

National Capital Region Transportation Planning Board

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Memorandum

September 23, 2008
Revised October 15, 2008

To: Travel Management Subcommittee

From: Daivamani Sivasailam
Principal Transportation Engineer

Subject: Transit Buses and Greenhouse Gas (GHG) Emissions, Costs and Cost-Effectiveness

Introduction

At the May 2008 MWAQC Technical Advisory Committee (TAC) meeting there was an agenda item called "Potential for Clean Buses", by Edgar Gonzalez of Montgomery County, who discussed the County's analysis comparing clean diesel and hybrid diesel-electric buses and their decision to buy a combination of the two. Mr. Sebastian Silvani, a consultant for WMATA, on the same agenda item spoke about the different technologies represented in the WMATA bus fleet. The committee requested DTP staff to look into the cost-effectiveness of the various technologies in reducing Greenhouse Gases and consider convening a special meeting of interested parties if necessary.

Staff has obtained the spread sheet prepared by Montgomery County (Attachment A) and emission rates from different WMATA buses provided by Sebastian Silvani (Attachment B).

Montgomery County Experience

As shown in Attachment A, the Montgomery County spread sheet has cost information, followed by emissions estimation and finally cost-effectiveness. Upon review of the spread sheet staff noticed some areas that needed clarification from the analyst. The per mile CO₂ emissions rate from a 2002 bus is lower than the CO₂ emissions rate of either the 2007 clean diesel bus or hybrid diesel-electric bus. The explanation for the higher fuel efficiency for these buses is that the older buses referenced are smaller in size than the 2007 buses which has since been confirmed by Montgomery County staff.

WMATA Experience

WMATA tested a sample of their buses using West Virginia University's heavy duty emissions test facility (mobile) and obtained emissions rates for various technologies based on the WMATA drive cycle. These results are shown in Attachment B.

Analysis

The following Table 1 was prepared by DTP staff using the annual miles driven, fuel economy in miles per gallon, cost of fuel, and cost of maintenance from Montgomery County, and using the WMATA provided emissions rate of CO₂ for hybrid electric buses, new diesel buses, and compressed natural gas (CNG) buses. Staff prepared CO₂ emissions, and cost-effectiveness. As shown in Table 1, hybrid diesel-electric buses produce the lowest CO₂ emissions, followed by CNG and diesel. For cost-effectiveness CNG buses are the most cost-effective followed by diesel, and finally hybrid diesel-electric buses. It should be noted that the CNG costs did not include capital cost of a CNG refueling facility since Montgomery County has existing facilities.

Attachments

Table 1

DTP Staff Analysis of Hybrid Diesel-Electric Buses, CNG and Diesel								
Draft (8/23/08)								
	Existing Diesel		Diesel		Hybrids		CNG	
	Data	Annualized	Data	Annualized	Data	Annualized	Data	Annualized
Procurement Cost (12 year life span)	0		\$323,000	\$26,917	\$497,000	\$41,417	\$383,000	\$31,917
Annual Miles driven per Bus (Montgomery County)		38,340		38,340		38,340		38,340
Miles per Gallon	2.9		2.9		4.0		2.9	
Gallons Used per Year		13,221		13,221		9,585		13,221
Cost for Fuel	\$3.60	\$47,594	\$3.60	\$47,594	\$3.60	\$34,506	\$2.30	\$30,408
Miles between Rear Brake Jobs	20,000		20,000		80,000		20,000	
Brake Jobs per Year	1.92		1.92		0.48			1.92
Cost of Brake Job	\$1,400	\$2,684	\$1,400	\$2,684	\$2,000	\$958	\$1,400	\$2,684
Cost of Replacing Battery Pack	0	0	0	0	\$50,000	\$4,167		0
Summary Cost of both Acquisition and Maintenance		\$50,278		\$77,195		\$81,048		\$65,008
Incremental cost compared to existing operation				\$26,917		\$30,770		\$14,730
CO2 Annual Emissions in tons (using WMATA rates)		149.14		105.74		85.12		92.98
Cost-effectiveness of CO2 (\$'s/ton)				\$255		\$362		\$158

Note:

*Cost and operational information provided by Montgomery County
 CNG Cost numbers based on the Maryland ATV project
 CNG analysis assumes refuelling stations are existing
 Existing Diesel Cost includes only operating
 cost*

Attachment A

Montgomery County Bus Analysis

Siva,

As requested, here is the analysis performed by our staff on the cost comparison between Hybrid and Clean Diesel buses. The spreadsheet also has estimates for the cost effectiveness of reducing CO2 emissions for our specific fleet.

Edgar

Analysis of Hybrid Buses vs. Diesel

	<u>Hybrids</u>	<u>Diesel</u>	<u>Difference</u>
Procurement Cost	\$ 497,000	\$ 323,000	
Annualized - 12 years	\$ 41,417	\$ 26,917	\$14,500
Est Miles per Year per Bus	38,340	38,340	
Miles per Gallon	4.0	2.9	
Gallons Used per Year	9,585	13,221	
Est Cost/Gallon (based on FY 09 budgeted cost per gallon)	\$ 3.60	\$ 3.60	
Cost for Fuel per year	\$ 34,506	\$ 47,594	\$ (13,088)
Miles between Rear Brake Jobs	80,000	20,000	
Brake Jobs per Year	0.48	1.92	
Cost of Brake Job	\$ 2,000	\$ 1,400	
	\$	\$	\$
Cost per Year for Brake Jobs	958	2,684	(1,725)
Cost of Replacing Battery Pack	\$ 50,000		
Annualized - 12 years	\$ 4,167	\$	\$ 4,167
Summary of Annual Cost of both Acquisition and Maintenance	\$ 81,048	\$ 77,195	\$ 3,853
Savings per year in fuel and maintenance			\$ 10,647
Savings over 12 year life			\$ 127,764

Analysis of Pollutant Impacts of FY 08 Supplemental & 09 CE Recommendation versus Hybrids

	(NOx + PM) Grams/Mile	Avg Miles/Bus	Pollution per Year Grams Per Bus	Pollution per Year Tons/Year
1995/96 Diesels	23.80	38,340	912,486	1.0
2002 Diesels	18.50	38,340	709,285	0.8
New Clean Diesel	5.65	38,340	216,620	0.2
New Hybrid	3.90	38,340	149,525	0.2

	<u>NOx + PM</u>		
	<u>CE REC</u>	<u>Hybrids (same \$'s)</u>	<u>T&E REC</u>
*Old Diesels being replaced	(67.6)	(42.1)	(67.6)
Clean Diesels (81)	17.5	-	8.4
Hybrids (53)	-	7.9	-
Hybrids (81)	-	-	5.8
Total Tons per Year	(50.1)	(34.1)	(53.3)

**Cost	\$ 25,339,000	\$ 25,339,000	\$ 27,142,195
Cost per ton of pollution reduction	\$ 506,112	\$ 742,258	\$ 508,924
Difference in Cost from CE REC to purchase all Hybrids			\$ 1,803,195
Difference in Pollution Reduction from CE REC to all Hybrids			(3.3)
**Acquisition Cost per Ton to Reduce Pollution from CE REC to all Hybrids			\$ (552,019)

CE REC (FY 08 & 09) - purchase 81 clean diesels to replace 81 model year 1995-96 diesel buses

All Hybrids - requires add'l \$13,908,000 to CE REC to purchase 81 hybrid buses to replace old diesel

buses

* Assumes 81 old diesels replaced in CE REC and All Hybrids, but only 53 if all hybrids with no add'l \$'s

** Assumes costs as follows:

		<u>FY 08</u>		<u>FY 09</u>
40' Diesel (incl farebox in FY 08)	\$	327,000	\$	323,000
30' Diesel	\$	295,000		N/A
40' Hybrid (incl farebox in FY 08)	\$	501,000	\$	497,000
30' Hybrid	\$	463,000		N/A

** 5.4 tons reduced at an additional cost of \$13,908,000 = \$2,559,130 per ton

Analysis of Pollutant Impacts of FY 08 Supplemental & 09 CE Recommendation versus Hybrids

Per Bus	Gallons of Diesel/Year	CO ₂ Tons/Year	CO ₂ Pounds/Mile
-			
95/96 Diesels	12,368	138.4	7.2
2002 Diesels	6,285	70.3	3.7
Clean Diesels	13,221	148.0	7.7
Hybrids	9,585	107.3	5.6

	<u>CO₂</u>		
	<u>CE REC</u>	<u>Hybrids (same \$'s)</u>	<u>T&E REC</u>
*Old Diesels being replaced	(9,101.6)	(5,225.9)	(9,101.6)
Clean Diesels (81)	11,985.2	-	6,214.5
Hybrids (53)		5,685.6	-
Hybrids (81)			4,183.7
Total Tons per Year	2,883.6	459.7	1,296.6

Cost (CE REC vs T&E REC)	\$	1,803,195
Change in Tons of CO ₂		1,586.9
Cost per Ton	\$	1,136.28

Attachment B

WMATA Bus Emission Rates

Siva,

As discussed, below is a sample of the CO2 emission data gathered by WVU on WMATA buses. Unless otherwise noted, the results are averages of 2 or more 40 ft. transit buses under the WMATA drive cycle we discussed. Please remember that although the average data is probably sufficient for most analyses, I do have individual results if required.

Bus Model, Engine Model, CO2 (g/mi)

2000 Orion V, DDC S50, 3529 g/mi

1996 Orion V, 2002 DDC S50, 3343 g/mi (repowered bus)

2006 New Flyer, Cummins ISL-Allison Hybrid, 2014 g/mi

2006 New Flyer, Cummins ISM EGR, 2502 g/mi

2005 Orion VII, Cummins CG CNG, 2286 g/mi

2005 Orion VII, John Deere 6081 CNG, 2089 g/mi

If you need any clarification of the data, please let me know.

Sebastian

DTP Work Program Elements for CO₂ Analysis

Draft

10/21/08

Task 1: (Details shown as Attachment A)

- Redo CO₂ emissions inventory for years 2002, 2005, 2010, 2012, 2020, and 2030.
 - 2008 CLRP conformity analysis network and land use will be used for the new emissions inventory.
 - 2005 and 2012 travel demand will be developed using an interpolation technique and the 2002 and 2009 travel demand network will be used for developing 2005; 2010 and 2020 travel demand network for 2012.
 - E.H. Pechan interface along with Mobile 6.2 will be used for estimating CO₂ inventories and factor them to obtain Green House Gas equivalents.
 - Final numbers will be published for 2005, 2010, 2012, 2020, and 2030.

Due date: December 2008.

Task 2:

- CO₂ Reduction strategy development
 - Staff will review the TPB Scenario Study and the Climate Change Committee report recommended CO₂ reduction strategies and assign specifics to them so they could be analyzed under the following three broad categories:
 - A. Fuel efficiency (CAFÉ, CALLEVII)
 - B. Fuel Carbon Intensity (alternative fuels, ethanol)
 - C. Travel Efficiency
 - i. VMT reduction (Smart growth/land use) -sketch planning
 - ii. Travel/VMT reduction (TDM strategies)
 - iii. Operational efficiency (TSM, Signal, Incident Management)

The re-specified strategies will be reviewed and finalized in consultation with the Travel Management Subcommittee during their October 21, 2008 meeting.

D. Analyze CO₂ Reduction Strategies

- a. The re-specified strategies will be analyzed using appropriate tools and the results will be reviewed by the Travel Management Subcommittee before they are finalized and presented to the policy committees.

Due date: June 2009

Task 3:

Scenario analysis

- a. Network development and travel demand modeling of two scenarios
- b. Emissions from the above

Due date: June 2009

ATTACHMENT A

DETAILS OF TASK 1

- I. Travel Demand** – use of travel demand data from air quality conformity assessment of 2008 CLRP and FY2009 TIP (scheduled for adoption on November 19, 2008)
- II. Emissions Factors** – use of Mobile6.2-generated CO₂ emissions rates (reflects 25 mpg CAFÉ standards)
 - a. CO₂
 - b. Total GHG
- III. Initial Inventories**
 - a. Prepare plan assessment years: 2002, 2010, 2020, 2030
 - b. Additional ‘Climate Change’ years:
 1. Network-based: 2005
 2. Interpolation-based: 2012
- IV. Official Baseline Inventories:** CAFÉ standard of 35 mpg by 2020: 2012 through 2030
 - a. Use ‘initial’ inventories as pivot
 - b. Apply consultant spreadsheet approach to develop reduction factors for LDVs and LDTs
 - c. Apply reduction factors to yield baseline numbers for each forecast year
- V. Documentation**
 - a. Summarize technical methods in a report
 - b. Present to committees

**ANALYSIS OF GREENHOUSE GAS REDUCTION STRATEGIES
MOBILE SOURCE MEASURES IN MWCOC CLIMATE CHANGE
REPORT**

**DRAFT
OCTOBER 20, 2008**

**PREPARED FOR DISCUSSION AT THE TRAVEL MANAGEMENT
SUBCOMMITTEE**

OCTOBER 21, 2008

NATIONAL CAPITAL REGION TRANSPORTATION PLANNING BOARD

This document lists the “recommendations for reducing greenhouse gas emissions from transportation and land use” from the *National Capital Region Climate Change Report* which was prepared by the Climate Change Steering Committee for the Metropolitan Washington Council of Governments Board of Directors. The purpose of this document is to begin laying a framework to quantitatively evaluate greenhouse gas reductions from the measures in this report. The description for each of the recommendations comes from the report. The analysis approach and assumptions were prepared by TPB staff. The measure number and name refers to Table 8.III in the climate change report. Changes have been made to some of the titles and the former title from the table is noted. The measures have been divided into three groups. Group A are the measures that will be analyzed by staff and they are: 1-5, 7-11, 17-18, and 20-22. Group B are measures which are goals rather than measures and will not be analyzed and they are: 6, 12-16, and 19. Group C are measures will be analyzed either under the scenario analysis or belong to land use design and outside the scope of this committee and the measures are: 23-28

GROUP A

Climate Change Measure #1 –Promote Adoption of Clean Vehicles, Including CAL LEV II

Description

This work activity will involve evaluating options for promoting use of clean vehicles. The work task will build upon TPB's FY 2009 CO2 mobile source emissions inventory work program. Evaluate the greenhouse gas reduction impacts for options that would increase fleet fuel economy.

- I. Evaluate the impact of possible changes to corporate average fuel economy (CAFÉ) standards including
 - a. different miles per gallon (mpg) and phasing assumptions
 - b. extension of CAFÉ to cover heavy trucks (19% of mobile CO2 emissions in the region are from heavy-duty trucks). Currently CAFÉ only covers vehicles up to 10,000 lbs.
- II. Assess hybrid vehicles/trends
- III. Evaluate the impact of CAL LEVII

Analysis Approach

- Any analysis will use the 2008 CLRP and Round 7.1 land use
- Baseline analysis will include 35 mpg CAFÉ by 2020 (on the books)
- Use TPB consultant spreadsheet to evaluate different fleet fuel economy goals (including CAL LEV II) through 2020
- For years beyond 2020, TPB consultant spreadsheet will need to be updated
- The impact of hybrid vehicles in the fleet can be estimated through off-line calculations using 2005 and 2008 registration data

Assumptions

- What is the target mpg standard or range of standards to analyze for the CAFÉ extension e.g., 45, 50 and 55 mpg?
- What would be the CAFÉ target for heavy trucks? (e.g. increasing for the HDDV8B from 5 mpg to 7 mpg which is a 40% increase)
- What should be considered in the cost calculations? (e.g., incremental cost to consumer, savings to the consumer due to reduced fuel usage)

Impact

Travel

Emissions

Annual CO₂ emissions benefit, revised inventories and reductions from 2005, and reductions from 'Business as Usual' in 2020 and 2030 would be calculated.

Costs

Cost-Effectiveness

Climate Change Measure #2 – Provide Incentives for Early Vehicle Retirement

Description

Evaluate the impact of implementing a “Cash-for-Clunkers” program to remove older, higher emitting passenger vehicles (both cars and light-duty trucks such as SUVs) from the roads

Analysis Approach

- Baseline analysis will include 35 mpg CAFÉ by 2020
- Use off-line analysis to calculate emissions reductions which result from the program implementation

Assumptions

- What is the minimum vehicle age and maximum fuel economy for eligibility?
- Should only vehicles that are driven a minimum number of miles each year (e.g. 10,000 miles) be eligible?
- What should the minimum fuel economy requirement for the new vehicle (35 mpg or 45 mpg) purchased be or what should the minimum fuel economy improvement between the old vehicle and new vehicle be (10mpg or 15 mpg)?
- What would the financial incentives be?
- How many vehicles would be eligible each year?
- How many years would the program last?

Impact

Travel

Emissions

Annual CO₂ emissions benefit in 2020 and 2030 and cumulative reductions would be calculated using spread sheet calculators

Costs

Cost of the incentive program, additional capital cost to the consumer, savings to reduced fuel use to the consumer.

Cost-Effectiveness

Climate Change Measure #3 – Green Fleet Policy

Description

Evaluate the impact of establishing a regional green fleet policy with measurable goals and time tables

Analysis Approach

- Determine which fleets are subject to state and/or local regulation and determine what percentage of the vehicle fleet they comprise.
- Survey public and private fleets (such as transit, taxicabs, rental cars, and refuse haulers) for total number in fleet, current age distribution of fleet, and current vehicle replacement policies and schedules
- Research “green fleet” policies in other areas
- Use offline analysis to calculate emissions benefits for specific region-wide “green fleet” conversion percentages for comparison to the baseline

Assumptions

- Determine definition of “green fleet”
 - o Measured by average vehicle age?
 - o Measured by average fleet fuel economy?
 - o Measured by percentage of fleet comprised of hybrids, etc?
- What are the emission reduction goals?
- What timetables would be established?

Impact

Travel

Emissions

Annual CO₂ emissions benefit in 2020 and 2030 and cumulative reductions would be calculated using spread sheet calculators

Costs

Cost of the incentive program, additional capital cost to the consumer, savings to reduced fuel use to the consumer.

Cost-Effectiveness

Climate Change Measure #4 – Traffic Engineering and Roadway Improvements

Description

Identify and promote best practices for traffic engineering improvements and roadway management to reduce VMT, congestion and greenhouse gases

Identify locations of significant recurrent congestion, and prioritize investments to reduce congestion

Implement the Metropolitan Area Transportation Operations Coordination Program (improve coordination among traffic agencies for data sharing, incident management)

Analysis Approach

- Research “Traffic Engineering improvements that had a positive impact on greenhouse gas emissions” in other areas
- Cite the benefits of existing TERMS
- Discuss with local DOTs any existing plans for improvements
- Extrapolate TERMS/local programs to the entire region, i.e. review the TERM tracking sheet for local programs that could be applicable throughout the region

Assumptions

- Are there already intersections/areas that local DOTs are already targeting for traffic engineering improvements (such as signal retiming or round-a-bouts) which could be a starting point for analysis?
- Are before/after studies for completed traffic engineering improvement studies available for study?

Impact

Travel

Emissions

Annual CO₂ emissions benefit in 2020 and 2030 and cumulative reductions would be calculated using spread sheet calculators

Costs

Possibly capital investment for traffic engineering improvements

Cost-Effectiveness

Climate Change Measure #5 – Anti-Idling Initiatives: Rules and Enforcement

Description

Increase enforcement of existing idling regulations to prevent extended vehicle idling

Analysis Approach

- Survey the existing rules for each jurisdiction; enforcement practices; recommendations
- Use spreadsheet analysis to calculate the average CO₂ emission rate while idling and the incremental reductions resulting from increased enforcement

Assumptions

- Which vehicle fleets should be studied?
- How many vehicles which are subjected to this rule are in the region on an average day? Is this a year-round measure or peak season?
- What percentage of these vehicles is currently exceeding the idling time limit and by how much?
- How much would enforcement be increased (person hours and/or area)?
- What is the fine assessed for violating idling regulations?

Impact

Travel

Emissions

Annual CO₂ emissions benefit in 2020 and 2030 and cumulative reductions would be calculated using spread sheet calculators

Costs

Cost of person-hours for increased enforcement (both patrolling and administrative)

Cost-Effectiveness

Climate Change Measure #7 – Shift Short Vehicle Trips to Non-motorized Modes
(formerly: VMT Reduction: Shift Short Trips)

Description

Identify the percentage of auto trips 3, 2, 1, and 0.5 miles and develop a strategy to shift half of these trips to bike, pedestrian, or transit modes and evaluate the benefits

Analysis Approach

- Use household travel survey to identify the number and purpose of short auto trips in the region
- Use a spreadsheet calculation to estimate the CO₂ emissions benefit if half of the trips are shifted away from auto mode

Assumptions

- The assumptions for this measure would be a discussion topic for the subcommittee

Impact

Travel

Emissions

Annual CO₂ emissions benefit in 2020 and 2030 and cumulative reductions would be calculated using spread sheet calculators

Costs

Cost-Effectiveness

Climate Change Measure #8 – Pricing to Reduce Vehicle Travel (*formerly : VMT Reduction: Financial Incentives*)

Description

Evaluate the potential greenhouse gas reduction benefits and costs of using financial incentives (e.g., pay as you travel insurance or congestion pricing) to reduce VMT

Analysis Approach

- Conduct a literature review on financial incentives such as a VMT-based car tax or VMT-based insurance
- Use the travel demand model elasticity values to study congestion pricing strategies such as cordon/area pricing, high occupancy toll lanes, and/or variable priced lanes

Assumptions

Impact

Travel

Emissions

Annual CO₂ emissions benefit in 2020 and 2030 and cumulative reductions would be calculated using spread sheet calculators

Costs

Cost-Effectiveness

Climate Change Measure #9 – Car Sharing *(formerly: VMT Reduction: Car Sharing)*

Description

Promote car sharing

Analysis Approach

- Conduct a literature review of existing car sharing programs
- Review results of the “Commuter Connections Carshare Survey 2008”
- Identify specific target locations in MD/VA/DC and analyze impact
-

Assumptions

Impact

Travel

Emissions

Annual CO₂ emissions benefit in 2020 and 2030 and cumulative reductions would be calculated using spread sheet calculators

Costs

Cost-Effectiveness

Climate Change Measure #10 – Parking Policies (formerly: *VMT Reduction: Parking Policies*)

Description

Examine parking policies and their relation to VMT, and implement new parking policies to reduce VMT

Analysis Approach

- Complete a literature review of parking policies which reduce vehicle travel
- Study on-street parking strategies which reduce the time drivers spend searching for a space
- Use the travel demand model to study the effect of increased parking costs of VMT

Assumptions

Impact

Travel

Annual CO₂ emissions benefit in 2020 and 2030 and cumulative reductions would be calculated using spread sheet calculators

Emissions

Costs

Cost-Effectiveness

Climate Change Measure #11 – Financial and Other Incentives to Reduce Vehicle Travel (formerly: *Financial and Other Incentives*)

Description

Strengthen financial and other incentives (e.g., tax rebates, higher parking costs, and transit benefits) to encourage residents to drive less

Analysis Approach

- Study financial incentives for carpools
- Study expansion of the Metrocheck program above the participation reported in the *2005 State of the Commute* report
- Study the impact of preferential and/or subsidized parking currently in the region and possible increase

Assumptions

Impact

Travel

Annual CO₂ emissions benefit in 2020 and 2030 and cumulative reductions would be calculated using spread sheet calculators

Emissions

Costs

Cost-Effectiveness

Climate Change Measure #17 – Alternative Modes: Promote Increased Transit Use

Description

- Examine options to promote the increased use of existing transit capacity
- Evaluate funding requirements for transit incentives and an expanded Metrocheck program

Analysis Approach

- This will no longer be a stand-alone measure
- The expanded Metrocheck program will be studied under Measure #11.
- Options to promote increased transit use are incorporated into Measure #15

Climate Change Measure #18 – Expand Commuter Connections Program *(formerly: Targets for Shifting Modes)*

Description

Building on the accomplishments of the Commuter Connections Program, develop specific targets for shifting modes from single-occupancy vehicles to transit, walking, and bicycling for commuting and non-commuting trips.

Analysis Approach

Review TERM evaluation reports

Assumptions

- Determine which existing programs could be expanded
- Discuss opportunities for new programs with the Commuter Connections Program Director
- Develop reasonable goals and target non-commuting trips since most of the existing programs are targeted at commute trips and have reached maturity.

Impact

Travel

Annual CO₂ emissions benefit in 2020 and 2030 and cumulative reductions would be calculated using spread sheet calculators

Emissions

Costs

Cost-Effectiveness

Climate Change Measure #20 – Expand Travel Management Plan for New Developments *(formerly: Travel Management Plan for New Developments)*

Description

Encourage new commercial construction to include a “travel management plan”

Analysis Approach

- Review literature and local experience with travel management plans offered for big developments and their impacts.
- Qualitatively study the effects of amenities such as sidewalks, crosswalks, bike racks and lockers, areas for bus pull-offs and shelters, shower facilities in office buildings, and good pedestrian access

Assumptions

Impact

Travel

Emissions

Costs

Cost-Effectiveness

Climate Change Measure #21 – Equalize Transit and Parking Benefits

Description

Promote the equalization of transit and parking benefits. Advocate for federal income tax benefits for transit use that equal or exceed the benefits for employer provides/subsidized parking.

Analysis Approach

- This is similar to TERM M7 – parking cash-out

Assumptions

Impact

Travel

Annual CO₂ emissions benefit in 2020 and 2030 and cumulative reductions would be calculated using spread sheet calculators

Emissions

Costs

Cost-Effectiveness

Climate Change Measure #22 – Alternative Modes: Bicycle/Pedestrian Programs

Description

Fully fund the construction of bicycle/pedestrian paths in the region, as outlined in the regional bicycle/pedestrian plan

Analysis Approach

- Estimate reduction in trips reduced if the regional bicycle plan is completed

Assumptions

- Use analysis method similar to the one currently used to evaluate bicycle TERMS

Impact

Travel

Emissions

Annual CO₂ emissions benefit in 2012, 2020 and 2030 would be calculated using spread sheet calculators

Costs

Cost-Effectiveness

GROUP B

The following transportation-related recommendations were listed in the *National Capital Region Climate Report*. These recommendations will not be analyzed because they are goals, rather than measures. Some of these goals are currently being studied as part of a “what would it take?” scenario analysis.

Climate Change Measure #6 – VMT Reduction: Goals

Description

Collaborate with the Transportation Planning Board (TPB) to develop VMT reduction goals for 2012 and 2020 and associated options for meeting those goals

Climate Change Measure #12 – Develop Conformity Process for GHGs

Description

Evaluate how a regional process modeled after the current regional conformity process for air quality planning might be adapted to address greenhouse gas emissions

Climate Change Measure #13 – Stated Goal of GHG Reduction in Transportation Planning

Description

Make greenhouse gas reduction a stated goal of regional transportation planning activities, including the newly launched multi-task stakeholder Greater Washington 2050 Initiative, poised to generate additional growth scenarios, a growth compact, and quality growth strategies

Climate Change Measure #14 – Direct development to TODs

Description

- Evaluate the benefits from achieving a range of possible goals (up to 95%) for directing new residential and commercial growth to designated regional activity centers, including growth around transit as well as mixed-use higher-density development
- Encourage local governments to evaluate opportunities to provide incentives (including zoning changes) to encourage mixed-use development, including workforce housing at transit stations and hubs to reduce sprawl and VMT
- Encourage localities to revisit current land-use plans, in light of current shifts in the real estate market, coupled with high energy costs
- Establish TOD as the region’s preferred growth strategy

Climate Change Measure #15 – Expanded Transit Infrastructure and Use

Description

With WMATA, MARC, VRE, and the local transit operators, evaluate the greenhouse gas reduction benefits of specific incremental expansion of transit capacity and commuter rail service

Climate Change Measure #16 – Alternative Modes: Exclusive Transit Use

Description

Evaluate the greenhouse gas reduction benefits of expanding existing and establishing new bus transit routes, lanes, on-ramps, corridors, and intercity high-speed rail

Climate Change Measure #19 – Alternative Modes: Enhance Access

Description

Expand existing and fund new programs to enhance access to transit and alternative modes, commuter connections, guaranteed ride home, telework programs, bike/pedestrian access, and park/ride lots.

GROUP C

The following recommendations are listed in the Climate Report under “land use planning” and will not be studied as part of this analysis.

Climate Change Measure #23 – Land Use Planning – Tree Canopy Preservation

Description

Preserve the region’s tree canopy

- Establish a goal and develop a program and plan to achieve “no net loss” in the region’s tree canopy. Evaluate the associated benefits and costs
- Consider associated issues related to density and height requirements for buildings

Climate Change Measure #24 – Land Use Planning – Promote Location and Design of New Development Around Regional Activity Centers

Description

Carefully plan the location and design of new, infill, and redevelopment projects

Climate Change Measure #25 – Land Use Planning – Promote Walkable Communities and Affordable Housing Near Transit

Description

Promote regional policies that support walkable communities and affordable housing near transit, and that protect green infrastructure

Climate Change Measure #26 – Evaluate LEED-ND Standards

Description

Evaluate the US Building Council’s Leadership in Energy and Environmental Design – Neighborhood Development (LEED-ND) standards for its utility in guiding new development

Climate Change Measure #27 – Comprehensive Planning: Best Practices

Description

Identify best practices enabling local governments to include greenhouse gas reduction and energy efficiency/conservation as elements in their local comprehensive planning

Climate Change Measure #28 – Comprehensive Planning: Environment Review

Description

In cooperation with COG’s Planning Directors Committee and local government environmental and energy planners, convene a working group to devise a consistent, standardized methodology for evaluating the greenhouse gas emissions from proposed individual development projects.