OFFICE OF LEGISLATIVE OVERSIGHT

MEMORANDUM REPORT 2009-2

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TO: County Council

FROM: Richard Romer, Legislative Analyst
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SUBJECT: **Follow-Up to 2003 OLO Report on Agency Fleet Emissions**

This memorandum report reviews the implementation status of the recommendations from OLO Report 2003-4, *An Emissions Analysis of the County and bi-County Fleets.* The report is organized as follows:

PART A: INTRODUCTION

Authority. Council Resolution 16-260, *Fiscal Year 2008 Work Program of the Office of Legislative Oversight*, adopted July 31, 2007.

Scope of Assignment. This memorandum report responds to the Council's request to review whether the Council's recommendations for action on previous years' OLO project have been implemented. The purpose of this follow-up assignment is to track the implementation of recommendations that the Council endorsed as a result of OLO's analysis of how County and bi-County agencies manage the emissions of their respective vehicle and equipment fleets (OLO Report 2003-4).

Methodology. OLO gathered information for this follow-up project through document reviews and interviews with staff members from the County Government's Department of Environmental Protection, Department of General Services, and Department of Transportation; Montgomery County Public Schools (MCPS); Washington Suburban Sanitary Commission (WSSC); Maryland-National Capital Park and Planning Commission (M-NCPPC); and Montgomery College. OLO circulated a draft of this memorandum report to agency staff for informal review; this final report incorporates all technical edits received.

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PART B: OVERVIEW OF OLO REPORT 2003-4

In 2002, the Council requested OLO Report 2003-4, *An Emissions Analysis of the County and bi-County Fleets*, to provide a better understanding of the fleet emission levels and related management practices of the five County and bi-County agencies:

- Montgomery County Government;
- Montgomery County Public Schools (MCPS);
- Washington Suburban Sanitary Commission (WSSC);
- Maryland-National Capital Park and Planning Commission (M-NCPPC); and
- Montgomery College.[1]

Agency Fleet Emissions. OLO Report 2003-4 found that, in FY02, the five agencies collectively managed a fleet of approximately 6,000 vehicles that annually traveled 75 million miles and burned 10 million gallons of fuel. Using FY02 data, OLO Report 2003-4 estimated the emissions of the agencies' vehicle fleets. In sum:

- This fleet emitted approximately 738 tons of nitrogen oxides, 211 tons of hydrocarbons and 24 tons of particulate matter;
- Transit buses, school buses and heavy trucks accounted for 45% of the vehicles, 51% of the miles traveled, and 95% of emissions;[2] and
- Passenger cars and light trucks (owned and operated) represented 56% of the fleet, 49% of the miles traveled, and less than 5% of all emissions.

The report found that older vehicles polluted at higher rates than newer vehicles. As a result, the age distribution of the fleet affected the total amount of emissions. For example, a passenger car or light truck manufactured built before 1994 emits pollutants at twice the rate of a vehicle built since 1994.

In addition, OLO Report 2003-4 estimated the emissions of the agencies' off-road equipment. The five agencies collectively owned 4,469 pieces of off-road engine equipment in FY02. The inventory of off-road engines was primarily gas operated equipment (83%), with the remaining 17% being diesel fueled. The County's Department of Environmental Protection (DEP) estimated that off-road equipment, such as lawn mowers, bulldozers and graders, produced approximately 20% of the ozone forming pollution in the County.

[1] Council Resolution 14-1395, *FY 2003 Work Program of the Office of Legislative Oversight*, adopted July 30, 2002.

[2] Additionally, the OLO report found that transit and school buses built before 1991 pollute at significantly higher rates than buses built since 1991.

Strategies to Reduce Emissions. Based upon research into promising practices used across the country, OLO Report 2003-4 identified potential strategies to reduce the emissions of the agency fleets. These strategies included:

- Managing the size of the vehicle fleet;
- Performing routine preventive maintenance;
- Using fuel efficient or alternatively fueled vehicles;
- Encouraging driving habits that conserve energy, e.g., limiting idling;
- Using ultra-low sulfur diesel fuel and/or diesel fuel additives;
- Retrofitting existing diesel engines with pollution control devices; and
- Replacing older vehicles with more fuel efficient or cleaner burning vehicles.

The various strategies addressed different vehicle types and pollutant types. Each of the strategies OLO identified varied in the cost and feasibility of implementation.

The OLO report found that some management practices to reduce fleet vehicle emission were already in place. For example, the five County and bi-County agencies complied with the State vehicle inspection program, provided routine preventive maintenance, and limited vehicle use and refueling on "Code Red" or worse air quality days.[3]

However, the report also found variations in the implementation of emissions reduction strategies. For example, the FY02 County Government fleet included the largest number of alternatively fueled vehicles, such as compressed natural gas (CNG) transit buses and hybrid passenger cars.

[3] The Washington Metropolitan region uses a color scheme, based upon EPA's Air Quality Index, to easily identify the level of pollutants in the air on a given day. The air quality colors range (good to poor) from Green, Yellow, Orange, Red, and Purple.

PART C: COUNCIL ACTION AND CURRENT IMPLEMENTATION STATUS

The Council released OLO Report 2003-4 on June 24, 2003. The Council's Transportation and Environment (T&E) Committee held a worksession on the report on July 10, 2003. The T&E Committee reviewed the report and endorsed recommendations related to the report for Council consideration.

On July 29, 2003, the Council adopted Resolution 15-313, *County Environmental Policy* (©1-4). The resolution created an Environmental Policy Implementation Task Force comprised of designees from each of the five County and bi-County agencies, as well as an ex-officio representative from the County Council. The resolution also required the Task Force to issue an environmental "Issues and Actions Report" that included a list of best practices agencies could pursue to reduce environmental impacts of government operations.

Also on July 29, in conjunction with the adoption of Resolution 15-313, the Council formally approved two recommendations on agency strategies to reduce fleet emissions. On July 31, 2003, the T&E Committee sent letters to each of the five agencies (a sample letter is attached at ©5) detailing the following two recommendations:

1) **Each agency should provide the Environmental Policy Implementation Task Force (EPITF) with a list of short-term and long-term strategies to reduce emissions by October 15, 2003.** The Committee asked that for each short- or long-term strategy listed by an agency, the agency should include the following information:

    - Estimated capital and/or operating costs;
    - Types of pollutants that would be reduced;
    - Estimated savings for each type of pollutant; and
    - Estimated cost effectiveness of the strategy, stated in cost per ton reduced.

2) **The EPITF should review and forward the agencies' responses with a prioritized list of short-term and long-term project recommendations to the T&E Committee by November 15, 2003.** The Committee requested that the EPITF forward all of the agencies' short- and long-term strategies to the Committee and, from these responses, identify:

    - Lower cost items that could be implemented easily;
    - Short-term priority projects that could by implemented in FY05; and
    - Long-term priority projects.

Since 2003, the two recommendations endorsed by the Council have been completed. The next page provides more detailed information on the implementation of each Council recommendation.

COUNCIL RECOMMENDATION #1: Each agency provide the EPITF with a list of short-term and long-term strategies to reduce emissions.

The five County and bi-County agencies submitted their lists of short-term and long-term emissions reduction strategies to the EPITF in the fall of 2003. The lists of strategies from each agency included the requested cost and pollutant reduction estimates.

COUNCIL RECOMMENDATION #2: The EPITF review and forward the agencies' responses with a prioritized list of short-term and long-term project recommendations to the T&E Committee.

The EPITF transmitted a prioritized list of emission reduction strategies as part of a draft "Issues and Actions Report" to the County Council in October 2003, and a final report on December 19, 2003. These strategies were outlined at a January 2004 T&E Committee worksession. On May 11, 2004, the Council formally endorsed the EPITF "Issues and Actions Report" through Resolution 15-597.

Based on the EPITF "Issue and Actions Report," 35 departments and agencies created Environmental Action Plans in July 2004 that included specific environmental initiatives tailored to each department or agency. These plans included, among other things, initiatives to reduce fleet emissions. On November 29, 2004, the EPITF provided an annual report to the T&E Committee summarizing the Environmental Action Plans.

In January 2005, the County's Department of Environmental Protection (DEP) briefed the Management and Fiscal Policy Committee on and the implementation of the "Issues and Actions Report." Also in 2005, the EPITF was renamed as the Environmental Policy Implementation Committee (EPIC) by Council resolution. In January 2006, EPIC provided another progress report to the T&E Committee that outlined successes and lessons learned.

OTHER COUNCIL ACTIONS TO REDUCE FLEET EMISSIONS

OLO has identified three other actions the Council has taken to reduce fleet emissions: participation in the State Implementation Plan, Air Quality Protection Strategy briefing, and the creation of a Sustainability Working Group.

State Implementation Plan. As stated in OLO Report 2003-4, in January 2003, the Environmental Protection Agency (EPA) classified the Washington metropolitan area as a "severe" nonattainment area (since reclassified to "moderate") for ozone. In addition, EPA designated the Washington region as a nonattainment area for the particulate matter standard in January 2005.

Under the Clean Air Act, areas that do not meet National Ambient Air Quality Standards (nonattainment) must develop and implement strategies to meet the standards through a State Implementation Plan (SIP). As part of the SIP process, Metropolitan Washington Council of Government's (COG) Air Quality Committee submits plans with control

measures to the EPA to show how it will reduce emissions and achieve attainment during the next three years.[4] COG submitted the most recent ozone SIP in May 2007 and the particulate matter SIP in April 2008. Both have an attainment deadline of 2010.[5]

Air Quality Protection Strategy. In 2003, the County developed an Air Quality Protection Strategy. The Air Quality Protection Strategy addresses local and regional ambient air quality issues, including on the reduction of ozone emissions, nitrogen oxides (NOx), and volatile organic compounds (VOCs). These strategies included:

- Reducing emissions from the County's mobile and non-road fleet; and
- Promoting activities such as transit use, carpooling, teleworking, and telecommuting.[6]

On February 12, 2007, the T&E Committee received an update on air quality initiatives. As part of this update, Council staff and DEP briefed the Committee on EPIC's work on fleet emissions, reviewed past fleet emissions initiatives, and provided a summary of the short- and long-term emissions strategies identified by the agencies.

Sustainability Working Group. On April 22, 2008, the Council passed a series of bills that addressed the County's environmental quality on a variety of fronts, including fleet emissions. Bill 32-07, *Environmental Sustainability – Climate Protection Plan* created a Sustainability Working Group, which is comprised of members from the five County and bi-County agencies, the municipalities in the County, businesses, developers, and the public. Bill 32-07 states that Sustainability Working Group will complete a climate protection plan, and perform other reports, such as those incorporated into Bill 29-07, *Environmental Sustainability – Climate Protection – Motor Vehicles*. This includes a(n):

- Inventory of the County's fleet, including sport utility vehicles;
- Evaluation of the costs and benefits of a car share program;
- Strategy to improve the County fleet's fuel economy standards; and
- Telecommuting Action Plan.

[4] Montgomery County is one of the 21 COG member jurisdictions.
[5] Metropolitan Washington Council of Governments. http://www.mwcog.org/environment/air/SIP/default.asp
[6] Department of Environmental Protection. *Air Quality Protection Strategy*. Montgomery County, Maryland. 2003. http://www.montgomerycountymd.gov/content/dep/Publications/airstrategy.pdf

PART D. AGENCY UPDATE

As reported in Part C, OLO found that all five County and bi-County agencies met the Council's request to develop and prioritize strategies to reduce fleet emissions. To further update the implementation of specific emissions reduction strategies since the release of the report, OLO recently interviewed staff members from each of the five agencies:

1. County Government;
2. Montgomery County Public Schools;
3. Washington Suburban Sanitary Commission;
4. Maryland-National Capital Park and Planning Commission; and
5. Montgomery College.

Each of the agencies reported its actions on each emissions reduction strategy since 2003, and stated any planned future actions. Agencies also reported measurable results from emissions reduction strategies, if available.

1. County Government

In Fiscal Year 2007, the County had a fleet of 1,433 passenger cars, 252 heavy trucks, 710 light trucks, and 393 transit buses. The County also owned about 350 pieces of other heavy equipment, such as trailers, tractors, graders, forklifts, and chippers.

In August 2007, the Department of Public Works and Transportation (DPWT) signed an Environmental Sustainability Policy. The section of the Policy entitled "Promote cleaner emission and/or alternate fuel vehicle use" includes:

- Promoting the purchase of ultra-low emission or zero emission vehicles;
- Educating agencies in determining the appropriate size vehicles necessary;
- Purchasing ultra-low sulfur fuel (ULSD) for heavy duty vehicles;
- Promoting use of transit for travel County functions, and eliminate mileage and parking payments when transit options are present;
- Promoting the use of public transportation, ridesharing, bicycling, and walking;
- Maintaining or decreasing the replacement cycle for County vehicles;
- Exploring the most feasible options to reduce diesel particulate emissions; and
- Implementing a biodiesel pilot for buses and trucks.[7]

The Policy also states that each DPWT depot will demonstrate progress towards meeting environmental compliance at the end of each fiscal year, measured in indicators such as money saved, reductions in air emissions, and improvements in compliance.

[7] Department of Public Works and Transportation. "Montgomery County Department of Public Works & Transportation Environmental Sustainability Policy." August 21, 2007.

Table 1: County Government Actions Taken on Fleet Emissions Reduction Strategies

Strategy	Action Taken
Routine preventive maintenance	✓
Limit vehicle idling	✓
Implement Code Red day limitations	✓
Reduce fleet size and mileage	✓
Purchase fuel efficient or alternatively fueled vehicles	✓
Replace pre-1994 heavy trucks	✓
Convert to ultra-low sulfur diesel fuel	✓
Replace pre-1997 lawn and garden equipment	✓
Retrofit heavy duty diesel off-road equipment	
Replace older buses with clean bus technology	✓
Retrofit diesel transit buses	

Source: Department of General Services; Department of Transportation; DEP

Routine preventive maintenance. The County's Fleet Management Services (FMS) schedules with user departments and performs preventive maintenance at the required intervals. Fleet staff report that the County works to complete preventive maintenance in a timely manner.

Limit vehicle idling. The County is developing a County-wide standard operating procedure to limit idling for vehicles. FMS is implementing a policy to limit idling when vehicles are in the shop for maintenance, and Transit Services' idling policy requires operators to turn off buses at the end of the line and to not start buses earlier than three minutes before departure. FMS is also pursuing idle limiting technology for the Silver Spring transit facility.

Implement Code Red day limitations. The Environmental Sustainability Policy outlines the actions taken on poor air quality days. Table 2 shows the County's voluntary "Ozone Action Day" (Code Orange or worse air quality) policies. The Department of General Services posts signs at County fueling stations to encourage end users to not refuel vehicles when the County's air quality is in a Code Orange or worse air quality status.

Table 2: County Government "Ozone Action Day" Policies

Code Orange
• Refuel County vehicles after 7:00 p.m. • Curtail center line painting, median strip spraying, mowing, and asphalt paving • Limit driving and encourage use of carpooling and transit • Minimize the use of aerosol products
Code Red (or worse air quality)
• Institute Code Orange policies • Provide free Ride On bus service • Decrease the load of the Resource Recovery Facility to 70%, barring emergency

Source: County Government

Reduce fleet size and mileage. The County considers efficiency of operations before adding additional vehicles and/or routes. However, some services are demand driven. For example, Ride On sizes their transit buses to the ridership of the route. Staff report that most routes start out with smaller transit buses until the ridership warrants going to a larger bus to maintain service levels.[8] In addition, the Sustainability Working Group is charged with inventorying the County's fleet; evaluating the costs and benefits of a car share program; and developing a strategy to improve the fleet's fuel economy standards.

Purchase fuel efficient or alternatively fueled vehicles. When it is cost effective, the County considers purchasing the most fuel efficient and least polluting vehicle in its corresponding class subject to procurement contracts. The Department of General Services and the Office of Management and Budget review and sign off on all vehicle requests. The review includes an assessment of whether the vehicle is the appropriate size for the job. In addition, the Sustainability Working Group is charged with conducting annual inventories of the County's sport utility vehicles to determine whether they can/should be replaced with a more fuel efficient vehicle.

The County's administrative fleet is currently 19% alternatively fueled, which is close to the County's Air Quality Protection Strategy goal of replacing at least 20% of passenger vehicles with hybrid electric, flex-fueled, or other clean technology vehicles. FMS and DEP staff report that the County plans to begin including vehicle emissions as a criteria for a vehicle's replacement schedule.

Since 2003, the County has purchased 140 cars that use 85% ethanol (E85) and 18 gasoline-electric hybrid passenger cars. FMS staff report that the County is purchasing an estimated 160 flex-fueled and 20 hybrid vehicles in FY09. The County prohibits flex-fueled vehicles from receiving unleaded fuel at fuel sites with available E85 fuel. The County also advertises the availability and sells E85 fuel to the public.

As stated in OLO Report 2003-4, newer vehicles pollute less than older vehicles, and as a result, the age distribution of a fleet affects the total amount of emissions. FMS estimates that the County has reduced emissions by 135 tons per year through new vehicle purchases when compared to the emissions of vehicles replaced.[9]

FMS also calculates the gallons of petroleum-based fuels offset through the use of alternative fuels. As shown in Table 3, FMS estimates the County offset a total of 1.18 million gallons of diesel fuel and 75,000 gallons of unleaded fuel through the use of alternative fuels in calendar year 2007.

[8] The County uses an industry standard of ten riders per bus hour as a minimum threshold to support a new transit route.

[9] FMS bases emissions calculations on the engine's year of manufacture and the emissions limits that were in place at the time of manufacture multiplied by the miles traveled.

Table 3: Gallons of Fuel Offset through Vehicle Fuel Economy Improvements, 2007

Fuel Type	Alternative Fuel Type	Gallons of Fuel Offset
Diesel	CNG vehicles	1,124,000
	Diesel-electric hybrid buses	56,000
	Total	**1,180,000**
Unleaded	Gasoline-electric hybrids vehicles	46,000
	E85 ethanol fuel	26,000
	CNG automobiles	3,000
	Total	**75,000**

Source: Fleet Management Services

Another County goal is to use biodiesel in as much of the diesel fleet as possible. The County is currently running a pilot of soy-based 5% biodiesel fuel (B5) at one depot, and is exploring an expansion of biodiesel use. FMS is examining the feasibility of potentially using 20% biodiesel (B20) during warm weather months. In May 2007, the Division of Solid Waste Services (formerly part of DPWT) changed the fuel it uses for all equipment at the Dickerson Compost Facility to B20 fuel.

Convert to ultra-low sulfur diesel fuel. In October 2006, the County converted all of its low sulfur diesel tanks over to ultra-low sulfur diesel (ULSD). Both on-road vehicles and off-road equipment use the ULSD fuel.

Replace pre-1994 heavy trucks. The County has a 12-year replacement schedule for heavy trucks. In FY02, the County owned 65 transit buses, 217 heavy trucks and 57 light trucks that were pre-1994 vehicles. Since 2003, the County has replaced 76 pre-1994 trucks and buses. The County plans to continue replacing pre-1994 equipment in the County's heavy truck fleet in the future.

In addition, in May 2007, the County completed work funded by grants from the EPA and the Maryland Department of the Environment to reduce emissions from vehicles operating near sensitive populations. Since 2003, the County has retrofitted seven Model Year 2001 diesel dump trucks and 15 Montgomery County Fire and Rescue emergency vehicles with diesel emissions catalysts (DOC).

DEP staff estimate that the DOC retrofits have resulted in annual emissions reductions of about six tons of carbon monoxide (CO) and one ton of hydrocarbons (HC). The County completed these grant-funded retrofits in 2007 at a total cost of $29,165.

Replace pre-1997 lawn and garden equipment. The County replaces lawn and garden equipment as necessary.

Retrofit heavy duty diesel off-road equipment. The County is planning on retrofitting 70 vehicle engines with diesel particulate filters (DPF), pending receipt of an EPA grant.

Table 4 shows the estimated emissions reductions from the proposed diesel particulate filters (DPF) retrofits of 44 Ride On buses and 26 Division of Solid Waste Services (DSWS) off-road engines. DEP estimates that the retrofits will have annual combined reductions of about 98 tons of carbon monoxide, 13 tons of hydrocarbons, and nine tons of particulate matter.

Table 4: Estimated Annual Emissions Reductions of 2008 DPF Retrofit Grant (tons)

Vehicle Type	No. of Vehicles	Carbon Monoxide	Hydro-carbons	Particulate Matter
Ride On buses (2001-2002 Model Year)	44	62.63	4.72	2.72
DSWS off-road engines	26	35.42	8.40	6.64
Total	**70**	**98.05**	**13.12**	**9.36**

Source: DEP

In addition, the County has replaced 66 pieces of off-road diesel equipment since 2003.

Replace older buses with clean bus technology. Since 2003, the County has replaced 87 buses with clean bus technology, including 73 compressed natural gas (CNG) buses and 14 diesel-hybrid buses. The County plans to continue replacing older buses with new clean bus technology in the future.

Retrofit additional diesel transit buses. Planned retrofits described above in Table 4.

2. Montgomery County Public Schools

In the 2007-08 school year, Montgomery County Public Schools (MCPS) had a fleet of about 2,000 vehicles, including 1,272 school buses, 243 light trucks, 279 heavy trucks (including passenger vans), 83 trailers, and 42 passenger cars. MCPS also owned about 1,500 pieces of off-road equipment.

Table 5: MCPS Actions Taken on Fleet Emissions Reduction Strategies

Strategy	Action Taken
Routine preventive maintenance	✓
Limit vehicle idling	✓
Implement Code Red day limitations	✓
Reduce fleet size and mileage	
Purchase fuel efficient or alternatively fueled vehicles	✓
Replace pre-1994 heavy trucks	
Convert to ultra-low sulfur diesel fuel	✓
Replace pre-1997 lawn and garden equipment	
Retrofit heavy duty diesel off-road equipment	
Replace pre-1991 school buses	✓
Retrofit school buses	✓

Source: MCPS

Routine preventive maintenance. MCPS performs routine preventive maintenance on all of the vehicles in the fleet.

Limit vehicle idling. In 2006, MCPS established a five-minute idle time limitation on each of its buses and prohibited idling in front of school buildings.

Implement Code Red day limitations. MCPS' Code Red day policies have not changed since 2003. MCPS modifies maintenance operations on Code Red days, including: restricting refueling to early morning hours (whenever possible); restricting grass cutting and gasoline powered lawn maintenance equipment; and suspending outdoor painting or exterior use of materials containing volatile compounds.

Reduce fleet size and mileage. MCPS' fleet and mileage has increased since 2003 due to increased service demand from new schools. However, a recent MCPS memorandum reports that efforts to conserve fuel, such as monitoring bus idling times and reviewing bus routes, have resulted in fuel savings of about 68,500 gallons in FY07, and 45,000 gallons in FY08.[10]

Purchase fuel efficient or alternatively fueled vehicles. While MCPS does not have any formal procedures in place to review vehicle size, MCPS considers fuel efficiency in the purchase of new vehicles. MCPS uses alternative fuel and has purchased alternatively fueled vehicles. In 2007, MCPS began using 5% biodiesel fuel (B5) in all diesel engines in the fleet, and is considering an upgrade to 20% biodiesel (B20) in the future, pending resolution of warranty issues. The MCPS fleet also includes six hybrid vehicles and three flex fuel vehicles.

Replace pre-1994 heavy trucks. In FY02, MCPS owned 123 pre-1994 heavy trucks. MCPS does not have a replacement schedule for heavy trucks, but replaces them as they break down.

Convert to ultra-low sulfur diesel fuel. In 2006, MCPS began using ultra-low sulfur diesel fuel, and now uses it exclusively.

Replace pre-1997 lawn and garden equipment. MCPS does not have a replacement schedule for pre-1997 lawn and garden equipment, but replaces them as they break down.

Retrofit heavy duty diesel off-road equipment. MCPS has not retrofitted any heavy duty diesel off-road equipment.

Replace pre-1991 school buses. In FY02, there were 120 pre-1991 school buses in the MCPS fleet. In accordance with its school bus replacement plan, MCPS has replaced all pre-1991 school buses.

[10] Memorandum to the Board of Education. "Recommended FY 2009 Supplemental Appropriation for Diesel Fuel." Superintendent of Schools Jerry D. Weast. July 15, 2008.

Retrofit school buses. In 2006, MCPS completed a three-phase diesel retrofit project of 251 school buses through EPA grant funds. MCPS retrofitted 171 school buses with diesel oxidation catalysts (DOC). MCPS also retrofitted 80 school buses with "Green Diesel" technology. This retrofit included both a DOC and a software upgrade that modifies the engine's computer to reduce the nitrogen oxide (NOx) emissions released during more fuel-efficient, "off-cycle" highway driving. MCPS reports that these retrofits resulted in annual emissions reductions of about 59 tons of carbon monoxide (CO), eight tons of hydrocarbons (HC), and four tons of nitrogen oxides (NOx).

MCPS is currently applying for a nearly $1 million grant from the EPA to retrofit 104 school buses with Diesel Particulate Filters (DPF). The DPF retrofit equipment will last as long as the engine itself and require minimal maintenance. The grant will cover all of the retrofit costs, as well as five additional DPFs for use as stock at the five MCPS depot locations. If MCPS receives the grant, staff estimate that the DPF retrofit will have the following emissions reductions over the lifetime of the buses:

- 52 tons of carbon monoxide (CO) at $19,026 per ton reduced;
- 11 tons of hydrocarbon (HC) at $94,095 per ton reduced; and
- 6 tons of particulate matter (PM) at $176,429 per ton reduced.

3. Washington Suburban Sanitary Commission

In Fiscal Year 2008, the Washington Suburban Sanitary Commission (WSSC) had a fleet of about 841 vehicles, including 527 light trucks, 228 heavy trucks, and 86 passenger cars. WSSC also owned about 550 pieces of off-road equipment.

Table 6: WSSC Actions Taken on Fleet Emissions Reduction Strategies

Strategy	Action Taken
Routine preventive maintenance	✓
Limit vehicle idling	✓
Implement Code Red day limitations	✓
Reduce fleet size and mileage	✓
Purchase fuel efficient or alternatively fueled vehicles	✓
Replace pre-1994 heavy trucks	✓
Convert to ultra-low sulfur diesel fuel	✓
Replace pre-1997 lawn and garden equipment	*
Retrofit heavy duty diesel off-road equipment	✓
Replace older buses with clean bus technology	N/A
Retrofit diesel transit buses	N/A

Source: WSSC
*WSSC contracts out all lawn and garden services.

Routine preventive maintenance. WSSC operates a preventative maintenance program for the entire vehicle and equipment fleet.

Limit vehicle idling. WSSC's written Clean Air Policy includes vehicle idling limitations. The policy requires staff to turn off motors when vehicles and/or equipment are "…not being driven or the equipment is not being actively used."[11]

Implement Code Red day limitations. WSSC's written Clean Air Policy includes procedures to follow on Code Red days. These include: restricting fleet refueling to early morning hours; prohibiting the use of gasoline powered equipment; and prohibiting outdoor painting and facility cleaning. WSSC's Clean Air Policy requires vehicle operators to refuel only when the vehicle's fuel tank is less than half full. The Policy also encourages employees to carpool, use public transit, and combine errands when possible.

Reduce fleet size and mileage. WSSC reduced the size of its vehicle fleet as part of the agency's organizational downsizing from 1998 to 2003. WSSC has continued to reduce the size of the fleet from 943 vehicles in 1998 to 907 vehicles in 2000 to its current level of about 841 vehicles. WSSC reduced its average monthly fleet mileage from 620,000 in 2000 to 458,000 in 2008; an average per vehicle reduction of about 17%.

WSSC's planned emissions reduction strategies/programs include using a new fuel management system to better monitor driving habits and fuel consumption.

Purchase fuel efficient or alternatively fueled vehicles. WSSC replaced certain sport utility vehicles (SUV) with more fuel efficient models; downsized large truck diesel motors where possible; and eliminated all full size passenger vehicles.

Replace pre-1994 heavy trucks. WSSC has reduced the number of pre-1994 vehicles in the fleet from 212 vehicles in 2002 to 83 vehicles in 2008. WSSC staff stated that the replacement of all pre-1994 heavy trucks is a priority, and has been completed as budget constraints allow. Of the 83 pre-1994 vehicles remaining, 49 are heavy trucks. As part of the FY08 vehicle replacements, WSSC removed an additional 14 pre-1994 heavy trucks from the fleet.

Convert to ultra-low sulfur diesel fuel. WSSC converted the entire diesel-fueled vehicle and equipment fleet to ultra-low sulfur diesel fuel in 2006.

Replace pre-1997 lawn and garden equipment. WSSC contracts out all lawn and garden services.

Retrofit heavy duty diesel off-road equipment. WSSC is replacing older heavy equipment with newer, low emission units in accordance with the replacement schedule. WSSC staff have also worked closely with the EPA on a program to monitor heavy truck on-road emissions. Since 2001, EPA testing personnel come annually to WSSC garage facilities and physically test new WSSC vehicles to determine the on-road results of manufacturer(s) compliance with Federal emission legislation.

[11] Washington Suburban Sanitary Commission. "Standard Procedures of the Washington Suburban Sanitary Commission: Clean Air Policy." April 19, 2002.

4. Maryland-National Capital Park and Planning Commission

In Fiscal Year 2008, the Maryland-National Capital Park and Planning Commission had a fleet 257 light trucks, 251 passenger cars, and 42 heavy trucks. M-NCPPC also owned about 800 pieces of off-road equipment.

Table 7: M-NCPPC Actions Taken on Fleet Emissions Reduction Strategies

Strategy	Action Taken
Routine preventive maintenance	✓
Limit vehicle idling	✓
Implement Code Red day limitations	✓
Reduce fleet size and mileage	✓
Purchase fuel efficient or alternatively fueled vehicles	✓
Replace pre-1994 heavy trucks	✓
Convert to ultra-low sulfur diesel fuel	✓
Replace pre-1997 lawn and garden equipment	✓
Retrofit heavy duty diesel off-road equipment	
Replace older buses with clean bus technology	N/A
Retrofit diesel transit buses	N/A

Source: M-NCPPC

Routine preventive maintenance. M-NCPPC performs preventive maintenance on all vehicles every 5,000 miles or at least once per year. M-NCPPC also has started a program to inflate tires with nitrogen rather than air, which reduces under-inflation of tires, increases mileage, and, in turn, reduces emissions.

Limit vehicle idling. M-NCPPC currently has an informal policy in effect, and will formalize and implement the policy in FY09.

Implement Code Red day limitations. M-NCPPC supports the County limitations on declared "Code Red" days.

Reduce fleet size and mileage. Since FY04, M-NCPPC fleet size and mileage has remained constant despite a growing workforce, work program and parks. M-NCPPC is instituting a vehicle utilization policy to reduce fleet size, and the agency encourages carpooling for attendance at meetings. M-NCPPC also recently hired a consultant to identify efforts to reduce vehicle emissions. The consultant is conducting a study of M-NCPPC's fleet and will recommend areas for improvement to increase mileage efficiency and reduce emissions over the next five years.

Purchase fuel efficient or alternatively fueled vehicles. M-NCPPC does not have any formal procedures in place to review vehicle size. Since FY 2005, M-NCPPC has purchased 22 hybrid vehicles, and plans to continue purchase hybrid vehicles as they become available and as funding permits. The agency is also using biodiesel at the three largest fueling sites, and plans to bring its remaining fueling sites on line for biodiesel fuel this fiscal year.

Replace pre-1994 heavy trucks. M-NCPPC has replaced 29 diesel powered trucks with fuel and emission efficient diesel powered trucks.

Convert to ultra-low sulfur diesel fuel. In January 2007, M-NCPPC converted to ultra-low sulfur diesel.

Replace pre-1997 lawn and garden equipment. M-NCPPC has replaced 56 pieces of lawn and garden equipment. When available, M-NCPPC purchases four-cycle engines for all small engine equipment.

Retrofit heavy duty diesel off-road equipment. While M-NCPPC has not retrofitted any heavy duty off-road equipment, it has replaced 11 pieces of equipment.

5. Montgomery College

In Fiscal Year 2008, Montgomery College had a fleet of 61 vehicles, including one passenger car, 35 light trucks, and 25 heavy trucks. The College also owned about 100 pieces of off-road equipment.

Table 8: Montgomery College Actions Taken on Fleet Emissions Reduction Strategies

Strategy	Action Taken
Routine preventive maintenance	✓
Limit vehicle idling	
Implement Code Red day limitations	✓
Reduce fleet size and mileage	✓
Purchase fuel efficient or alternatively fueled vehicles	✓
Replace pre-1994 heavy trucks	✓
Convert to ultra-low sulfur diesel fuel	✓
Replace pre-1997 lawn and garden equipment	
Retrofit heavy duty diesel off-road equipment	
Replace older buses with clean bus technology	N/A
Retrofit diesel transit buses	N/A

Source: Montgomery College

Routine preventive maintenance. Montgomery College performs regular preventative maintenance on all vehicles and equipment based on operational hours and/or mileage.

Limit vehicle idling. Although the College has not implemented a formal procedure to limit idling, the College reports that staff generally turn off vehicles when they are not in active use.

Implement Code Red day limitations. Montgomery College postpones or reduces gasoline-powered outdoor maintenance work during Code Red days to reduce emissions and protect the health of employees.

Reduce fleet size and mileage. The College maintains a fleet of vehicles to meet the minimum student and operational needs, and improves vehicle efficiency by purchasing "right size" vehicles for its application.

Purchase fuel efficient or alternatively fueled vehicles. Montgomery College does not have any formal procedures in place to review vehicle size. However, the College purchases vehicles sized to meet the minimum operational requirements. For example, all heavy duty 15 passenger vans have been replaced by light duty eight passenger vans. Montgomery College staff state that the College will consider alternatively fueled vehicles for future fleet vehicles when such vehicles can meet operational needs, vehicle pricing is competitive, and alternative fuels are readily available. The College is also reviewing the feasibility and cost-effectiveness of a switch to 10% biodiesel fuel (B10).

Replace pre-1994 heavy trucks. The College has replaced all pre-1994 vehicles.

Convert to ultra-low sulfur diesel fuel. Montgomery College is converting to ultra-low sulfur diesel fuel with the purchase of new vehicles and equipment.

Replace pre-1997 lawn and garden equipment. The College purchased the majority of its lawn and garden equipment before 1997, and plans to replace the equipment when parts are unavailable or the equipment is not repairable due to age. While the majority of the College's equipment is pre-1997, it is not used every day or only during certain seasons. For example, Montgomery College uses chain saws for infrequent pruning or storm damage, and equipment with brushes if it snows.

Montgomery College is replacing two-stroke engine lawn and garden equipment with four-stroke engines as the equipment needs to be replaced.

Retrofit heavy duty diesel off-road equipment. Montgomery College has one heavy duty diesel backhoe, which is not used on a daily basis.

PART E. CHALLENGES TO IMPLEMENTATION

This section summarizes agency feedback on the challenges to implementing the emissions reduction strategies/programs described in Part D. The five County and bi-County agencies cited two common challenges to implementing emissions reduction strategies: operational feasibility and the cost of implementation.

1. Operational Feasibility

Agency staff cited three factors as challenges relate to operational feasibility – operational restrictions, implementation difficulty, and available infrastructure.

Operational restrictions. Fleet managers operate in an environment where cost and performance matter. MCPS staff cite legal/operational restrictions as challenges to reducing emissions. For example, the size of the MCPS school bus fleet is determined by a range of factors including enrollment, the Board of Education's transportation policies, and state/federal requirements. Also, alternative fueling times on Code Red air quality days are difficult for school buses because limiting refueling hours would cause backups at the pumps, route delays, or increases in staff cost to refuel buses during off-hours.

Agency staff also stated that alternative fuel vehicles may not be feasible for operational needs. For example, Montgomery College staff state that alternative fuel, two-wheel drive vehicles do not meet certain operational needs. The College requires vehicles to plow snow, haul heavy loads, and patrol campuses in ice and snow. WSSC staff state that alternative fuel vehicles, such as compressed natural gas (CNG) and electric vehicles, are not practical in heavy work periods during the cold weather months.

Implementation difficulty. The agencies repeated a common theme from OLO Report 2003-4 that user acceptance and changing user behavior is a challenge when trying a new technology. Fleet departments struggle to achieve user acceptance of new technologies and increase customer awareness of the importance of air quality issues. County staff report that it is difficult to hold department staff accountable for reducing miles traveled, reducing fuel usage, or using alternative fuels in vehicles.

County General Services staff report that emissions reduction strategies should be employed in a manner that allows the departments to achieve the environmental benefits while minimizing additional operating costs as much as possible. Staff assert that end users should be included at the implementation stage of new technologies and practices, and that policy changes should contain adequate controls to hold end users accountable for achieving the desired environmental goals targets without compromising operations.

In addition, many strategies to reduce vehicle emissions require the cooperation of the vendor. County General Services staff emphasized the importance of obtaining vendor commitment prior to using new technologies for warranty purposes, and advise departments to prepare for the technical problems that arise when using these technologies/strategies.

Available infrastructure. For emissions reduction strategies to be successful, the necessary infrastructure must be in place. County staff report that alternatively fueled vehicles typically require additional fuel infrastructure to support their operation, and usage is limited by the user agency's proximity to the fueling infrastructure. M-NCPPC staff report that the current County-wide infrastructure for refueling CNG and ethanol vehicles is a challenge because M-NCPPC only has two locations within a convenient driving distance from the Crabbs Branch refueling facility.

2. Cost of Implementation

Agency staff cited the cost of implementation as a challenge to implementing emissions reduction strategies, as many strategies rely on expensive or emerging technologies.

Alternatively fueled vehicles, including hybrid vehicles, are typically more expensive than their traditionally fueled counterparts, and replacement funding for new vehicles and equipment is limited. MCPS staff estimate that the cost of hybrid buses is approximately $200,000 each, which staff report is significantly more expensive than a traditional bus. MCPS staff also report that emissions reduction technology, such as new tanks and engines, often comes out last in the school bus industry, requiring a longer wait to implement the technology.

Montgomery College staff state that fiscal constraints limit the ability of the agency to replace well-maintained vehicles based only on emissions requirements. The College has replaced vehicles and equipment with more efficient vehicles when the replacement is more cost effective than repairs. This natural attrition results in lowers emission and incorporates the latest technologies.

M-NCPPC staff state that additional funding is required to accelerate the replacement of older diesel vehicles. In addition, WSSC staff state that additional technical and staffing resources are necessary to provide the requested level of emissions monitoring and reporting.

PART F. NEXT STEP

The implementation of the Council-endorsed recommendations by the five County and bi-County agencies meets the Council's goals of identifying and implementing strategies to reduce fleet emissions.

OLO recommends the Council forward this memorandum report to the Sustainability Working Group. Among other things, the Council charged the Sustainability Working Group with completing a climate protection plan, compiling an inventory of the County's fleet, and developing a strategy to improve the County fleet's fuel economy standards. This report summarizes agency fleet emissions reduction activities since 2003, measurable results, and challenges to implementing fleet emissions reduction strategies.