

**City of Columbus
Green Fleet Action Plan Update
Effective January 1, 2008**

Mayor Michael B. Coleman

Section 1: Introduction

When Mayor Coleman announced the “Get Green Columbus” initiative in January 2005, one of the key policy strategies outlined in his Green Memo was to:

“Stop unnecessary vehicle emissions by conducting a review of our City’s on-road and off-road vehicle operation and maintenance procedures to reduce vehicle emissions...”

Other key policy strategies relating to “greening” our City’s fleet were outlined in the memo, several of which the Division of Fleet Management has since implemented, including developing and implementing an anti-idling policy, seeking and receiving grant funding to retrofit vehicles with oxidation converters and engine hydraulic and coolant heaters and increasing our use of environmentally friendly bio fuels.

Yet, the need to address outdoor air quality is as great as ever:

- In 2004, U.S. EPA officially designated six central Ohio counties as non-attainment for failing to meet federal standards for either/both ozone and PM 2.5 pollution. Columbus is located in 3 of those counties.
- Air pollution contributes to asthma prevalence and increases asthma episodes.
- According to a news release from the EPA, the average refuse truck emits approximately 8 tons of air pollutants per year through exhaust emissions.
- Retrofitting refuse trucks with oxidation converters will cut particulate matter by 30%, hydrocarbons and toxics by 50% and nitrogen oxides by 40%.

The City of Columbus recognizes that energy use associated with the operation of its vehicle fleet is one of the many factors impacting local air quality and the greenhouse gas emissions that contribute to global climate change. Mayor Coleman is directing all departments and divisions have to take specific steps toward improving the energy efficiency of its fleets and reducing emissions from fleet operations, especially heavy duty vehicles. Improving the energy efficiency of the City fleet will result in significant monetary savings in the long run. The City of Columbus is establishing this Green Fleet Action Plan to address the management, operation, and procurement of fleet vehicles under the control of the City in order to improve the energy efficiency and reduce emissions of its fleet.

Section 2: Definitions

“Light-duty vehicles” any motor vehicle with a gross vehicle weight less than 14,000 pounds and includes all passenger vehicles (autos), pick-up trucks, vans, sport utility vehicles (SUV) and motorcycles

“Medium-duty vehicles” any vehicle with a gross vehicle weight between 14,001 and 26,000 pounds

“Heavy-duty trucks” any motor vehicle with a gross vehicle weight greater than 26,000 pounds and includes all Fire apparatus, dump trucks, snow plows, street sweepers and Refuse trucks

“Off-Road Construction” any vehicle not licensed for on-road use that is used primarily for construction purposes (backhoes, loaders, mixers, etc.)

“Off-Road Other” are smaller, motorized equipment (mowers, weed eaters, air compressors, etc.)

“Alternative fuel” any fuel that is substantially non-petroleum in nature, is not gasoline or diesel, and is defined as an alternative fuel by the U.S. Department of Energy

“Green Vehicle” refers to any vehicle that employs environmentally friendly technology to reduce either fuel consumption or emissions (i.e. hybrid, flex-fuel, CNG, equipped with after-treatment device, anti-idling device, auxiliary heating device, etc.)

Section 3: Fleet Inventory

The City of Columbus Fleet Management Division maintains nearly 6,000 pieces of equipment, approximately 3,100 of which are on-road vehicles, i.e., cars, trucks, SUVs, etc. and over 2,800 are off-road, e.g. construction equipment.

| Vehicle Inventory (as of May 2007) | | |
|---|--------------------------------|------------------------------|
| Vehicle Type | Number Gasoline Powered | Number Diesel Powered |
| Light Duty Vehicles | | |
| Autos | 1,297 | 11 |
| Light Duty Trucks | 892 | 59 |
| SUVs | 143 | |
| Motorcycles | 32 | |
| Medium Duty Vehicles | 16 | 130 |
| Heavy Duty Vehicles | | |
| Fire Apparatus | | 143 |
| Heavy/Dump Trucks | 14 | 178 |
| Refuse Trucks | | 184 |
| Street Sweepers | | 22 |
| Off-Road Construction | 122 | 561 |
| Off-Road Other | 2,032 | 96 |
| TOTAL | 4,548 | 1,384 |

Section 4: Goals of the Action Plan

The goals of this action plan are to reduce fleet fuel use and reduce vehicle fleet emissions. The City will manage and operate its fleet so that our vehicles are the most fuel efficient, low emission vehicles possible that still meet the various business needs of the City. The following are proposed to measure the City's performance toward meeting these goals:

- **Measure:** Total annual City fuel use
 - Target: Reduce City fuel use by 3% by 2010
- **Measure:** Total annual City petroleum use
 - Target: Reduce annual petroleum use by 2% by the end of 2008
 - Target: Reduce annual petroleum use by 12% by the end of 2010
- **Measure:** Percentage of eligible pre-2002 on-road and off-road diesel vehicles replaced or retrofitted with at least DOC technology, with DPF technology being considered for high fuel usage vehicles
 - Target: 25% by 2008
 - Target: 50% of 2010
 - Target: 100% by 2012
- **Measure:** Percentage of eligible vehicles fitted with engine coolant and hydraulic oil heaters or engine coolant heaters
 - Target: 100% by end of 2009
- **Measure:** Percentage of new light-duty vehicles purchased each year that are considered green
 - Target: 25% by end of 2008
 - Target: 100% by end of 2010
- **Measure:** Off-road equipment
 - Target: All new equipment will be non-petroleum, if a non-petroleum version is available and proven to meet operational needs, by end of 2008
 - Target: Existing diesel equipment will be fueled on biodiesel by end of 2008
 - Target: All new portable fueling containers will be low vapor leak.
- **Measure:** Percentage of City bulk diesel purchases that are a biodiesel blend (at least B5 or B20 depending on season)
 - Target: 100% by end of 2008
- **Measure:** Percentage of City employees who drive City vehicles that have completed a green driver education course.
 - Target: 100% by end of 2009

Section 5: Action Plan Strategies

In order to accomplish the goals outlined above, the City shall modify procurement procedures, implement policies, conduct reviews and take other actions as outlined in the sections below, with a focus on:

- 1) Operate cleaner vehicles (cleaner fuels and cleaner engine operation)
- 2) Operate vehicles more efficiently (more efficient vehicle types and more efficient use of vehicles that result in fuel savings)

(1) Cleaner Vehicles - *Strategies to achieve cleaner operating vehicles:*

- **Technology: Diesel truck retrofits-** Retrofitting diesel vehicles with emission control devices will reduce particulate emissions by 30 to 90%, depending on the device used. Grants have been sought that would allow the city to install diesel oxidation catalysts (DOCs) on approximately 84 on-road diesel vehicles, as well as install diesel particulate filters (DPFs) on approximately 25 on-road vehicles. Diesel vehicles considered “eligible” for DOCs have pre-2002 engines and must have exhaust systems in good enough condition to accommodate the DOC, and will typically be kept in the fleet for at least 3 more years. DPFs would be reserved for higher use vehicles that will remain the fleet for at least 4-5 more years and that typically have a higher dollar value. In order to be eligible for a DPF, the vehicle must have an electronically controlled engine that accommodates a DPF.

Recommended action: Conduct analysis of all City diesel vehicles to determine number eligible for retrofit and complete retrofits of all targeted vehicles; following evaluation of results, conduct pilot of off-road vehicles to determine if retrofits are beneficial for off-road vehicles as well.

- **Alternative fueled vehicles.** Alternative fueled vehicles (AFV) operate on fuels other than petroleum-based gasoline and diesel.

Biodiesel: Biodiesel is a clean, renewable fuel, made by refining any fat or oil such as soybean oil. It behaves and performs much like petroleum diesel but is biodegradable and nontoxic. It’s typically blended with petroleum diesel to create a biodiesel blend. Fleet Management conducted two bio-diesel pilot programs beginning in December 2006 through early 2007. Two refuse collection vehicles operated using B5 and the Sewerage & Drainage compost facility has been using B20 in front loaders. The use of biodiesel was expanded citywide in 2007 to include all Refuse fueling locations. Fleet will work with other city divisions to provide information and education on biodiesel fuel and expand the usage to all divisions in 2008. The goal is to switch most of the City’s diesel fuel purchases to B20 by mid 2008. If successful, all city diesel vehicles will operate on B20 until early November and then will switch to B5 until early March and then will switch back to B20 for the warmer months.

Recommended action: Expand current efforts to switch all diesel fleet, including off-road diesel vehicles and equipment, to B5 during cold weather months and B20 or greater during warm weather months by the end of 2008. Consider use of B20 year round in situations where fuel is stored underground and vehicles are stored indoors.

CNG (Compressed Natural Gas): Compressed Natural Gas (CNG) vehicles emit fewer nitrogen oxides and less particulate matter than gas powered vehicles. CNG typically costs between 25-50% less per mile of operation than gasoline or diesel. Fleet Management is working with both the Refuse Collection and Transportation Divisions on specifying CNG vehicles for bid in 2007. Fleet is committed to specifying at least one rear loading refuse collection vehicle and one street sweeper in Transportation as CNG. A CNG option is also available for some medium and light duty vehicles as well. Language was added to the city's 2008 light duty vehicle UTC specifications that listed CNG capability, among other "environmentally preferable" features, as a preferred option.

The main impediment to the operation of CNG vehicles is the lack of fueling locations. Currently, the City does not operate any CNG fueling locations; however, the County currently operates a fuel site located off Alum Creek Drive that the City is able to access, and additional CNG stations are expected to be constructed in Franklin County in the near future.

Recommended action: Expand current efforts: Pursue additional grant funding opportunities to assist in CNG purchases as well as building of CNG fueling stations. Consider CNG across a wide range of light, medium and heavy duty applications where practical.

Flex fuel: Flexible fuel vehicles offer drivers a choice of fuels. They can either use standard unleaded gasoline or E85, a blend of 15% gasoline and 85% ethanol. Flex fuel vehicles cost no more than gas-only vehicles, and E85 is usually less expensive to purchase at the pump. E85 comes from renewable, American resources like corn. The City currently owns approximately 70 flex fuel vehicles, located in the Police division and has an additional 20 Police flex fuel cruisers on order. City fueling locations are not currently equipped to dispense E85; however, there are various E-85 retail locations located throughout the area. In addition to purchasing retail, Franklin County has an E85 refueling station off Alum Creek Drive that they have offered to make available to the City FFV fleet.

Language was added to the City's 2008 light duty vehicle UTC specifications that listed flex fuel capability, among other "environmentally preferable" features, as a preferred option.

Recommended actions: Expand current efforts. Make flex fuel vehicles available on current City UTCs and encourage the purchase of flex fuel vehicles through the procurement process (see below). Provide an information sheet with each new flex fuel vehicle to educate drivers about the

benefits of E85 and list the retail fuel locations where E85 can be purchased, as well as the County location on Alum Creek Drive.

- **Procurement practices.** One of the policy strategies outlined in the Mayor's Green Memo states: "Purchase better performing vehicles by assuring that as we get bids for new on-road and off-road vehicles, we seek vehicles that are fuel efficient and reduce emissions, and that we evaluate and pursue vehicles that operate on alternative or renewable fuel sources, when possible and practical." Green language that gives preference to hybrids, flex fuel vehicles and CNG vehicles was included as part of the 2008 light duty vehicle UTC specifications. This "environmentally preferable purchasing" language gives preference to environmentally preferable bidders.

Recommended actions: Implement procurement policies and practices to advance the City's green efforts including:

- *Include a minimum efficiency standard in miles per gallon for each vehicle class for which the City has procurement specifications and include such a standard in any new vehicle procurement specification.*
- *Review all vehicle/equipment specifications and modify as necessary to ensure that:*
 - *The most fuel efficient vehicles possible are being purchased*
 - *The specs are written in a manner flexible enough to allow the purchase of alternative fuel or hybrid vehicles when possible*
 - *Specifications for off-road equipment/vehicles are also written in a way that favors green options when available*
- *Require all passenger vehicles and light duty trucks that are purchased be rated as ultra-low emission or zero emission vehicles, when this option is available.*

(2) Increased efficiency- more efficient vehicles and more efficient use of vehicles - *Strategies to achieve increased efficiency:*

- **Driver behavior.** Fleet Management developed a pamphlet on fuel conservation and emissions reduction that was distributed citywide in May 2006. It addresses driver behavior that will help conserve fuel and save money. In addition to the driver pamphlet, Fleet Management developed an anti-idling policy for all city vehicles which was distributed citywide in 2006.

The Citywide Office of Training and Development currently offers a class on defensive driving. It is not mandatory.

Recommended actions: Develop an employee education program designed to achieve the Green Fleet action plan goals and make it mandatory for drivers of city vehicles. Topics could include fuel usage/conservation, maintenance, using alternatives to driving, defensive driving, and education on fleet-related citywide policies (i.e. anti-idling). Target date to have education program implemented: April 1, 2008.

- **Vehicle Pool.** The Fleet Management Division has been working to develop and implement a vehicle pool since mid 2006. Vehicles targeted for the pool include underutilized vehicles located in the downtown area. Fleet Management is also working with rental car agencies to utilize rental vehicles for the pool when necessary. The objective of the pool is to better utilize city vehicles, reduce maintenance and fuel costs, as well as increase vehicle efficiency and the use of maintenance facilities. The ultimate goal of the pool is to reduce the overall fleet size through better utilization of City vehicles.

Recommended actions: Continue to expand the size of the vehicle pool and increase marketing efforts to increase usage. Fleet should pursue the purchase of hybrid vehicles to use in the pool, which would offer both vehicles for the pool as well as the opportunity to study and evaluate hybrid technology. Other advanced technology vehicles should also be considered for the pool including plug-in hybrids and low speed dedicated electric vehicles (GEMs) for short distances.

- **Hybrid vehicles.** One of the most effective ways to increase the fleet's average fuel economy is the use of hybrid electric vehicles, which combine a highly efficient gas engine with an advanced electric motor. Hybrids are designed to recover energy during braking and gearing down and store it in the battery pack. Hybrids can achieve up to twice the energy efficiency compared with a conventional vehicle. The City currently owns only 1 hybrid vehicle, located in the Department of Public Utilities. Green language that gave preference to hybrids was included as part of the 2008 light duty vehicle UTC specifications, however no bids for hybrids were received.

Recommended actions: A separate hybrid bid should be considered in early 2008. Other advanced technology options should be explored, including plug-in hybrids and the possibility of adding heavy duty hybrids to the fleet.

- **Reduce vehicle idling.** Unnecessary idling wastes fuel and increases emissions. Idling for one hour equates to approximately 33 miles of engine wear on a standard automobile. Columbus has taken several steps to reduce unnecessary idling, including developing and implementing a citywide anti-idling policy that went into effect as a Mayor's Executive Order in December 2005. In addition, all new Refuse trucks have an automatic shut-off when the vehicle idles for more than ten minutes without moving. Hydraulic oil and engine coolant heaters have been installed in five refuse collection trucks which will reduce engine idling during periods of extreme cold. Fifteen new trucks received in 2006 came equipped with similar units and an additional 5 trucks will come equipped with the units in 2007. Grant funds will be used to install hydraulic heaters on an additional 21 Refuse trucks located at Morse Road.

Recommended actions: Continue with current efforts and expand efforts to include analyzing fleet to determine number of additional vehicles eligible for hydraulic oil and engine coolant heater installation and complete installation of all targeted vehicles by action plan target date. Launch employee education program (referenced above) to educate employees about anti-idling policy. Consider installing anti-idling signs at City fleet facilities and parking lots.

- **“Right-sizing” vehicles.** Ensuring that the duty requirements of a vehicle match the smallest possible vehicle for the task is an effective fuel saving strategy. Fleet Management currently meets with every division to discuss vehicle purchase requests for the year. During this meeting, justifications for purchase requests are required from divisions, including intended use of the vehicle requested. Fleet Management will often recommend a smaller, alternate vehicle that better aligns with the vehicle’s intended use.

Recommended actions: Review every new vehicle purchase request and modify them as necessary to ensure that the vehicle class to which the requesting vehicle belongs is appropriate for the duty requirements that the vehicle will be called upon to perform. Consider creating formal guidelines for divisions.

Section 6: Monitoring of the Green Fleet Action plan

In order to ensure compliance and track progress of the goals outlined in Section 4 above, as well as to monitor the actions outlined in Section 5, some type of oversight process should be implemented. A Green Fleet committee, comprised of representatives from various City divisions, is one option. Another option would be to use a special session of Columbus Stat to review action plan progress once a year, more often if necessary. All department/division fleet coordinators should submit a Green Fleet report to the committee/panel detailing their progress in achieving the goals of the Green Fleet program. The committee/panel should meet at least once a year to review these reports and assess the overall progress of the Green Fleet program. Action plan goals and timelines should be reviewed at least annually so that targets and/or timelines can be re-evaluated and adjusted if needed.

This committee should be given the authority to reward the division that demonstrates the best compliance with the Green Fleet mission. Incentives should be developed that reward the division head and/or appropriate staff.

In addition to tracking the progress of the action plan, data should be collected regarding the various initiatives set forth in the plan. Costs and benefits should be calculated over the life cycles of the various vehicles. Initial purchase costs should be recorded and then fuel and maintenance costs tracked for the life of each vehicle purchased under this action plan. This type of data would aid the City in making life cycle assessments over time. The City should attempt to estimate and assess possible “hidden” costs and savings that accrue over time from the action plan.