

Air Quality

Congestion Mitigation and Air Quality Improvement
(CMAQ) Program

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With passage of the Clean Air Act Amendments of 1990, the Congress made great strides in America's efforts to attain the National Ambient Air Quality Standards (NAAQS). The 1990 amendments required further reduction in the amount of allowable vehicle tailpipe emissions, initiated more stringent control measures in areas that still failed to meet the NAAQS-known as nonattainment areas-and provided for a stronger, more rigorous link between transportation and air quality planning. Further establishing this link, one year later, the Congress passed the Intermodal Surface Transportation Efficiency Act-the ISTEA of 1991. This far-reaching legislation brought transportation into the multi-modal arena and also set the stage for an unprecedented focus on environmental programs. Part of this approach was the newly authorized Congestion Mitigation and Air Quality Improvement (CMAQ) Program. The CMAQ program was implemented to support surface transportation projects and other related efforts that contribute air quality improvements and provide congestion relief.

Jointly administered by FHWA and the Federal Transit Administration (FTA), the CMAQ program was reauthorized under the Transportation Equity Act for the 21st Century (TEA-21) in 1998, the Safe, Accountable, Flexible, and Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) in 2005, and most recently, the Moving Ahead for Progress in the 21st Century Act (MAP-21) in July, 2012. Through the close of the SAFETEA-LU period in 2012, the CMAQ program has provided nearly \$30 billion in just under 29,000 transportation-environmental projects to State DOTs, metropolitan planning organizations, and other sponsors across the country. As with its predecessor legislation, the MAP-21 provides funding to areas in nonattainment or maintenance for ozone, carbon monoxide, and/or particulate matter. In addition, those State that have no nonattainment or maintenance areas still receive a minimum apportionment of CMAQ funding for either air quality projects or other elements of flexible spending.

The MAP-21 provides just over \$2.2 billion in CMAQ funding for each year of the authorization-2013 and 2014. While project eligibility remains basically the same, the legislation places considerable emphasis on diesel engine retrofits and other efforts that underscore the priority on reducing fine particle pollution (PM 2.5). See [FHWA's MAP-21 website](#) for additional information.

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Interim Program Guidance Under MAP-21

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The Congestion Mitigation and Air Quality Improvement (CMAQ) Program Under the Moving Ahead for Progress in the 21st Century Act

The guidance contained in this document is intended to be nonbinding, except insofar as it references existing statutory requirements. In this guidance document, the use of mandatory language such as "shall," "must," "required," or "requirement" is only used to reflect statutory or regulatory mandates and does not create new requirements. This guidance does not create or confer any rights for or on any person and should not be construed as rules of general applicability and legal effect.

I. Introduction

The Congestion Mitigation and Air Quality Improvement Program (CMAQ) was created under the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991^[1], and reauthorized under the Transportation Equity Act for the 21st Century (TEA-21)^[2], the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU)^[3], and, most recently, the Moving Ahead for Progress in the 21st Century Act (MAP-21).^[4] Through Fiscal Year (FY) 2012, the CMAQ program has supported nearly 28,000 transportation projects across the country, accounting for nearly \$30 billion in transportation investments since its inception in 1992.

This guidance replaces the October 2008 edition and provides information on the CMAQ program, including:

- Authorization levels and apportionment changes specific to the MAP-21
- Flexibility and transferability provisions available to States
- Geographic area eligibility for CMAQ funds
- Project eligibility information
- Project selection processes
- Program administration
- Annual reporting
- Performance management

The guidance has been prepared by the Air Quality and Transportation Conformity Team in Federal Highway Administration's (FHWA) Office of Natural Environment, in cooperation with the Federal Transit Administration's (FTA) Office of Planning and Environment.

II. Program Purpose

The purpose of the CMAQ program is to fund transportation projects or programs that will contribute to attainment or maintenance of the National Ambient Air Quality Standards (NAAQS) for ozone, carbon monoxide (CO), and particulate matter (both PM₁₀ and PM_{2.5}).^[5]

The CMAQ program supports two important goals of the U.S. Department of Transportation (Department): *improving air quality and relieving congestion*. While these goals are not new elements of the program, they were strengthened in the SAFETEA-LU and further bolstered in provisions added to the MAP-21.

Reducing pollution and other adverse environmental effects of transportation projects and transportation system inefficiency have been long-standing objectives of the Department. The strategic plans for the Department and for the FHWA both include initiatives specifically focused on reducing air pollution from transportation sources. The CMAQ program provides funding for a broad array of tools to accomplish these goals. By choosing to fund or sponsor a CMAQ project, a State or local government, transit agency, or other eligible project sponsor can improve air quality and make progress toward achieving attainment status and ensuring compliance with the transportation conformity provisions of the Clean Air Act (CAA).^[6]

Growing highway congestion continues to rise at a faster rate than transportation investments. Reducing congestion is a key objective of the Department, and one that has gathered increasing importance in the past several years. The costs of congestion can be an obstacle to economic activity. In addition, congestion can hamper quality of life through diminished air quality, lost personal time, and other negative factors.

Since some congestion relief projects also reduce idling, the negative emissions impacts of "stop and go" driving, and the number of vehicles on the road, they have a corollary benefit of improving air quality. Based on their emissions reductions, these types of projects are eligible for CMAQ funding. The Department believes State and local governments can simultaneously reduce the costly impacts of congestion while also improving air quality.

III. Authorization Levels Under The MAP-21

A. Authorization Levels

The MAP-21 covers FY 2013 and FY 2014. Total apportioned Federal-aid highway program authorization is \$37.40 billion for FY 2013 and just under \$37.8 billion for FY 2014.^[7] Table 1 shows the MAP-21 CMAQ levels by fiscal year. The CMAQ funds will be apportioned to States each year based upon a modified process established in the legislation and codified at 23 U.S.C. 104 (See Section V discussion of Apportionment).

Table 1

MAP-21 CMAQ Levels

Fiscal Year Authorization	Amount
FY 2013	\$2.20 Billion (actual)
FY 2014	\$2.23 Billion (estimated)

B. Transferability of CMAQ Funds

Since transportation and environmental program priorities fluctuate, States have been able to transfer a limited amount of their CMAQ apportionment. The MAP-21 changed the transfer provisions for CMAQ considerably, as the legislation amended 23 U.S.C. 126, *Uniform transferability of Federal-aid highway funds*.^[8] Prior to MAP-21, State transfer of CMAQ funds to other elements of the Federal-aid highway program was subject to a specific statutory process that served to limit such annual transfer flexibility to approximately 20 percent of a State's overall CMAQ funds (the percentage varied somewhat by State). Through MAP-21, the unique transfer process required for CMAQ has been removed, and the standard provisions of 23 U.S.C. 126 now apply, i.e. subject to certain adjustments, up to 50 percent of apportioned program funds can be transferred each year from program funds eligible for transfer. For CMAQ, the apportioned funds eligible for transfer will not include the statutory PM_{2.5} priority set-aside, which is discussed later in the guidance (Section V.C.). This interpretation gives meaning to both the statutory transfer language in Section 126 and to the PM_{2.5} priority established by Congress in 23 U.S.C. 149(k). This safeguarding of PM_{2.5} set-aside funds from transfer does not affect the ability of a State to transfer up to 50 percent of its CMAQ funds to another apportioned program.

The FHWA's Chief Financial Officer will issue a detailed memorandum covering these and other transfer provisions encompassing the full Federal-aid highway program, including guidance on program-specific transfer requirements, limitations, process and logistics, and other factors associated with Federal-aid transfer.

IV. Cost-Effectiveness and Priority Use of CMAQ Funds

The SAFETEA-LU directed States and Metropolitan Planning Organizations (MPOs) to give priority to cost-effective projects, including diesel retrofits and congestion-mitigation efforts that also produced an air quality benefit. The MAP-21 continues and expands the focus on efficiency and cost-effective project selection.^[9] The new legislation also calls for the Department, in consultation with the Environmental Protection Agency

(EPA), to develop a series of graphs or tables that illustrate the cost-effectiveness of a cross section of eligible project types.^[10] These tables are intended to inform States, MPOs, and other project sponsors on the air quality benefits derived from a variety of project types compared to the investment required. The tables are intended to be a resource for State and local planners as they consider CMAQ investments and the emissions reduction needs in the areas covering their programs.

A number of other resources are available to assist with development of the cost-effectiveness tables. In 2009, the FHWA published *SAFETEA-LU 1808: CMAQ Evaluation and Assessment*,^[11] a two-phase progress report on the program that was required by Section 1808 of the legislation. The EPA released a guidance document, *The Cost Effectiveness of Heavy-Duty Diesel Retrofits and Other Mobile Source Emission Reduction Projects and Programs*,^[12] which provides cost-effectiveness data on diesel engine retrofit technologies and other CMAQ-eligible activities. In addition, the Transportation Research Board published *The Congestion Mitigation and Air Quality Improvement Program: Assessing 10 Years of Experience*^[13] in 2002, providing estimates of costs, changes in vehicle miles travelled (VMT), emission reductions, and other benefits. Private industry provides a variety of other cost-effectiveness studies and graphics that focuses on specific service sectors, such as heavy-duty diesel equipment, alternative fuels, and others.

While no single cost-effectiveness document or table is required to establish State or local programs, project selection should reflect the positive cost-effectiveness relationships highlighted in these guidance documents. State and local transportation programs that implement a broad array of these cost-effective measures may record a more rapid rate of progress toward their clean air goals, since many of these endeavors generate immediate benefits. Local procedures that elevate the importance of these efforts in project selection-and rate them accordingly-may accelerate the drive to air quality attainment. Based on MAP-21, States and other sponsors are expected to record cost-effectiveness analyses in their CMAQ annual reports to the extent they have been providing such information.^[14]

In addition to the MAP-21 priority on cost-effectiveness, Section 176(c) of the CAA requires that the FHWA and FTA ensure timely implementation of transportation control measures (TCMs) in applicable State Implementation Plans (SIPs).^[15] These and other CMAQ-eligible projects identified in approved SIPs should receive funding priority.

The FHWA recommends that States and MPOs develop their transportation/air quality programs using complementary measures that provide alternatives to single-occupant vehicle (SOV) travel while improving traffic flow through operational strategies and balancing supply and demand through pricing, parking management, regulatory, or other means.

V. Annual Apportionment Process For CMAQ Funds

A. State Federal-aid Apportionment

The MAP-21 establishes that for the apportioned Federal-aid highway program, the combined total for each State in FY 2013 shall equal the combined total apportioned for that State for FY 2012. In FY 2014, a similar process will be followed with the exception that no State shall receive less than 95 percent of the estimated tax payments in that State that were provided to the Highway Trust Fund.^[16]

B. CMAQ Apportionment

Under ISTEA, TEA-21, and SAFETEA-LU, funding apportionments for each State were calculated based on a formula for weighted populations in ozone and CO nonattainment and maintenance areas. Unlike previous legislation, MAP-21 does not contain a specific statutory distribution formula for CMAQ apportionment. Under 23 U.S.C. 104(b)(4), as amended by Section 1105 of MAP-21, CMAQ apportionments are determined using a ratio of the State's FY 2009 CMAQ funding relative to the State's total apportioned Federal-aid for that year. The resulting ratio applies to both FY 2013 and FY 2014 CMAQ apportionments. The FY 2009 apportionment was calculated with the statutory formula from SAFETEA-LU. Therefore, the weighting factors from SAFETEA-LU, shown in Table 2, have been carried forward through MAP-21's use of the 2009 apportionments to set the FY 2013 and 2014 apportionments. The CMAQ apportionment for FY 2013 is \$2.20 billion; for FY 2014, apportionment is estimated at \$2.23 billion.^[17]

Table 2

SAFETEA-LU CMAQ Apportionment Factors

POLLUTANT	CLASSIFICATION AT THE TIME OF ANNUAL APPORTIONMENT	WEIGHTING FACTOR
Ozone (O3) or (CO)	Maintenance (these areas had to be previously eligible as nonattainment areas - See Section VI.)	1.0

Ozone	Subpart 1 ("Basic") [18]	1.0
Ozone	Marginal	1.0
Ozone	Moderate	1.1
Ozone	Serious	1.2
Ozone	Severe	1.3
Ozone	Extreme	1.4
CO	Nonattainment	1.0
Ozone and CO	Ozone nonattainment or maintenance and CO nonattainment or maintenance	1.2 x O3 factor
All States - minimum apportionment	1/2 of 1 percent total annual apportionment of CMAQ funds	N/A

C. Priority Set-aside for PM_{2.5} Areas

Any State that has a PM_{2.5} nonattainment or maintenance area-including those with approved SIPs that identify on-road mobile sources as insignificant for regional transportation conformity-is required under MAP-21 to invest a portion of its CMAQ funding in projects that reduce PM_{2.5} directly or its precursors.[\[19\]](#) More specifically, an amount equal to 25 percent of the funds attributable to PM_{2.5} nonattainment in each of the affected States must be used for projects targeting PM_{2.5} reductions in those nonattainment and maintenance areas.[\[20\]](#) In addition, the legislation highlights diesel retrofits as a primary example of such related projects. Since MAP-21 removed the CMAQ apportionment formula that was in prior legislation-the primary means of establishing the weighted population that would be used in part to calculate the 25 percent-the FHWA is proposing a weighting factor for PM_{2.5} through a rulemaking and public comment process. If this process leads to a final rule, FHWA plans on using the PM_{2.5} weighting factor developed during that rulemaking for set-aside determinations made after the effective date of the final rule.

The pollutant weightings in Table 2 reflect the last statutory apportionment factors, i.e. the SAFETEA-LU formula. Please see the following section on State Flexibility and minimum apportionment considerations for further discussion.

D. State Flexibility: Mandatory-Flexible CMAQ Funding

Prior to MAP-21, each State was guaranteed a minimum of one-half percent of the year's total CMAQ program funding, regardless of whether the State had any nonattainment or maintenance areas. The minimum apportionment provision of SAFETEA-LU and past transportation authorizations has been eliminated under MAP-21, and replaced with a section on State Flexibility.[\[21\]](#) However, MAP-21's use of FY 2009 apportionments as the basis for FY 2013 and FY 2014 apportionments results in each State still receiving a minimum amount of funding. For both FY 2013 and 2014, States that received the minimum apportionment in FY 2009 under Section 104(b)(2)(d) as in effect on the day before enactment of MAP-21 and have designated nonattainment or maintenance areas for ozone or CO, will be able to use a portion of their CMAQ funding for any project eligible under either the CMAQ program or under the Surface Transportation Program (STP) at 23 U.S.C. 133. The flexible portion is determined by multiplying the ratio described in 23 U.S.C. 149(d)(2)(B) by the CMAQ amount apportioned to the State under 23 U.S.C. 104(b)(4) after deduction of the PM_{2.5} set-aside.[\[22\]](#) This ratio is, essentially, the amount of FY 2009 CMAQ funding each State was permitted to spend on projects eligible under the STP bears to the total amount of CMAQ funding apportioned for that State under 23 U.S.C. 104(b)(2) as in effect on September 30, 2012.[\[23\]](#) States that have no ozone or CO nonattainment or maintenance areas will be able to use all their CMAQ funds for either CMAQ- or STP-eligible projects.[\[24\]](#)

Under past authorizations, the FHWA Office of Planning, Environment, and Realty and the Budget Division have identified annual apportionments of CMAQ funds as either *mandatory* or *flexible*. All funding was considered mandatory for States with weighted populations yielding one-half percent or more of the authorized funds (based on the table above). Prior to MAP-21 enactment, annual CMAQ funding apportioned through the application of 23 U.S.C. 104(b)(2)(B) and 104(b)(2)(C) had to be used for projects in nonattainment/maintenance areas. States with weighted populations yielding at least some apportioned value but less than one-half percent of the authorized funds received both mandatory and flexible funds to reach the minimum apportionment. For example, if a State's weighted population yielded two-tenths of 1 percent of the total authorized funds, it would receive two-tenths of 1 percent of the national funds as mandatory funds, and three-tenths of 1 percent as flexible funds. Thus, in this example, 40 percent of the State's funds would be mandatory and 60 percent would be flexible.

For States with no areas applicable to the apportionment table, their one-half percent is all flexible funding. These flexible funds can be used anywhere in the State for projects eligible for either CMAQ or the STP. The FHWA reports the breakdown of mandatory and flexible funds by State in its fiscal year apportionment documentation, i.e. the [supplemental tables](#).^[25]

As noted earlier, the specific CMAQ statutory apportionment formula in SAFETEA-LU was not carried forward under MAP-21. While State apportionments have been set using the 2009 levels as a base, the fine PM portion and the State flexibility considerations must be addressed through an assessment of all relevant criteria pollutants in each State. However, with the exception of the PM_{2.5} values, these weights will be used to address the State Flexibility covering former minimum apportionment areas, since 23 U.S.C. 149(d)(3), as amended by MAP-21, requires the FHWA to factor in any changes in nonattainment and maintenance area designation. Consequently, the FY 2009 weighted nonattainment and maintenance area populations have been or will continue to be updated to reflect changes in these designations for FY 2013 and FY 2014; the 2009 factors have been used because MAP-21 uses this fiscal year as the basis for the calculation. Unlike past apportionments, however, the update of the FY 2009 basis for the purposes of State Flexibility in minimum apportionment will not include revised population-only the changes in nonattainment and maintenance designations for the pollutants that applied in 2009.

E. Apportionments and State Allocation

With the exception of the PM_{2.5} priority set-aside, the State may use its CMAQ funds in any ozone, CO, or PM nonattainment or maintenance area. Except for the PM_{2.5} set-aside, a State is under no statutory obligation to allocate CMAQ funds in the same way they have been apportioned at the Federal level-either directly prior to MAP-21, or by reference via the 2009 apportionments under MAP-21. State departments of transportation (State DOT) are encouraged to consult affected MPOs and air quality agencies to determine regional and local CMAQ priorities and work with them to allocate funds accordingly.

F. Federal Share and State/Local Match Requirements

The Federal share for most CMAQ projects, generally, has been 80 percent. An exception to the Federal share requirement was provided via the Energy Independence and Security Act of 2007. This legislation amended 23 U.S.C. 120, *Federal share payable*, to provide temporary flexibility for States to use a 100 percent Federal share on all CMAQ projects. This flexibility was carried forward with each of the SAFETEA-LU extensions, but was not continued under the MAP-21. Consequently, as of October 1, 2012, Federal share requirements for CMAQ revert to the standard provisions of 23 U.S.C. 120. It should be noted that States are able to program a full, 100 percent Federal share for a select few project types listed under 23 U.S.C. 120(c). This section sets a priority for safety projects, although there are a number listed that also provide the potential for emissions reduction, including roundabouts, carpool/vanpool projects, traffic signalization, and others.^[26]

The FHWA publishes a detailed manual, outlining the options and requirements for cost sharing, accounting structure and allowable costs as a matching share, and a host of other factors surrounding the financial elements of project implementation. Additional guidance on matching requirements for Federal Highway Administration (FHWA) funded grants and subgrants can be found in [Non-Federal Matching Requirements](#)^[27].

VI. Geographic Areas That Are Eligible To Use CMAQ Funds

A. Eligible Areas

The CMAQ funds may be invested in all ozone, CO, and PM nonattainment and maintenance areas, including former areas where the NAAQS has been revoked. Funds also may be used for projects in proximity to nonattainment and maintenance areas if the **benefits will be realized primarily within the nonattainment or maintenance area**. The delineation of an area considered "in proximity" should be discussed with the FHWA and FTA field offices and elevated to headquarters if necessary. The FHWA issued a *Federal Register* notice^[28] discussing this policy in 2002.

B. Maintenance Areas

The CMAQ funds may be invested in maintenance areas that have approved maintenance plans under CAA section 175A (42 U.S.C. 7505a) and 23 U.S.C. 149(b)). In States with ozone or CO maintenance areas but no nonattainment areas, mandatory CMAQ funds must be used in the maintenance areas.

C. Flexible Funds in PM Areas

While States may use flexible CMAQ funding anywhere and for any CMAQ- or STP-eligible project, the FHWA

encourages States and MPOs to evaluate the cost-effectiveness and benefits to public health of targeting flexible CMAQ funding to projects that reduce PM. Examples of such projects include implementing a diesel retrofit or idle reduction program, constructing freight/intermodal transfer facilities, traffic signalization, Intelligent Transportation Systems (ITS) projects that reduce congestion, treating dirt or gravel roads, and purchasing street sweeping equipment.

VII. Project Eligibility Provisions

A. Project Eligibility: General Conditions

Each CMAQ project must meet three basic criteria: ***it must be a transportation project, it must generate an emissions reduction,*** [29] ***and it must be located in or benefit a nonattainment or maintenance area.*** [30] In addition, all Federal-aid projects-CMAQ is no exception-must be included in the MPO's current transportation plan and Transportation Improvement Program (TIP) (or the current Statewide Transportation Improvement Program (STIP) in areas without an MPO). [31] In nonattainment and maintenance areas, the project also must meet the conformity provisions contained in section 176(c) of the CAA and the transportation conformity regulations. [32] Lastly, all CMAQ-funded projects need to complete National Environmental Policy Act (42 U.S.C. 4321 *et seq.*) (NEPA) requirements and satisfy the basic eligibility requirements under titles 23 and 49 of the United States Code.

The following should guide CMAQ eligibility decisions:

1. Capital Investment

The CMAQ funds may be used to establish new or expanded transportation projects or programs that reduce emissions, including capital investments in transportation infrastructure, congestion relief efforts, vehicle acquisitions, diesel engine retrofits, or other capital projects.

2. Operating Assistance

There are several general conditions for operating assistance eligibility under the CMAQ program:

- a. Operating assistance is limited to new transit, commuter and intercity passenger rail services, intermodal facilities, travel demand management strategies, including traffic operation centers, inspection and maintenance programs, and the incremental cost of expanding these services.
- b. In using CMAQ funds for operating assistance, the intent is to help start up viable new transportation services that can demonstrate air quality benefits and eventually cover costs as much as possible. Other funding sources should supplement and ultimately replace CMAQ funds for operating assistance, as these projects no longer represent additional, net air quality benefits but have become part of the baseline transportation network. The provisions in 23 U.S.C. 116 place responsibilities for maintenance of transportation facilities on the States. Since facility maintenance is akin to operations, a time-limited period of CMAQ assistance provides adequate incentive and flexibility while not creating a pattern of excessive or even perpetual support.
- c. Operating assistance includes all costs of providing new transportation services, including, but not limited to, labor, fuel, administrative costs, and maintenance.
- d. When CMAQ funds are used for operating assistance, non-Federal share requirements still apply.
- e. With the focus on start-up, and recognizing the importance of flexibility in the timing of financial assistance, the 3 years of operating assistance allowable under the CMAQ program may now be spread over a longer period, for a total of up to 5 sequential years of support. Grantees who propose to use CMAQ funding for operating support may spread the third year amount (an amount not to exceed the greater of year 1 or year 2) across an additional 2 years (i.e. years 4 and 5). This will provide an incremental, taper-down approach, while other funding is used for a higher proportion of the operating costs as needed. See Table 3 for examples of possible funding allocations. At the conclusion of the 5-year period, operating costs would have to be maintained with non-CMAQ funding. It is anticipated that this may enable a transition to more independent system operation. The amounts, which apply to years 1 and/or 2, are established at the discretion of the State or local sponsor.

Table 3 - Example Allocations of CMAQ Funds for Operating Assistance

Example	Year 1	Year 2	Year 3	Year 4	Year 5	Total

A	\$300	\$300	\$200	\$50	\$50	\$900
B	300	300	100	100	100	900
C	100	400	200	100	100	900

Eligible activities that used CMAQ funds for operating support in FY 2012, as described in the 2008 CMAQ Program Guidance, and that had not received operating assistance for three fiscal years as of September 30, 2012, may continue to receive operating assistance under MAP-21, transitioning into the 5-year schedule described above. The number of prior years of operating assistance will determine which year of the 5-year cycle applies in FY 2013. Except as noted in this paragraph, activities that already have received 3 years of operating support under prior authorizations of the CMAQ program are not considered to be in a start-up phase and are not eligible for the expanded assistance period. Those transportation uses expressly eligible for CMAQ funding under SAFETEA-LU sections 1808(g)-(k) and certain provisions in appropriations acts are eligible for CMAQ dollars for an additional 5 years consistent with this Section. The maximum allowable assistance level and the 5-year time period described above will apply.

- f. Elements of operating assistance prohibited by statute or regulation are not eligible for CMAQ participation, regardless of their emissions or congestion reduction potential.

3. Emission Reduction

Air quality improvement is defined by several distinct terms in 23 U.S.C. 149. These terms include contribution to attainment, reduction in pollution, air quality benefits, and others. For purposes of this guidance, **emission reduction** represents this group of terms. CMAQ-funded projects or programs must reduce CO, ozone precursors (NO_x and VOCs), PM_{2.5}, PM₁₀, or PM precursor (e.g., NO_x) emissions from transportation; these reductions must contribute to the area's overall clean air strategy and can be demonstrated by the emissions reduction analysis that is required under this guidance.^[33] States and MPOs also may consider the ancillary benefits of eligible projects, including greenhouse gas reductions, congestion relief, mobility, safety, or other elements, when programming CMAQ funds, though such benefits do not alone establish eligibility.

4. Planning and Project Development

Activities in support of other Title 23-eligible projects also may be appropriate for CMAQ investments. All phases of eligible projects-not only construction-are eligible for CMAQ funding. For example, studies that are part of the project development pipeline (e.g., preliminary engineering) under NEPA are eligible for CMAQ support. General studies that fall outside specific project development do not qualify for CMAQ funding. Examples of such ineligible efforts include major investment studies, commuter preference studies, modal market polls or surveys, transit master plans, and others. These activities are eligible for Federal planning funds.

B. Projects Ineligible for CMAQ Funding

The following projects are ineligible for CMAQ funding:

1. Light-duty vehicle scrappage programs.
2. Projects that add new capacity for SOVs are ineligible for CMAQ funding unless construction is limited to high-occupancy vehicle (HOV) lanes.^[34] This HOV lane eligibility includes the full range of HOV facility uses authorized under 23 U.S.C 166, such as high-occupancy toll (HOT) and low-emission vehicles.
3. Routine maintenance and rehabilitation projects (e.g., replacement-in-kind of track or other equipment, reconstruction of bridges, stations, and other facilities, and repaving or repairing roads) are ineligible for CMAQ funding as they only maintain existing levels of highway and transit service, and therefore do not reduce emissions.^[35] (See previous section covering eligibility for operational support.) Other funding sources, such as STP and FTA's Urbanized Area Formula Program (49 U.S.C. 5307), are available for such activities.
4. Administrative costs of the CMAQ program may not be defrayed with program funds, e.g., support for a State's "CMAQ Project Management Office" is not eligible.
5. Projects that do not meet the specific eligibility requirements of Titles 23 and 49, United States Code, are ineligible for CMAQ funds.
6. Stand-alone projects to purchase fuel.
7. Models and Monitors-Acquisition, operation, or development of models or monitoring networks are

not eligible for CMAQ funds. As modeling or monitoring emissions, traffic operations, travel demand or other related variables do not directly lead to an emissions reduction, these activities or acquisitions are not eligible. Such efforts may be appropriate for Federal planning funds.

8. Litigation costs surrounding CMAQ or other Federal-aid projects.

C. Public-Private Partnerships (PPPs)

In a PPP, a private or non-profit entity's resources replace or supplement State or local funds and possibly a portion of the Federal-aid in a selected project.^[36] The PPP component of CMAQ has evolved into a critical element of the program, as private sector involvement in such activities as freight and diesel retrofits has grown considerably.

Partnerships should have a legally binding, written agreement in place between the public agency and the private or non-profit entity before a CMAQ-funded project may be implemented. These agreements should be developed under relevant Federal and State law and should specify the intended use for CMAQ funding; the roles and responsibilities of the participating entities; and how the disposition of land, facilities, and equipment will be carried out should the original terms of the agreement be altered (e.g., due to insolvency, change in ownership, or other changes in the structure of the PPP).

Public funds should not be invested where a strong public benefit cannot be demonstrated. Consequently, CMAQ funds should be devoted to PPPs that benefit the general public by clearly reducing emissions, not for financing marginal projects. Consistent with the planning and project selection provisions of the Federal-aid highway program, the FHWA considers it essential that all interested parties have full, open, and timely access to the project selection process.

There are several other statutory restrictions and special provisions on the use of CMAQ funds in PPPs.^[37] Eligible costs under this section should not include costs to fund an obligation imposed on private sector or non-profit entities under the CAA or any other Federal law. However, if the private or non-profit entity clearly is exceeding its obligations under Federal law, CMAQ funds may be used for that incremental portion of the project.

Eligible non-monetary activities that satisfy the non-Federal match requirements under the partnership provisions include the following:

- Ownership or operation of land, facilities, or other physical assets
- Construction or project management
- Other forms of participation approved by the Department.

Sharing of total project costs, both capital and operating, is a critical element of a successful public-private venture, particularly if the private entity is expected to realize profits as part of the joint venture. State and local officials are urged to consider a full range of cost-sharing options when developing a PPP, including a larger State/local match.

D. Costs and other Regulatory Requirements

The CMAQ projects must comply with other applicable Federal requirements, including those affecting determinations of eligible project costs. All Federal projects must conform to the appropriate cost principles for Federal-aid. Most CMAQ projects are subject to 2 CFR Part 225-also known as OMB Circular A-87-the [cost principles for State, local, and Indian tribal governments](#).^[38] These principles focus on determining the allowable costs for the subject government entities and also provide a discussion of the relationship between appropriate costs and the purpose of the program.

Sponsors also should be familiar with the general cost and accounting components of 49 CFR Part 18, which provides direction on administering Federal grants to State and local governments.

E. Programmatic Eligibility

The MAP-21 provides flexibility for States and MPOs to conduct a technical assessment of the program of CMAQ projects under review that fulfills the requirement for an emissions reduction demonstration.^[39] This technical assessment is fully optional and can include the full program as listed in the TIP or a subset of that full program. The technical methods are at the discretion of the MPO but can include modeling or other contemporary tools generally found acceptable by professionals in the field. If the assessment is successful in demonstrating an emissions reduction, no further analysis will need to be provided by the MPO for those projects included, and these efforts can proceed to CMAQ obligation. However, emissions reductions also should be demonstrated for CMAQ projects not included in the selected subset covered by the technical

assessment.

F. Eligible Projects and Programs

Eligibility information is provided below. Not all possible requests for CMAQ funding are covered-this section provides examples of general project types that may be eligible for CMAQ funds.

1. Diesel Engine Retrofits & Other Advanced Truck Technologies

The MAP-21 continues the emphasis SAFETEA-LU placed on diesel engine retrofits and the various types of projects that fall under this broad category.^[40] These efforts are defined as vehicle replacement, repowering (replacing an engine with a cleaner diesel engine, alternative fuels, etc.), rebuilding an engine, or other technologies determined by the EPA as appropriate for reducing emissions from diesel engines. This latter point, highlighting developing technologies, establishes a degree of flexibility and a need for periodic adjustment in the definition by the EPA. The legislation defines retrofit projects as applicable to both on-road motor vehicles and non-road construction equipment; the latter must be used in Title 23 projects based in nonattainment or maintenance areas for either PM or ozone.^[41]

The MAP-21 expands the prior focus created by the SAFETEA-LU. Specifically for PM_{2.5} areas, diesel retrofits are called out as eligible projects in the Priority Consideration section.^[42] Similarly, such efforts are again highlighted in the discussion of the PM_{2.5} priority set-aside, and emphasized again in the closely related section on construction vehicles and equipment.^[43]

More than 13 million diesel engines make up the legacy fleet operating in the U.S. The vast majority of these power on-road heavy-duty and medium-duty trucks, locomotives, and off-road construction equipment-all of which may be eligible for CMAQ funding.

There are a number of specific project types in the diesel retrofit area for which CMAQ funds are eligible. Assuming all other CMAQ criteria are met, eligible projects could include diesel engine or full vehicle replacement; full engine rebuilding and reconditioning; and purchase and installation of after-treatment hardware, including particulate matter traps and oxidation catalysts, and other technologies; and support for heavy-duty vehicle retirement programs. Project agreements involving replacements for either engines or full vehicles should include a provision for disposal or destruction of the engine block, verification that the engine is no longer contributing emissions in the nonattainment or maintenance area, or for other processes at the State's discretion that track the retirement of the vehicle or engine in accordance with the State's or sub-grantee's program^[44]. The MAP-21 provided one change to the approach in establishing eligibility for emissions control equipment. After-treatment and other on-board control devices are restricted to those EPA or the California Air Resources Board (CARB) verified and/or technologies as defined in section 791 of the Energy Policy Act of 2005 (42 U.S.C. 16131).^[45]

A strong component of the SAFETEA-LU focus on diesel retrofits, construction vehicles and equipment also are eligible under MAP-21. Eligible acquisitions or retrofits would be for those capital items used for highway construction projects in PM_{2.5} nonattainment or maintenance areas. Equipment or vehicles used predominantly in a maintenance role would not qualify. These would include loaders or backhoes in yard or depot work, tractors assigned to mowing or other median maintenance, impactors or rollers involved in routine work, such as pothole repair, and others.

The CMAQ funds may be used to purchase and install emission control equipment on school buses. (Such projects, generally, should be administered by FHWA; see Transit Improvements, below). In addition, although CMAQ funds should not be used for the initial purchase of conventionally fueled airport parking lot shuttles, funds may be used for purchase and installation of after treatment hardware or repowering (with a hybrid drive train, for example).

Refueling is not eligible as a stand-alone project, but is eligible if it is required to support the installation of emissions control equipment, repowering, rebuilding, or other retrofits of non-road engines.

In addition to equipment and technology, outreach activities that provide information exchange and technical assistance to diesel owners and operators on retrofit options are eligible investments. These projects could include the actual education and outreach program, construction or acquisition of appropriate classroom buildings, and other efforts to promote the use of retrofit technologies.

Non-road mobile source projects also are eligible for CMAQ funding. Most notably, a considerable amount of CMAQ support has been directed to locomotive retrofit and the acquisition of clean locomotives, such as railyard switchers and shunters that fit the generator-set criterion (See Freight and Intermodal, Section VII. F. 4). The FHWA acknowledges that diesel retrofit projects may include non-road mobile source endeavors, which traditionally have been outside the Federal-aid process. However, the MAP-21 clarifies CMAQ eligibility

for non-road diesel retrofit projects. Areas that fund these projects are not required to take credit for the projects in the transportation conformity process. For areas that want to take credit, the EPA developed guidance for estimating diesel^[46] retrofit emission reductions and for applying the credit in the SIP and transportation conformity processes.

Transportation projects that are part of an effort associated with EPA's Diesel Emissions Reduction Act (DERA) also may be eligible. Federal field offices, State DOTs, and other local sponsors should consult with the nearest EPA Regional Office on projects that feature DERA elements or mutual funding with CMAQ.

In addition to retrofit projects, upgrading long-haul heavy-duty diesel trucks with EPA and/or CARB verified advanced technologies, such as idle reduction devices, cab and trailer aerodynamic fixtures, and single-wide or other efficient tires, has been demonstrated by the EPA's *Smart Way Transport Partnership Program* to reduce NO_x emissions and save fuel. These strategies also are eligible for CMAQ support. Such projects funded directly by CMAQ that involve the private sector should be part of a PPP, as discussed in Section VII.C.

Many diesel retrofit projects involve private sector participation. Although standard match rates established in 23 U.S.C. 120 apply to these efforts, States and local governments are encouraged to seek a higher non-Federal match from those participants that ultimately will own the equipment. An even 50-50 split share between the Federal CMAQ and all other sources has been a frequent compromise for many past projects in this arena.

2. Idle Reduction

Idle reduction projects that reduce emissions and are located within, or in proximity to and primarily benefiting, a nonattainment or maintenance area are eligible for CMAQ investment. (The geographic requirement mainly applies to off-board projects, i.e., truck stop electrification (TSE) efforts.) However, if CMAQ funding is used for an on-board project (i.e. auxiliary power units, direct fired heaters, etc.) the vehicle-usually a heavy-duty truck-should travel within, or in proximity to and primarily benefiting, a nonattainment or maintenance area. Idle reduction devices are verified by the EPA.

There have been several instances where operating assistance funds have been requested for TSE services. The CMAQ funding for TSE projects has been limited to capital costs (i.e. deployment of TSE infrastructure). Operating assistance for TSE projects should not be funded under the CMAQ program since TSE projects generate their own revenue stream and therefore should be able to cover all operating expenses from the accumulated revenue.

Commercial idle reduction facilities cannot be located within rest areas of the Interstate right-of-way (ROW). ^[47] The SAFETEA-LU initially provided for these facilities in the ROW. However, this provision was removed with the SAFETEA-LU Technical Corrections Bill that followed.

3. Congestion Reduction & Traffic Flow Improvements

Traffic flow improvements may include the following:

a. Traditional Improvements

Traditional traffic flow improvements, such as the construction of roundabouts, HOV lanes, left-turn or other managed lanes, are eligible for CMAQ funding provided they demonstrate net emissions benefits through congestion relief.

b. Intelligent Transportation Systems

ITS projects, such as traffic signal synchronization projects, traffic management projects, and traveler information systems, can be effective in relieving traffic congestion, enhancing transit bus performance, and improving air quality. The following have the greatest potential for improving air quality:

- Regional multimodal traveler information systems
- Traffic signal control systems
- Freeway management systems
- Electronic toll-collection systems
- Transit management systems
- Incident management programs.

The FHWA has provided a lengthier [discussion of the benefits\[48\]](#) associated with various operational improvements.

c. Value/Congestion Pricing

Congestion pricing is a market-based mechanism that allows tolls to rise and fall depending on available capacity and demand. Tolls can be charged electronically, thereby eliminating the need for full stops at tollbooths. In addition to the benefits associated with reducing congestion, revenue is generated that can be used to pay for a wide range of transportation improvements, including Title 23-eligible transit services in the newly tolled corridor.

Parking pricing can include time-of-day parking charges that reflect congested conditions. These strategies should be designed to influence trip-making behavior and may include charges for using a parking facility at peak periods, or a range of employer-based parking cash-out policies that provide financial incentives to avoid parking or driving alone. Parking pricing integrated with other pricing strategies is encouraged.

Pricing encompasses a variety of market-based approaches such as:

- **HOT lanes**, or High Occupancy Toll lanes, on which variable tolls are charged to drivers of low-occupancy vehicles using HOV lanes, such as the "FasTrak" Lanes on I-15 in San Diego and the recently converted I-394 in Minneapolis in which prices vary dynamically every 2 minutes based on traffic conditions.
- **New variably tolled express lanes** on existing toll-free facilities, such as the "91 Express Lanes" on State Route 91 in Orange County, CA.
- **Variable tolls on existing or new toll roads**, such as on the bridges and tunnels operated by the Port Authority of New York and New Jersey.
- **Network-wide or cordon pricing**, such as implemented in Stockholm, London, and Singapore.
- **Usage-based vehicle pricing**, such as mileage-based vehicle taxation being explored by the State of Oregon, or pay-per-mile car insurance.

As with any eligible CMAQ project, value pricing should generate an emissions reduction. Marketing and outreach efforts to expand and encourage the use of eligible pricing measures may be funded indefinitely. Eligible expenses for reimbursement include, but are not limited to: tolling infrastructure, such as transponders and other electronic toll or fare payment systems; small roadway modifications to enable tolling, marketing, public outreach, and support services, such as transit in a newly tolled corridor. Innovative pricing approaches yet to be deployed in the U.S. also may be supported through the [Value Pricing Pilot Program](#). [\[49\]](#)

Operating expenses for traffic operating centers (TOCs) are eligible for CMAQ funding if they can be shown to produce air quality benefits, and if the expenses are incurred from new or additional capacity. The operating assistance parameters discussed in Section VII.A.2 apply.

Projects or programs that involve the purchase of integrated, interoperable emergency communications equipment are eligible for CMAQ funding.

4. Freight/Intermodal

Projects and programs targeting freight capital costs-rolling stock or ground infrastructure-are eligible provided that air quality benefits can be demonstrated.

Freight projects that reduce emissions fall generally into two categories: primary efforts that target emissions directly or secondary projects that reduce net emissions.

Successful primary projects could include new diesel engine technology or retrofits of vehicles or engines. See discussion in Section VII.F.1. Eligibility under CMAQ is not confined to highway projects, but also applies to nonroad mobile freight projects such as rail.

Secondary projects reduce emissions through modifications or additions to infrastructure and the ensuing modal shift. Support for an intermodal container transfer facility may be eligible if the project demonstrates reduced diesel engine emissions when balancing the drop in truck VMT against the increase in locomotive or other non-highway activity. Intermodal facilities, such as inland transshipment ports or near/on-dock rail, may generate substantial emissions reductions through the decrease in miles traveled for older, higher-polluting heavy-duty diesel trucks. This secondary, indirect effect on truck traffic and the ensuing drop in diesel emissions help demonstrate eligibility.

The transportation function of these freight/intermodal projects should be emphasized. Marginal projects that support freight operations in a very tangential manner are not eligible for CMAQ funding. Warehouse handling equipment, for example, is not an eligible investment of program funds. Warehouses, themselves, or other similar structures, such as transit sheds, bulk silos or other permanent, non-mobile facilities that function more as storage resources are not eligible. However, equipment that provides a transportation function or directly supports this function is eligible, such as railyard switch locomotives or shunters that fall into the generator-set or other clean engine category. Similarly, large-scale container gantry cranes, or other heavy-duty container handling equipment that is a clear link in the intermodal process can be eligible as well. Also, on the ground operations side of aviation, the purchase or retrofit of airport handling equipment can be eligible, including baggage handlers, aircraft tow motors, and other equipment that plays a role in this intermodal link.

5. Transportation Control Measures (TCM)

Most of the TCMs included in Section 108 of the CAA, listed below, are eligible for CMAQ funding. We would note that one particular CAA TCM, created to encourage removal of pre-1980 light-duty vehicles, is specifically excluded from CMAQ eligibility.[\[50\]](#)

- i. Programs for improved public transit;
- ii. Restriction of certain roads or lanes to, or construction of such roads or lanes for use by, passenger buses or HOV;
- iii. Employer-based transportation management plans, including incentives;
- iv. Trip-reduction ordinances;
- v. Traffic flow improvement programs that reduce emissions;
- vi. Fringe and transportation corridor parking facilities serving multiple-occupancy vehicle programs or transit service;
- vii. Programs to limit or restrict vehicle use in downtown areas or other areas of emission concentration particularly during periods of peak use;
- viii. Programs for the provision of all forms of high-occupancy, shared-ride services;
- ix. Programs to limit portions of road surfaces or certain sections of the metropolitan area to the use of non-motorized vehicles or pedestrian use, both as to time and place;
- x. Programs for secure bicycle storage facilities and other facilities, including bicycle lanes, for the convenience and protection of bicyclists, in both public and private areas;
- xi. Programs to control extended idling of vehicles;
- xii. Reducing emissions from extreme cold-start conditions;
- xiii. Employer-sponsored programs to permit flexible work schedules;
- xiv. Programs and ordinances to facilitate non-automobile travel, provision and utilization of mass transit, and to generally reduce the need for SOV travel, as part of transportation planning and development efforts of a locality, including programs and ordinances applicable to new shopping centers, special events, and other centers of vehicle activity; and
- xv. Programs for new construction and major reconstructions of paths, tracks, or areas solely for the use by pedestrian or other non-motorized means of transportation when economically feasible and in the public interest.

6. Transit Improvements

Many transit projects are eligible for CMAQ funds. The general guideline for determining eligibility is whether the project increases transit capacity and would likely result in an increase in transit ridership and a potential reduction in congestion. As with other types of CMAQ projects, there should be a quantified estimate of the project's emissions benefits accompanying the proposal.

The FTA administers most transit projects. For such projects, after the FTA determines a project eligible, CMAQ funds will be transferred, or "flexed," from the FHWA to the FTA, and the project will be administered according to the appropriate FTA program requirements. Certain types of eligible transit projects for which FTA lacks statutory authority, such as diesel retrofit equipment for public school bus fleets, may be the responsibility of the State or other eligible project sponsor and are administered by FHWA.

a. Facilities

New transit facilities (e.g., lines, stations, terminals, transfer facilities) are eligible if they are associated with new or enhanced public transit, passenger rail, or other similar services. Routine maintenance or rehabilitation of existing facilities is not eligible, as it does not reduce emissions. However, rehabilitation of a facility may be eligible if the vast majority of the project involves physical improvements that will increase transit service capacity. In such cases there should be supporting documentation showing an expected increase in transit ridership that is more than minimal. If the vast majority of the project involves capacity enhancements, other elements involving refurbishment and replacement-in-kind also are eligible.

b. Vehicles and Equipment

New transit vehicles (bus, rail, or van) to expand the fleet or replace existing vehicles are eligible. Transit agencies are encouraged to purchase vehicles that are most cost-effective in reducing emissions. Diesel engine retrofits, such as replacement engines and exhaust after-treatment devices, are eligible if certified or verified by the EPA or California Air Resources Board (CARB). See discussion in Section VII.F.1. Routine preventive maintenance for vehicles is not eligible as it only returns the vehicles to baseline conditions. Other than diesel engine retrofits, other transit equipment may be eligible if it represents a major systemwide upgrade that will significantly improve speed or reliability of transit service, such as advanced signal and communications systems.

c. Fuel

Fuel, whether conventional or alternative fuel, is an eligible expense only as part of a project providing operating assistance for new or expanded transit service under the CMAQ program. This includes fuels and fuel additives considered diesel retrofit technologies by the EPA or CARB. Purchase of alternative fuels is authorized in some States based on the continuation of a series of exemptions for uses expressly eligible for CMAQ funding under SAFETEA-LU section 1808(k) and certain provisions in subsequent appropriations acts. The maximum allowable assistance level and time limitation described in Section VII.A.2 will apply.

d. Operating Assistance

Operating assistance to introduce new transit service or expand existing transit service is eligible. The eligibility applies regardless of the size of the urbanized area (UZA) or whether a particular grantee is or was previously authorized to use funding under Chapter 53 of Title 49 U.S.C. for operating assistance. For a detailed discussion of operating assistance eligibility, including the changes brought about by MAP-21, please see Section VII.A.2 above.

e. Transit Fare Subsidies

The CMAQ funds may be used to subsidize regular transit fares in an effort to prevent the NAAQS from being exceeded, but only under the following conditions: The reduced or free fare should be part of a comprehensive areawide program to prevent such an anticipated exceedance. For example, "Ozone Action" programs vary in scope around the country, but they generally include actions that individuals and employers can take, and they are aimed at all major sources of air pollution, not just transportation. The subsidized fare should be available to the general public and may not be limited to specific groups. It may only be offered during periods of elevated pollution when the threat of exceeding the NAAQS is greatest; e.g., it is not intended for the entire high-ozone season. The fare subsidy proposal should demonstrate that the responsible local agencies will combine the reduced or free fare with a robust marketing program to inform SOV drivers of other transportation options. Because the fare subsidy is not strictly a form of operating assistance, it would not be subject to the 5-year limit.

7. Bicycle and Pedestrian Facilities and Programs

Bicycle and pedestrian facilities and programs are included as a TCM in section

108(f)(1)(A) of the CAA (42 U.S.C. 7408(f)(1)(A)). The following are eligible projects:

- Constructing bicycle and pedestrian facilities (paths, bike racks, support facilities, etc.) that are not exclusively recreational and reduce vehicle trips.
- Non-construction outreach related to safe bicycle use.
- Establishing and funding State bicycle/pedestrian coordinator positions for promoting and facilitating nonmotorized transportation modes through public education, safety programs, etc. (Limited to one full-time position per State).

Bicycle and pedestrian programs that are not supported under 23 CFR Part 652, *Pedestrian and Bicycle Accommodations and Projects*, also are not eligible for CMAQ funding. For example, under 23 CFR 652.9(b)

(3), a non-construction bicycle project does not include salaries for administration, maintenance costs, and other items akin to operational support under 23 CFR 652.9(b)(3), and, therefore, these are not allowable CMAQ costs.

Additional activities related to bicycle and pedestrian programs can be supported by other elements of the Federal-aid highway program. These efforts are described at the FHWA's [Bicycle and Pedestrian Programs Web site](#).^[51]

8. Travel Demand Management

Travel demand management (TDM) encompasses a diverse set of activities that focus on physical assets and services that provide real-time information on network performance and support better decisionmaking for travelers choosing modes, times, routes, and locations. Such projects can help ease congestion and reduce SOV use-contributing to mobility, while enhancing air quality and saving energy resources. Similar to ITS and Value Pricing, today's TDM programs seek to optimize the performance of local and regional transportation networks. The following activities are eligible if they are explicitly aimed at reducing SOV travel and associated emissions:

- Fringe parking
- Traveler information services
- Shuttle services
- Guaranteed ride home programs
- Carpools, vanpools
- Traffic calming measures
- Parking pricing
- Variable road pricing
- Telecommuting/Teleworking
- Employer-based commuter choice programs.

The CMAQ funds may support capital expenses and, as discussed in Section VII.A.2, up to 5 years of operating assistance to administer and manage new or expanded TDM programs. Marketing and outreach efforts to expand use of TDM measures may be funded indefinitely, but only if they are broken out as distinct line items.

Eligible telecommuting activities include planning, preparing technical and feasibility studies, and training. Construction of telecommuting centers and computer and office equipment purchases should not be supported with CMAQ funds.

9. Public Education and Outreach Activities

The goal of CMAQ-funded public education and outreach activities is to educate the public, community leaders, and potential project sponsors about connections among trip making and transportation mode choices, traffic congestion, and air quality. Public education and outreach can help communities reduce emissions and congestion by inducing drivers to change their transportation choices. More important, an informed public is likely to support larger regional measures necessary to reduce congestion and meet CAA requirements.

A wide range of public education and outreach activities is eligible for CMAQ funding, including activities that promote new or existing transportation services, developing messages and advertising materials (including market research, focus groups, and creative), placing messages and materials, evaluating message and material dissemination and public awareness, technical assistance, programs that promote the Tax Code

provision related to commute benefits, transit "store" operations, and any other activities that help forward less-polluting transportation options.

Using CMAQ funds, communities have disseminated many transportation and air quality public education messages, including maintain your vehicle; curb SOV travel by trip chaining, telecommute and use alternate modes; fuel properly; observe speed limits; don't idle your vehicle for long durations; eliminate "jack-rabbit" starts and stops; and others.

Long-term public education and outreach can be effective in raising awareness that can lead to changes in travel behavior and ongoing emissions reductions; therefore, these activities may be funded indefinitely.

10. Transportation Management Associations

Transportation Management Associations (TMAs) are groups of citizens, firms, or employers that organize to address the transportation issues in their immediate locale by promoting rideshare programs, transit, shuttles, or other measures. The TMAs can play a useful role in brokering transportation services to private employers.

Subject to applicable cost principles under 2 CFR Part 225, CMAQ funds may be used to establish TMAs provided that they reduce emissions. Eligible expenses include TMA start-up costs and up to 5 years of operating assistance as discussed in Section VII.A.2. Eligibility of specific TMA activities is addressed throughout this guidance.

11. Carpooling and Vanpooling

Eligible activities can be divided into two types of costs: *marketing* (which applies to both carpools and vanpools) and *vehicle* (which applies to vanpools only).

a. Carpool/vanpool marketing covers existing, expanded, and new activities designed to increase the use of carpools and vanpools, and includes purchase and use of computerized matching software and outreach to employers. Guaranteed ride home programs are also considered marketing tools. Marketing costs may be funded indefinitely.

b. Vanpool vehicle capital costs include purchasing or leasing vans for use in vanpools. Eligible operating costs, limited to 5 years as set forth in Section VII.A.2, empty-seat subsidies, maintenance, insurance, administration, and other related expenses. Prorated cost sharing plans that establish grant proportions for undefined shares of capital and operating costs need to be broken down to the specific components or line items that establish the capital-operating shares.

The CMAQ funds should not be used to buy or lease vans that would directly compete with or impede private sector initiatives. States and MPOs should consult with the private sector prior to using CMAQ funds to purchase vans, and if private firms have definite plans to provide adequate vanpool service, CMAQ funds should not be used to supplant that service.

In accordance with 23 U.S.C. 120(c)(1), carpooling and vanpooling activities may be supported with up to 100 percent Federal funding, under certain limitations.

12. Carsharing

The MAP-21 specifically highlights carsharing projects in the amended section on traffic demand.^[52] These efforts involve the pooling of efficient, low-emission vehicles, provided to travelers who have occasional need for a vehicle but not the constant, daily necessity that demands ownership. As with any CMAQ project, sponsors need to demonstrate an emissions reduction from the carsharing program. If a programwide emissions reduction cannot be demonstrated, CMAQ funding may be available to support vehicle costs under Alternative Fuels and Vehicles eligibility, discussed in Section VII.F.17.

13. Extreme Low-Temperature Cold Start Programs

Projects intended to reduce emissions from extreme cold-start conditions are eligible for CMAQ funding. Such projects include retrofitting vehicles and fleets with water and oil heaters and installing electrical outlets and equipment in publicly owned garages or fleet storage facilities.

14. Training

States and MPOs may use Federal-aid funds to support training and educational development for the transportation workforce. Such activities are subject to applicable cost principles in 2 CFR Part 225. The FHWA encourages State and local officials to weigh the air quality benefits of such training against other cost-effective strategies detailed elsewhere in this guidance before using CMAQ funds for this purpose. Training funded with CMAQ dollars should be directly related to implementing air quality improvements and be approved in advance by the FHWA Division office.

15. Inspection/Maintenance (I&M) Programs

Funds under the CMAQ program may be used to establish either publicly or privately owned I&M facilities. Eligible activities include construction of facilities, purchase of equipment, I&M program development, and one-time start-up activities, such as updating quality assurance software or developing a mechanic training curriculum. The I&M program must constitute new or additional efforts, existing funding (including inspection

fees) should not be displaced, and operating expenses are eligible for 5 years as discussed in Section VII.A.2.

States or other sponsors planning new or expanded I&M programs that incorporate other elements of a State's vehicle administrative function, e.g. registration, safety inspection, titling, etc., must remove these line items from the CMAQ project. These tasks are not linked to the CMAQ purpose and are, therefore, not allowable costs.

Privately Owned I&M Facilities

In States that rely on privately owned I&M facilities, State or local I&M program-related administrative costs may be funded under the CMAQ program as in States that use public I&M facilities. However, CMAQ support to establish I&M facilities at privately owned stations, such as service stations that own the equipment and conduct emission test-and- repair services, requires a PPP.

The establishment of "portable" I&M programs, including remote sensing, is also eligible under the CMAQ program, provided that they are public services, reduce emissions, and do not conflict with statutory I&M requirements or EPA regulations.

16. Innovative Projects

State and local organizations have worked with various types of transportation services to better meet the travel needs of their constituents. These innovative projects also may show promise in reducing emissions, but do not yet have supporting data. The FHWA has supported and funded some of these projects as demonstrations to determine their benefits and costs. Such innovative strategies are not intended to bypass the definition of basic project eligibility, but seek to better define the projects' future role in strategies to reduce emissions.

For a project or program to qualify as an innovative project, it should be defined as a transportation project and be expected to reduce emissions by decreasing VMT, fuel consumption, congestion, or by other factors. The FHWA encourages States and MPOs to creatively address their air quality problems and to consider new services, innovative financing arrangements, PPPs, and complementary approaches that use transportation strategies to reach clean air goals.

Given the untried nature of these innovative projects, before-and-after studies should be completed to determine actual project impacts on air quality as measured by net emissions reduced. These assessments should document the project's immediate impacts in addition to long-term benefits. A schedule for completing the study should be a part of the project agreement. Completed studies should be submitted to the FHWA Division office within 3 years of implementation of the project or 1 year after the project's completion, whichever is sooner.

17. Alternative Fuels and Vehicles

The FHWA issued a memorandum in April 2011, covering the relationship between the required emissions reduction benefits of alternative fuel vehicles and the associated cost principles at 2 CFR Part 225.^[53] Essentially, this guidance illustrates the cost-benefit relationship between different vehicle types and functions and the air quality benefit provided as a cost basis under the CMAQ program. The memorandum, outlining the requirements in 23 U.S.C. 149, supports eligibility only for the incremental cost, limited to the marginal emissions-reducing elements of the alternative fuel vehicles that are acquired through PPPs or that are purchased by public sponsors.

Program funds may be used to support projects involving the alternative or renewable fuels defined in the Energy Policy Act of 1992^[54] or the Energy Independence and Security Act of 2007.^[55] All standard eligibility criteria apply. Aside from fuel acquisitions that are part of a transit operating support effort, stand-alone purchase of any fuel-alternative or otherwise-is not an eligible CMAQ cost. However, the few exceptions provided by Section 1808(k) of SAFETEA-LU continue under MAP-21, subject to the limitation on operating assistance as described in Section VII.A.2.

Generally, CMAQ support for alternative fuel vehicle projects can be broken into the following areas:

Infrastructure

Except as noted below, establishing publicly owned fueling facilities and other infrastructure needed to fuel alternative-fuel vehicles is an eligible expense, unless privately-owned fueling stations are in place and reasonably accessible. Fueling facilities can dispense one or more of the alternative fuels identified in section 301 of the 1992 Energy Policy Act or biodiesel, or provide recharging for electric vehicles. Additionally, CMAQ funds may support converting a private fueling facility to support alternative fuels through a public-private

partnership agreement. In accordance with 23 U.S.C. 149(c)(2), and 23 U.S.C. 111, regarding the prohibition of commercial activities in the Interstate ROW, CMAQ-funds may be used to establish or support refueling facilities within the Interstate ROW, providing these services are offered at no charge.

Non-transit Vehicles

The CMAQ funds may be used to purchase publicly-owned alternative fuel vehicles, including passenger vehicles, service trucks, street cleaners, and others. However, only publicly owned vehicles providing a dominant transportation function can be fully funded, such as paratransit vans, incident management support vehicles, refuse haulers, and others. Costs associated with converting fleets to run on alternative fuels are also eligible. When non-transit vehicles are purchased through PPPs, only the cost difference between the alternative fuel vehicles and comparable conventional fuel vehicles is eligible. Such vehicles should be fueled by one of the alternative fuels identified in section 301 of the 1992 Energy Policy Act or biodiesel.

Eligible projects also include alternatives to diesel engines and vehicles. Alternative fuel vehicle projects that are implemented as diesel retrofits and involve the replacement of an operable engine-not standard fleet turnover-would be eligible for full Federal participation, i.e. an 80 percent Federal share of the full vehicle cost.

Hybrid Vehicles

Although not defined by the Energy Policy Act of 1992 as alternative fuel vehicles, certain hybrid vehicles that have lower emissions rates than their non-hybrid counterparts may be eligible for CMAQ investment. Hybrid vehicle models that are in part the focus of State legislation addressing HOV exemptions for alternative fuel and low emissions vehicles are considered eligible for CMAQ support.^[56] Other hybrid vehicles will be assessed on a case specific basis, as there is no specific EPA regulation available to rate the lower emissions and energy efficiency advantages of the models involved.

Projects involving heavier vehicles, including refuse haulers and delivery trucks, also may be appropriate for program support. Eligibility should be based on a comparison of the emissions projections of these larger candidate vehicles and other comparable models.

VIII. Project Selection Process-general Conditions

Proposals for CMAQ funding should include a precise description of the project, providing information on its size, scope, location, and timetable. Also, an assessment of the project's expected emission reduction benefits should be completed prior to project selection to better inform the selection of CMAQ projects (See below).

A. Air Quality Analysis

1. Quantitative Analyses

Quantified emissions benefits (i.e., emissions reductions) and disbenefits (i.e., emissions increases) should be included in all project proposals, except where it is not possible to quantify emissions benefits (see Qualitative Assessment, Section VII(A)(2) below). Benefits and disbenefits should be included for all pollutants for which the area is in nonattainment or maintenance status and should include appropriate precursor emissions. Benefits should be listed in a consistent fashion (i.e., kg/day) across projects to allow accurate comparison during the project selection process. Net benefits from all emissions sources involved should be included in the analysis. For example, in analyzing a commuter rail project, net benefits would include emissions reductions from the auto trips avoided, and emissions increases tied to locomotive operation.

State and local transportation and air quality agencies conduct CMAQ-project air quality analyses with different approaches, analytical capabilities, and technical expertise. Section 149(h) of title 23, United States Code, encourages State DOTs and MPOs to consult with State and local air quality agencies in nonattainment and maintenance areas about the estimated emission reductions from CMAQ proposals. However, while no single method is specified, every effort should be taken to ensure that determinations of air quality benefits are credible and based on a reproducible and logical analytical procedure.

2. Qualitative Assessment

Although quantitative analysis of air quality impacts is expected for almost all project types, an exception will be made when it is not possible to accurately quantify emissions benefits. In these cases, qualitative assessments based on reasoned and logical determinations that the projects or programs will decrease emissions and contribute to attainment or maintenance of a NAAQS are acceptable.

Public education, marketing, and other outreach efforts, which can include advertising alternatives to SOV travel, employer outreach, and public education campaigns, may fall into this category. The primary benefit of these activities is enhanced communication and outreach that is expected to influence travel behavior and thus air quality.

3. Analyzing Groups of Projects

In some situations, it may be more appropriate to examine the impacts of comprehensive strategies to improve air quality by grouping projects. For example, transit improvements coupled with demand management to reduce SOV use in a corridor might best be analyzed together. Other examples include linked signalization projects, transit improvements, marketing and outreach programs, and ridesharing programs that affect an entire region or corridor.

4. Tradeoffs

As noted above, emissions benefits should be calculated for all pollutants for which an area is in nonattainment or maintenance status. Some potential projects may lead to benefits for one pollutant and increased emissions for another, especially when the balance involves precursors such as NO_x and VOC. States and MPOs should consult with relevant air agencies to weigh the net benefits of the project.

IX. Program Administration

A. Project Selection-MPO and State Responsibilities

Title 23, United States Code, protects State sovereignty in implementing the Federal-aid highway program. [57] In addition, 23 U.S.C. 145 emphasizes that Title 23 provides for a federally assisted State program. Consequently, all projects in the Federal-aid highway program, including those supported with CMAQ funds, are selected by the State or the State in conjunction with the MPO.

To ensure that projects deemed most effective in reducing motor vehicle emissions and congestion are programmed for early implementation in the TIP, MPOs, State DOTs, and transit agencies should develop CMAQ project selection processes in accordance with the metropolitan and/or statewide planning process under 23 U.S.C. 134 and 135. The selection process should involve State and/or local transportation and air quality agencies. This selection process provides an opportunity for States and/or local agencies to present a case for the selection of eligible projects that will best use CMAQ funding to meet the requirements and advance the goals of the Clean Air Act.

The CMAQ project selection process should be transparent, in writing, and publicly available. The process should identify the agencies involved in rating proposed projects, clarify how projects are rated, and name the committee or group responsible for making the final recommendation to the MPO board or other approving body. The selection process should also clearly identify the basis for rating projects, including emissions benefits, cost-effectiveness, and any other ancillary selection factors such as congestion relief, greenhouse gas reductions, safety, system preservation, access to opportunity, sustainable development and freight, reduced SOV reliance, multimodal benefits, and others. At a minimum, projects should be identified by year and proposed funding source.

Close coordination is encouraged between the State and MPO to ensure that CMAQ funds are used appropriately and to maximize their effectiveness in meeting the CAA requirements. While the program of projects is being developed, the State or MPO should consult with FHWA and FTA to resolve any questions about eligibility. This will ensure that the projects programmed for CMAQ funding in the TIP are all eligible.

States and MPOs should fulfill this responsibility so that nonattainment and maintenance areas are able to make good-faith efforts to attain and maintain the NAAQS by the prescribed deadlines. State DOTs and MPOs should consult with State and local air quality agencies to develop an appropriate project list of CMAQ programming priorities that will have the greatest impact on air quality. In developing this list, MPOs and States should evaluate the cost-effectiveness of the projects and give priority consideration to those that will create the greatest emissions reductions for the least cost, especially in those areas designated nonattainment or maintenance for PM_{2.5}. [58] The MAP-21 calls out diesel retrofits as one type of cost-effective project to which priority consideration shall be given. The EPA has conducted a study of the cost-effectiveness of diesel retrofits in reducing PM, NO_x, and VOC emissions. In addition, the National Academy of Science's Transportation Research Board has evaluated the cost-effectiveness of other CMAQ eligible projects, with a focus on NO_x and HC reductions. [The CMAQ Program: Assessing Ten Years of Experience](#) [59] was completed in response to prior Federal transportation legislation.

Information on the cost-effectiveness of CMAQ-eligible projects can be used as a guidepost in evaluating the

different types of projects under consideration by an MPO or State. However, cost-effectiveness ultimately will depend on local conditions and project specific factors that affect emission reductions and costs. As noted earlier in this guidance, the FHWA and FTA, in consultation with EPA, are developing cost-effectiveness tables and other graphic representations of these relationships to aid States and other project sponsors in selecting the most efficient mix of CMAQ projects.

B. Federal Agency Responsibilities and Coordination

1. Eligibility Determinations

The FTA determines the eligibility of transit projects, and the FHWA determines the eligibility of all other projects. The FHWA, FTA, and EPA field offices should establish and maintain a consultation and coordination process to review CMAQ funding proposals. While the eligibility determination is not made jointly, every effort should be made to satisfy the concerns raised by the agencies' field offices. The FHWA or FTA field offices may request additional information from the State or MPO to help determine eligibility. The consultation process should provide for timely review and handling of CMAQ funding proposals. The FHWA and FTA headquarters offices are available to consult with their field offices on eligibility determinations.

2. Program Administration

The FHWA Division offices and the FTA Regional offices are responsible for administering the CMAQ program. In general, the FHWA transfers funds to FTA to administer CMAQ-funded transit projects. In cases where the FTA lacks statutory authority (e.g., school bus fleets), the FHWA will administer the transit project. For projects that involve transit and non-transit elements, such as park-and-ride lots and intermodal passenger projects, the administering agency is decided on a case-by-case basis. All other projects are administered by the FHWA.

3. Tracking Mandatory/Flexible and PM_{2.5} Set-aside Funds

The FHWA's Chief Financial Officer has established accounting codes in the Fiscal Management Information System (FMIS) to track State investments of CMAQ funds in the mandatory and flexible spending areas, and the set-aside spending for the MAP-21 PM_{2.5} priority. States and other sponsors are encouraged to accurately reflect these CMAQ obligations as they record project data in the FMIS or provide information that ultimately populates the system.

C. Annual Reports

States should prepare annual reports detailing how CMAQ funds have been invested. The CMAQ reporting is not only useful for the FHWA, the FTA, and the general public, but the development and maintenance of a cumulative database of all CMAQ projects by the Secretary is required by MAP-21. In addition, more recent annual reports will be key in supporting case studies for the CMAQ Outcomes Study, a major research effort designed to gauge the impact of the program, and also required by the statute.^[60] The CMAQ annual reports should be submitted through the Web-based [CMAQ Tracking System](#).^[61]

The FHWA Division offices, State DOTs, and MPOs should develop a process for entering and approving the data in a timely manner. This report should be approved by the FHWA Division office by the first day of March following the end of the previous Federal fiscal year (September

30) and cover all CMAQ obligations for that fiscal year. Thus, State DOTs and MPOs should report the data early enough that the Division office has time to review and comment on the report. The report as entered into the CMAQ Tracking System should include:

1. A list of projects funded under CMAQ, in seven main project categories:

- *Transit*: facilities, vehicles, equipment, and related activities, operating assistance for new transit service, etc. Include all transit projects whether administered by the FTA or the FHWA.
- *Shared Ride*: vanpool and carpool programs and parking for shared-ride services.
- *Traffic Flow Improvements*: traffic management and control services, signalization projects, ITS projects, intersection improvements, and construction or dedication of HOV lanes.
- *Demand Management*: trip reduction programs, transportation management plans, flexible work schedule programs, vehicle restriction programs.
- *Pedestrian/Bicycle*: bikeways, storage facilities, promotional activities.
- *I/M and other TCMs*: projects not covered by the above categories.

- *STP/CMAQ*: projects funded with the flexible funds provided in those States receiving the minimum apportionment.

For reporting purposes, obligations for all CMAQ-eligible phases (beginning with the NEPA process) should be reported for the project they support.

2. The amount of CMAQ funds **obligated** or **deobligated** for each project during the Federal fiscal year. Enter deobligations as a negative number. (Do not include Advance Construction funds, as these are not obligations of Federal CMAQ funds. Such projects should be reported later when converted to CMAQ funds.)

3. A quantitative analysis. Given the emphasis MAP-21 places on cost-effectiveness and performance measurement, quantitative assessment should be provided whenever possible. In addition, to the extent this information has been provided historically, a cost-effectiveness assessment for each reported project should be projected as well. Emissions benefits (and disbenefits) should be developed for each project from project-level analyses. Emissions estimates may be derived from EPA's MOVES model, CARB's EMFAC model, and AP-42, among others. Report *projected* emissions benefits expected to occur in the first year that a project is fully operational, in kilograms reduced per day. Benefits should be reported the first time a project is entered into the system, and only then to avoid double counting of benefits. (Because funds may be obligated for a project over several years, an individual CMAQ project may show up in reports for multiple years.) Additionally, all pollutants for which the area is in nonattainment or maintenance status, regardless of which pollutant contributed to the area's weighted population for apportionment, should be addressed. Emissions benefits for deobligations or projects funded with flexible funds (STP/CMAQ) should not be entered.

4. Public-private partnerships and experimental pilot projects should be identified in the system. Transmit electronic versions of completed before-and-after studies for experimental pilot projects to the Division offices.

5. Other requested information: MPO, nonattainment/maintenance area, project description.

6. Optional information: TIP, State and/or FMIS project numbers-highly recommended. Other optional information includes: greenhouse gas emission reductions, cost-effectiveness, safety, congestion relief, and other ancillary benefits.

D. Performance Plan

The MAP-21 established a requirement in 23 U.S.C. 149(l) for a CMAQ performance plan covering MPOs that serve a TMA^[62] of one million or more population and that represent a nonattainment or maintenance area. In addition, performance measures and target setting for emissions and traffic congestion reduction for the CMAQ program will be established through a rulemaking process. The CMAQ performance plan will be completed and updated biennially and will include:

1. Baseline levels for traffic congestion and on-road mobile source emissions for which the area is in nonattainment or maintenance;
2. A progress report on achievements in reaching performance targets described in 23 U.S.C. 150(d);
3. A description of the projects identified for CMAQ funding and a projection of how these projects will contribute to achieving the emission and traffic congestion reduction targets developed pursuant to 23 U.S.C. 150(d);^[63] and
4. A separate report assessing the progress of the projects under the previous plan in achieving the air quality and congestion targets of the previous plan.^[64]

The biennial performance plan will be submitted with the CMAQ annual report for that year. Reports will be turned in to the FHWA Division Office through the State DOT. Further guidance on FHWA's approach to performance management will be provided as the rulemaking process covering changes under MAP-21 continues.

^[1] Sec. 1008, Pub. L. 102-240 (December 18, 1991).

^[2] Sec. 1110, Pub. L. 105-178 (June 9, 1998),

^[3] Sec. 1808, Pub. L. 109-59 (August 10, 2005).

[4] Sec. 1113, Pub. L. 112-141, (July 6, 2012).

[5] PM₁₀ refers to particulate matter 10 microns or less in diameter; PM_{2.5} refers to 2.5 microns or less.

[6] 42 U.S.C. 7506 (Section 176(c) of the CAA). The CAA (42 U.S.C. 7401-7671q) consists of Pub. L. 84-159, 69 Stat. 322 (July 14, 1955); and subsequent amendments.

[7] Sec. 1101, Pub. L. 112-141 (July 6, 2012). Section 149(m) of title 23, United States Code, states that "[a] State may obligate funds apportioned under section 104(b)(2) [of Title 23]" FHWA has interpreted the reference to section 104(b)(2), which is the Surface Transportation Program, as a drafting error. Under prior law, section 104(b)(2) was the funding authorization for the CMAQ program, and MAP-21 placed CMAQ funding in section 104(b)(4). The FHWA intends to apply section 149(m) as though the reference read "funds apportioned under section 104(b)(4)"

[8] 23 U.S.C. 126(a), as amended by Sec. 1509, Pub. L. 112-141 (July 6, 2012).

[9] 23 U.S.C. 149(g), as amended by Sec. 1113(b)(5), Pub. L. 112-141 (July 6, 2012).

[10] 23 U.S.C. 149(i)(2), as amended by Sec. 1113(b)(6)), Pub. L. 112-141 (July 6, 2012).

[11] See, http://www.fhwa.dot.gov/environment/air_quality/cmaq/research/.

[12] See, <http://www.epa.gov/cleandiesel/publications.htm>.

[13] See, <http://www.nap.edu/catalog/10350/the-congestion-mitigation-and-air-quality-improvement-program-assessing-10>.

[14] 23 U.S.C. 149(i)(1)(A), as amended by Sec. 1113(b)(6)).

[15] 42 U.S.C. 7506(c)(2)(B) (Section 176 of the CAA).

[16] 23 U.S.C. 104(c), as amended by Sec. 1105(a), Pub. L. 112-141 (July 6, 2012).

[17] 23 U.S.C. 104(b)(4), as amended by Sec. 1105(a), Pub. L. 112-141 (July 6, 2012).

[18] Subpart 1 classification carried under SAFETEA-LU since removed by EPA rulemaking, see 77 FR 28424 (May 14, 2012), available at <http://www.gpo.gov/fdsys/pkg/FR-2012-05-14/pdf/2012-11232.pdf#page=2>.

[19] 23 U.S.C. 149(k), as amended by Sec. 1113(b)(6), Pub. L. 112-141 (July 6, 2012).

[20] 23 U.S.C. 149(k), as amended by Sec. 1113(b)(6), Pub. L. 112-141 (July 6, 2012).

[21] 23 U.S.C. 149(d), as amended by Sec. 1113(b)(3), Pub. L. 112-141 (July 6, 2012).

[22] 23 U.S.C. 149(d)(2)(A), as amended by Sec. 1113(b)(3), Pub. L. 112-141 (July 6, 2012).

[23] 23 U.S.C. 149(d)(2)(B), as amended by Sec. 1113(b)(3), Pub. L. 112-141 (July 6, 2012).

[24] 23 U.S.C. 149(d)(1), as amended by Sec. 1113(b)(3), Pub. L. 112-141 (July 6, 2012).

[25] See <http://www.fhwa.dot.gov/legsregs/directives/notices/n4510758/n4510758t14.htm>.

[26] 23 U.S.C. 120(c)(1).

[27] See <http://www.fhwa.dot.gov/legsregs/directives/policy/memonfmr20091229.htm>

[28] See <http://www.gpo.gov/fdsys/pkg/FR-2002-01-16/pdf/02-1164.pdf>

[29] See discussion of the term "emissions reduction" in Section VII(A)(3).

[30] 23 U.S.C. 149(b).

[31] 23 U.S.C. 134 and 135.

[32] 40 CFR Part 93, Subpart B.

[33] See 23 U.S.C. 149(b).

[34] 23 U.S.C. 149(c)(3), as amended by Sec. 1113(b)(2), Pub. L. 112-141 (July 6, 2012).

[35] 23 U.S.C. 166.

[36] 23 U.S.C. 149(f), as amended by Sec. 1113(b), Pub. L. 112-141 (July 6, 2012).

[37] 23 U.S.C. 149(f)(2), as amended by Sec. 1113(b), Pub. L. 112-141 (July 6, 2012).

[38] See http://www.whitehouse.gov/sites/default/files/omb/fedreg/2005/083105_a87.pdf.

[39] 23 U.S.C. 149(j), as amended by MAP-21 sec. 1113(b)(6), Pub. L. 112-141 (July 6, 2012).

[40] 23 U.S.C. 149(b)(8).

[41] *Id.*

[42] 23 U.S.C. 149(g)(3), as amended by, Sec. 1113(b)(5), Pub. L. 112-141 (July 6, 2012).

[43] 23 U.S.C. 149(k), as amended by Sec. 1113(b)(6), Pub. L. 112-141 (July 6, 2012).

[44] Note that if a replacement project does not require the permanent destruction of the replaced vehicle or engine, it is not eligible to receive emission reduction credit in a SIP or conformity determination in accordance with EPA policy and guidance (<http://www.epa.gov/otaq/stateresources/transconf/policy.htm#retrofit>).

[45] 23 U.S.C. 149(b)(8)(A)(ii), as amended by Sec. 1113(a)(4), Pub. L. 112-141 (July 6, 2012).

[46] See <http://www.epa.gov/otaq/stateresources/transconf/policy.htm#retrofit>.

[47] 23 U.S.C. 111(b).

[48] See http://ops.fhwa.dot.gov/program_areas/programareas.htm.

[49] See <http://www.ops.fhwa.dot.gov/congestionpricing/>.

[50] 23 U.S.C. 149(b)(1)(A)(i)

[51] See http://www.fhwa.dot.gov/environment/bicycle_pedestrian/.

[52] 23 U.S.C. 149(b)(7), as amended by Sec. 1113(b)(7), Pub. L. 112-141 (July 6, 2012).

[53] Memorandum is at the following link:
http://www.fhwa.dot.gov/environment/air_quality/cmaq/policy_and_guidance/cmaqaltfuel.cfm.

[54] 42 U.S.C. 13211, (Energy Policy Act of 1992, Sec. 301, Pub. L. 102-486 (October 24, 1992)).

[55] 42 U.S.C. 7545(o)(1) (Energy Independence and Security Act of 2007, Sec. 201, Pub. L. 110-140 (December 19, 2007)).

[56] U. S. Department of Energy, Alternative Fuels Data Center, available at
http://www.afdc.energy.gov/laws/matrix?sort_by=incentive.

[57] 23 U.S.C. 145.

[58] 23 U.S.C. 149(g)(3), as amended by Sec. 1113(b)(5), Pub. L. 112-141 (July 6, 2012).

[59] See <http://www.nap.edu/catalog/10350/the-congestion-mitigation-and-air-quality-improvement->

[program-assessing-10](#).

[60] Sec. 1113(c), Pub. L. 112-141 (July 6, 2012).

[61] See http://www.fhwa.dot.gov/environment/air_quality/cmaq/reporting/.

[62] 23 U.S.C. 134(k).

[63] 23 U.S.C. 149(l)(1).

[64] 23 U.S.C. 149(l)(2).