-Electrification (TSE) allows drivers to "plug-in" at the truck stop to a unit that provides electricity to power heating or cooling units as well as other services, such as Internet connections and cable television. Auxiliary Power Units are portable power generators that are installed in each vehicle to provide power for heating, cooling and other purposes without using the vehicle's petroleum powered engine. In the urban transit sector, hybrid-electric vehicles improve fuel efficiency and reduce idle time when the vehicle is standing still by using electric motors and batteries instead of the fossil fuel powered engine. According to estimates by Argonne National Laboratory, truck idling consumes approximately 838 million gallons (over 19 million barrels) of fuel per year (Stodolsky, Gaines, & Vyas, 2000). Diesel engines comprise the vast majority of these engines and when compared with gasoline, diesel fuel emits considerably more particulate matter, a pollutant linked to respiratory damage, nonfatal heart attacks and premature death (U.S. EPA, *Particulate Matter*, 2006). Idle reduction technologies can provide local air quality benefits if they are available more widely along heavily traveled corridors and in dense population centers.
>
> Broader adoption of idle reduction technologies will require participation by key players including freight carriers, truck stop owners and public transportation departments. The State of Georgia should continue to support truck stop electrification efforts through the Congestion Mitigation and Air Quality Improvement Program and two Clean Cities Coalitions, and should leverage its efforts with private partners to increase the benefits of these technologies. Transit authorities, such as the Metropolitan Atlanta Rapid Transit Authority (MARTA), should consider using more hybrid-electric vehicles to reduce idling emissions and fuel consumption, particularly as current vehicles age and need replacing. To increase use of all these technologies, the State should ensure that accurate and updated information is distributed to key stakeholders through a collaboration of the Georgia

Department of Transportation (DOT), State universities, related nonprofit organizations and private sector entities, including manufacturers. A current collaboration among North Carolina, South Carolina and Georgia has installed TSE stations along the I-85 corridor and documented significant increases in usage over the nine months since installation." The number and location of available Advanced Travel Center Electrifications (ATE) made by IdleAir, which is a "stand alone" TSE system, can be found by visiting IdleAire's web site.

Reducing emissions from internal combustion (IC) engines used by on-road and non-road vehicles are important to assuring National Ambient Air Quality Standards (NAAQS) are met. Emissions from vehicles tend to have a more significant impact on human health because of the proximity of the emissions to the air we breathe. This is particularly true for idling vehicles. Sensitivity numbers show that reducing vehicle emissions affectively lowers ozone and $PM_{2.5}$ ambient concentrations (See Section 3.4).

Eliminating unnecessary idling of heavy-duty vehicles is a logical and reasonable step in mitigating the air pollution impact in Georgia. Idling as a control strategy is supported by a study conducted by Georgia Institute of Technology in December of 2005, entitled "Atlanta Heavy-Duty Vehicle and Equipment Inventory and Emissions Study (AHDVEIES)." The cost savings from reduced fuel consumption when using anti-idling technology is expected to cover the cost of implementing anti-idling technology. The U.S. EPA provides a cost savings example showing $3,600 per year could be saved if a truck used an auxiliary power units (APU) rather than idling the main drive engine. The U.S. EPA is offering financial tools to help companies with the capital cost associated with anti-idling technologies. A rule to eliminate unnecessary idling of heavy-duty vehicles will help Georgia meet and maintain compliance with NAAQS and help reduce localized toxic risk to our communities with minimal cost.

1.3 Ambient Standards & Nonattainment

The Clean Air Act requires the U.S. EPA to establish NAAQS that are protective of public health. The U.S. EPA continues to update the ambient standards as needed. More recent changes to the ambient standards occurred on July of 1997, September of 2006, and March 12, 2008. Georgia has already had areas designated as nonattainment for failing to meet the 8-hour ozone standard and fine particulate matter standard ($PM_{2.5}$) standard set in July 1997. These standards are 160 ug/m3 (0.08 ppm) and 15 ug/m3 respectively. EPD has submitted recommendations to EPA that the no additional nonattainment areas should be designated based on the September 2006 standards. Effective May 27, 2008, the 8-hour ozone standard has been reduced to 0.075 ppm. EPD is required to submit designation recommendations by March 12, 2009. Figure 1.3.1 shows the current nonattainment areas in Georgia.

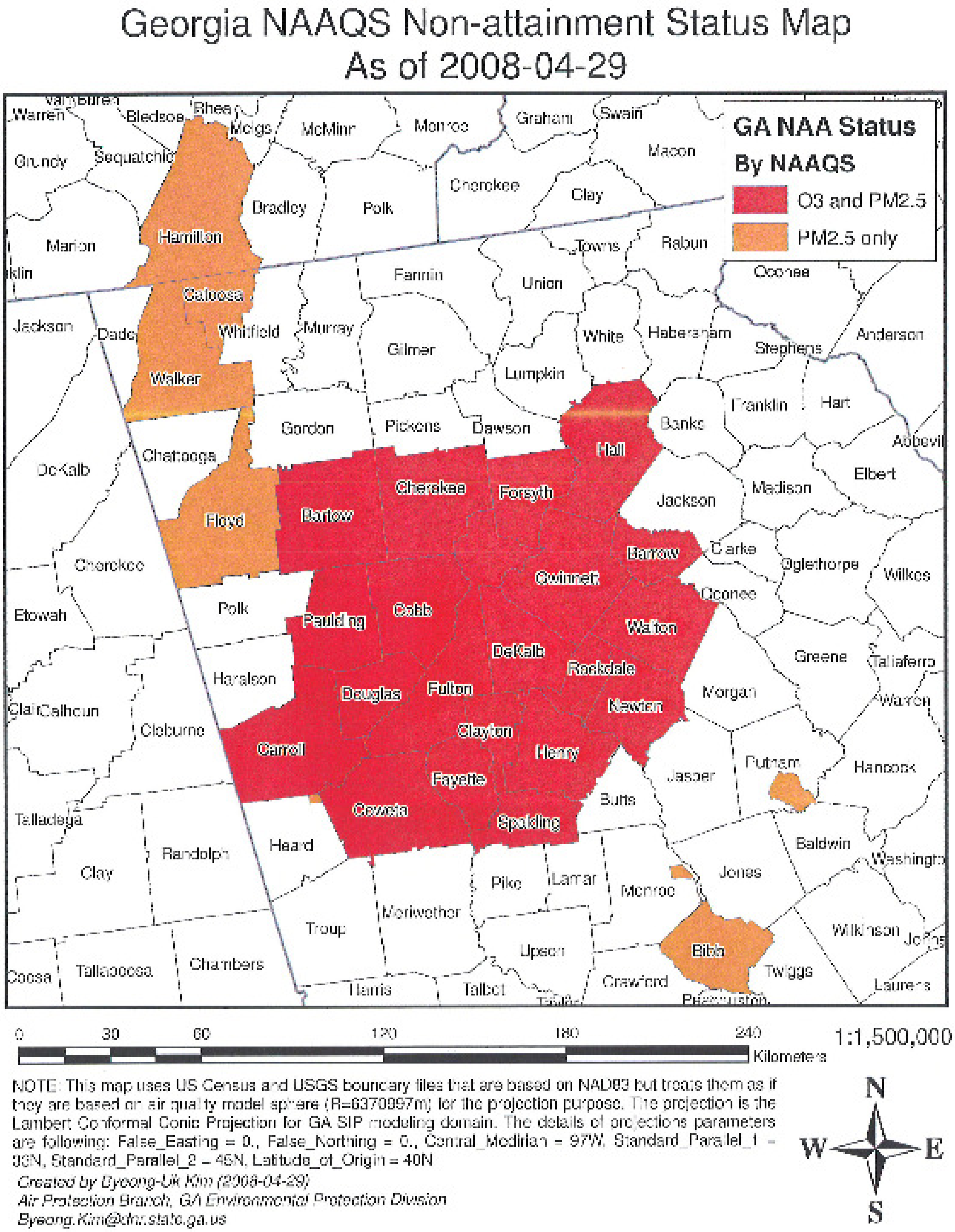


Figure 1.3.1. The map shows current nonattainment areas in Georgia.

A statewide rule precluding unnecessary idling of heavy-duty vehicles should help improve air quality in the nonattainment areas while also preventing unnecessary deterioration of air quality in attainment areas. The highest measured values based on 2006 data compared to the standard inside and outside the Atlanta Nonattainment area are as follows:

Highest 4th high ozone in units of ppb (**0.080 ppb standard**)

	City	County	2006 Measured Value
Nonattainment	Conyers	Rockdale	0.099
Attainment	Athens	Clarke	0.086

Highest Annual Arithmetic Mean for PM2.5 in units of ug/m3 (**15.0 ug/m3 standard**)

	City	County	2006 Measured Value
Nonattainment	Atlanta FS#8	Fulton	18.380
Attainment	Augusta Bungalow Rd.	Richmond	16.340

1.4 The U.S. EPA Requirements for Emission Reduction Credits

This document has been design to include critical topics associated with obtaining emission reduction credits needed to improve air quality in the nonattainment areas. The U.S. EPA provides guidance for how to quantify and use idling emission reductions in state implementation plans (SIPs). (See documents EPA420-B-04-001 and EPA420-B-04-002). To obtain the emission reduction credit, the U.S. EPA requires Georgia to submit the following:

1. identification and description of the idle reduction project and schedule to reduce idling emissions with a specific time period;
2. a methodology to quantify emission reduction using the most recent information available and providing explanations of uncertainties associated with the estimates;
3. federally enforceable requirements that assure the responsible party monitors and records the appropriate information;
4. enforceable commitments to evaluate and report the resulting emission reductions for voluntary measures;
5. enforceable commitment to remedy the SIP emission shortfall in a timely manner if emission reductions fall short of the estimates; and
6. Demonstrate all requirements for revising the SIP under Section 110 and 172 of the Clean Air Act (CAA).

1.5 Sources of Pollutants

1.5.1 Ozone and $PM_{2.5}$ Formation

Ozone (O_3) results when oxygen (O_2), volatile organic compounds (VOCs), nitrogen oxide emissions (NO_x) react in the atmosphere in the presence of sunlight. See Figure 1.5.1. High temperatures and other associated atmospheric conditions (i.e., inversion and dry weather) during the summer months tend to create conditions that result in higher concentrations of ozone. Reducing ozone requires limiting the availability of VOCs or NOx. Biogenic sources (i.e., trees and other vegetation) in Atlanta emit so much VOCs that reducing man made VOCs will have little affect on reducing ozone. Hence, NOx emission reductions will provide the most effective means of lowering ambient ozone concentrations.

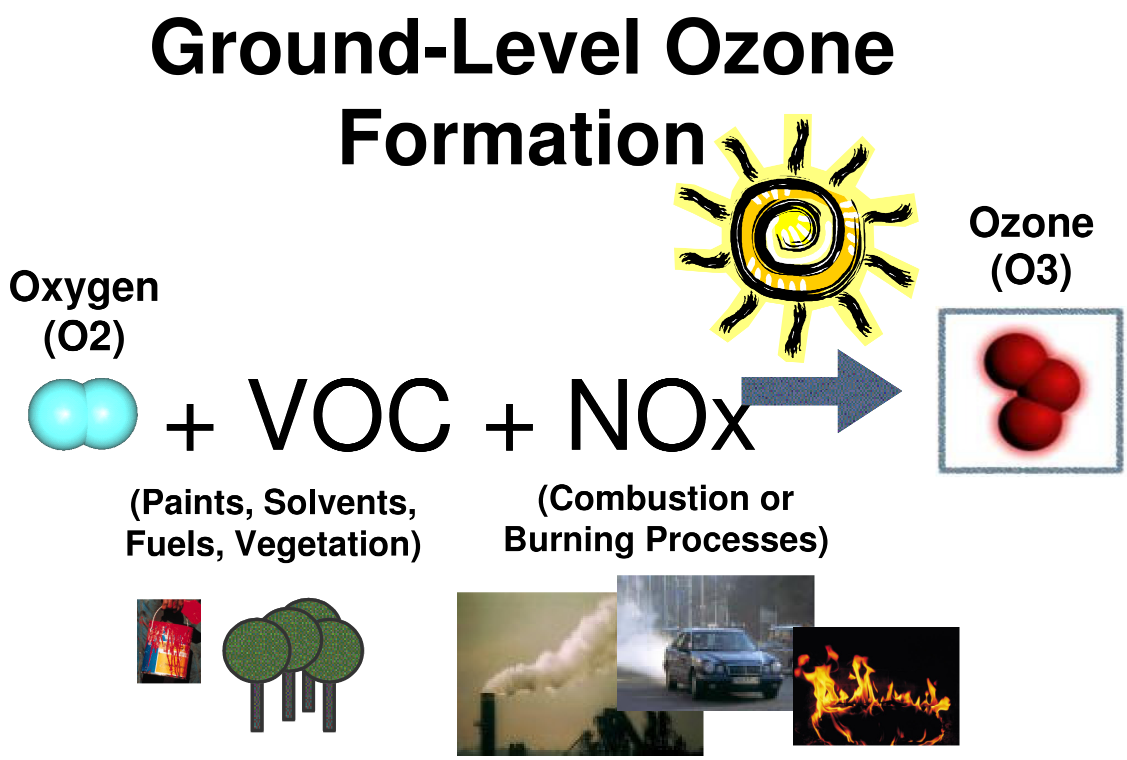


Figure 1.5.1. Pictorial illustration of ozone formation is shown above.

$PM_{2.5}$ can be emitted directly or formed in that atmosphere. The term "primary" is used to describe direct emission from a source while the term "secondary" is used to describe a pollutant formed as a result of reactions in the atmosphere. Sulfur dioxide, nitrogen oxide, ammonia and organics emissions can react in the atmosphere resulting in secondary $PM_{2.5}$ emissions in the form of sulfates, nitrates and organic aerosols. High concentrations of $PM_{2.5}$ can occur any time of year.

1.5.2 Methods for Assessing Ambient Impact

There are two basic approaches used to examine ambient impact. One is to look at actual ambient samples (monitoring). The other is to apply computer models to predict ambient impacts based on understanding the original sources of the pollution (modeling). Each approach has merits and limitations. Together, these approaches provide important tools to better understand air quality problems and what should be done to improve air quality.

An ambient sample provides good information about the types and amounts of pollutants occurring at a specific location. The ambient samples can also give us some information about the origins of the pollutants. However, ambient sampling does not provide a full appreciation of how to best address air quality problems. The most recent monitoring report was completed November 1, 2007 entitled, "2006 Ambient Air Surveillance Report," The modeling approach provides a good method of assessing impact everywhere and can be used to help us understand how changes at emission sources might affect air quality for planning purposes. However, obtaining accurate input data can be difficult.

1.5.3 NO_x and $PM_{2.5}$ Emissions

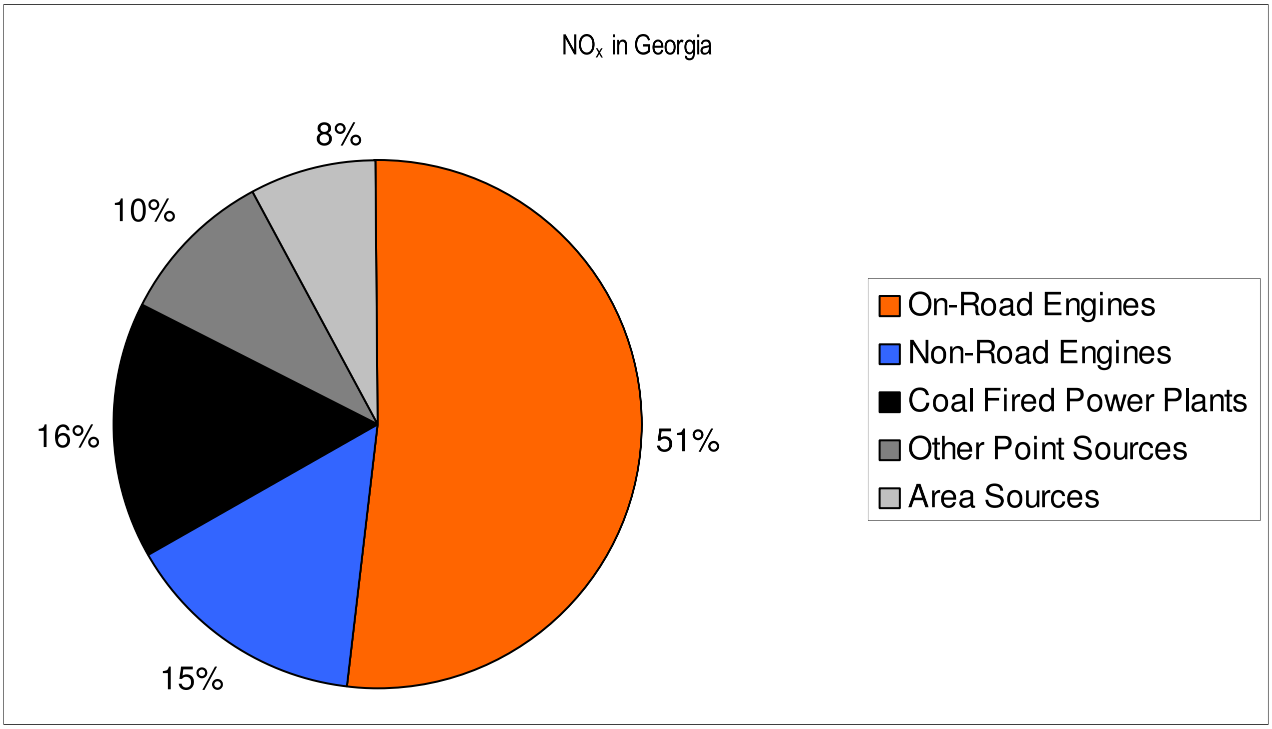
Sources of pollution may be generally classified as on-road vehicles, non-road vehicles, coal fired power plants, other point sources, and area sources. Figures 1.5.2, 1.5.3, 1.5.4 and 1.5.5 show the estimated contribution of emissions to Georgia and to the Atlanta nonattainment area. In Figures 1.5.2, 1.5.4 and 1.5.5, black and gray are colors used to show pollutant sources that are not vehicles. Black and gray was not used for Figure 1.5.3 because ambient samples rather than the emission inventories were used as the data source, which provides more accurate $PM_{2.5}$ information. However, a bright line distinction between vehicle and non-vehicle emissions is more difficult. In Figures 1.5.2, 1.5.4 and 1.5.5, Orange, yellow, brown and white colors are used for on-road vehicles while blue, green, violet and red are used for non-road vehicles.

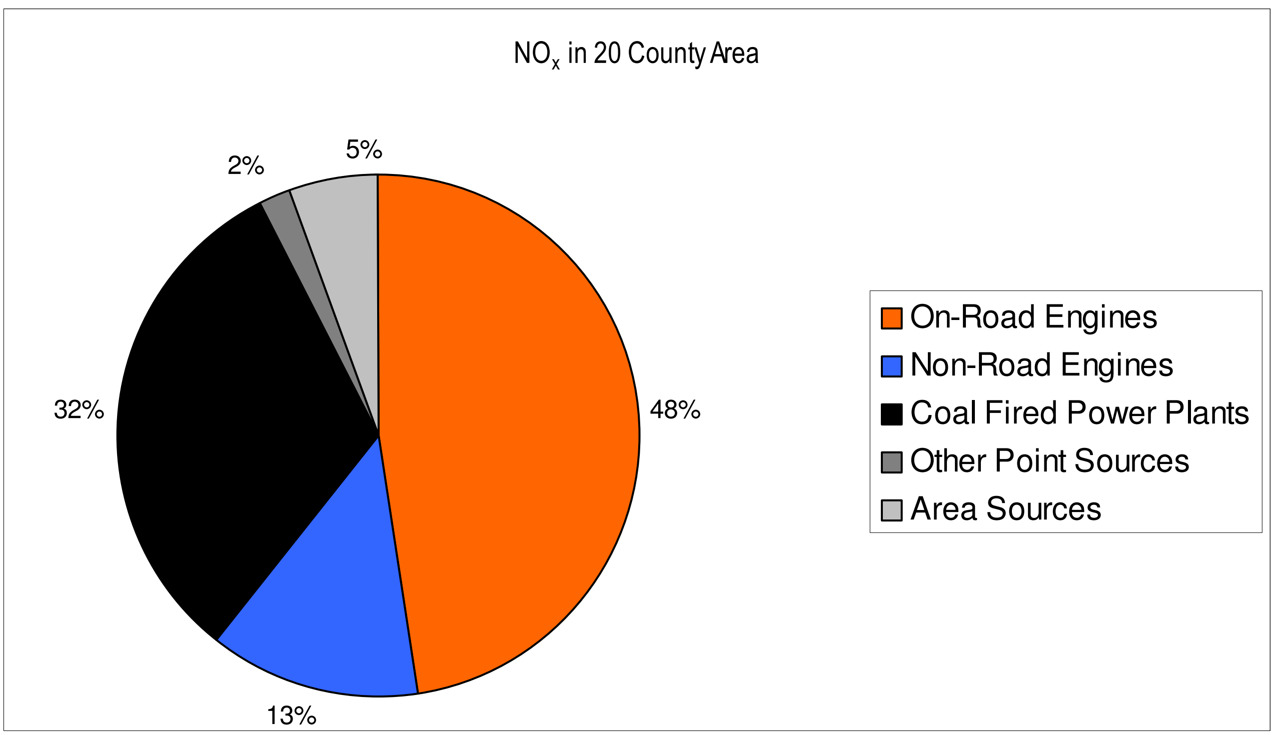
Figures 1.5.2 depicts the relative NO_x emission contributions that emphasize the importance of on-road and non-road vehicle emissions to ozone ambient impact. Coal fired power plant NO_x emissions are from 2005 CEM data. Otherwise, NO_x emissions are based on 2002 Consolidated Emission Reporting Rule (CERR) data.

Figures 1.5.3 depicts the relative $PM_{2.5}$ emission contributions that illustrate the relative importance of mobile sources to $PM_{2.5}$ ambient impact. The $PM_{2.5}$ data is based on ambient monitoring speciation. The "2005 Ambient Air Surveillance Report" contains ambient sampling information. Understanding the chemistry associated with the speciation of the ambient samples provides insight to the origins of the pollution. The U.S. EPA provides information on assessing emission source apportionment according to ambient samples. Figure 1.5.3 states primary emission sources in self-explanatory terms. However, secondary emission sources are not as obvious. The secondary emission source include the following:

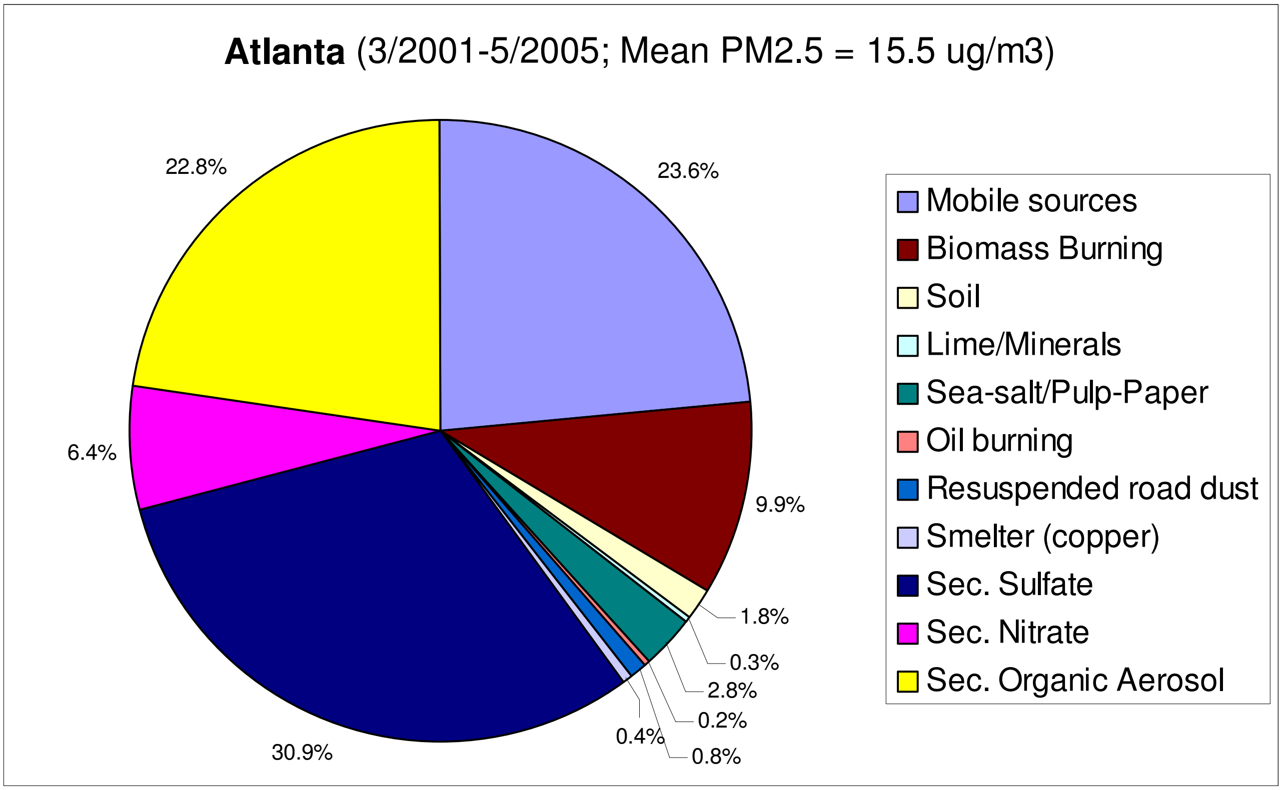
- **Secondary Sulfates** form from the oxidation of SO_2 in the atmosphere. SO_2 is primarily produced by coal burning boilers.
- **Secondary Nitrates** are formed through a complex series of reactions that convert NO_x to nitrates. Vehicle emissions and fossil fuel burning produces NO_x.
- **Secondary Organic Aerosols** are formed through a complex series of reactions mostly from biogenic sources and a small amount from anthropogenic source (fossil fuel combustion).

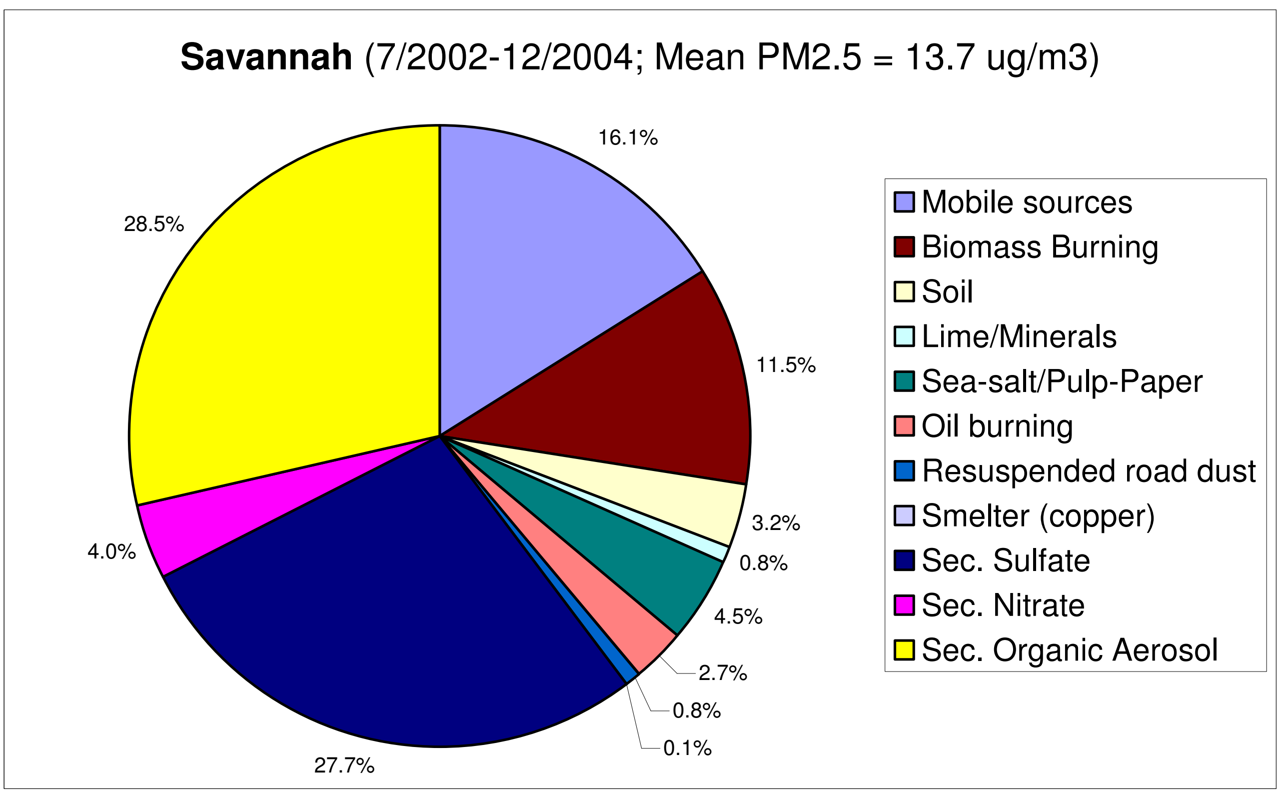
Figures 1.5.4 shows the estimated amount of NO_x and $PM_{2.5}$ emissions from on-road engines based on 2002 CERR. Figures 1.5.5 shows the estimated amount of NO_x and $PM_{2.5}$ emissions from non-road engines based on 2002 CERR.



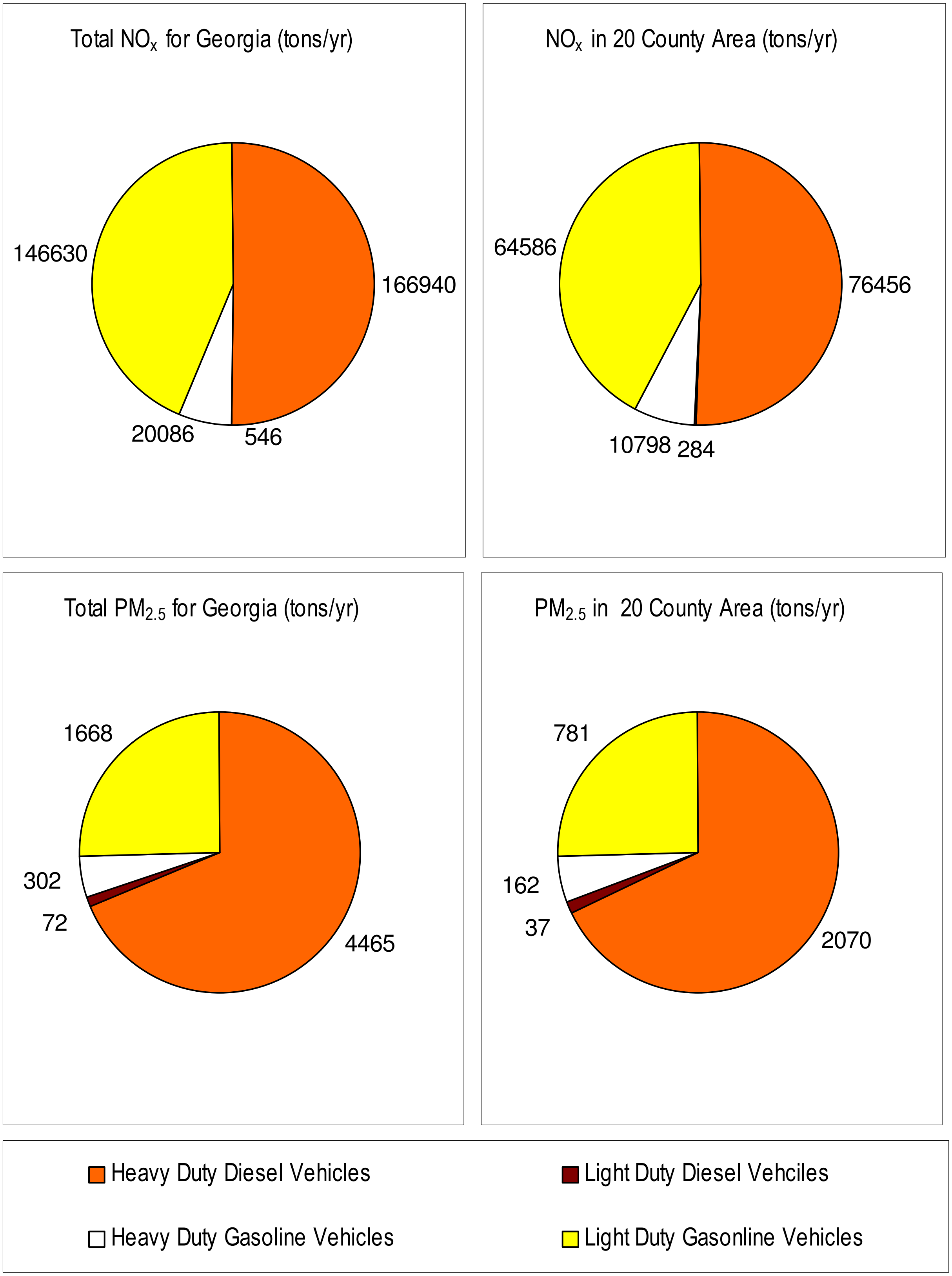


Figures 1.5.2. The relative NO_x emission contributions provide insight to the importance of on-road and non-road vehicles to ambient ozone impact. Coal fired power plant NO_x emissions are based on 2005 CEM data. Otherwise, NO_x emissions are based on 2002 CERR data.

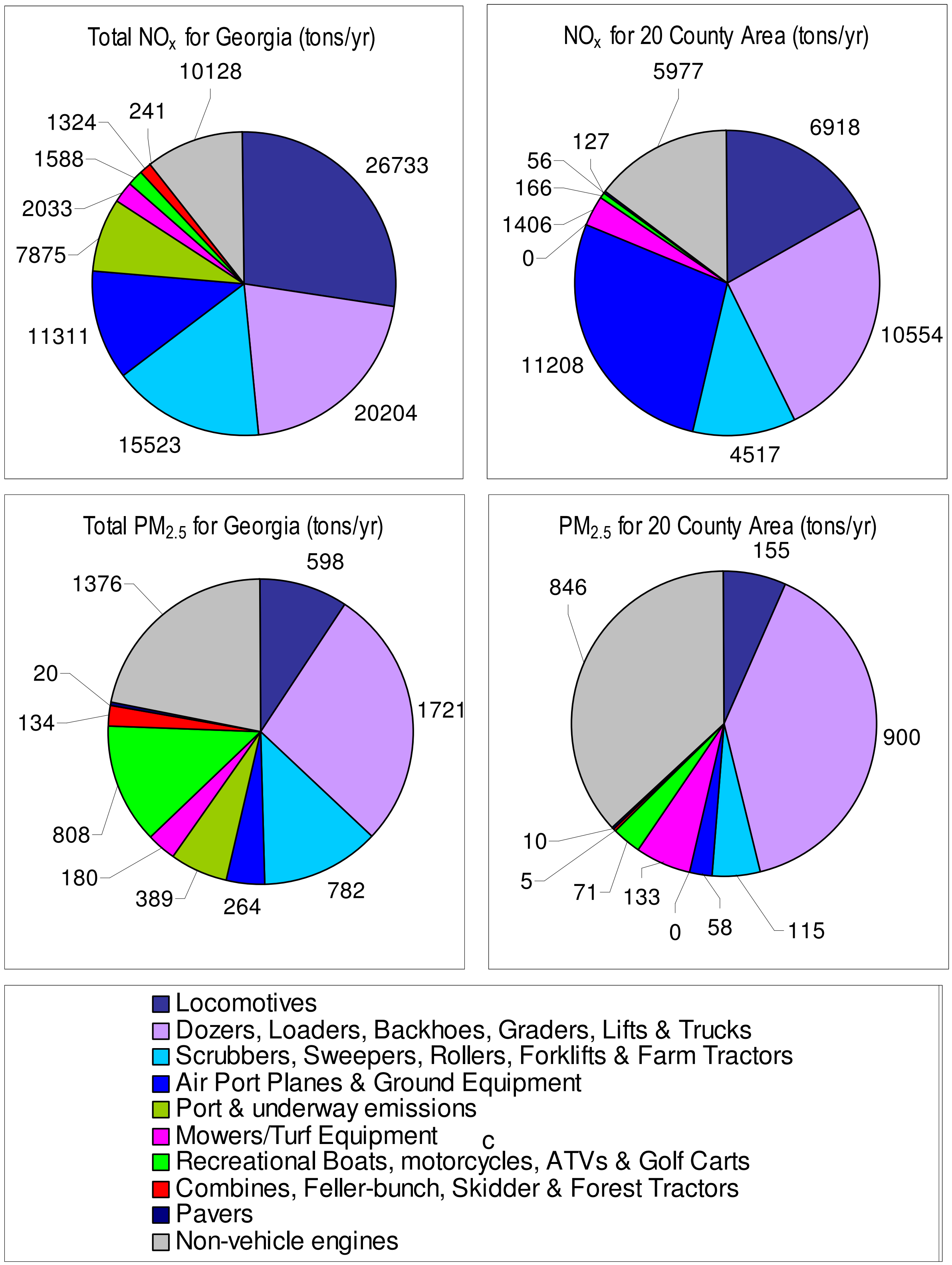




Figures 1.5.3. The relative $PM_{2.5}$ emission contributions provide insight to the importance of mobile sources to ambient impact. 2002 through 2004 ambient monitoring data was used to generate the charts.



Figures 1.5.4. The figures represent the NO_x and $PM_{2.5}$ emissions from on-road engines based on 2002 CERR.

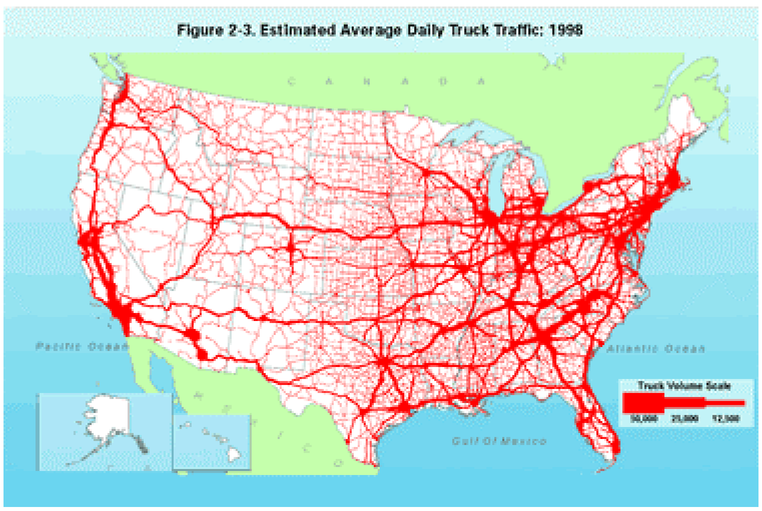


Figures 1.5.5. The figures represent the NO_x and $PM_{2.5}$ emissions from non-road engines based on 2002 CERR.

1.5.4 Truck Traffic, Locomotives and Construction Equipment

Understanding various sources and associated activities can improve impact assessments and consequently help in developing methods for pollution mitigation. This section provides links to information that shows truck traffic, location of railways in Atlanta and types of construction equipment.

As shown by the U.S. DOT, "truck traffic is concentrated on major routes connecting population centers, ports, border crossings, and other major hubs of activity. Most of these routes will experience increases in truck traffic over the next twenty years, which, in combination with increases in passenger travel, will add to existing congestion."



Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework.
Figures 1.5.5. The figures shows an estimate of 1998 daily truck traffic patters

There are different types of construction and agricultural vehicles. The wikipedia is a good resource to learn more about these vehicles.

DOT provides a map showing the rail systems in the Atlanta area.

1.6 Toxicity

Meeting and maintaining each national ambient air quality standard is federally mandated. While there is no federal mandate at this time to address the toxics from unnecessary idling of heavy-duty vehicles, reducing toxic impact is another benefit. This is especially true when considering the proximity of exhaust emissions relative to people when idling occurs. There are also sensitive populations that may be exposed to unnecessary idling of heavy-duty vehicles such as school children who ride buses. Toxins from vehicle exhaust may originate from unburned fuel, formed from chemical reactions during combustion, or formed as part of a chemical reaction in the atmosphere. The U.S. EPA provides information about toxic emissions and associated risks.

Eliminating unnecessary idling of heavy-duty vehicles is a responsible course of action in providing for healthier communities.

2. IDENTIFICATION AND DESCRIPTION

2.1 Schedule and Vehicles

A rule will provide the basis for identifying and describing emission reductions obtained by eliminating unnecessary idling of heavy-duty vehicles with a specific time schedule. The Stakeholders process started May of 2008 and is anticipated to end in October of 2008. Based on the current schedule, the draft rule should be presented to the Board of the Department of Natural Resources in January of 2009. The proposed compliance date is May 1, 2009 for all vehicles except sleeper berth trucks that may need additional time to install equipment providing comfort alternatives. January 1, 2012 compliance date for long haul trucks is proposed by EPD to achieve need emission reductions for nonattainment planning purposes. Definitions and exemptions contained in the rule will identify vehicles subject to idling requirements. Georgia's current emissions inventory identifies every possible vehicle, which falls into one of the following categories:

On Road Vehicles

1. Long haul trucking
2. Deliveries trucks
3. School buses
4. Transit buses
5. Cars
6. Motorcycles

Non-Road Vehicles

7. Locomotives
8. Construction and Industrial Vehicles
9. Agricultural Vehicles
10. Recreational Vehicles
11. Landscaping Vehicles
12. Forestry Vehicles
13. Airport Vehicles
14. Marine Vessels

2.2 *Existing Idling Rules*

2.2.1 Other State Idling Rules

Currently, Arizona, California, Connecticut, Delaware, Hawaii, Illinois, Maryland, Massachusetts, Nevada, New Hampshire, New Jersey, New York, Rhode Island, South Carolina, Texas, Utah, and Virginia have state codes regulating idling. For the most part, the state rules define the regulated persons, regulated vehicles, idle time limits, and exemptions. The rules vary between states. For example, Connecticut has a broad reaching idle rule that applies to autos, buses, trucks and non-road vehicles while New York regulates idling from only on road heavy-duty vehicles. South Carolina has an idling rule that went into affect on May 22, 2008. Florida and North Carolina are both actively pursuing rules to limit idling.

2.2.2 Local Municipal Idling Rules

Atlanta, Georgia has municipal codes regulating idling. Beaufort and Charleston, South Carolina have municipal codes regulating idling.

The current Atlanta Municipal Code of Ordinances §150-97 requires in part:

> … (c) Time limit for idling. No person shall stop or stand any truck or bus on any street or public place and idle for more than 15 minutes. A violation of this subsection shall, upon conviction, be punishable by a minimum fine of $500.00. This limitation shall not apply under the following conditions:
>
> (1) Emergency vehicles, utility company, construction and maintenance vehicles where the engines must run to perform needed work;
>
> (2) Truck or bus is forced to remain motionless because of traffic conditions;
>
> (3) Truck or bus is being used to supply heat or air conditioning necessary for passenger safety or comfort, and such truck or bus is being used for commercial passenger transportation or is a transit authority bus or school bus, in which idling shall be limited to a maximum of 25 minutes;
>
> (4) If the ambient temperature is less than 32 degrees Fahrenheit, idling shall be limited to a maximum of 25 minutes; or
>
> (5) Any vehicle, truck, bus, or transit authority bus in which the primary source of fuel is Natural Gas (CNG) or electricity shall be exempt from the idling limitations set forth in this section.

The South Caroline Municipal Codes requires in part:

> For Beaufort City Ordnance §7-11027 idling requirements, Idling of engines is allowed only while passengers are embarking onto or debarking from vehicles, not to exceed fifteen (15) minutes, with exceptions as noted below…
>
> For Charleston City Ordnance §29-239 idling requirements, For Charleston, No buses may park with engines idling for more than five (5) minutes in residential areas.

EPA published a document entitled "Compilation of State, County, and Local Anti-Idling Regulations," that contains a comprehensive list of regulatory language from idling regulations as of April 2006.

2.2.3 Georgia's Current Rules and Idling

Georgia Rule 391-3-1-.02(2)(ooo) *Heavy-Duty Diesel Engine Requirements* adopts and incorporates the December 12, 2002 California Air Resources Board's (CARB) exhaust emission standards and associated performance test procedures, which may be found in Title 13, California Code of Regulation (CCR), §1956.8- *Exhaust Emission Standards and Test Procedures – 1985 and Subsequent Model Heavy-duty Engines and Vehicles*. Effective November 15, 2006, California amended Title 13, CCR, §1956.8 to include some idling requirements. In particular, 2008 model and subsequent year heavy-duty vehicles are required to have an automatic shut down feature that addresses idling over 5-minutes and also requires idling alternative technologies to meet specific emission standards. Section 209 of the CAA precludes states such as Georgia from setting its own state specific emission standards for vehicles and engines. However, California may set standards different from the U.S. EPA by requesting a wavier. For the recent amended to Title 13, CCR, §1956.8, California did not seek a wavier since they believe the amendments to fall under their existing waiver. CARB plans to issue a letter to EPA to confirm their opinion. Section 209 of the CAA does allow states to have their own use and operational requirements. Section 177 of the CAA allows states with an EPA approved nonattainment plan, such as Georgia, to "opt into" the California requirements rather than defaulting to the U.S. EPA requirements. The U.S. EPA vehicle and engine requirements may be found in the 40 Code of Federal Regulations (CFR) Part 86. Georgia has incorporate California's most recent amendments to Title 13, CCR, §1956.8 as part of maintaining the decision to "opt into" California's requirements while assuring consistency that avoids any potential concerns about creating a "third" vehicle emission standard prohibited by Section 177 of the CAA. The November 15, 2006 California amendment to Title 13, CCR, §1956.8(a)(6)(D) *Optional Alternatives to Min Engine Idling* requires all new 2008 and subsequent model year heavy-duty diesel engines that may be equipped with idling emission reduction devices to comply with specific design and control technologies requirements for Auxiliary Power Systems (APSs), Fuel Fired Heaters and other idle reduction technologies requirements in Title 13, CCR, §2485(c)(3). The amendment to Title 13, CCR, §1956.8(a)(6)(C) and Title 13, CCR, §2485(c)(3)(D) requires proper labeling according to the 40 CFR 86 except as provided by the *California Exhaust Emission Standards and Test Procedures for 2004 and Subsequent Model Heavy-Duty Diesel Engines and Vehicles*.

2.3 Proposed Idling Rule and Enforcement Policy

Other state and local county rules were considered in crafting the proposed idling rule language. EPD hopes to develop simple language that will be practically enforceable. The stakeholder process is expected to play an important and valuable role in further developing the language into a reasonable, fair and effective rule.

2.3.1 Proposed Idling Rule

The following is a redline draft rule that will be covered during the October 7th stakeholder meeting:

Specific Comments & Redline Draft Rule
For October 7, 2008 Meeting

1. *Requirements:* The following requirements shall apply:

   (i) After May 1, 2009, no person who owns, operates or leases a heavy-duty vehicle shall cause, let, permit, suffer, or allow the propulsion engine to idle for a period greater than five consecutive minutes except as exempt by this rule.

   (ii) After May 1, 2009, persons owning, leasing or occupying nonresidential land and engaging in activities involving the use of one or more heavy-duty vehicle(s) on such land shall implement policies, practices, and offer idling alternatives as needed to provide a practical and reasonable expectation for the operator to comply while on such land. Policies shall provide written guidance for decisions and actions that would encourage and enable operators of heavy-duty vehicles to comply. Practices are those actions carried out encouraging and enabling operators to comply. Actions may include, but are not limited to, displaying written policies, distribution of written or printed materials, radio communications, and contract stipulations. Idling alternative shall include any practical method, strategy, technology, structure, and/or mechanical or electrical device that would provide the same or similar function and/or comfort as idling the primary engine. These practical idling alternatives shall reduce idling and air pollution at a cost not to exceed the cost of the continued practice of idling. As a minimum, assessing a practical idling alternative shall compare the expense of the idling alternative to the financial benefit resulting from reduced fuel consumption. Financial benefit shall include the net benefit for the person owning, operating or leasing the heavy-duty vehicle and for the person owning, leasing or occupying land. The assessment shall cover the expected lifetime of the idling alternative. Any idling alterative used through sole discretion of the person owning, leasing or occupying land shall be considered practical even if the alternative exceeds the cost of idling. Practical idling alternatives may include, but are not limited to, shore power (electrification of parking spaces), building refuge (climate-controlled rooms at staging area), enhancement of loading and unloading equipment, and equipment used to disseminate information about loading/unloading conditions to operators;

(iii) Operation of an auxiliary power system (APS) shall be allowed except as prohibited in this paragraph. No person who installs a diesel fueled auxiliary power system (APS) after May 1, 2011 on any 2007 or new model year motor vehicle subject to this rule ~~after May 1, 2009~~ shall operate it ~~the APS~~ unless ~~it is~~ the APS is equipped with a verified level three in-use strategy for particulate matter control or the exhaust is routed directly into the vehicles exhaust pipe, upstream of the diesel particulate after treatment device as specified in Title 13, of the California Code of Regulations, Section 2485(c)(3).

2. *Applicability:* The requirements of this subparagraph shall apply to heavy-duty vehicles powered in-part or entirely by an internal combustion engine including:

(i) any motor vehicle with a gross vehicle weight rating more than 10,000 pounds; or

(ii) any subject nonroad vehicle with a brake horsepower (bhp) rating more than 75.

3. *Exemptions:* Provided all reasonable precautions are taken to minimize idling, exemptions shall apply to this rule as follows:

(i) idling of emergency, law enforcement and military tactical vehicles;

(ii) idling necessary for vehicle repair or maintenance;

(iii) idling necessary to provide power take off (PTO) for refrigeration of cargo, processing of cargo, pumping, dumping, lifting, hoisting, drilling, mixing, loading, unloading, compacting, vacuuming, repairing, servicing, installing, constructing, agricultural operations, utility operations, industrial operations, commercial operations, residential operations and any other function as approved by the Division;

(iv) idling for research, development, performance evaluations or other case specific reason as approved by the Division;

(v) idling of a vehicle when needed to safely fight or manage a fire, to respond to traffic accidents, or to respond and assist stranded motorists;

(vi) idling required for a federal, state or municipal inspection;

(vii) idling of an armored vehicle when a person remains inside the vehicle to guard contents or while the vehicle is being loaded or unloaded;

(viii) idling of a crane;

(ix) idling necessary for queuing provided the vehicle's propulsion engine does not idle for more than fifteen consecutive minutes;

(x) idling of a transit bus provided the vehicle's propulsion engine does not idle for more than fifteen consecutive minutes;

(xi) idling of a bus as needed to accommodate an individual's impairment from a physiological or mental disorder covered by the Americans with Disabilities Act (ADA) ~~exceptional child's physical or mental condition~~;

(xii) idling of a heavy-duty vehicle with an occupied sleeper berth until January 1, 2012;

(xiii) idling of a motor vehicle meeting the optional NOx idling emission standard in lieu of using an engine shutdown system in accordance with Title 13, of the California Code of Regulations, Section 1956.8(a)(6) provided such motor vehicle has the required "clean idle engine" decal displayed on the hood as specified by Title 13, of the California Code of Regulations, Section 86.001-35(B)4;

(xiv) idling of a heavy-duty vehicle while remaining motionless due to traffic conditions, official traffic control devices or signals, congestion, or at the direction of a law enforcement official provided that such idling is not for the purpose of queuing;

4. *Definitions:* For the purpose of this subsection, the following definitions shall apply:

(i) "Emergency vehicle" means any vehicle that is legally authorized by a governmental authority to exceed the speed limit to transport people and equipment to and from situations in which speed is required to save lives or property, such as a rescue vehicle, fire truck, or ambulance.

(ii) (ii) "Idle (idling)" means the operation of a vehicle's propulsion engine while the vehicle is stationary.

(iii) "Gross vehicle weight rating" means the weight specified by the manufacturer as the loaded weight of a single vehicle.

(iv) "Heavy-duty vehicle" means any vehicle powered in-part or entirely by an internal combustion engine, which is a motor vehicle with a gross vehicle weight rating more than 10,000 pounds or any subject nonroad vehicle with a brake horsepower (bhp) rating more than 75.

(v) "Law enforcement vehicle" means any vehicle that is primarily operated by a civilian or military police officer or sheriff or enforcement agencies of the federal government, by state highway patrols, municipal law enforcement, or by other similar law enforcement agencies and which is used for the purpose of law enforcement activities including, but not limited to, chase, apprehension, surveillance, or patrol of people engaged or potentially engaged in unlawful activities.

(vi) "Military tactical vehicle" means a motor vehicle or equipment owned by the U.S. Department of Defense and/or the U.S. military services and used in combat, combat support, combat service support, tactical or relief operations, or training for such operations.

(vii) "Motor vehicle" means any self-propelled vehicle that is used or intended to be used for transporting persons or commodities on public roads.

(viii) "Person" means any individual, corporation, partnership, association, State, municipality, political subdivision of a State, and any agency, department, or instrumentality of the United States, or any other entity, and includes any office, agent, or employee of any of the above. ~~"Physical or mental condition" means any physiological or mental disorder resulting in an impairment covered by the Americans with Disabilities Act (ADA).~~

(ix) "Propulsion engine" means an internal combustion engine used for the primary purposes of moving the vehicle.

(x) "Queuing" means keeping a vehicle in line for the purpose of an orderly receipt or delivery of items, services, fuel or people.

(xi) "Subject nonroad vehicle" means any non-rail vehicle that is designed to move across land and does not meet the definition of a Motor Vehicle. Examples of subject nonroad vehicles include, but is not limited to, tractors, dozers, loaders, backhoes, lifts, graders, combines, A workshop was held by the U.S. EPA entitled Modeling State Idling Law Workshop in 2005 to discuss idling exemptions. The U.S. EPA provided a subsequent document dated April 2006 entitled Modeling State Idling Law. Efforts have been made and will continue to assure stakeholders remain engaged as part of developing a reasonable, fair and effective rule.

2.3.2 Enforcement Policy

EPD will implement enforcement and collect subsequent data to demonstrate effectiveness using audits. This should provide the most cost effective method for assuring idle reductions. Currently, EPD has inspectors who visit gas stations and truck stops to inspect underground storage tanks and vapory recovery systems. EPD has inspectors that also visit industrial sites and construction sites. EPD's enforcement strategy will rely on existing staff to enforce this rule. EPD will expect owners, operators and leasers of heavy-duty vehicles subject to this rule to meet specified idling limits. EPD will also expect persons owning, leasing or occupying land involving the use of heavy-duty vehicles to implement policies, practices, and offer idling alternatives as needed to provide a practical and reasonable expectation for the operator to comply.

EPD may implement an outreach program to local cities and counties to promote the option for the voluntary adoption of this idling rule by ordinance so that local law enforcement officials could enforce it. Amending the Georgia Code § 40 Chapter 8 *Equipment and Inspection of Motor Vehicles* is another potential option that would allow any uniformed officer in Georgia to enforce the rule. Changes to the Georgia Code would require action by the state legislators.

EPD is interested in receiving input on how to structure a policy for assessing fines. Fines could be graduated so that the first offense would be significantly less than subsequent violations committed by the same person. The objective of fines would be to assure the rule is effective in reducing air emissions and improving air quality. Any fines collected by EPD would go into the general state fund according the Georgia Air Quality Act. Other enforcement agencies that choose to adopt this requirement would handle penalty money according to their rule and policies.

2.4 Alternatives to Idling

There are a variety of reasons why idling occurs. However, alternatives do exist. The following lists some common reasons for idling and alternatives:

1. Maintaining vehicle occupancy comfort through heating, cooling and operation of auxiliary electrical devices such as radios. Several anti –idling technologies are available to keep the cabin comfortable without idling the main drive engine. The technologies are discussed in Section 2.5 of this document.

2. Assuring proper warm-up of an engine or keeping an engine in ready mode. It is always best to follow the manufacturer's specifications. EPD is unaware of any manufactures recommending more than a 5-minute warm up. While a cold engine may have reduced performance, it is generally acceptable. Engines are designed to operate in a certain power band. Idling is usually associated with the fringes of the designed power band.

Consequently, idling is typically harder on the engine than operating it under load conditions.

3. Idling an engine can mask undesirable outside noises that otherwise disrupt sleeping. Environmentally friendly sound masking systems may be used to help blackout undesirable outside noises

4. Vehicles may need to idle for proper maintenance and repair, which is exempt from the proposed rule. Also, vehicles that require inherently unavoidable idling to provide a service or function are exempt.

The Department of Energy (DOE) provides some background information regarding the reasons for idling and the value of idle reduction. Their web site has a monthly newsletter and notes from their 2004 national idling conference.

2.5 Available Technology

The US EPA web site includes specific information links regarding available anti-idling technologies. The term "mobile technology" describe idling technology that is part of the vehicle and can operate independently of any fixed location while the term "stationary technology" describes idling technology that is fixed at a location, such as a parking lot, requiring connectivity to a vehicle. There is no intent to restrict anti-idling technologies that can be used to mitigate the environmental impact that would otherwise occur. New technologies will likely evolve over time. This section focuses on describing existing technologies that are reasonably available. The discussions are to convey basic concepts used to reduce idling, which may be employed on a wide range of vehicles in a variety of combinations.

2.5.1 Auxiliary Power Unit (APUs) – Mobile Technology

The APU can deliver usable power by an internal combustion (IC) engine or battery storage. An internal combustion drive APU uses a small engine that is significantly more efficient by design, which provides optimum heat, ventilation, air condition and electricity while the vehicle in a standby mode. See Figure 2.5.1.

Figure 2.5.1. The picture above shows an internal combustion powered APU.

A battery powered APU would operate by allowing a bank of batteries to charge during normal driving operations of the vehicle. As needed, the charged batteries would provide heat, ventilation, air condition and electricity while the vehicle was in standby mode. See Figure 2.5.2.

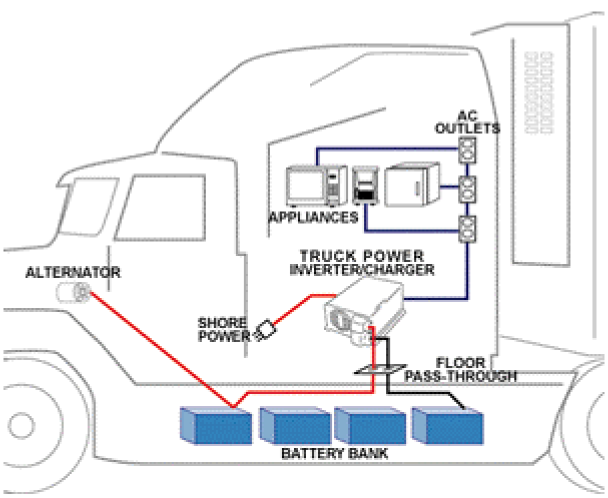


Figure 2.5.2. The above picture shows a battery powered APU.

2.5.2 Diesel Driven Heating System – Mobile Technology

A diesel driven heating system burns oil using a small combustion chamber. The heat from combustion is transferred by an indirect heat exchanger to a cabin space of the vehicle or to heat a fluid as needed. See Figure 2.5.3.


Espar

Figure 2.5.3. The above picture shows a diesel heating system.

Designs may involve multiple system approaches. A common APU design shown in Figure 2.5.2 may also use a diesel heating system for cold weather rather than relying on battery power for heating.

2.5.3 Cold Storage for Air Condition System – Mobile Technology

A portable air conditioning system can be operated using cold storage. There are ice systems readily available, which can provide comfort during dry-hot days. Ice is typically placed into a cooler. The system depicted in Figure 2.5.4 is a portable swamp cooler made by Swampy that uses cold water pumped from an icebox. Unfortunately, swamp coolers do not work well in humid areas such as Georgia. This is because swamp coolers rely largely on evaporative cooling, which increases humidity and lowers the dry bulb temperature as part of absorbing latent heat. A small amount of cooling also occurs because warm air passes by ice-cold water (sensible heat). The need to regularly fill the icebox can be a draw back too. Webasto makes a cold storage product system that refills the cold storage while the primary engine of the vehicle is in normal operating mode.

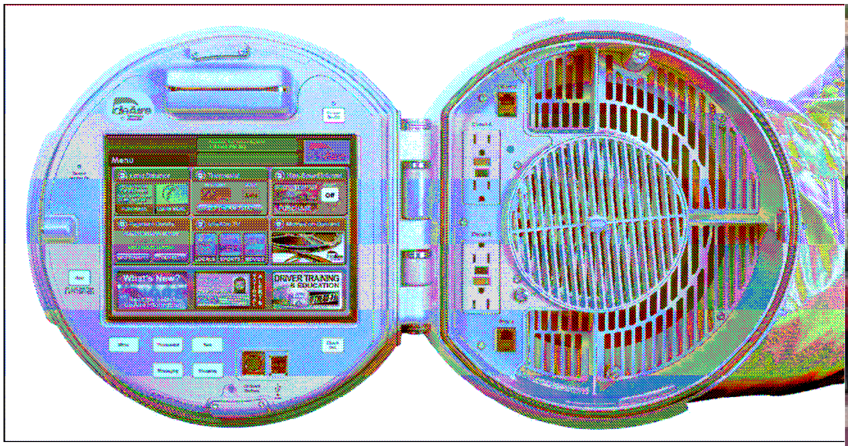
Figure 2.5.4. The picture shows a portable swamp cooler that uses an icebox storage system.

2.5.4 Automated Startup and Shutdown Systems – Mobile Technology

An automated startup and shutdown system is a sophisticated control system that optimizes the operation of the vehicle to minimize fuel consumption and environmental impact. The cab temperature, oil temperature and other component parameters are kept within designed specifications using battery power and heat typically provided by the drive engine. As needed, the automated startup and shutdown system would start the engine for a short optimum duration (i.e., less than 5 minutes) then shut the engine down for long periods of time (e.g., 4 hours) as needed to maintain the system functioning within an optimum operating range. Mobile technologies may integrate an automated startup and shutdown system. For example, the battery operating time for the APU shown in Figure 2.5.2 could be extended using an automated startup and shutdown system.

2.5.5 Shore Power – Stationary Technology

A design such as that depicted in Figure 2.5.2 can also be plugged into an electrical outlet at a fixed location, which is known as "shore power." Figure 2.5.2 is actually a dual system since the technology can be mobile or stationary. When plugged into shore power it would be functioning as stationary. Truck stop electrification (TSE) and Advanced Travel Center Electrification (ATE) are terms used to describe different types of shore power for trucks. Figure 2.5.5 is a single system that only works with shore power. The system is self-contained ("stand alone"), which does not require any vehicle modification. The number and location of available Advanced Travel Center Electrifications (ATE) made by IdleAire, which is a "stand alone" TSE system, can be found by visiting IdleAire's web site. CabAire and Shurepower are also examples of TSE systems. Their respective websites also contain information on the number and locations of units that have been installed.



IdleAire

Figure 2.5.5. The picture above shows a self-contained ("stand alone") shore power system that can be placed in the window of a vehicle.

2.5.6 Building Refuge – Stationary Technology

Refuge inside a building can offer an excellent way to avoid unnecessary idling of heavy-duty vehicles when a vehicle is in a standby mode. Those driving buses, delivery vehicles, construction equipment, or agricultural equipment may find building refuge particularly helpful when trying to minimize their idling. Hotels and motels can offer long-term comfort refuge for long haul drivers.

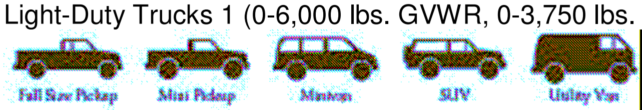
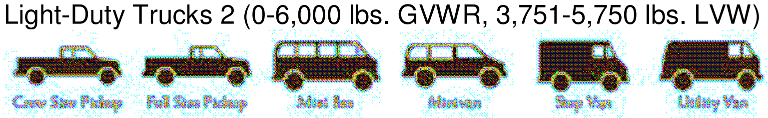
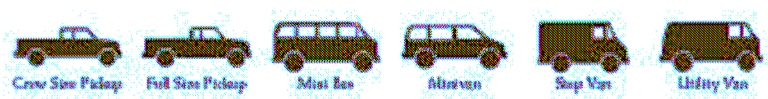
3. QUANTIFYING EMISSIONS

3.1 Emission Reduction Overview

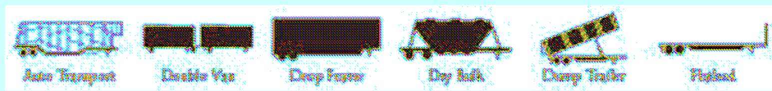
A method must be used to quantify emission reductions, which relies on the most recent information available and provides explanations of uncertainties. The first step in assessing emission reductions is to understand the current emissions. EPD has relied on the U.S. EPA approved methods for estimating vehicle emissions. Emission estimates used for modeling, thus far, have not explicitly accounted for idling. Mobile 6 is used for estimating on road vehicle emissions. The NONROAD model is used to estimate emissions from non-road activities including Mobile Construction Equipment, Mobile Agricultural Equipment, Recreational Vehicles, Mobile Landscaping Equipment, and Mobile Equipment at Industrial Sites. An emission and dispersion modeling system (EDMS) developed by the Federal Aviation Agency (FAA) is used to assess air emissions from airports, and emission factors are used to estimate emissions from locomotives and marine vessels. Understanding the current emission inventory will provide needed appreciation for how idling emissions are estimated. Assessing emission reductions will involve the use of data from the inventories in combination with understanding idling behavior and technology.

3.2 Emission Reductions from On Road Vehicles

Based on vehicle model and age, Mobile 6 is used to obtain emission factors for on road vehicles traveling at different speeds. The emission factor output is in units of grams of emissions per vehicle mile travel (VMT). Based on measurements in the nonattainment area, a travel model is used to predict the vehicle speeds, VMT and vehicle location. This data is entered into our model to predict ambient impacts from on road vehicles. The model has 16 different types of vehicles that may be used for data entry as depicted in Table 3.2.1.

Number	Abbreviation	Description
1	LDV	Light-Duty Vehicles (Passenger Cars)
2	LDT1	Light-Duty Trucks 1 (0-6,000 lbs. GVWR, 0-3,750 lbs. LVW) 
3	LDT2	Light-Duty Trucks 2 (0-6,000 lbs. GVWR, 3,751-5,750 lbs. LVW) 
4	LDT3	Light-Duty Trucks 3 (6,001-8,500 lbs. GVWR, 0-5,750 lbs. ALVW*) 
5	LDT4	Light-Duty Trucks 4 (6,001-8,500 lbs. GVWR, 5,751 lbs. and greater ALVW) 
6	HDV2B	Class 2b Heavy-Duty Vehicles (8,501-10,000 lbs. GVWR) 
7	HDV3	Class 3 Heavy-Duty Vehicles (10,001-14,000 lbs. GVWR) 
8	HDV4	Class 4 Heavy-Duty Vehicles (14,001-16,000 lbs. GVWR) 
9	HDV5	Class 5 Heavy-Duty Vehicles (16,001-19,500 lbs. GVWR) 
10	HDV6	Class 6 Heavy-Duty Vehicles (19,501-26,000 lbs. GVWR) 
11	HDV7	Class 7 Heavy-Duty Vehicles (26,001-33,000 lbs. GVWR)

12	HDV8A	Class 8a Heavy-Duty Vehicles (33,001-60,000 lbs. GVWR)
13	HDV8B	Class 8b Heavy-Duty Vehicles (>60,000 lbs. GVWR)



14	HDBS	School Buses

15	HDBT	Transit and Urban Buses

16	MC	Motorcycles (All)

* ALVW = Alternative Loaded Vehicle Weight: The adjusted loaded vehicle weight is the numerical Average of the vehicle curb weight and the gross vehicle weight rating (GVWR)

Table 3.2.1. The above look up chart may be used to identify different types of vehicles.

Using Mobile 6 and making assumptions about driver behavior can allow for calculations of reductions from idling. Determining the time idling occurs or the percent of emissions attributed to idling is difficult. Outside of long haul truck idling, these numbers are largely dependent on individual habits and company policies. New fleet monitoring technologies are making it possible to better understand these habits. Networkcar's website provides some example idle time numbers for vehicles. Mobile 6 was used to show, as depicted in Table 3.2.2, reductions based on assuming an idle time and/or percent of emissions attributed to idling.

Assumptions are shown in red italic.			
	Minutes per day	**Hours per day**	**% emissions @ idle**
Idling for vehicles HDDV8			*3.40%*
Idling for vehicles HDDV 3 & 7			*10%*
Idling for Vehicles HDDV 4, 5 & 6	*60.00*	1.00	
Idling for school buses	*60.00*	1.00	
Idling for transit buses	*60.00*	1.00	

Vehicle Type --> **(Units) -->**	**HDDV3** **(ton/day)**	**HDDV4, HDDV5 & HDD6 (ton/day)**	**HDDV7** **(ton/day)**	**HDDV8A** **(ton/day)**	**HDDV8B** **(ton/day)**	**School Bus** **(ton/day)**	**Transit Busses** **(ton/day)**
NOx Emissions **state wide** based on 2004 data		**3.098**			**9.497**	**1.141**	**0.856**
NOx Emissions in **20 County Area** based on 2004 data		1.501				**0.541**	**0.126**
NOx Emissions in **20 County Area** based on 2009 data	**0.125**	**0.785**	**0.939**	**0.470**	**1.951**		
PM2.5 Emissions **state wide** based on 2004 data		**0.059**			**0.262**	**0.041**	**0.024**
PM2.5 Emissions in **20 County Area** based on 2004 data		0.027				**0.019**	**0.003**
PM2.5 Emissions in **20 County Area** based on 2009 data	**0.004**	**0.005**	**0.009**	**0.013**	**0.055**		

Table 3.2.2. The tables summarize NOx and PM2.5 reductions associated with on road vehicles.

For long haul trucks, emissions may also be estimated based on parking spaces and the use of those spaces. The Federal Highway Administration (FHWA) sponsored a report entitled STUDY OF ADEQUACY OF COMMERCIAL TRUCK PARKING FACILITIES TECHNICAL REPORT, which contained information about parking spaces. The report shows at least 6158 private (i.e., truck stops) parking spaces in Georgia. 1,162 parking spaces are provided as part of Georgia's 21 rest areas and welcome centers. 79% of drivers reported that they preferred a truck stop for resting for more than 2 hours. For a quick nap of less than 2 hours, 45% of drivers preferred a public rest area while 36% of drivers had no preference. A March 2002 report "Model Development for National Assessment of Commercial Vehicle Parking" by the FHWA shows a predicted modeled maximum daily demand for parking spaces in the Atlanta area as 2104. The study reports an average parking ratio of short haul vehicles to long haul vehicles in Atlanta as 0.37/0.63 (58.7%). Hence, the maximum daily parking for long haul vehicles in Atlanta is expected to be 1,326.

Most long haul trucks in Georgia will likely use an APU or some form of electrification because the temperature tends to be hotter requiring an effective cooling system for the cab. The U.S. EPA's 2002 Study of Exhaust Emissions from Idling Heavy-Duty Diesel Trucks and Commercially Available Idle-Reducing Devices shows emission APU technology can reduce NO_x emissions by 89-90%. The study estimated an average truck to have 144 grams per hour (.317 lb/hr) of NO_x emissions. Hence, this technology should reduce NO_x emissions by at least 15.8 grams per hour (0.0348 lb/hr). The U.S. EPA provided additional emissions data in the paper entitled Particulate Matter and Aldehyde Emissions From Idling Heavy-Duty Diesel Trucks, which shows variability of results. Taking the average, NOx emissions from the truck engines at idle were 154 grams per hour (.339 lb/hr) and PM emissions were 3.92 grams per hour (0.00864 lb/hr). On average, an APU showed reduction of NO_x emissions by 93% and PM emissions by 81%.

Emissions also result when using truck stop electrification manifested at power plants. The power plants are expected to provide comforts for drivers with at least the same level of efficiency as APUs. Furthermore, the power plants are positioned to effectively control NO_x and $PM_{2.5}$ with add on control technology.

Reductions may be estimated using the following equation:
Emission reduction = (parked trucks)*(hours parked)*(emission reduction)*(emission rate)

Assuming 6,158 trucks park each day in Georgia for 10 hours, the estimated NO_x and PM reductions from long haul trucks may be calculated as follows:
NO_x reduction = (6,158 trucks) *(10 hrs/day)*(89%)*(0.317/2000 tons/hr) = 8.7 tons/day.
PM reduction = (6,158 trucks)*(10 hrs/day)*(81%)*(0.00864/2000 tons/hr) = 0.22 tons/day.

Assuming 1,326 trucks park each day in the Atlanta area for 10 hours, the estimated NO_x and PM reductions from long haul trucks may be calculated as follows:
NO_x reduction = (1,326 trucks) *(10 hrs/day)*(89%)*(0.317/2000 tons/hr) = 1.9 tons/day.
PM reduction = (1,326 trucks)*(10 hrs/day)*(81%)*(0.00864/2000 tons/hr) = 0.046 tons/day.

The values based on long haul parking compare well to estimates from Mobile 6. Note that the U.S. EPA guidance shows that no more than 3.4% of the emissions from long haul trucks may be attributed to idling when using Mobile 6. Table 3.2.2 shows these numbers. For the entire state, long haul truck values for Class 8 vehicles are 9.5 tons per day for NO_x and .26 tons per day for $PM_{2.5}$. For the Atlanta area, long haul truck values for Class 8 vehicles are 2.4 tons per day for NO_x and 0.068 tons per day for $PM_{2.5}$.

3.3 Emission Reduction from NONROAD model

For locomotives, the Atlanta Heavy-Duty Vehicle and Equipment Inventory and Emissions Study (AHDVEIES) estimated 1610 tons per year reduction for NO_x and 35.54 tons per year reduction for PM in the Atlanta area. This is accomplished using APUs that would reduce fuel consumption from 23 pounds per hour to 4.8 pounds per hour for approximately 325 locomotives ranging between 3,000 to 4,500-hour power in the Atlanta area. Based on this level of reduction, both NO_x and PM would be reduced by 23%. This information provides an initial estimate based on limited data. EPD is currently working with the railroad companies to obtain more accurate data and develop a comprehensive control strategy that will address locomotive idling. The proposed rule in this document and the accompanying stakeholder process will not focus on emissions from locomotives. The above information is provided for reference only and to assure the stakeholders that another work group is working closely with the railroad industry to curb emissions from this sector.

EPA provides a list of horsepower ranges for different types of nonroad vehicles. Furthermore, EPA has relied on certain horsepower ranges when regulating nonroad vehicles. An applicability threshold for nonroad vehicles of 75 brake horsepower (bhp) provides constancy with other EPA regulatory efforts while eliminating relatively small non-road equipment. Based on information from EPA and a 75 bhp threshold, 0% emission reductions were assumed for airport ground equipment, mowers/turf equipment, motorcycles, ATVs, golf carts, scrubbers, sweepers, rollers, forklifts and agricultural tractors. Emission reductions from airplanes and recreational boats were also assumed to be 0% because these vehicles will not travel across land.

A 10% emission reduction is assumed for tractors, dozers, forklifts, tractors, combines, feller-bunchers, skidders, backhoes, road-rollers, and graders. See emission reduction estimates in Table 3.3.1.

Assumptions are shown in red.	Assume % of Emission Reduction	NO_x **State Wide** (tons/day)	NO_x in **20 County Area** (tons/day)	$PM_{2.5}$ **State Wide** Georgia (tons/day)	$PM_{2.5}$ in **20 County Area** (tons/day)
Locomotives	23%	16.8	4.36	0.377	0.098
Dozers, Loaders, Backhoes, Graders, Lifts & Trucks	10%	5.54	2.89	0.471	0.247
Port & underway emissions	0%	0.00	0.000	0.000	0.000
Scrubbers, Sweepers, Rollers, Forklifts & Agricultural Tractors	0%	0.000	0.000	0.000	0.000
Air Port Planes & Ground Equipment	0%	0.000	0.000	0.000	0.000
Mowers/Turf Equipment	0%	0.000	0.000	0.000	0.000
Recreational Boats, motorcycles, ATVs & Golf Carts	0%	0.000	0.000	0.000	0.000
Combines, Feller-bunch, Skidder & Forest Tractors	10%	0.363	0.015	0.037	0.001
Pavers	10%	0.07	0.03	0.005	0.003

Table 3.3.1. This table summarizes NO_x and $PM_{2.5}$ emission reductions associated with eliminating unnecessary idling from non-road vehicles.

3.4 Ambient Concentration Reductions for Ozone and $PM_{2.5}$

Sensitivity values have been developed to predict ambient concentrations resulting from ambient reductions. Table 3.4.1 shows sensitivity values for vehicle emissions and corresponding ambient reductions expected based on emission reductions.

	Sensitivity*	Units
Ozone	37.00	PPT**/(ton/day)
PM2.5	0.09	(µg/m³)/(ton/day)

	Reduction (ton/day)	Expected Reduction	Current Max	Projected Max	Standard	**Units**	Percent Reduction
NOx - Ozone **state wide**	22.38	0.00083	0.078	0.077	0.080	**ppm**	1.06%
NOx - Ozone 20 County	7.25	0.0002683	0.092	0.0917	0.080	**ppm**	0.29%
PM2.5 **state wide**	0.85	0.0789	14.89	14.81	15.00	**µg/m³**	0.53%
PM2.5 20-County	0.34	0.032038	18.26	18.23	15.00	**µg/m³**	0.18%

Table 3.4.1. This table summarizes estimated ozone and $PM_{2.5}$ emission reductions resulting from the elimination of extended idling from vehicles.

Note: *Sensitivity number is multiplied by the emission reduction in units of ton/day to find the expected reduction in ambient impact.
**PPT means parts per trillium (PPT).

4. MONITORING AND RECORDKEEPING

EPD needs federally enforceable requirements that assure the responsible party monitors and records the appropriate information. The primary objective of the monitoring and recordkeeping requirements are to assure the credits claimed are in fact achieved. The U.S. EPA suggests the use of data acquisition systems to track operations of the anti-idling technology and global positioning system (GPS) to track the location of vehicles. River Guide for Construction Workers has an article showing theses systems cost $600-1000 initially and then have a monthly fee of $20-50. The U.S. EPA expects five years retention of records.

Technology advancements with "on board diagnostics" (OBD) systems and GPS may provide a logical link to collecting detailed emissions data from vehicles in the future that will help us better understand how to manage mobile sources. However, the current inventory relies on less refined methods. Calculating idling emissions with a high degree of accuracy is not expected to provide much benefit without first developing a more accurate accounting of the total emissions from vehicles. While every effort should be made to collect the most accurate information possible, it is important to consider the associated governmental resources needed to gain the maximum environmental benefit. To this end, an equivalent methodology for assessing overall vehicle emissions will be applied to assessing idle reductions. Another important consideration is assessing the baseline, which is limited to approximation methods currently at our disposal. The enforcement policies described in Section 2.3.2 will be used as a mechanism for collecting data to satisfy monitoring and recordkeeping data requirements as needed to quantify actual emission reduction credits.

5. VOLUNTARY MEASURES

For voluntary measures, EPD needs to have enforceable commitments to evaluate and report the resulting emission reductions.

6. ESTIMATE SHORT FALL

If emission reductions fall short of the estimates, EPD must have an enforceable commitment to remedy the SIP emission shortfall in a timely manner.

7. REVISING SIP

The requirements for revising the SIP can be found under Title 1 §110 and §172 of the Clean Air Act (CAA).

Bibliography of Links & Websites

#	Origin - Description of Link	Web Address / Link
1	City - Georgia, Atlanta City Ordnance 150-97 idling requirements.	http://www.municode.com/resources/gateway.asp?pid=10376&sid=10
2	City - South Carolina, Beaufort City Ordnance 29-239 idling requirements.	http://www.municode.com/resources/gateway.asp?sid=40&pid=10245
3	City - South Carolina, Beaufort City Ordnance 7-11027 idling requirements.	http://www.municode.com/resources/gateway.asp?pid=10399&sid=40
4	Federal - U.S. Department of energy conference on idle reduction:	http://www1.eere.energy.gov/vehiclesandfuels/resources/proceedings/2004_national_idling_reduction.html#keynote_frankel
5	Federal - U.S. Department of energy newsletters on idle reduction	http://www1.eere.energy.gov/vehiclesandfuels/resources/fcvt_national_idling.html
6	Federal - U.S. EPA description of available anti idling technologies	http://www.epa.gov/otaq/smartway/idlingtechnologies.htm
7	Federal - U.S. EPA document on "Model State Idling Law Workshop" in 2005	http://www.epa.gov/smartway/documents/420s05010.pdf
8	Federal - U.S. EPA document on "Truck Engine Idling"	http://www.epa.gov/ne/eco/diesel/assets/pdfs/Diesel_Factsheet_Truck_Idling.pdf

9	Federal - U.S. EPA Guidance for Quantifying and Using Long Duration Switch Yard Locomotive Idling Emission Reductions in State Implementation Plans	http://www.epa.gov/otaq/smartway/documents/420b04002.pdf
10	Federal - U.S. EPA Guidance for Quantifying and Using Long Duration Truck Idling Emission Reductions in State Implementation Plans and Transportation Conformity	http://www.epa.gov/otaq/smartway/documents/420b04001.pdf
11	Federal - U.S. EPA has made available on their web site a study entitled "Particulate Matter and Aldehyde Emissions From Idling Heavy-Duty Diesel Trucks"	http://www.epa.gov/smartway/documents/pmteststudy.pdf
12	Federal - U.S. EPA provides a table summarizing state idling codes:	http://www.epa.gov/otaq/retrofit/documents/s03002.pdf
13	Federal - U.S. EPA provides an example cost saving from reducing idling	http://epa.gov/smartway/calculator/calculatorexplanation.htm
14	Federal - U.S. EPA provides definition of terms	http://www.epa.gov/OCEPAterms/
15	Federal - U.S. EPA provides financing tools for anti-idling technology	http://yosemite.epa.gov/opa/admpress.nsf/e1fffb2c795ec9b2852570210055ba60/3e718f93846151a4852572260062b7e2!OpenDocument
16	Federal - U.S. EPA provides information about toxic emission and associated risks	http://www.epa.gov/otaq/toxics.htm
17	Federal - U.S. EPA publications on PM2.5 analyses that includes apportionment concepts	http://www.epa.gov/oar/oaqps/pm25/docs.html

18	Federal - U.S. EPA reported on a Study of Exhaust Emissions from Idling Heavy-Duty Diesel Trucks and Commercially Available Idle-Reducing Devices	http://www.epa.gov/smartway/documents/epaidlingtesting.pdf
19	Federal - U.S. EPA's "Analysis of Commercial Marine Vessels Emissions and Fuel Consumption Data"	http://www.epa.gov/otaq/models/nonrdmdl/c-marine/r00002.pdf
20	Federal - U.S. EPA's "Technical Highlights" - emission factors for locomotives	http://www.epa.gov/otaq/regs/nonroad/locomotv/frm/42097051.pdf
21	Federal - U.S. EPA's approved methods for estimating vehicle emissions	http://www.epa.gov/otaq/models.htm
22	Federal Aviation Administration's emission and dispersion modeling system (EDMS)	http://www.faa.gov/about/office_org/headquarters_offices/aep/models/edms_model/media/EDMS4.2_User_Manual_3.pdf
23	Federal Highway Administration provides a report on "Adequacy of Commercial Truck Parking Facilities - Technical Report"	http://www.tfhrc.gov/safety/pubs/01158/index.htm
24	Federal Highway Administrations sponsored a report on the "Model Development For National Assessment of Commercial Vehicle Parking"	http://www.tfhrc.gov/safety/pubs/01159/01159.pdf
25	Federal U.S. EPA provides Model Idling Law April 2006	http://www.epa.gov/smartway/documents/420s06001.pdf
26	Federal U.S. EPA provides section 110 of the CAA.	http://www.epa.gov/air/caa/caa110.txt

27	Federal U.S. EPA provides section 172 of the CAA.	http://www.epa.gov/air/caa/caa172.txt
28	Federal U.S. EPA provides section 177 of the CAA.	http://www.epa.gov/air/caa/caa177.txt
29	Federal U.S. EPA provides section 209 of the CAA.	http://www.epa.gov/air/caa/caa209.txt
30	Federal U.S. EPA provides the 40 CFR PART 86--CONTROL OF EMISSIONS FROM NEW AND IN-USE HIGHWAY VEHICLES AND ENGINES	http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&sid=6519b96e34038704838a3a0849f5d7b3&tpl=/ecfrbrowse/Title40/40cfr86a_main_02.tpl
31	Federal U.S. EPA provides Title I of the CAA.	http://www.epa.gov/air/caa/title1.html
32	Image - Swampy manufactures a portable swamp cooler system that uses cold ice storage.	http://www.swampy.net/truck.html
33	Image of Advance Travel Center Electrification	http://www.idleaire.com/
34	Image of batter APU	http://images.google.com/imgres?imgurl=http://www.oksolar.com/images/inverters_truck_schematic2.gif&imgrefurl=http://www.oksolar.com/inverters/truck_inverters.htm&h=241&w=300&sz=14&hl=en&start=8&tbnid=mrdDhN7P3-DbHM:&tbnh=93&tbnw=116&prev=/images%
35	Image of diesel heating system	http://www.espar.com/

36	National Space-Based Positioning, Navigation, and Timing (PNT) Executive Committee provides information about global positioning system (GPS)	http://www.gps.gov/
37	Networkcar provides GPS systems	http://www.networkcar.com/networkcar/pub/idletimemonitoring
38	River Guide for Construction Workers provides an article on "Vehicle Tracking Systems," which discusses global positioning systems (GPS)	http://www.riverguideinc.com/construction/index.php?id=readanarticle04&tx_ttnews%5Btt_news%5D=160&tx_ttnews%5BbackPid%5D=76&cHash=26d99334c3
39	State - Arizona Department of Environmental Quality's information about their idling requirements.	http://www.azdeq.gov/environ/air/prevent/pcp.html#diesel
40	State - California Air Resource Board provides a cite that allows one to lookup California Code of Regulations (CCR) by Title and Section.	http://government.westlaw.com/linkedslice/search/default.asp?tempinfo=find&RS=GVT1.0&VR=2.0&SP=CCR-1000
41	State - California Air Resource Board's changes to the heavy duty engine vehicle requirements to address the new idling requirements including labeling	http://www.arb.ca.gov/regact/hdvidle/appb.pdf
42	State - California Air Resource Board's information about their idling requirements.	http://www.arb.ca.gov/toxics/idling/regtext.htm
43	State - Connecticut Department of Environmental Protection's information about their idling requirements.	http://www.ct.gov/dep/cwp/view.asp?a=2684&q=322086
44	State - Georgia DOT provides a rail map of the metro Atlanta rail system	http://www.dot.state.ga.us/dot/plan-prog/intermodal/rail/Documents/PDF/Metro_Atlanta_Rail_Map.pdf

45	State - Georgia DOT provides information on rest areas and welcome centers	http://www.dot.state.ga.us/operations/maintenance/restareas/index.shtml
46	State - Georgia Energy Plan	http://www.georgiaenergyplan.org/suppmat/STATE_ENERGY_STRATEGY_FINAL_12_14_06.pdf
47	State - Georgia EPD Rules	http://www.gaepd.org/Documents/rules_exist.html
48	State - Georgia EPD's 2005 Ambient Air Surveillance Report (from ambient monitoring)	http://www.georgiaair.org/amp/report05.pdf
49	State - Georgia Tech's Atlanta Heavy-Duty Vehicle and Equipment Inventory and Emissions Study	http://heavyduty.ce.gatech.edu/AHDVEIES/cb2005/cb2005.html
50	State - Hawaii State Department of Health' information about their idling requirements	http://www.hawaii.gov/health/environmental/air/cab/CABrules/11-60-1.pdf
51	State - Illinois's idling requirements.	http://www.ilga.gov/legislation/publicacts/fulltext.asp?name=094-0845
52	State - Maryland's idling requirements.	http://mlis.state.md.us/cgi-win/web_statutes.exe?gtr&22-402
53	State - Massachusetts Department of Environmental Protection's idling requirements.	http://www.mass.gov/dep/air/community/schbusir.htm

54	State - Nevada's idling requirements.	http://www.leg.state.nv.us/NAC/NAC-445B.html#NAC445BSec576
55	State - New Hampshire's' idling requirements.	http://www.des.state.nh.us/rules/env-a1100.pdf
56	State - New York Department of Conservation's idling requirements	http://www.dec.state.ny.us/website/regs/subpart217_3.html
57	State - Virginia's idling requirements.	http://leg1.state.va.us/cgi-bin/legp504.exe?000+cod+46.2-1224.1
58	State - Wisconsin Department of Transportation's information regarding Restricting Diesel Idling at Construction and Distribution Sites	http://www.dot.state.wi.us/library/research/docs/tsrs/tsrdieselidling.pdf
59	Webasto manufactures a portable cold storage system for trucks that replenishes the cold storage while driving.	http://www.webasto.us/home/en/homepage.html
60	Wikipedia - explains evaporative cooling	http://en.wikipedia.org/wiki/Evaporative_cooling
61	Wikipedia - explains latent heat	http://en.wikipedia.org/wiki/Latent_heat
62	Wikipedia - explains sensible heat	http://en.wikipedia.org/wiki/Sensible_heat

63	Wikipedia - explains swamp coolers	http://en.wikipedia.org/wiki/Evaporative_cooler
64	Wikipedia - information describing power band	http://en.wikipedia.org/wiki/Power_band
65	Wikipedia - information describing sound masking systems	http://en.wikipedia.org/wiki/Sound_masking_system
66	Wikipedia - link to engineering vehicles	http://en.wikipedia.org/wiki/Category:Engineering_vehicles
67	Wikipedia - provides general information	http://www.wikipedia.org/

Appendix A (Idling Reduction Technology List)

Table A, Comparison Table for Truck and Locomotive Idle Reduction Technologies

Company / Model	Diesel Engine	Electrical Output	Heats Truck Eng. Coolant	Air Conditioning Output (Btu/hr)	Heater Output (Btu/hr)	L x H x W (inches) weight (lbs)	Retail Cost
AuraGen *Inverter / Charger System*	N/A	6 or 8.5 kW, 120V AC or 240V AC with 200 Amp 14V DC Shore power capability	Optional	Yes, merged with truck AC or independent electrical	Yes, 3400 maximum from ECU exhaust heat	30 x 10 x 12 + under hood component + batteries; 490-710 lbs	$7,000
Automotive Climate Control (ACC) *Fuel Fired Heater (air-to-air) FFHD 2*	N/A. Battery draw: 2.5 amps 12V or 1.25 amps 24V	N/A Shore power capability	No	No	7,000	14 x 5 x 5 7.7 lbs	$990 with automatic control $931 with manual control
Autotherm Division Enthal Systems, Inc *T-2500 Energy Recovery System (ERS)*	N/A	N/A	No	No	Similar to truck engine output	3 ¾ X 2 X 2 ½ in. 5 lbs	Less Than $550
Aux Generators Inc. *AUX Power System*	Kubota 2 cyl.	12V DC alternator, No 110V AC	Yes	Yes, independent 15,000	Yes 18,000	25 x 23 x 18, 265lbs	$6,200
Aux Generators Inc. *GENAUX 2000*	Kubota 2 cyl.	12V DC 4.2 kW @ 110V AC 4000 watts	Yes	Yes, independent 15,000	Yes 18,000	26 x 28 x 18, 365 lbs	$6,900
Aux Generators Inc. *Idle Hawk*	Kubota 1 cyl air-oil cooled	5400 watts 110V AC 60Hz	Yes	Yes, independent 15,000	Yes 18,000 (1800 watts)	19.5 x 26 x 24 315 lbs	$6,900
Auxiliary Power Dynamics, LLC	Kubota 3 cyl.	Provides 130 amp 12V DC power, No 115V AC	Yes	Yes, merged with truck A/C	Yes truck heater	29 x 26 x 23, 360 lbs	$7,900
Bergstrom, Inc. *NITE*	N/A	N/A	N/A	Yes, 3,000	Yes 2,900-7,500	AC: 22 x 11 x 16	$3,495

Table A, Comparison Table for Truck and Locomotive Idle Reduction Technologies

Company / Model	Diesel Engine	Electrical Output	Heats Truck Eng. Coolant	Air Conditioning Output (Btu/hr)	Heater Output (Btu/hr)	L x H x W (inches) weight (lbs)	Retail Cost
					(1800 watts)	Heat: 12 x 5 x 4 Battery: 10 x 11 x 14 Combined weight: 210 lbs	
Carrier Transicold *ComfortPro APU*	Kubota 2 cyl. 13.9 hp	4 kW 110/120V AC 60 amp@ 12V DC	Yes	Yes, 10,000 independent	Yes, 10,000 electric	Eng/Gen: 18.5 x 25 x 28.5 Heat/AC Unit (outside): 28 x 15 x 12 Condenser (outside): 26.5 x 17 x 7.5 460 lbs	$8,000 - $9,000 installed
CSXT *K-9* (Locomotive Only)	Kubota 4 cyl	240/120V AC, single phase; 6 kW oil heat; 120V lighting; 240V AC / 70V DC battery charger	Yes, 9 kW water heat	Yes, 36,000 BTU 240V AC air conditioning (requires purchasing HVAC)	Requires purchasing HVAC	3 x 4 x 4 (ft) 1,200 lbs.	$35,000 - $40,000
Dometic Corporation (Tundra)	N/A	N/A	No	7K, 10K, or 14K	3400 to 8500	Self contained or remote	$1,000 to $7,000
Double Eagle Industries, *Gen-Pac*	Kubota 3 cyl.	5 or 8 kW, 51 amp 12V DC includes 120V DC	Yes	Yes, merged with truck A/C	Yes (truck heater)	29 x 29 x 36 582 lbs (w/AC)	$8,400
Energy & Engine Technologies Corporation,	4 - Stroke, Air Cooled,	50 AMPS DC, 40 AMPS 110 AC,	Outlet for Block Heater	Split Unit 9000 BTU	1500 Watt	26 x 18 x 19 260 lbs	$5,495, plus install

Table A, Comparison Table for Truck and Locomotive Idle Reduction Technologies

Company / Model	Diesel Engine	Electrical Output	Heats Truck Eng. Coolant	Air Conditioning Output (Btu/hr)	Heater Output (Btu/hr)	L x H x W (inches) weight (lbs)	Retail Cost
AXP 1000	Single Cylinder, 7.5 Hp	2 - 2 plex					
Espar *D1LC*	N/A Battery draw: 2.5 amps	N/A	No	No	Yes, 7,500	14 x 5 x 5.3 7.7 lbs	$1,374
Espar *D3LC*	N/A Battery draw: 3.0 amps	N/A	No	No	Yes, 12,000	16.6 x 6 x 6.3 14.3 lbs	$1,790
Espar *Airtronic D2*	N/A Battery draw: 2.6 amps	N/A	No	No	Yes, 7,500	12.2 x 4.5 x 4.8 6.0 lbs	$1,374
Espar *Aitronic D4*	N/A Battery draw: 3.3 amps	N/A	No	No	Yes, 13,600	14.6 x 5.5 x 5.9 9.9 lbs	$1,790
Espar *Hydronic 5*	N/A Battery draw: 4.4 amps	N/A	Yes	No	Yes, 13,600	9.75 x 3.5 x 6.3 6.9 lbs	$1,405
Espar *Hydronic 10*	N/A Battery draw: 10.4 amps	N/A	Yes	No	Yes, 13,600	13 x 5.3 x 9.3 14.3 lbs	$2,600
Frigette Truck *Systems - Gen Set 1*	Kubota 2 Cyl 11 hp engine	5.5 KW electrical output 40 amp 12V DC, 120V AC	Yes, use block heater	Yes, 10,000	Yes, 1,500 watts	23 x 20 x 21 385 lbs	$7,495
Frigette Truck *Systems - Gen Set 2*	Kubota 1 Cyl 7 hp engine	3.5 KW electrical output 40 amp DC 120V AC	Yes, use block heater	Yes, 10,000	Yes, 1,500 watts	30 x 15 x 17 282 lbs	$6,495

Table A, Comparison Table for Truck and Locomotive Idle Reduction Technologies

Company / Model	**Diesel Engine**	**Electrical Output**	**Heats Truck Eng. Coolant**	**Air Conditioning Output (Btu/hr)**	**Heater Output (Btu/hr)**	**L x H x W (inches) weight (lbs)**	**Retail Cost**
Frigette Truck Systems - *APU*	Kubota 1 cyl 7 hp engine	120 Amps of 12V DC	No	Yes, 12,000	Yes, 15,000	26 x 15 x 16 190 lbs	$5,895
IdleAire Technologies, Inc	Power source: grid or off-grid electric power	Two 20 amp 120V AC circuits	120V AC power for block heater	Yes, 18,000; independent of truck	Yes, 17,000; independent of truck	No hardware added to the truck; one-time charge of $10 for window template.	Service charge: $1.50/hr ($1.25/hr w/ contract).
Kim Hotstart *Diesel Driven Heating System* (Locomotive Only)	Lister-Petter 3-cyl	72V, 80 amp, cab heating, supplement coolant heating, battery charging	Yes, 20 kW water heat + 10 kW oil heat	No	N/A	24 x 49 x 33 1,000 lbs	$27,000 - $29,000
Kim Hotstart *Electric Powered Heating System* (Locomotive Only)	N/A	N/A, battery charging optional	Yes, 24 kW water heat+ 6 kW oil heat	No	N/A	17 x 44 x 27 100 lbs.	$4,000 - $14,000
Kool-Gen / *KG-1000*	Yanmar 2-cyl	40 amp AC 115V	No	17,500 BTU	10-20,000 BTU heat optional	27 1/2 x 24 x 19 approx. 425 lbs.	$6295
Phillips and Temro / *Cab Power 8500633*	Shore Power	120V AC 15 Amps (30 amps optional)	Yes, use block heater	Mates to HVAC	Mates to HVAC	Load Center 5" x 5" x 3" System 5 lb.	$125
Pony Pack, Inc. *Pony Pack*	Kubota 2 cyl. 10.8 hp	105 amp 12V DC No 110V AC	Yes	Yes, merged with truck A/C	Yes, truck heater	26 x 25 x 24 300 lbs	$7,000
RigMaster Power Systems, Inc.(Div. of International	Perkins 2 cyl. 10 hp	4 kW, 30 amp 110V AC, 25 amp 12V	No, can use block heater	Yes, 20,000 (independent of truck	Yes, 12,000 (Uses APU coolant to	Main Unit: 27 x 29 x 30, 393 lbs; Bunk	$6,300

Table A, Comparison Table for Truck and Locomotive Idle Reduction Technologies

Company / Model	Diesel Engine	Electrical Output	Heats Truck Eng. Coolant	Air Conditioning Output (Btu/hr)	Heater Output (Btu/hr)	L x H x W (inches) weight (lbs)	Retail Cost
Power Systems Inc.) *Rig Master Power*		DC		engine)	heat sleeper)	Heater/AC Unit: 14 x 9.25 x 9.25, 27 lb	
Safer Corporation *VIESA*	N/A	N/A	N/A	Yes, Evaporator	N/A	30 x 40 x 6.5 Tank 4 x 10 x 15 126 lbs.	$1,240
Shurepower™, LLC	Power source: shore power grid or off grid electric power	20 Amp 120V AC, 30 Amp 120V AC, and 50 Amp 240V AC	120V AC power for block heater	Yes, depends on vehicle equipment	Yes, depends on vehicle equipment	Depends on vehicle equipment; 10-200 lbs	Service charge: $0.50 to $1.00 depending on level of service and location
TAS Distributing Inc. *Temp-A-Start*	N/A	N/A	Yes	Same as truck	Same as truck	Unknown, 14 lbs	$2,500
Truck Gen *UCT I-3.5*	Kubota 1 cyl. 7 hp	3.5 kW 40 amp DC, 120V AC	No, can use block heater	Yes, 10,000	Yes, 1200 watts	30 x 15 x 17; 220-280lbs w/ air	$6495
Truck Gen *UCT 2-5..5*	Kubota 2 cyl. 11 hp	5.5 kW 40 amp 12V DC, 120V AC	No, can use block heater	Yes, 10,000	Yes, 1200 watts	23 x 20 x 21; 385 lbs w/ air	$7495
Truck Gen *UCT-APU*	Kubota 1 cyl./7hp	120 Amps of 12V DC	No	Yes, 12,000	Yes, 15,000	26 x 15 x 16; 150-190 lbs	$5,895
Webasto *Air Top 2000*	N/A	N/A	No	No	Yes, 7,000	12.7 x 5 x 4.8 8 lbs	$1,000
Webasto *Air Top 3500*	N/A	N/A	No	No	Yes, 12,000	16 x 5 x 5 13.2 lbs	$1,650
Webasto *TSL 17*	N/A	N/A	Yes	No	Yes, 17,000	9.1 x 4.1 x 6.4 7 lbs	$917

Table A, Comparison Table for Truck and Locomotive Idle Reduction Technologies

Company / Model	Diesel Engine	Electrical Output	Heats Truck Eng. Coolant	Air Conditioning Output (Btu/hr)	Heater Output (Btu/hr)	L x H x W (inches) weight (lbs)	Retail Cost
Webasto *Thermo 90S*	N/A	N/A	Yes, 45,000	No	Optional	24 x 9 x 11 65 lbs	$2,300

Appendix B (Stakeholder List)

Company	Representative	Mailing Address	Phone/fax/E-mail/website
ACCG	Mr. Edwards	Mr. Todd Edwards Associate Legislative Director Natural Resources & Environment Association County Commissioners of Georgia 50 Hurt Plaza, Suite 1000 Atlanta, GA 30303	404-522-5022 tedwards@accg.org
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AGC – The Georgia Branch	Mr. Woodall	Mr. Mark Woodall Director, Government Affairs The Georgia Branch, Associated General Contractors of America	678-298-4116 woodall@agcga.org
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Athens- Clarke County Solid Waste Dept.	Mr. Corley	Mr. Jim Corley Director Athens-Clark County Solid Waste Dept. PO Box 1868 Athens, GA 30603-1868	706-613-3501 ext 305 JamesCorley@co.clarke.ga.us
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