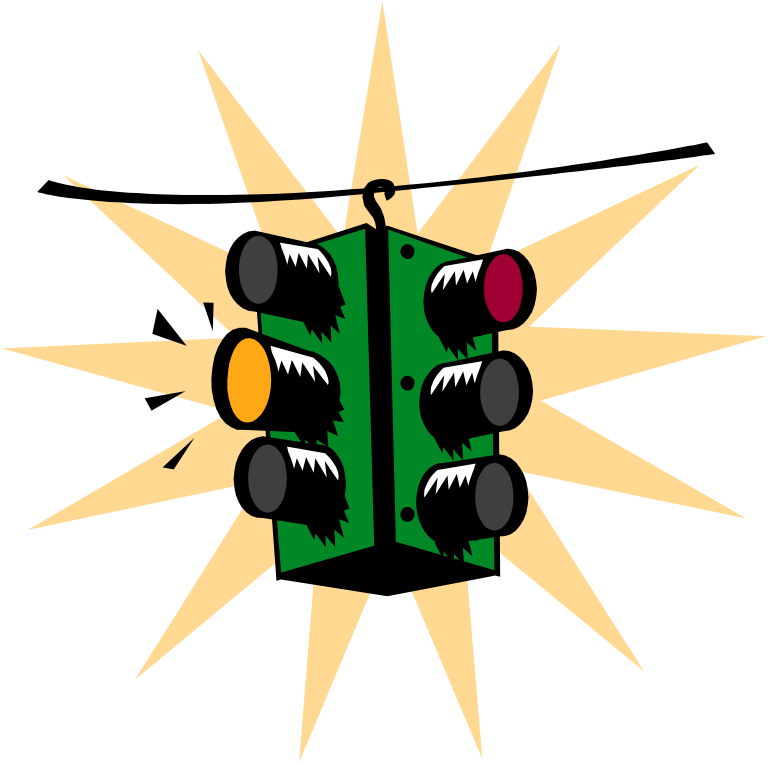

Congestion Mitigation and Air Quality Program
2003 Annual Report

November 8, 2004

Executive Summary

Background

The purpose of the federal Congestion Mitigation and Air Quality Improvement (CMAQ) Program is to fund transportation projects that assist non-attainment and maintenance areas in meeting the National Ambient Air Quality Standards (NAAQS) established by the Clean Air Act (CAA). The focus for CMAQ funding is for projects that reduce ozone, carbon monoxide (CO) or particulate matter – 10 microns or less (PM-10).

CMAQ projects are typically strategies that reduce pollutants emitted by motor vehicles. The funds primarily support construction, Intelligent Transportation Systems, travel demand management, transit, and PM-10 projects that reduce transportation related emissions. However, the funds may not be used to construct additional single occupant vehicle (SOV) capacity.

Consistent with resolution TC-807, CMAQ funds are allocated to the three eligible urban areas: Denver Regional Council of Governments (DRCOG), Pikes Peak Area Council of Governments (PPACG), North Front Range (NFR) Metropolitan Planning Organization (MPO) and the five eligible rural areas: Aspen / Pitkin County, Canon City, Pagosa Springs, Steamboat Springs / Routt County, and Telluride / Mountain Village.

2003 Projects and Benefits

Statewide, FY2003 CMAQ funds were obligated primarily for transit purposes (58%), transportation demand management programs (16%), ITS/Signalization (16%), as well as, PM-10 reduction programs such as street paving, alternative deicers, and sweepers (8%).

At first glance, emissions reductions appear to be less than they were in 2002, but the lower numbers in 2003 are more the result of different reporting methods than true reductions in the benefits from the program. The apparent decline in CO and PM-10 emission reductions stem largely from changes in the methodology used to calculate benefits. In earlier years, benefits from previously funded projects were often grouped with current year projects.

In 2003, the following methodology is being used:

- New projects are reported with a one-year benefit and a long-term benefit. The one-year benefit is required by and reported to FHWA. In future years, the long-term benefit will be used to calculate benefit/cost ratio at the state level.
- Benefits from current projects received in future years will be noted as residual benefits in the years that they are received. These future benefits will be presented in the annual report for the year in which they occur, but will not count toward the emission reductions for the year in the FHWA report.

This methodology will lower the emission reduction values reported annually, but will provide additional clarity about when the benefits are received and allow Colorado's annual CMAQ report to be more consistent with those of other states. It will also allow benefit/cost ratio to be calculated for various CMAQ projects and allow for comparison between projects.

After a few years of collecting data through the CMAQ Reporter, there will be an ability to examine trends over time and make recommendations regarding program allocations. However, at this time there are no specific suggestions for fine-tuning of the CMAQ Program.

Projects

The following table lists projects funded with CMAQ dollars in 2003. The column on the left shows the amount programmed and the anticipated emission reduction.

Non-Attainment / Maintenance Area	Projects Funded
Colorado Springs (PPACG) 4.8M VMT 8.5M hours 3,633k kg CO	City of Colorado Springs - Springs Transit City of Colorado Springs - ITS/Signals City of Colorado Springs - Ridefinders
Denver (DRCOG) 26.3M VMT 3.3M hours 3,544k kg CO 34k kg NOx 170k kg VOC 735k kg PM-10	Boulder Intermodal Center* DRCOG PM-10 Mitigation* Regional Air Quality Council Union Station* Transportation Demand Management Cherry Creek Bikestation City of Boulder DRCOG Commuter Services (RideArrangers) DRCOG Vanpool Flatiron Improvement District SEBP Senior Mobility Options Stapleton New Resident Program US36 TMO Regional Traffic Signal System Improvement*
Fort Collins (NFR) 6.5M VMT 178k kg CO	Advanced Traffic Management System^ Fort Collins Construction* SmartTrips
Five Rural Areas 299k kg PM-10	Canon City – Paving Aspen - Bike Trail* Routt County – Paving Steamboat Springs – Sweeping Pagosa Springs – Paving Mountain Village – Sweeping Telluride – Deicing

* Denotes multi year projects

Background

The purpose of the Congestion Mitigation and Air Quality Improvement Program (CMAQ) is to reduce vehicle related pollution that plays a major role in the deterioration of air quality in urban areas. The Federal Clean Air Act sets National Ambient Air Quality Standards (NAAQS) for pollutants. Transportation sources are significant for three of the NAAQS pollutants that include carbon monoxide (CO), ozone, and particulate matter – 10 microns or less (PM-10).

Congress established the CMAQ program in ISTEA and continued it in TEA-21 to provide extra funding to help reduce CO, ozone, and PM-10 in areas designated as non-attainment and maintenance under the Clean Air Act. In Colorado, the non-attainment / maintenance areas are the Denver, Fort Collins, and Colorado Springs urban areas, as well as, five rural areas: Aspen / Pitkin County, Canon City, Pagosa Springs, Steamboat Springs / Routt County, and Telluride / Mountain Village. The Transportation Commission has delegated project selection to the local level.

CMAQ Projects are typically strategies that reduce pollutants emitted by motor vehicles. The funds primarily support new facilities, equipment, and services that reduce transportation related emissions.

Following is summary of CMAQ project categories and activities (a complete list is found in Appendix C):

- **Construction** – HOV Lanes, Park and Rides, Bike Paths
- **ITS / Signals** – Intelligent Transportation Systems, Traffic Signal Coordination
- **TDM and Shared Ride** – Travel Demand Management, Carpools, Marketing
- **Transit** – New, Expanded, or Express Transit Service
- **PM-10** – Paving (unpaved roads), Sweeping, Deicing

In 2000, the Colorado Transportation Commission expressed concern about the effectiveness of the CMAQ program in improving air quality and adopted a resolution (TC-807) to increase accountability for the CMAQ funds. In 2002, as part of the CMAQ 2001 Annual Report, the MPOs made recommendations for improving the CMAQ benefit reporting system. Following is a summary of those recommendations and how the group is responding to them:

CDOT, MPOs, and Feds establish goals for the program and work together to determine most effective way to calculate project benefits

- We are working together on calculating a cost effectiveness measure that will account for long-term benefits of capital improvements and construction projects.

CDOT and MPOs should develop standards for monitoring project effectiveness during multi-year implementation

- The CMAQ Reporter is being refined to account of long-term benefits over a number of years.

Continue policy for formula distribution of CMAQ funds and clearly explain available funds

- Commission has continued to following existing formula of 50 percent VMT and 50 percent population, after a $1 million of-the-top allocation to the five CMAQ eligible rural areas.

Continue to allow each MPO to establish its own selection criteria and selection process

- Commission has continued to follow existing policy for MPOs with CDOT input to select projects while emphasizing the need for the most efficient use of the CMAQ funds.

The CMAQ Reporter tracks measurable emission reduction results and allows CMAQ recipients to use standardized formulas to calculate emission reductions and report obligated funds. As a result of the above recommendations the CMAQ reporter has been refined to provide reporting consistency. We are continuing development of the Reporter to include a measure of cost effectiveness. Future annual reports will contain a cost effectiveness measure and provide the Commission with a new perspective on the success of various CMAQ projects.

Funding

In 2003, $25 million was available for the CMAQ program statewide. According to resolution TC-807, the funds are shared between the MPOs based on a formula of 50 percent vehicle miles traveled (VMT) and 50 percent population, with an off-the-top $1 million split among the five rural areas.

As shown in Figure 1, 76 percent or $18.2 million was allocated to Denver Regional Council of Governments (DRCOG), 18 percent or $4.3 million and 5 percent or $1.2M were allocated to Pikes Peak Area Council of Governments (PPACG) and North Front Range (NFR) MPO respectively. Rural areas, Aspen/Pitkin County, Canon City, Pagosa Springs, Steamboat Springs/Routt County, and Telluride/Mountain Village, each received a $200,000 allocation.

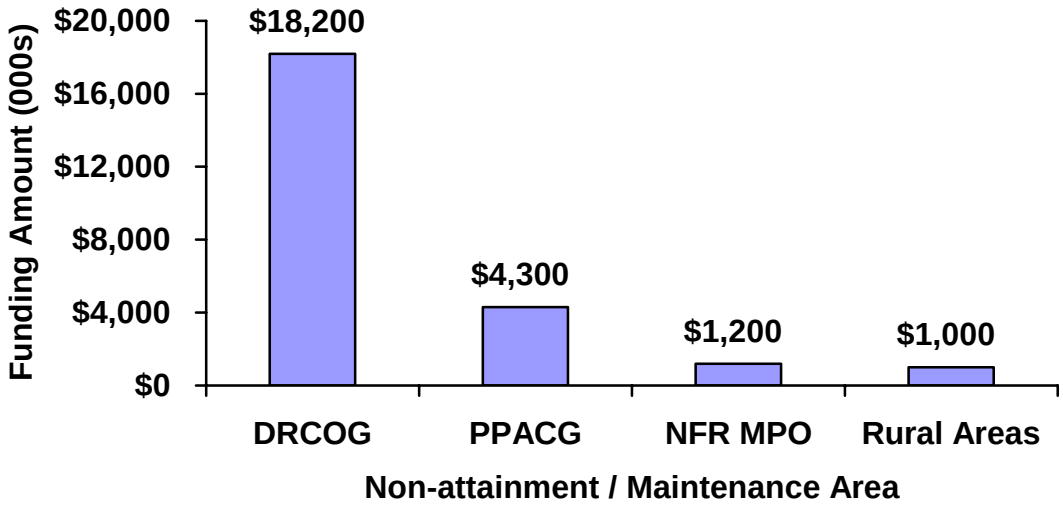

Figure 1 – FY 2003 Allocated Funds by Non-attainment / Maintenance Area

Overall, 58 percent of the available funds were spent on transit improvements. The Intelligent Transportation System (ITS) and signal projects were programmed at 16 percent and Transportation Demand Management (TDM) was programmed at 16 percent. The PM-10 and construction projects received 8 percent and 2 percent respectively.

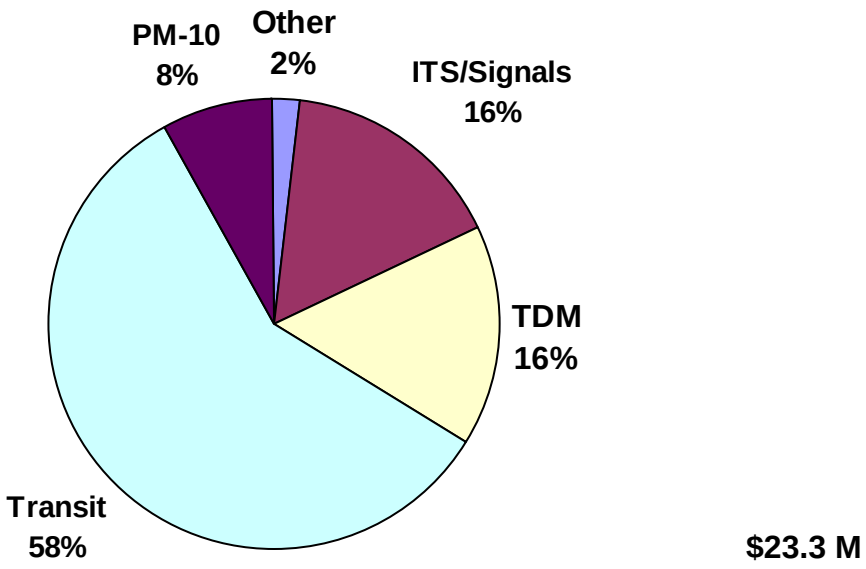

Figure 2 – FY 2003 Obligated Funds by Improvement Type

The following sections detail how each area distributed the available CMAQ funds according to obligations during fiscal year 2003. Figure 2 shows the statewide funds obligated by project type. Figures 3 through 5 further illustrate how the MPOs and rural areas obligated their 2003 CMAQ funds.

Metropolitan Area Projects

In 2003, DRCOG used 71 percent of the available CMAQ funds on transit, 9 percent on Intelligent Transportation System and signal projects, and 13 percent on Transportation Demand Management (including shared ride projects). The remaining funds were used on PM-10 projects such as purchasing sweepers and Ozone reducing projects.

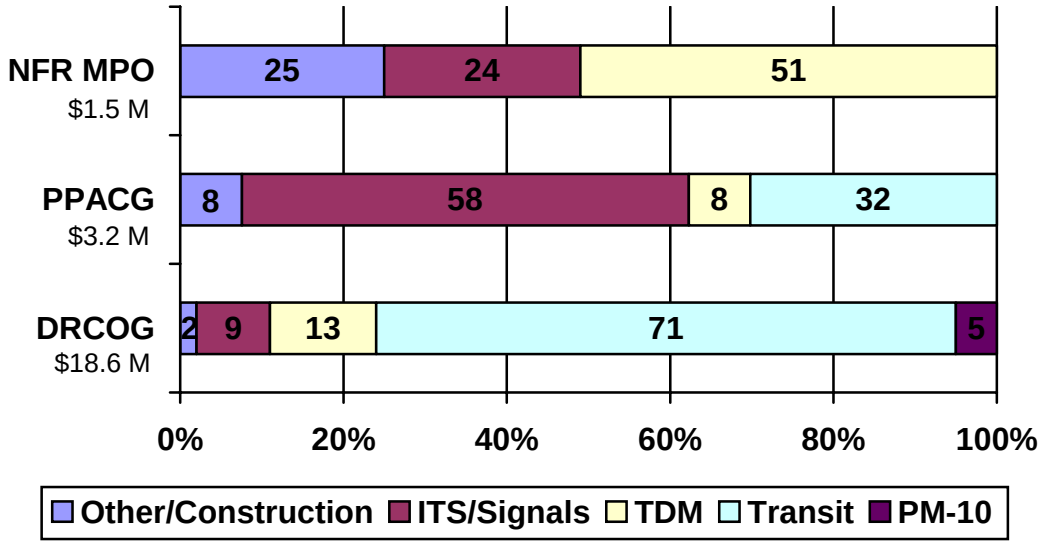

Figure 3 – FY 2003 Obligated Amount – DRCOG, PPACG, and NFR MPO

In 2003, PPACG distributed 58 percent of the available CMAQ funds for Intelligent Transportation System and signal projects, 32 percent toward transit, and the small remainder on construction and Transportation Demand Management projects.

In 2003, the NFR MPO used 51 percent of the available funds toward Transportation Demand Management. Twenty five percent was distributed to construction projects and 24 percent went toward ITS/signals.

Rural Area Projects

CMAQ eligible rural areas can spend money on various PM-10 reduction projects. These include deicing (purchase of a truck, tank, and liquid), sweeping, and paving. In 2003, rural areas used CMAQ funds to pave soft surface roads, sweep paved roads, purchase deicer, and construct a bike path.

Accomplishments

Only one violation of the air quality standard Ozone was reported in 2003. That violation was in the Denver area for Ozone. No violations of the CO or PM-10 standards occurred in 2003. The tables on page 9 list emission levels as compared with Federal standards for the eight air quality non-attainment / maintenance areas across the state.

The following pollutants are the focus of the emission reduction in the CMAQ program:

- **CO / Carbon Monoxide** – caused by incomplete fuel combustion in motor vehicles and is an issue in winter
- **NOx / Nitrogen Oxides** – contributes to ozone formation in summer and PM-10 in winter
- **VOC / Volatile Organic Compounds** –caused by fuel leakage; contributes to ozone formation in summer
- **PM-10 / Particulate Matter (10 microns or more)** – road dust; contributes to visibility problems in winter

The following table illustrates which areas across the state are in air quality non-attainment / maintenance for specific pollutants. The values in the table represent the emission budget in tons per day. An emission budget is set so that emissions will not cause an exceedance of Federal air quality standards. The Denver area has been designated non-attainment / maintenance for CO, Ozone, and PM-10. In the five rural areas PM-10 is the pollutant of primary concern. The Fort Collins and Colorado Springs areas have been designated non-attainment / maintenance for CO.

Current Emission Budgets for CMAQ Eligible Areas

Non-attainment / Maintenance Area	**CO**	**NOx > PM-10**	**NOx > Ozone**	**VOC**	**PM-10**
Season	Winter	Winter	Summer	Summer	Winter
Units	Tons/day kg/day*	Tons/day kg/day*	Tons/day kg/day*	Tons/day kg/day*	Tons/day kg/day*
Aspen/Pitkin County	-n/a-	-n/a-	-n/a-	-n/a-	8 7,300
Canon City	-n/a-	-n/a-	-n/a-	-n/a-	4 3,600
Colorado Springs (PPACG)	270 240,400	-n/a-	-n/a-	-n/a-	-n/a-
Denver (DRCOG)	800 725,800	101 91,600	134 121,600	119 108,000	51 46,200
Fort Collins (NFR)	99 89,800	-n/a-	-n/a-	-n/a-	-n/a-

Pagosa Springs	-n/a-	-n/a-	-n/a-	-n/a-	4 3,600
Steamboat Springs / Routt County	-n/a-	-n/a-	-n/a-	-n/a-	11 10,000
Telluride / Mountain Village	-n/a-	-n/a-	-n/a-	-n/a-	5 4,500

* Tons / day is the official units used from emission budgets. kg / day has been calculated and rounded for comparison with other figures in this document.

2003 Emission Reduction for CMAQ Eligible Areas

The following table list the annual emission reductions provided by projects obligated during 2003.

Denver Region – DRCOG

Program – Projects (s)	**VMT/VHT Reduction (mi)**	**CO Reduction (kg/year)**	**NOx Reduction (kg/year)**	**VOC Reduction (kg/year)**	**PM-10 Reduction (kg/year)**
Transit Service, Ozone Reduction, and Dust Mitigation					
Boulder Intermodal Center*	2,073,462	49,494	2,696	3,711	62
DRCOG PM-10 Mitigation*	n/a	n/a	n/a	n/a	611,746
Regional Air Quality Council	n/a	1,115,873	n/a	123,558	123,266
Union Station*	2,621,600	62,578	3,408	4,693	79
Transportation Demand Management					
Cherry Creek Bikestation	270,566	6,458	351	485	8
City of Boulder	1,807,026	43,134	2,349	3,235	54
DRCOG Commuter Services (RideArrangers)	16,069,265	383,573	20,889	28,764	483
DRCOG Vanpool	373,123	8,906	485	668	11
Flatiron Improvement District	997,851	23,819	1,297	1,786	30
SEBP	268,981	6,421	350	481	8
Senior Mobility Options	86,849	2,074	113	156	3
Stapleton New Resident Program	983,477	23,476	1,279	1,760	30
US36 TMO	784,214	18,719	1,019	1,404	24
Traffic Signals					
Regional Traffic Signal System Improvement*	3,362,334 hours	1,799,659	n/a	n/a	n/a
DRCOG TOTAL	**26.3M VMT 3.3M hours**	**3,544,184**	**34,236**	**170,701**	**735,804**

* Denotes project with multi-year benefit, however, only the first year benefit is included in the table above.

Fort Collins – NFR MPO

Program – Projects (s)	VMT/VHT Reduction (mi)	CO Reduction (kg/year)
Advanced Traffic Management System*	40,643 hours	16,664
Fort Collins Construction*	1,561,140	42,619
SmartTrips	5,006,382	135,748
NFR MPO TOTAL	**6,567,522 VMT 40,643 hours**	**195,031**

Colorado Springs – PPACG

Program – Projects (s)	VMT/VHT Reduction (mi)	CO Reduction (kg/year)
City of Colorado Springs - Springs Transit	600,874	16,404
City of Colorado Springs - ITS/Signals	8,540,626 hours	3,501,657
City of Colorado Springs - Ridefinders	4,214,673	115,060
PPACG TOTAL	**4,815,547 VMT 8,540,626 hours**	**3,633,121**

Canon City – Region 2
Aspen/Pitkin County, Routt County/Steamboat Springs – Region 3
Pagosa Springs, Telluride/Mountain Village – Region 5

Region	Program - Project(s)	VMT Reduction (mi)	PM-10 Reduction (kg/year)
2	Canon City – Paving	n/a	10,332
3	Aspen - Bike Trail*	2,400	3,286
3	Routt County – Paving	n/a	252,996
3	Steamboat Springs – Sweeping	n/a	31,004
5	Pagosa Springs – Paving^	n/a	86,866
5	Mountain Village – Sweeping	n/a	1,390
5	Telluride – Deicing#	n/a	9

* Denotes project with multi-year benefit, however, only the first year benefit is included in the table above.
^ Benefits not reported to date, however, an estimate is provided where available.
# This benefit is the remainder from the 2002 project, however, it is reported here because the final $3,000 for the project was obligated in 2003.

CO Emissions in Non-attainment / Maintenance Areas

In Colorado, there are three CMAQ eligible non-attainment / maintenance areas for CO. They are Denver, Colorado Springs, and Fort Collins. All three areas have met both 1-hour and 8-hour Federal standards for CO emissions during the past five years.

	1999		**2000**		**2001**		**2002**		**2003**	
	1hr	**8hr**	**1hr**	**8hr**	**1hr**	**8hr**	**1hr**	**8hr**	**1hr**	**8hr**
Standard	**35**	**9**	**35**	**9**	**35**	**9**	**35**	**9**	**35**	**9**
Colorado Springs	12.6	5.2	9.5	4.2	9.3	4.4	9.8	5.2	6.7	3.8
Denver	12.1	5.2	12.8	5.4	9.3	4.1	7.4	3.7	14.9	4.5
Fort Collins	8.4	5.1	7.5	3.8	6.8	3	5.5	2.9	8.1	2.3

PM-10 Concentration in Non-attainment / Maintenance Areas

The six PM-10 non-attainment / maintenance areas in Colorado have met both the 99th percentile and annual mean standards during the past five years. In the rural areas, paving has been the primary method of PM-10 reduction. Other projects have included purchasing sweepers and deicing trucks and equipment. In the Denver non-attainment / maintenance area, sweepers have been the primary method to reduce PM-10.

	1999		**2000**		**2001**		**2002**		**2003**	
	99th	**M**	**99th**	**M**	**99th**	**M**	**99th**	**M**	**99th**	**M**
Standard	**150**	**50**	**150**	**50**	**150**	**50**	**150**	**50**	**150**	**50**
Aspen Pitkin County	69	30	66	22	66	23	90	34	50	21
Canon City	64	15	133	17	40	15	42	17	30	16
Denver	72	32	85	37	97	40	88	38	111	37
Pagosa Springs	73	28	73	28	121	34	61	24	70	27
Steamboat Spgs Routt County	94	26	89	25	74	23	79	25	89	26
Telluride Mountain Village	65	23	59	22	52	18	58	22	74	25

Ozone Levels in Non-attainment / Maintenance Areas

Denver is the only Ozone non-attainment / maintenance area in Colorado. The federal standards were met 1999 through 2002. However, one violation of the 8-hour standard occurred in 2003. DRCOG is pursuing projects, such as High-emitter Vehicle Screening and Vehicle Fleet Replacement sponsored by the Regional Air Quality Council and the purchase of Denver Union Station which will provide a central hub for transit lines, which will reduce Ozone levels.

	1999		**2000**		**2001**		**2002**		**2003**	
	1hr	**8hr**	**1hr**	**8hr**	**1hr**	**8hr**	**1hr**	**8hr**	**1hr**	**8hr**
Standard	**.12**	**.08**	**.12**	**.08**	**.12**	**.08**	**.12**	**.08**	**.12**	**.08**
Denver	.088	.068	.086	.071	.091	.072	.092	.073	.096	***.085***

Note: In areas where there are multiple air quality monitors, the maximum value is shown. These values were extracted from the EPA website (http://www.epa.gov/air/data/) November 2003.

Appendix A - Federal Code

23 USC 149 – CMAQ Program

Sec. 149. - Congestion mitigation and air quality improvement program

(a) Establishment. -
The Secretary shall establish and implement a congestion mitigation and air quality improvement program in accordance with this section.

(b) Eligible Projects. -
Except as provided in subsection (c), a State may obligate funds apportioned to it under section 104(b)(2) for the congestion mitigation and air quality improvement program only for a transportation project or program if the project or program is for an area in the State that is or was designated as a nonattainment area for ozone, carbon monoxide, or particulate matter under section 107(d) of the Clean Air Act (42 U.S.C. 7407(d)) and classified pursuant to section 181(a), 186(a), 188(a), or 188(b) of the Clean Air Act (42 U.S.C. 7511(a), 7512(a), 7513(a), or 7513(b)) or is or was designated as a nonattainment area under such section 107(d) after December 31, 1997, and -

(1)

(A) if the Secretary, after consultation with the Administrator of the Environmental Protection Agency, determines, on the basis of information published by the Environmental Protection Agency pursuant to section 108(f)(1)(A) of the Clean Air Act (other than clause (xvi) of such section), that the project or program is likely to contribute to -

(i) the attainment of a national ambient air quality standard; or

(ii) the maintenance of a national ambient air quality standard in a maintenance area; or

(B) in any case in which such information is not available, if the Secretary, after such consultation, determines that the project or program is part of a program, method, or strategy described in such section;

(2) if the project or program is included in a State implementation plan that has been approved pursuant to the Clean Air Act and the project will have air quality benefits;
(3) the Secretary, after consultation with the Administrator of the Environmental Protection Agency, determines that the project or program is likely to contribute to the attainment of a national ambient air quality standard, whether through reductions in vehicle miles traveled, fuel consumption, or through other factors;
(4) to establish or operate a traffic monitoring, management, and control facility or program if the Secretary, after consultation with the Administrator of the Environmental Protection Agency, determines that the facility or program is likely to contribute to the attainment of a national ambient air quality standard; or
(5) if the program or project improves traffic flow, including projects to improve signalization, construct high occupancy vehicle lanes, improve intersections, and implement intelligent transportation system strategies and such other projects that are eligible for assistance under this section on the day before the date of enactment of this paragraph.

No funds may be provided under this section for a project which will result in the construction of new capacity available to single occupant vehicles unless the project consists of a high occupancy vehicle facility available to single occupant vehicles only at other than peak travel times. In areas of a State which are nonattainment for ozone or carbon monoxide, or both, and for PM-10 resulting from transportation activities, the State may obligate such funds for any project or program under paragraph (1) or (2)

without regard to any limitation of the Department of Transportation relating to the type of ambient air quality standard such project or program addresses.

(c) States Receiving Minimum Apportionment. -

(1) States without a nonattainment area. -

If a State does not have, and never has had, a nonattainment area designated under the Clean Air Act (42 U.S.C. 7401 et seq.), the State may use funds apportioned to the State under section 104(b)(2) for any project eligible under the surface transportation program under section 133.

(2) States with a nonattainment area. -

If a State has a nonattainment area or maintenance area and receives funds under section 104(b)(2)(D) above the amount of funds that the State would have received based on its nonattainment and maintenance area population under subparagraphs (B) and (C) of section 104(b)(2), the State may use that portion of the funds not based on its nonattainment and maintenance area population under subparagraphs (B) and (C) of section 104(b)(2) for any project in the State eligible under section 133.

(d) Applicability of Planning Requirements. -

Programming and expenditure of funds for projects under this section shall be consistent with the requirements of sections 134 and 135 of this title.

(e) Partnerships With Nongovernmental Entities. -

(1) In general. -

Notwithstanding any other provision of this title and in accordance with this subsection, a metropolitan planning organization, State transportation department, or other project sponsor may enter into an agreement with any public, private, or nonprofit entity to cooperatively implement any project carried out under this section.

(2) Forms of participation by entities. -

Participation by an entity under paragraph (1) may consist of -

(A) ownership or operation of any land, facility, vehicle, or other physical asset associated with the project;

(B) cost sharing of any project expense;

(C) carrying out of administration, construction management, project management, project operation, or any other management or operational duty associated with the project; and

(D) any other form of participation approved by the Secretary.

(3) Allocation to entities. -

A State may allocate funds apportioned under section 104(b)(2) to an entity described in paragraph (1).

(4) Alternative fuel projects. -

In the case of a project that will provide for the use of alternative fuels by privately owned vehicles or vehicle fleets, activities eligible for funding under this subsection -

(A) may include the costs of vehicle refueling infrastructure, including infrastructure that would support the development, production, and use of emerging technologies that reduce emissions of air pollutants from motor vehicles, and other capital investments associated with the project;

(B) shall include only the incremental cost of an alternative fueled vehicle, as compared to a conventionally fueled vehicle, that would otherwise be borne by a private party; and

(C) shall apply other governmental financial purchase contributions in the calculation of net incremental cost.

(5) Prohibition on federal participation with respect to required activities. -

A Federal participation payment under this subsection may not be made to an entity to fund an obligation imposed under the Clean Air Act (42 U.S.C. 7401 et seq.) or any other Federal law.

Appendix B - Commission Resolution

TC-807

WHEREAS, the Congestion Mitigation and Air Quality (CMAQ) improvement program was developed under the Intermodal Surface Transportation Efficiency Act (ISTEA) and has been continued with the Transportation Equity Act for the 21st Century (TEA-21); and

WHEREAS, the purpose of the CMAQ program is to provide a flexible funding source for spending on transportation projects and programs that help to meet the Clean Air Act requirements and that help to reduce transportation-related emissions for state and local governments; and

WHEREAS, funding is available for both non-attainment areas (areas not in compliance with the National Ambient Air Quality Standards) and maintenance areas (areas that were formerly in non-compliance and are now in compliance); and

WHEREAS, current resource allocation forecasts indicate that Colorado can expect to receive $145,875,000 in CMAQ funds between Fiscal Year (FY) 2001–2006; and

WHEREAS, federal regulations state how the money can be spent; and

WHEREAS, CMAQ money is allocated to the state of Colorado to be distributed within the state among the eligible areas as determined by the State in consultation with non-attainment areas, local governments, MPOs and the state; and

WHEREAS, in the past, CMAQ money has been allocated to the carbon monoxide non-attainment area MPOs based on 50 percent Vehicle-Miles Traveled (VMT) and 50 percent population; and

WHEREAS, based upon TEA-21 provisions that allow CMAQ money to be used in PM-10 non-attainment areas, last year the Commission allocated a total of $2 million over 3 years (FY 1998-2000) to the five rural PM-10 non-attainment areas; and

WHEREAS, CDOT's budget is now required by the Joint Budget Committee of the General Assembly to include performance measures describing the results of CDOT's various programs and projects; and

WHEREAS, CMAQ funds have not yet been allocated beyond FY 2000.

NOW THEREFORE BE IT RESOLVED, the Commission has determined that for the remainder of TEA-21 (FY 2001 – 2003):

A total of $1,000,000 per year of CMAQ funds be allocated among the five rural PM-10 non-attainment areas;

the remaining balance of CMAQ funds will be allocated to the three non-attainment MPOs based on the 50% VMT and 50% population as follows:

DRCOG	76.31%
PPACG	18.13%
NFRT&ACPC	5.56%

project selection for CMAQ funds will be at the local level: in the non-attainment MPOs, projects, including eligible CDOT and transit agency projects, will be selected by the MPOs cooperatively

with CDOT and the public transit agencies; and, in the rural non-attainment areas, projects will be selected by local governments cooperatively with their respective CDOT Regions.

CMAQ fund recipients will report annually in writing to the Commission on the effectiveness of the CMAQ fund expenditures.

CDOT will continue developing performance measures as part of its on-going resource allocation and budget requirements, including measures related to the CMAQ program, seeking input from external stakeholders.

If performance measurement of the CMAQ program indicates concerns regarding the effectiveness of the use of CMAQ funds, the Commission reserves the option for reviewing and altering the allocation formula.

FURTHER, for the period 2004 through 2020, the above formula can be used for planning purposes but is not a budget allocation.

Appendix C - Reporter Overview

Congestion Mitigation and Air Quality (CMAQ) Program

The purpose of the federal CMAQ program is to fund transportation projects that assist non-attainment and maintenance areas in meeting the National Ambient Air Quality Standards (NAAQS) established by the Clean Air Act (CAA). The focus for CMAQ funding is for areas designated as non-attainment or maintenance for ozone, carbon monoxide or PM-10. Funding is available for improvements to the transportation system that will have a tangible emission reduction.

What projects are eligible for CMAQ funding?

CMAQ Projects are typically strategies to lessen the pollutants emitted by motor vehicles. The funds are intended primarily for new facilities, equipment and services aimed at generating new sources of emission reductions. Operating funds that support these projects are generally limited to a three-year period. Projects categorized as maintenance, rehabilitation, and highway capacity improvements for single occupant vehicles (SOVs) are not eligible because they will not result in emission reductions. Following is a list from the Federal Highway Administration (FHWA) of projects eligible for CMAQ funding.

1. Transportation Activities in an approved State Implementation Plan (SIP)
2. Transportation Control Measures (TCMs)
3. Extremely Low-Temperate Cold Start Programs
4. Public-Private Partnerships
5. Alternative Fuels
6. Traffic Flow Improvements
7. Transit Projects
8. Bicycle and Pedestrian Facilities
9. Travel Demand Management
10. Outreach and Rideshare Activities
11. Telecommuting
12. Fare/Fee Subsidy Programs
13. Intermodal Freight
14. Planning and Project Development Activities
15. Inspection / Maintenance (I/M)
16. Magnetic Levitation Transportation Technology Deployment Programs
17. Experimental Pilot Programs

(Excerpt from Federal Register, February 23, 2000, pg. 9047 – 9051)

What is the CMAQ Reporter?

The CMAQ Reporter is a web-based tool developed by the Colorado Department of Transportation and CMAQ recipients to meet the Federal Highway Administration (FHWA) and Colorado Transportation Commission reporting requirements. CDOT is required to report to FHWA annually on the amount of CMAQ funds obligated and the amount of emissions reduced through the implementation of CMAQ funded projects.

The CMAQ Reporter tracks measurable emission reduction results, on a consistent basis, for most Colorado CMAQ fund recipients. The Reporter allows most CMAQ recipients to use standardized formulas to calculate emission reductions and report obligated project funds. Using the CMAQ Reporter, information will be provided to FHWA and the Transportation Commission. The next phase of the CMAQ Reporter will focus on developing an accurate picture of long-term air quality benefits and cost effectiveness. All CMAQ recipients will have the opportunity to make

suggestions on how project life benefits should be calculated in the CMAQ Reporter. Long term benefits and cost effectiveness will not be reported until this phase of the CMAQ Reporter is completed.

What are the reporting requirements for CMAQ projects?

Project data is reported annually at the end of the calendar year. In October, CDOT supplies usernames, passwords, and other necessary information to CMAQ fund recipients. The MPOs and local sponsors report on their CMAQ projects on an annual basis in November and December. In turn, CDOT reports the CMAQ emission reduction results to FHWA at the end of January. Results are presented to the Transportation Commission as requested.

How does the CMAQ Reporter calculate emission reduction?

The Reporter calculates emissions for three types of projects: VMT Reduction, PM-10 / Road Dust Reduction, and Inspection/Maintenance. Projects that reduce VMT calculate emission reduction by applying a reduction factor to the VMT. Benefits for other types of projects such as ITS and Signal Timing are calculated manually by the project sponsor and entered directly into the Reporter.

VMT Reduction

Annual VMT Reduction (AVMTR)	X	Emission Factor CO, NOx, VOC, PM-10	=	Emission Reduction CO, NOx, VOC, PM-10

Projects that reduce VMT include: carpool matching, vanpool matching, schoolpool matching, new or expanded transit service, construction of bike and ped facilities, construction of transit stations, HOV facilities, telecommuting/telework, bike share, and bike to work day.

PM-10 Road Dust Reduction

Projects that reduce PM-10 Road Dust include: paving, broom sweeping, deicing, vacuum sweeping, and reduced sanding. VMT is multiplied by various factors to determine the PM-10 reduction.

ITS and Traffic Control

ITS and Traffic Control projects reduce vehicle hours traveled (VHT) rather than VMT. Because of the complex calculations associated with these projects, the fund recipient calculates the emission reduction for each project manually. The amount of CO reduction is entered directly into the Reporter.

Inspection/Maintenance

Inspection and Maintenance projects reduce emissions by requiring improvements to high-emitter vehicles. . For other projects such as fuel tank cap replacement and maintenance technician training, the fund recipient calculates the emission reduction for each project manually.

How is the CMAQ Reporter Accessed?

The Reporter is available at http://denver.c-b.com/CMAQ/. When asked from a username and password enter “view” for both fields. Specific user logins and passwords will distributed as necessary for reporting.

Who should you contact if you have a question?

For questions about the CMAQ Reporter, contact CDOT Project Manager, Shawn McDowell by phone at 303-757-9063 or email at shawn.mcdowell@dot.state.co.us.

Appendix D - Reporter Formulas

Phase II Formulas extracted on August 19, 2003

Paving

PM10 Emissions Reduction (kg) = AVMT * (EFi - EFi*(1-RF))

Variable	Default	Units	Description
AVMT	-	miles	Total annual vehicles miles of travel affected by the project for the year
EFi	0.606	kg/VMT	Emissions Factor before Paving
RF	0.9818	unitless	Percent Reduction in Emissions entered as a decimal (This value should not be changed)
WF	0.5443	unitless	Weight factor (This value should not be changed)

Broom Sweeping (ADT > 5000)

PM10 Emissions Reduction (kg) = AVMT * (EFi - EFf)

Where:

Ei = Initial Emissions Factor = k*(SLi/2)^0.65*WF

Ef = Final Emissions Factor = k*(SLf/2)^0.65*WF

SLf = Final Silt Loading Factor = ((SLi-0.5)*(1-RF/100))+0.5

Variable	Default	Units	Description
AVMT	-	miles	Total annual vehicles miles of travel affected by the project for the year
k	0.0073	kg/VMT	Particle size range base emission factor (This value should not be changed)
SLi	-	kg/m2	Initial Silt Loading Factor entered by the administrator
RF	0.32	unitless	Percent Reduction in Emissions entered as a decimal (This value should not be changed)
WF	0.5443	unitless	Weight factor (This value should not be changed)

Broom Sweeping (ADT < 5000)

PM10 Emissions Reduction (kg) = AVMT * (EFi - EFf)

Where:

Ei = Initial Emissions Factor = k*(SLi/2)^0.65*WF

Ef = Final Emissions Factor = k*(SLf/2)^0.65*WF

SLf = Final Silt Loading Factor = ((SLi-3.0)*(1-RF/100))+3.0

Variable	Default	Units	Description
AVMT	-	miles	Total annual vehicles miles of travel affected by the project for the year
k	0.0073	kg/VMT	Particle size range base emission factor (This value should not be changed)
SLi	-	kg/m2	Initial Silt Loading Factor entered by the administrator
RF	0.32	unitless	Percent Reduction in Emissions entered as a decimal (This value should not be changed)
WF	0.5443	unitless	Weight factor (This value should not be changed)

Deicing (ADT > 5000)

PM10 Emissions Reduction (kg) = AVMT * (EFi - EFf)

Where:
Ei = Initial Emissions Factor = k*(SLi/2^)0.65*WF
Ef = Final Emissions Factor = k*(SLf/2)^0.65*WF
SLf = Final Silt Loading Factor = ((SLi-0.5)*(1-RF/100))+0.5

Variable	Default	Units	Description
AVMT	-	miles	Total annual vehicles miles of travel affected by the project for the year
k	0.0073	kg/VMT	Particle size range base emission factor (This value should not be changed)
SLi	-	kg/m2	Initial Silt Loading Factor entered by the administrator
RF	0.2	unitless	Percent Reduction in Emissions entered as a decimal (This value can vary between .20 and .90)
WF	0.5443	unitless	Weight factor (This value should not be changed)

Deicing (ADT < 5000)

PM10 Emissions Reduction (kg) = AVMT * (EFi - EFf)
Where:
Ei = Initial Emissions Factor = k*(SLi/2)^0.65*WF
Ef = Final Emissions Factor = k*(SLf/2)^0.65*WF
SLf = Final Silt Loading Factor = ((SLi-3.0)*(1-RF/100))+3.0

Variable	Default	Units	Description
AVMT	-	miles	Total annual vehicles miles of travel affected by the project for the year
k	0.0073	kg/VMT	Particle size range base emission factor (This value should not be changed)
SLi	-	kg/m2	Initial Silt Loading Factor entered by the administrator
RF	0.2	unitless	Percent Reduction in Emissions entered as a decimal (This value can vary between .20 and .90)
WF	0.5443	unitless	Weight factor (This value should not be changed)

Vacuum Sweeping

PM10 Emissions Reduction (kg) = AVMT * (EFi - EFf)
Where:
Ei = Initial Emissions Factor = k*(SLi/2)^0.65*WF
Ef = Final Emissions Factor = k*(SLf/2)^0.65*WF
SLf = Final Silt Loading Factor = SLi*(1-RF/100)

Variable	Default	Units	Description
AVMT	-	miles	Total annual vehicles miles of travel affected by the project for the year
k	0.0073	kg/VMT	Particle size range base emission factor (This value should not be changed)
SLi	-	kg/m2	Initial Silt Loading Factor entered by the administrator
RF	0.34	unitless	Percent Reduction in Emissions entered as a decimal (This value should not be changed)
WF	0.5443	unitless	Weight factor (This value should not be changed)

Reduced Sanding or Sweeping

PM10 Emissions Reduction (kg) = EF * 907 * APN * RF * 240
Where:

907 is the conversion factor from tons to kilograms
240 is the number of days in the PM10 season. Multiplying by this factor will provide a yearly reduction.

Variable	Default	Units	Description
EF	102.1	tons/day	Uncontrolled emissions factor for the region
APN	-	unitless	Agency's percent of the reported sanding network for all reporting agency's. If you don't know this value, ask RAQC
RF	-	unitless	Percent of PM10 emissions reduced from the baseline level (1989). If this value is not known, it can be calculated by the following equation:

RF = (1-(0.36*(1-(SRC* % Swept)) + (0.64(1-% Sand Reduction)^0.8*(1-(SRC*% Swept))))
where:

0.36 is dust faction of emissions and 0.64 is sand plus residual sand fraction of emissions

SRC = Sweeping equipment emissions reduction credit; currently recommended as 0.37 for Mechanical and Combination equipment or 0.61 or Vacuum and Regenerative Air equipment.

% Swept = % of Network Swept in 4 days, [as reported in section E of the annual Street Sand Use Report].

% Sand Reduction = ((Baseline Rate - Material Application Rate)/Baseline Rate) * 100

Baseline Rate (lbs/lane mile) = (Sand applied in tons * 2000)/Miles driven in 1989 for each entity. If Baseline is not know, contact the RAQC or APCD.

Material Application Rate (lbs./lane mile) = (Material applied, as corrected total in tons * 2000) / Miles Driven

Material Applied, as corrected in tons (Solids Only) = Sand/Salt and Ice Slicer shall be recorded as actual tons applied. Realite shall be multiplied by a factor of 1.1. All the above totals of solid material in tons shall be summed for the corrected total. Can be found in Section B of annual Street Sand Use Report

Miles Driven if do not know, can be found Section D of Annual Street Sand Use Report

The power of 0.8 is the EPA factor used to calculate emissions reduction credit from the reduction of applied sand.

240 is the number of days in the PM10 season, multiplying by this factor will provide a yearly reduction.

Carpool Matching

AVMTR = (N + Nt-1 + 0.75 * Nt-2) * P * (1/AVO) * ((S-1)/S) * (F/W) * Nt * Nd * D

Variable	Default	Units	Description
N		people	The average number of carpool commuters at any given time during the year.
Nt-1		applications	Number of carpool matching applications processed in the

			previous year (i.e. 2001 if N = 2002)
Nt-2		applications	Number of carpool matching applications processed in the year prior to the previous year (i.e. 2000). The final portion of the equation is then multiplied by 0.75 to account for months 24 - 33 of carpool operation.
P	0.16	unitless	Ongoing placement rate. The proportion (expressed as a decimal) of matching applicants placed in carpools.
AVO	1.08	people	Average vehicle occupancy for work trips.
S	2.74	people	Average carpool size (including the driver).
F		days	Average number of days per week that carpool is used instead of driving alone.
W	5	days	Number of workdays in a week.
D	19.5	miles	Average one-way trip distance.
Nd	240	days	Number of benefit days per year.
Nt	2	trips	Number of one-ways trips per day.

Vanpool Matching

AVMTR = N * (1/AVO) * ((S-1)/S) * (F/W) * Nt * Nd * D

Variable	Default	Units	Description
N	-	people	The average number of vanpool commuters at any given time during the year.
AVO	1.08	people	Average vehicle occupancy for work trips.
S	-	people	Average vanpool size (including the driver).
F	-	days	Average number of days per week that vanpool is used instead of driving alone.
W	5	days	Number of workdays in a week.
Nt	2	trips	Number of one-ways trips per day.
Nd	240	days	Number of benefit days per year.
D	19.5	miles	Average one-way trip distance.

School Pool

AVMTR = N * P * ((S-1)/S) * D * W * Nw * ((P2 * Nt) + (1 - P2) * Nf)

Variable	Default	Units	Description
N	-	people	Number of families in the database
P	0.2424	unitless	The proportion (expressed as a decimal) of families in the database that form carpools
S	2.13	people	Average carpool size (including the driver).
D	-	miles	Average one-way trip distance.
W	4.81	days	Number of carpool days in a week.
Nw	-	weeks	Number of weeks in a school year
P2	0.49	unitless	The proportion (expressed as a decimal) of two-way trip carpools. The remainder of carpools is assumed to be four-way trip carpools
Nt	2	trips	Number of one-ways trips per day for the two-way trip carpool
Nf	4	trips	Number of one-ways trips per day for the four-way trip carpool

New or Expanded Transit Service

AVMTR = (((Rf - Ri) * (1 - GR) * D * Nt * PSOV) - (EF * DBVMT)) * Nd

Variable	Default	Units	Description
Rf	-	people	Average daily ridership after project
Ri	-	people	Average daily ridership before project
GR	-	unitless	Yearly population growth rate (expressed as a decimal) for the surrounding community. For example, .2 = 20% growth, -.3 = 30% loss
D	19.5	miles	Average one-way trip distance.
Nt	2	trips	Number of one-ways trips per day.
PSOV	-	unitless	Proportion of users (expressed as a decimal) that formerly commuted by single occupant vehicle
EF	-	unitless	Emission factor of transit vehicle (i.e., bus) relative to automobiles. For example, 3 = transit emits three times as much as automobiles.
DBVMT	1	miles	Average daily transit vehicle (i.e., bus) miles traveled, including route mileage and mileage to and from garage
Nd	290	days	Number of benefit days per year.

Bike Ped

AVMTR = PSOV * Nd * D

Variable	Default	Units	Description
PSOV	-	unitless	Proportion of users (expressed as a decimal) that formerly commuted by single occupant vehicle
Nd	252	days	Number of benefit days per year.
D		miles	Total number of miles traveled on new facility per day (for all users)

New Transit Station

AVMTR = N * Cs / Cl * PSOV * Nd * D

Variable	Default	Units	Description
N	-	people	Number of new trips traveling through the station
Cs		dollars	Cost of station
Cl	-	dollars	Total cost of transit lines feeding into station
PSOV	-	unitless	Proportion of users (expressed as a decimal) that formerly commuted by single occupant vehicle
Nd	290	days	Number of benefit days per year.
D	19.5	miles	Average one-way trip distance.

HOV Lanes

AVMTR = N * (PSOV - (1/S)) * Nd * D

Variable	Default	Units	Description
N	-	vehicles	Average total number of vehicles traveling on HOV facility per day
PSOV	-	unitless	Proportion of users (expressed as a decimal) that formerly commuted by single occupant vehicle
S	2.74	people	Average carpool size (including the driver).
Nd	290	days	Number of benefit days per year.

D	19.5	miles	Average one-way trip distance.

Telework / Telecommute

AVMTR = N * P * D * Nt * W * Nw

Variable	Default	Units	Description
N	-	people	Total number of employees that work at companies with a telework program
P	0.0536	unitless	Percentage (expressed as a decimal) of employees that telework
D	19.5	miles	Average one-way trip distance.
Nt	2	trips	Number of one-ways trips per day.
W	1.62	days	Average days per week that employees telework instead of commuting
Nw	50	weeks	Number of work weeks per year

Bike Share

AVMTR = PSOV * Nd * D

Variable	Default	Units	Description
PSOV	-	unitless	Proportion of users (expressed as a decimal) that formerly commuted by single occupant vehicle
Nd	252	days	Number of benefit days per year.
D		miles	Average daily number of miles traveled on shared bicycles

Bike to Work Day

AVMTR = N * R * D * Nt * Nd

Variable	Default	Units	Description
N	-	people	The average number of bike to work participants
R	0.59	unitless	Percentage (expressed as a decimal) of participants who already regularly bike to work
D	19.5	miles	Average one-way trip distance.
Nt	2	trips	Number of one-ways trips per day.
Nd	4.21	days	Number of benefit days per year. Equal to the number of days that participants biked to work during the initial event plus any months following the event.

Marketing

AVMTR = N * P * (R / E) * PSOV * Nt * Nd * D

Variable	Default	Units	Description
N	-	items	Number of items (e.g., pamphlets, flyers, etc.) distributed by the project
P	0.6	unitless	Proportion (expressed as a decimal) of items that are seen by the target audience. Default value is from Coloradoan.
R	0.27	unitless	Percent (expressed as a decimal) recall of multiple ads. Default value is from Riger Knowledge Base Media.
E	3	items	Minimum number of exposures needed to incite action in the target audience. Default value is from Riger Knowledge Base Media.

PSOV	-	unitless	Proportion of users (expressed as a decimal) that formerly commuted by single occupant vehicle
Nt	2	trips	Number of one-ways trips per day.
Nd	240	days	Number of benefit days per year.
D	19.5	miles	Average one-way trip distance.

Inspection and Maintenance (I/M)

AVMTR = ADT * P * (J1 - J2) * D * Nd

Variable	Default	Units	Description
ADT	-	trips	Average number of trips per day
P	-	unitless	Proportion of vehicles (expressed as a decimal) subject to I/M
J1	-	unitless	Before I/M emission speed factor
J2	-	unitless	After I/M emission speed factor
D	-	miles	Average one-way trip distance.
Nd	252	days	Number of benefit days per year.

ITS and Traffic Controls

This formula allows for direct entry of CO emission reduction. The project sponsor provides calculations.

Variable		Units	Description
VHT		hours	Total number of vehicle hours eliminated by the project during the year.
CO		kg	Total kilograms of carbon monoxide eliminated by the project during the year.

Common PM 10 Formula

PM10 Emissions Reduction (kg) = (TPEF + (SLEF / 1000) * (1 - RF)) * AVMTR

Variable	Default	Units	Description
TPEF	-	kg/mile	Tailpipe PM10 emissions factor entered by administrator
SLEF	-	g/vmt	Uncontrolled emissions factor for the region
RF	-	unitless	Percent PM10 reduction by the Agency, entered as a decimal

Appendix E - Reporter Emission Factors

Tailpipe Emission Factors

Emission Region	Year	CO	NO_x	VOCs	PM_{10}
		(kg/mile)	(kg/mile)	(kg/mile)	(kg/mile)
Colorado Springs	2002	0.02807	0.00155	0.00197	3.00E-05
	2003	0.0273	0.00132	0.00184	3.00E-05
Denver Metro	2002	0.02419	0.00155	0.00192	3.00E-05
	2003	0.02387	0.0013	0.00179	3.00E-05
Fort Collins	2002	0.02807	0.00155	0.00197	3.00E-05
	2003	0.0273	0.00132	0.00184	3.00E-05
Other	2002	0.02097	0.00197	0.00244	0.001
	2003	0.02097	0.00197	0.00244	0.001

Silt Loading Factors

Emission Region	Silt Loading Factor	Silt Loading Factor
	2002	2003
	(g/m^2)	(g/m^2)
Aspen - Local Streets	10.7	10.7
Aspen - Main St. (SH 82 in town)	15.2	15.2
Aspen - SH 82 Outside City	7.15	7.15
Canon City - Local Streets	9.714	9.714
Canon City - US 50	29.98	29.98
Pagosa Springs - Local Streets	9.714	9.714
Pagosa Springs - US 160 Through Town	29.98	29.98
Pitkin County Roads	14.84	14.84
Steamboat Springs - Lincoln Ave.	29.98	29.98
Steamboat Springs - Local streets	9.714	9.714
Steamboat Springs - US 40 Outside City	4.96	4.96
Telluride - SH 145 Near Society Turn	32.47	32.47
Telluride and Mountain Village Local Streets	9.714	9.714