

CMAQ FUNDED DIESEL RETROFIT PROJECTS

[A GUIDE TO UNDERSTANDING AND ACCESSING THE
CONGESTION MITIGATION AND AIR QUALITY PROGRAM]





5291 Corporate Drive
Suite 102
Frederick, MD 21703
www.dieselforum.org

The Diesel Technology Forum is a nonprofit organization dedicated to raising awareness about the progress and potential of diesel technology in all applications. It represents the leaders of the diesel industry including engine and equipment makers, key component manufacturers, fuel producers and emissions control technology manufacturers. The Forum brings together a broad range of diesel stakeholders including diesel users, public & environmental interest groups and government regulators to encourage the exchange of information, findings and ideas about the current and future use of diesel technology. For more information, visit www.dieselforum.org

TABLE OF CONTENTS

I. Introduction.....	3
II. Overview Of The CMAQ Program.....	4
CMAQ Authorization Levels and Apportionments to State Departments of Transportation	4
Allocation of CMAQ Funds Within States.....	4
Relationship Between CMAQ and Transportation Planning Requirements.....	4
SAFETEA-LU Changes to CMAQ and Their Relevance to Diesel Retrofits	5
CMAQ Program Guidance	5
III. CMAQ Program Administration And Process.....	7
Administration Models	7
Project Solicitation Process	7
IV. Project Applications And Selection Criteria	9
Funding Applications	9
Evaluation of Proposed Projects	9
V. Increasing The Competitiveness Of Diesel Retrofit Projects.....	11
Research Regional Priorities and CMAQ Funding History	11
Determine Project Details	12
Identify the Local Match	13
Develop the Proposal	13
Build Support: Communication and Advocacy.....	14
Submit Proposal and Follow Up	15
VI. Post-Award Requirements.....	16
Spending CMAQ Funding Expeditiously.....	16
Understand Reporting Requirements	16
Reimbursement Requirements	16
Successful Implementation	16
VII. Case Studies	17
New York, New York (Ferry).....	17
Richmond, Virginia	18
Stamford, Connecticut	20
New York, New York (Locomotive).....	21

I. INTRODUCTION

Clean diesel technology is unique and unparalleled in terms of its combination of energy-efficiency, power, reliability and durability. Last year's nationwide introduction of ultra-low sulfur diesel (ULSD) fuel paved the way for revolutionary improvements in diesel engine and emissions control technology. As a result, it would take 60 new trucks built in 2007 to equal the particulate matter (PM) emissions of just one truck built in 1988.

While these advancements will contribute to cleaner air in our towns and cities, a diesel engine's inherent reliability and durability could mean that full fleet turnovers embracing these new technologies could take years, thereby delaying full realization of their air quality benefits. Fortunately, some of these technologies can also be applied to older diesel vehicles and equipment that still have several more years of performance ahead. The emissions reductions gained from retrofitting diesel vehicles can range from 25-90%. This obviously has enormous value from an air quality perspective; however, because a diesel retrofit does not improve fuel efficiency or provide economic benefits, it is a hard sell for truckers, school districts and contractors who must justify the investment costs while operating under tight budgets and profit margins. As a result, the growth of federal and state funding programs will be critical to expedite the adoption of these new, cleaner technologies.

The largest of these funding sources is the Congestion Mitigation and Air Quality (CMAQ) Improvement Program, jointly administered by the U.S. Department of Transportation's Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA). Diesel retrofit projects have been eligible for funding under the CMAQ program since its inception. However, new priority for the funding of diesel retrofit projects was established by Congress in its passage of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) in 2005. This priority status has sparked new interest in the CMAQ program from fleet managers, air quality officials, transportation agencies, environmental organizations and others seeking particulate matter (PM) and nitrogen oxide (NOx) emission reductions.

The CMAQ program is quite complex, which when added to the variability of its administration from state to state, makes it extremely difficult to assess the process and prospects for competing for these funds. The Diesel Technology Forum, with assistance from the Emissions Control Technology Association, has written this guide to assist those wishing to learn more about the potential retrofit funding opportunities available under this program. We hope this guide, together with the case studies provided at the end of this document, will provide some insight into the program's administration and offer suggestions on how to increase the competitiveness of diesel retrofit applications.

II. OVERVIEW OF THE CMAQ PROGRAM

The CMAQ program was originally included in the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA).¹ The program was envisioned to provide a source of funding for projects that would help contribute to attainment of the national ambient air quality standards (NAAQS) through reductions in vehicle miles traveled, fuel consumption, or other factors. CMAQ funds are allocated from the Federal Highway Trust Fund and can be used in concert with transportation projects to either reduce traffic congestion, improve air quality, or both. The CMAQ Program has continued through the two subsequent laws authorizing federal surface transportation funding. These are the Transportation Equity Act for the 21st Century (TEA-21)² and the Safe, Accountable, Flexible, Efficient, Transportation Equity Act- A Legacy for Users (SAFETEA-LU).³ The FHWA website provides an overview of the CMAQ program and other current information.⁴

CMAQ Authorization Levels and Apportionments to State Departments of Transportation

According to Section 1101 of Title I of SAFETEA-LU, authorized spending levels for the CMAQ program are as follows:

- A) \$1,667,255,304 for fiscal year 2005;
- B) \$1,694,101,866 for fiscal year 2006;
- C) \$1,721,380,718 for fiscal year 2007;
- D) \$1,749,098,821 for fiscal year 2008; and,
- E) \$1,777,263,247 for fiscal year 2009⁵.

CMAQ funds are apportioned to states based upon a formula weighted for population and the severity of the ozone or carbon monoxide nonattainment or maintenance status as determined by the Environmental Protection Agency (EPA). Although particulate matter levels are not considered in the allocation formula, CMAQ funds

can be spent in ozone, carbon monoxide, PM10 or PM2.5 nonattainment or maintenance areas. All states, including those without nonattainment or maintenance areas, receive a minimum allocation of CMAQ funds each year. For FY07 the minimum allocation is \$8.43 million. These states generally have greater latitude in the type of projects that can be funded. The FHWA website provides weighted population numbers⁶ and the current fiscal year CMAQ apportionments for all states.

Allocation of CMAQ Funds Within States

The state Departments of Transportation (DOTs) have discretion as to how to allocate CMAQ funds within the state. For example, in some states, the DOT provides CMAQ funds to Metropolitan Planning Organizations (MPOs) on the same basis that they were allocated to the state (weighted population, etc.). In other states, the state DOT allocates CMAQ funds directly to project sponsors (which must be public entities) and makes decisions on expenditures statewide. A third example is where the state sets aside a portion of CMAQ funds to be spent on projects selected by the state DOT and provides some CMAQ funds to nonattainment or maintenance area MPOs to make CMAQ project decisions. All of these models are acceptable under federal requirements and it is important to know how the CMAQ project decisions are made in the state in which CMAQ funds are being sought.

Relationship between CMAQ and Transportation Planning Requirements

States and metropolitan areas are subject to federal requirements for statewide and metropolitan transportation planning. Two principal products of this process are the Transportation Improvement Program (TIP) for metropolitan areas and the Statewide Transportation Improvement Program (STIP) for states. All projects that are to be funded with federal transportation funds must be included in a TIP and/or STIP. The TIP and STIP are short-term, four-year capital

1 P.L. 102-240, Dec.18, 1991, Sec. 1008. Congestion Mitigation and Air Quality Improvement Program.

2 P.L. 105-178, June 9, 1998 see: <http://www.fhwa.dot.gov/tea21/index.htm>

3 P.L. 109-59, August 10, 2005 see: <http://www.fhwa.dot.gov/safetealu/legis.htm>

4 <http://www.fhwa.dot.gov/environment/cmaqpgs/index.htm>.

5 P.L. 109-59, August 10, 2005 see: <http://www.fhwa.dot.gov/tea21/index.htm>

6 <http://www.fhwa.dot.gov/environment/cmaqpgs/po-p06a.htm> and <http://www.fhwa.dot.gov/legisregs/directives/notices/n4510640.htm>

improvement programs that show how federal transportation funds will be spent. Complementing these short term programs are Long Range Transportation Plans (LRPs) which provide a strategy for achieving transportation goals over a much longer time horizon (20+ years). It is the LRP which provides the context from which the TIP is drawn.

In addition, metropolitan areas that include air quality nonattainment or maintenance areas are subject to Clean Air Act (CAA) requirements including transportation conformity. Transportation conformity is a process which ensures that transportation plans and TIPs are consistent with air quality plans to attain the National Ambient Air Quality Standards (NAAQS). If projects do not “conform” to a state’s air quality plan, federal transportation funding can be limited to certain types of projects until the conformity issue is resolved. Thus, the use of CMAQ funds for cost-effective air quality projects such as diesel retrofits can help a state balance transportation and air quality objectives.⁷

SAFETEA-LU Changes to CMAQ and Their Relevance to Diesel Retrofits

Under SAFETEA-LU (Sec. 1008 (c)(f)(3)(A)), Congress made a number of changes to the CMAQ program⁸. For the first time, SAFETEA-LU established eligibility for off-road diesel retrofit projects used in construction of highway and transit projects. It also included language requiring that states and MPOs grant priority to funding diesel retrofit projects, other cost effective emission reduction activities, and cost-effective congestion mitigation strategies that provide air quality benefits. Nevertheless, SAFETEA-LU also included a savings clause, which states that this priority is not intended to supersede the decision-making authority of state government agencies. While the savings clause does protect the decision-making authority, it should be noted

that it does not negate the priority consideration established in the preceding paragraph.

The priority language in Sec. 1808 reads, in part,

“(3) *PRIORITY.*—

“(A) IN GENERAL.—States and metropolitan planning organizations shall give priority in distributing funds received for congestion mitigation and air quality projects and programs from apportionments derived from application of sections 104(b)(2)(B) and 104(b)(2)(C) to—

“(i) diesel retrofits, particularly where necessary to facilitate contract compliance, and other cost-effective emission reduction activities, taking into consideration air quality and health effects; and

“(ii) cost-effective congestion mitigation activities that provide air quality benefits.

“(B) SAVINGS.—This paragraph is not intended to disturb the existing authorities and roles of governmental agencies in making final project selections.”

CMAQ Program Guidance

FHWA has issued CMAQ program guidance several times over the past 16 years, with the most recent guidance issued on October 31, 2006 as Interim Program Guidance⁹. This guidance document is quite comprehensive and discusses all aspects of the CMAQ program, including various program changes resulting from the passage of SAFETEA-LU. Several industry and environmental organizations submitted comments on this guidance, many of which urged the FHWA to give a clearer definition of the term “priority” and provide more useful tools to help determine the cost-effectiveness of proposed projects.¹⁰ FHWA is expected to consider these comments

7 For more information on transportation conformity, see http://www.fhwa.dot.gov/environment/conformity/con_bas.htm

8 See: <http://www.fhwa.dot.gov/safetealu/legis.htm>.

9 See: <http://www.fhwa.dot.gov/environment/cmaq06gm.htm>.

10 These comments can be viewed through DOT’s Docket Management System (<http://dms.dot.gov>). It is docket number 26383.

and release a final guidance document in 2007. Until such time as a revised document is released, the Interim Program Guidance is considered to be in effect.

In addition to the Interim Program Guidance, the FHWA has issued a number of guidance documents on specific issues such as eligibility

of high-speed rail projects, guidance on using CMAQ for HOV lanes, eligibility of operating costs for CMAQ funding, and eligibility of freight projects and diesel retrofit programs. All of these guidance documents are available on the FHWA website.¹¹

11 <http://www.fhwa.dot.gov/environment/cmaqpgs/index.htm>.

III. CMAQ PROGRAM ADMINISTRATION AND PROCESS

As noted above, the allocation of CMAQ funds is managed at the discretion of the state DOTs. There are a number of ways that state DOTs have chosen to allocate funding. To find out how the CMAQ process works in a particular region, the place to begin should be with the state DOT and MPO websites. You may also contact the MPO or state DOT directly to speak with the staff associated with the CMAQ program and ask to be put on mailing or email lists, and to receive all materials on project application processes and schedules.

Administration Models

In general, there are four distinct models for administering the CMAQ program and making funding decisions. Each one is described below.

State DOT Leads the Process

In some states, the state DOT directly manages the program and CMAQ projects compete with all other projects seeking state funds. In this case the state DOT develops the application and project selection criteria, but may include others such as transit agencies, MPOs, or air agencies in the evaluation and analysis of proposed projects. The selected projects are then included in the metropolitan areas TIP and the state STIP. One example of a state using this process is Connecticut.

MPOs Lead the Process

In some states, the MPOs in nonattainment and maintenance areas decide how CMAQ funds will be expended in their regions. The MPOs develop the application package and project selection criteria and once sponsors submit applications, a technical committee handles the analysis and evaluation of project submittals. The technical committee often consists of MPO staff and may include other transportation and air quality agency representatives. Under this scenario, the selection process leads into the TIP development process based on a schedule set by the MPO consistent with SAFETEA-LU requirements. After review, the technical committee then recommends projects to be included in the draft Transportation Improvement Program (TIP) which is approved by the MPO policy board. An example of a state that uses this process is California.

MPOs and State DOTs Jointly Manage the Process

In this model, the MPO and the state DOT jointly manage the CMAQ project selection process. This might include development of application criteria and priorities, a scoring system for projects, and other aspects of project selection. Alternatively, the state DOT may work with MPOs to set priorities for types of projects to be funded and then the MPO may carry out the process at the regional level. After the region develops its program, the state DOT may rank projects using an emission calculating methodology or other analysis tools that apply statewide. An example of a state that uses this approach is New York.

State Leads for Rural Nonattainment and Maintenance Areas and MPOs Lead for Metropolitan Areas

A fourth approach to managing the CMAQ program allows MPOs to identify and select projects in the metropolitan areas with the state DOT identifying projects in rural nonattainment or maintenance areas. The MPO includes their projects in the TIP and the state includes the rural area projects in the STIP. An example of a state that uses this approach is Illinois.

Project Solicitation Process

As noted earlier, MPOs develop Long Range Plans (LRPs), also called Regional Transportation Plans (RTPs) to show how the region will invest over the next 20 years to address regional transportation needs. They also develop short-term Transportation Improvement Programs (TIPs) that include projects consistent with the Plan that will be funded in the upcoming four year period. In deciding which projects to fund, MPOs (or state DOTs depending upon the models previously outlined) must ensure that they are both consistent with the LRP and ready for funding in addition to meeting all federal transportation planning requirements. Like the funding allocation process, the project selection process varies from state to state and from MPO to MPO.

Broad Call For Projects

Since MPOs allocate funds from many federal transportation funding sources for projects in metropolitan areas (Surface Transportation

Program Funds, Enhancement Funds, National Highway System Funds, etc.) the MPO may develop a project selection process that solicits applications for all categories of projects on a periodic basis. This “call for projects” might have a standard application for projects with project ranking and selection criteria for each mode of transportation. An example of this approach is the Metropolitan Transportation Authority (MTA) in Los Angeles, CA. In this case, there are eight modal applications and applicants for CMAQ funds apply along with project applicants for all other funding sources. The MTA staff determines whether a project meets CMAQ criteria and which projects should be funded with CMAQ funds, allowing MTA maximum flexibility in allocating various sources of funds and facilitating overall financial management.¹²

Program Specific Call For Projects

In some cases, MPOs have a specific solicitation process for CMAQ funds along with an applica-

¹² http://www.mta.net/projects_plans/call_projects/images/cfp_application_2007.pdf/

tion and project selection process and criteria. The notification process for CMAQ project solicitation may be limited to those public agencies, transit agencies and local jurisdictions that are within the MPO region. It is then left to the jurisdictions to decide whether and how to identify potential projects for CMAQ funding. Interested parties may want to get on the MPO mailing lists for all such notifications in order to be aware of pending funding opportunities. These MPOs usually tailor the application to only CMAQ projects, require emission reduction estimates and other information that will allow for the ranking and prioritization of projects. This model is used in the New York City region where three transportation-coordinating committees of the MPO solicit project proposals.¹³

¹³ For an example of a CMAQ application from this region, see: <http://www.nymtc.org/files/2008-2012%20TIP/MHSTCC%20TIP%20APP%20Hard%20Copy%20Version.pdf>.

IV. PROJECT APPLICATIONS AND SELECTION CRITERIA

The intent of the CMAQ program is clear; to implement projects that will help areas attain or maintain the national ambient air quality standards. However, state DOTs and MPOs have the discretion to develop their own criteria and analysis procedures so long as they meet the objectives of the CMAQ program. The selection criteria for CMAQ projects vary considerably across the country and, in some cases, within states. In most cases a written application is required, with analysis and evaluation of applications conducted by staff from state DOTs, MPOs, and often other transportation stakeholders (e.g., transit agencies, air agencies, etc.). In all cases, the MPO/DOT must be able to demonstrate that emission reductions will be realized from each project.

Funding Applications

Given that the eligibility of non-road diesel retrofits is new and that relatively few diesel retrofits for on-road vehicles have been implemented with CMAQ funds, most application forms for CMAQ funding are not yet geared toward evaluating these types of projects. Some areas have begun to update their CMAQ applications to include diesel retrofit projects and it can be expected that other areas will do so in the future. One example of a state that has designed an application specifically tailored for diesel retrofit projects is Tennessee where the Tennessee DOT recently solicited project applications for locomotives and road construction equipment.¹⁴

Other agencies are using their existing CMAQ applications and some have several mode-specific applications depending on the proposed project. For example, in Chicago, the MPO has an application packet for CMAQ funds that includes ten different categories of projects and an application for each category. One of the ten, the “other” category, is being used in the current round of applications for CMAQ funds for diesel retrofit projects.¹⁵

Evaluation Of Proposed Projects

Quantitative Evaluation

Many different approaches are used to evaluate proposed CMAQ projects. Depending on the nonattainment issues in a region, evaluation of volatile organic compounds (VOC), NO_x, CO and/or PM emissions may be included. Some areas may emphasize reductions in certain pollutants over others. For example, if PM emissions are a concern, a region might weight evaluation criteria to benefit PM reducing projects. In some places, evaluation is done on a quantitative basis using various analytical tools. For example, in New York State a software program called CMAQtraq has been developed and is being used to evaluate all CMAQ applications statewide. MPOs receive funding targets for CMAQ and do not have to compete against each other for CMAQ funds. In California, the Air Resources Board (ARB) has developed tools to evaluate the cost effectiveness of CMAQ projects.¹⁶ The FHWA also sponsored research some years ago to identify analysis tools used for CMAQ projects.¹⁷

Since there are so many different types of projects eligible for CMAQ funding (e.g., technology applications, transportation demand management, alternative fuels projects, bicycle and pedestrian projects, diesel retrofit projects) it is very difficult to establish one evaluation methodology that allows for the distinct differences in categories of projects. Another difficulty in evaluating some categories of projects (e.g., transportation demand management projects) is establishing baseline data that would enable evaluation of CMAQ projects after implementation to ensure that the actual emission reductions reflect the estimates in the project application. FHWA encourages post-implementation evaluation of CMAQ projects and agencies have the ability to use CMAQ funds for the costs of evaluation.

14 See <http://www.tdot.state.tn.us/cmaq/LocomotiveApplication.pdf> and <http://www.tdot.state.tn.us/cmaq/RoadConstructionApplication.doc>

15 See: <http://www.catsmpo.com/prog-cmaq-fy2008.htm>.

16 See: <http://www.arb.ca.gov/planning/tsaq/eval/eval.htm>

17 See: <http://www.fhwa.dot.gov/environment/tcm/tcm3.htm>.

Qualitative Evaluation

While a threshold criterion for all CMAQ-funded projects is that they should be shown to reduce emissions, it is often difficult to provide credible emission reduction estimates.

Quantitative techniques can be difficult to use due to lack of data or uncertainty in assumptions (e.g., How many hours a year does a truck operate? What is the average miles a year a truck travels? At what speeds? etc.), leading some MPOs to rely more on a qualitative approach to evaluation. The U.S. EPA has recently released a diesel emissions “quantifier”¹⁸ and other evaluation tools can be expected to improve as agencies expand the types of projects funded through the CMAQ program. This will be especially important for MPOs that want to take emission reduction credit for CMAQ-funded projects in transportation conformity or in a SIP.

Staff or Technical Review Committee

Whether the CMAQ project selection takes place within an MPO, a state DOT, or as a collaborative process, there is usually a technical committee that reviews, ranks, and prioritizes projects. The technical review committee might include MPO staff, state DOT environmental staff, air agency staff, transit agency representatives, or others. In many

18 <http://cfpub.epa.gov/quantifier/>. EPA does not allow the emissions estimates generated from this tool to be used for transportation conformity or SIP credit.

cases, these committees provide opportunities for project sponsors to make presentations on their application. This is a good opportunity to make the benefits of a potential project known, particularly if the project is not a traditional CMAQ project. The technical committee then recommends which projects should be funded to the policy board of the MPO. It is very important to know the priorities of the technical committee and how your project competes in terms of emission reductions and cost-effectiveness since policy boards tend to rely heavily on staff judgment and recommendations.

Policy Board Review and Approval

The MPO policy board must formally approve the TIP, which includes all projects to be funded with federal transportation funds. Most often the CMAQ funded project recommendations are included in the recommendation on the full TIP. Specific project funding sources may or may not even be reflected in agendas and documents. Alternatively, in some cases, the CMAQ program is managed on a different schedule than the balance of the program and thus, the policy board may specifically review and approve those projects that are to be CMAQ-funded. Since the processes differs from place to place, it is important to know how the CMAQ project selection process works for the area where the application is being submitted.

V. INCREASING THE COMPETITIVENESS OF DIESEL RETROFIT PROJECTS

There are several steps in the process of developing a competitive diesel retrofit application for CMAQ funds. These steps, which are not strictly sequential, are depicted in the chart below:

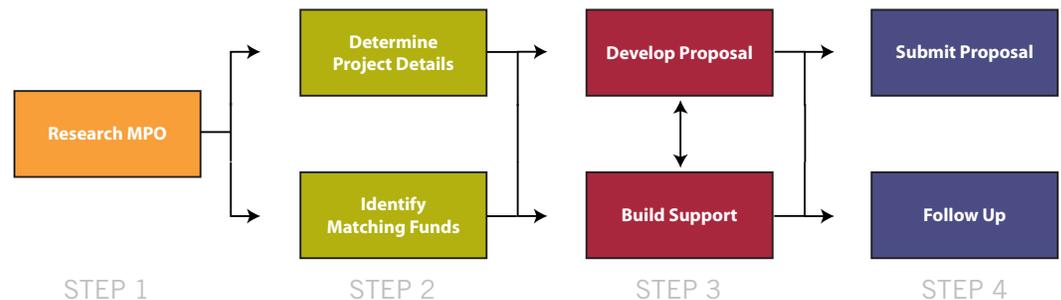
Research Regional Priorities & CMAQ Funding History

In addition to knowing the project solicitation schedule and project selection process, potential CMAQ applicants should familiarize themselves with the Regional Transportation Plan (RTP), which provides the MPO's longer-term goals, investment priorities and possible transportation conformity concerns. Since CMAQ applicants are required to explain how a proposed project is consistent with the RTP, a review of these materials can help applicants make the strongest possible case for funding their project. Project proposals should explain diesel retrofits' relative cost-effectiveness per ton of emissions reduced and may benefit from including examples of similar projects funded elsewhere. Just like other grant-making organizations, only those projects which most effectively advance the MPO or DOT's mission will be funded. A variety of factors will influence the receptivity of new CMAQ project applications including:

- Nonattainment or maintenance status for each pollutant – a region's air quality status for each of six principal pollutants is available at: <http://www.epa.gov/air/urbanair/designations.html>.
- Annual Amount CMAQ Funds – FHWA directives indicating each state's CMAQ appropriations levels can be found on the FHWA website at: <http://www.fhwa.dot.gov/legsregs/directives/notices/n4510640.htm>.
- Status of CMAQ Funds – As noted above, MPOs and state DOTs program their federal transportation funds for multiple years as part of the TIP and STIP respectively. A region/state may have already programmed CMAQ

funds for the next four years (fiscal years 2008–2012). Some areas update their TIPs more frequently than others, which means they may solicit CMAQ projects more frequently.

- Local Match Requirements – The federal share for most eligible projects is usually 80% (90% for projects on the interstate system). There are some exceptions (traffic control signalization projects, commuter carpooling and vanpooling projects, and priority signalization for transit vehicles) which may be funded with 100%



federal funding if they meet the requirements of 23 U.S.C. §120 (c).¹⁹ States and MPOs also have discretion to increase the required local match for CMAQ projects (e.g., 50% CMAQ/50% local match).

- Cash Match vs. Soft Match/In-Kind Services – In some states, the match requirement must be a cash match valued at 20% of the project cost. In other areas, a soft match including in-kind services, the cost of labor to handle project management, or the cost of land or facilities is allowed. It is important to know, prior to filing an application for CMAQ funding, what the local match requirements are and what constitutes a local match.

Depending on the status of the issues noted above, it may be possible to gauge the potential success of a diesel retrofit application. MPOs that exhibit the following characteristics may be more likely to fund diesel retrofit projects with CMAQ money:

¹⁹ http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=browse_usc&docid=Cite:+23USC120.

- 1) **Funding Mechanism:** If the MPO leads the CMAQ process in the region, it may be the best place to focus attention in the search to implement diesel retrofit projects using CMAQ funds. The most efficient scenario would be for the MPO to receive direct allocation of funds from the state DOT.
- 2) **Project Evaluation Criteria:** The cost-effectiveness of diesel retrofits sets this category of projects (both on-road and non-road) apart from other uses of CMAQ funds. Of all CMAQ projects, diesel retrofits rank at the top in terms of cost-effectiveness. This means that diesel retrofit projects have the greatest chance of receiving funding if “cost-effectiveness of emission reductions” is a key criterion against which the MPOs evaluate and rank CMAQ projects. While the MPO or DOT should consider cost-effectiveness in project evaluation criteria, it may not be the highest priority for selecting projects.²⁰
- 3) **Conformity Lapse Concerns:** Conformity lapses trigger the need for quick, efficient and easily implemented emission reduction strategies, making them fertile ground for the consideration of diesel retrofit projects. In particular, as the new PM_{2.5} requirements come into effect and areas face pressure to reduce PM_{2.5} emissions in order to meet conformity requirements, it is reasonable to assume that MPOs will look to diesel retrofits in order to help demonstrate conformity.
- 4) **Diesel Retrofit Experience:** Regions that have successfully implemented diesel retrofit projects in the past are likely to duplicate these successes in the future, especially MPOs that have effectively utilized CMAQ funds for this purpose.
- 5) **Fleet Inventories:** MPOs that have completed or are in the process of conducting diesel fleet inventories have demonstrated interest

in focusing on diesel emissions as a source for future reductions. This interest may eventually translate into funding diesel retrofit projects with CMAQ funds.

Determine Project Details

While it is important to know as much as possible about the CMAQ funding process, an applicant must also conduct considerable research about the proposed project and the factors which will make it competitive in the eyes of the decision makers.

Depending on the applicant, there may or may not be a specific project fully developed. While a transit agency may be focused on their fleet, a county government, local air agency or city agency may have a general commitment to improve the environment through any number of retrofit candidates including school bus fleets, publicly owned fleets, commuter/transit buses, garbage haulers and sanitation trucks, port or rail equipment, or highway maintenance/snow removal vehicles.

Public Private Partnerships (PPP)

CMAQ funds have been used in the past for public-private partnerships and this will likely increase with the SAFETEA-LU emphasis on cost-effective diesel emission reductions for both on- and off-road vehicles and equipment. All CMAQ projects must have a public sponsor.²¹ Additionally, PPPs must include a written agreement on how funds will be used, how long the asset will be operational, what happens if the asset is taken out of service, legal and liability issues, etc. It is important to understand these contractual requirements and all associated issues in advance of applying for funds. Some areas are requiring that written commitments to implement a PPP are made prior to the evaluation and project selection process.

Once a candidate fleet or vehicles have been identified, it is important to determine what technology would be most cost effective since cost-effectiveness is among the most important

20 Additional information on retrofit cost-effectiveness for NOx and PM reductions can be found at <http://www.dieselforum.org> and <http://www.ectausa.com>.

21 See: <http://www.fhwa.dot.gov/environment/cmaq06gd.pdf>

funding determinants. Retrofit technology manufacturers can help determine the most cost-effective options for your fleet and provide emissions reduction information to justify the investment in the retrofit. Information on the fleet size, engine type, age, operating temperature and operating hours are needed to answer these questions. A list of EPA certified retrofit technologies and a list of manufacturers is available on EPA's website.²²

Identify the Local Match

As noted earlier, virtually all CMAQ projects require a 20% match of local funds. This has been a problem for many applicants that face tight budgets or do not reap an economic benefit from the retrofit. One example of this challenge can be found in Illinois where a CMAQ project to retrofit school buses was approved but never completed since the school district could not secure the local matching funds. In order to avoid a situation where CMAQ funds go unused and risk a lapse of funds, most MPOs and state DOTs require that the match be identified and secured to as part of the application process. In some cases, applicants have even offered higher matching rates (i.e. 30% vs. 20%) in order to increase the attractiveness of their application and better leverage CMAQ funds. Local matches can come from private sources or a variety of federal, state and local programs. More information about many of these sources can be found in the Diesel Technology Forum's retrofit toolkit.²³

Develop The Proposal

As noted earlier, the lack of experience using CMAQ funds for diesel retrofit means that not all DOTs or MPOs have applications that will facilitate the evaluation of these types of projects. In order to maximize the application's competitiveness, it is strongly suggested that the following information be submitted even if not explicitly requested as part of the application.

Clear Project Description and Cost Estimate

One of the most important elements of the CMAQ proposal is the project description. The

²² <http://www.epa.gov/otaq/retrofit/retroverifiedlist.htm>

²³ <http://www.dieselforum.org/retrofit-tool-kit-homepage/>

Develop the Proposal and Build Support

A complete proposal should contain the following elements (as directed by the application guidelines):

- ✓ Project Data
- ✓ Emissions Data
- ✓ Financial Data including commitment of local match
- ✓ Letters of Support

Be prepared to provide the following:	
Project Data	
✓	Project sponsor/sponsoring public agency
✓	Project description (justification, details on equipment or vehicles to be retrofit, etc.)
✓	Map of the project area
✓	Project duration
✓	Air quality or congestion mitigation impact
Emissions Data	
✓	Detailed emissions analysis (including methodology)
✓	Nonattainment status of area
✓	If the project is included in a SIP, the emission reductions assumed in the SIP
Financial Data	
✓	Financial plan
✓	Certification of matching funds
✓	Operation and maintenance costs (including who will maintain the project)
Letters of Support	
✓	Government officials
✓	Broad coalition of stakeholders

project description should include information on the project sponsor and the justifications for completing the project as related to the MPO's or DOT's mission. Additional information regarding the fleet size, types of vehicles, project duration should also be included.

Furthermore, fairly accurate project cost estimates should be provided. Transportation projects are renowned for cost overruns and many MPOs and state DOTs are minimizing their risk by limiting project costs to the original estimates approved by the MPO policy board. In such cases, the state DOTs and MPOs may not contribute additional funds to account for the shortfall, leaving the private entity legally obligated to complete the project regardless of its increased cost.

Emission Reduction Benefits

It is vital to know the project's emission reduction benefits and to be able to explain how these figures were calculated. MPOs, state DOTs or air agencies may make independent emission reduction estimates on proposed projects. Some states, such as New York and Nevada, have developed emission reduction methodologies that may be used for this analysis. Several organizations and government agencies also offer methodologies.²⁴

Cost Effectiveness Per Ton

As the SAFETEA-LU CMAQ provisions noted, diesel retrofits and other cost effective emission reduction projects are to be given priority for funding. MPOs often need to know emission reductions on a tons per day basis for transportation conformity purposes, so information presented in tons per year and tons per day by pollutant impacted will likely be favorably received. Calculation sources should be cited so the analysis can be independently verified. One such methodology has been developed by the California Air Resources Board.²⁵

Maps and Graphics Showing Project Proposal

If appropriate, it may be helpful and/or required to include maps or graphics as part of the project

proposal. For example, in the case of a truck retrofit, it might be helpful to show the retrofit device, how it works, and what it would look like on the truck being retrofitted. Additionally, a map could be provided of the area that the truck plans operate after the retrofit is installed and its relationship to the nonattainment area. Similarly, a proposal to clean up locomotives might include a map of the rail yard where the locomotives are domiciled.

Build Support: Communication and Advocacy

An essential part of being successful in securing CMAQ funds is to implement an effective communications and advocacy effort. This should be done simultaneously with actual project development so that feedback and insights from project supporters can be used to improve the final proposal. Advocacy should not end however, with the submission of the project proposal. There should be an ongoing advocacy effort up until the project is finally approved in a TIP and STIP. Even after approval, it may be necessary to continue follow-up with the MPO/DOT until the project is actually approved by the FHWA. Specific elements of this effort include, but are not limited to the following:

Identify and Meet with Public Sponsor

Since all CMAQ projects require a public sponsor, it is essential that you identify and meet with the sponsor early in the process to present and discuss the proposal. In most cases, MPOs or state DOTs require the public sponsor be identified and committed to the project at the application stage. Without a public sponsor, it may not be possible to submit an application. Examples of possible public sponsors include a city, state DOT, port authority, airport authority, MPO, air agency, or transit agency.

Face-to-Face Meeting with MPO and/or State DOT Staff

Meet the MPO and/or state DOT staff to notify them about the retrofit proposal. The MPO staff may have ideas on how to enhance the project's competitiveness, and may have contacts that could help develop a project concept into an application (e.g., transit bus retrofits). Be prepared to answer staff questions and provide follow up

24 <http://www.ccap.org/safe/guidebook.html> and <http://epa.gov/otaaq/stateresources/transconf/policy/420b06005.pdf>

25 <http://www.arb.ca.gov/planning/tsaq/eval/eval.htm>.

if needed. Given the new emphasis on using CMAQ funds for cost-effective on- and off-road diesel emission reduction projects, it is important to know the MPO staff and the issues and concerns that they may have regarding the proposal. MPO staff will be familiar with air quality and any related conformity issues in the region and can be valuable advocates if they understand and support the proposal.

State DOTs are also good resources for air quality expertise and are usually involved in the transportation conformity process. DOT staff have an appreciation for the need to find cost-effective ways to reduce emissions and often have technical expertise that supports MPO activities such as travel demand or emissions modeling. Finally, the state DOT is the conduit through which all CMAQ funds flow so state DOT support can only help.

Advocacy Efforts and Building Support

Once a project application is developed, applicants may want to share the project's potential emission reduction benefits with interested stakeholders such as environmental groups, elected officials, local governments, school districts, non-profit organizations, community groups, labor unions, health based organizations, etc. Some application processes allow for written endorsements from supporting organizations and if this is the case, it is a good opportunity to highlight widespread support for the proposal. In other areas, it might be best to submit letters of support at another juncture in the process. The MPO may be able to advise about the best time to secure letters of support.

In many cases public hearings are held to receive testimony on the TIP and any proposed TIP amendments. After notice has been given that a hearing will be held, and before the date of the hearing, the comments may be submitted to the agency regarding particular projects. It would be useful to have supporters prepare written comments for the agency, as well as have a physical presence at the hearing to demonstrate support.

Presentation to Technical Committee, Facility Tours, Product Demonstrations

In some cases, applicants are allowed to make a presentation on their application to the technical review committee. As noted above, this provides an excellent opportunity to explain the project's competitiveness relative to others and its potential value to the MPO. Presentations should be crisp, concise and limited to the time allowed by the technical committee.

MPO staff may also be interested in an offer to tour a facility or see an example of the retro-fit technology in use. If so, this affords another opportunity to make the case for funding the project.

Submit Proposal and Follow up

Submitting a complete project proposal on time and in accordance with the specific directions of the funding agency is essential. However, this is not the final step in this process. As noted above, it is essential to follow-up and advocate for the approval of the project in the TIP/STIP until finally approved by the MPO Policy Board and/or state DOT. Even after project approval, the project sponsor will need to continue working with the MPO/DOT throughout project implementation.

VI. POST-AWARD REQUIREMENTS

Spending CMAQ Funding Expeditiously

One of the often- heard criticisms of the CMAQ program is that funds do not get expended expeditiously. After receiving notification of a CMAQ grant, it is important to understand the time limits on fund expenditures and be prepared to implement the project in that timeframe. Generally speaking, federal funds must be obligated to contracts and/or expended within four years of federal apportionment. This means, for example, that funds apportioned in federal fiscal year 2007 (October 1, 2006) would have to be obligated or expended by September 30, 2010. States may also have their own requirements on how quickly CMAQ funds must be obligated. It is essential to know the state's policy on spending CMAQ funds once awarded to ensure that your project is not at risk of losing funding due to inadequate progress in implementation. If the funds are not obligated or expended on time, the funds lapse which means they are no longer available to the state and/or MPO. When the FHWA issues a directive apportioning funds, it notes on the cover page the date by which the funds must be obligated.²⁶

Understand Reporting Requirements

State DOTs and MPOs have reporting requirements for CMAQ-funded projects. The reporting requirements vary within the states; however, all state DOTs must submit annual reports to the FHWA for CMAQ projects and FHWA maintains an automated database that is used to develop annual reports on the CMAQ program.

²⁶ <http://www.fhwa.dot.gov/legsregs/directives/notices/n4510640.htm>

See: <http://www.fhwa.dot.gov/environment/cmaqpgs/tracksys/index.htm>.

Reimbursement Requirements

The CMAQ program is a reimbursement program and it requires that states and MPOs expend funds to implement projects and subsequently be reimbursed with CMAQ funds. Project sponsors must have a way to advance the funds to implement their projects in the first instance. When a PPP is implemented, ordinarily the private sector entity would be required to advance the implementation funds and then be reimbursed according to the public-private sector agreement discussed earlier.

Successful implementation

In order to successfully implement any federally funded transportation project, a project sponsor must be cognizant of all federal requirements and attentive to delivering the project on schedule and within budget. Important federal requirements include competitive bidding, National Environmental Policy Act (NEPA) requirements, criteria for eligible project expenses, periodic reporting requirements, and grant "close-out" requirements when a project is completed. Information about these requirements and issues are available on FHWA's CMAQ website.²⁷

VII. CASE STUDIES

²⁷ <http://www.fhwa.dot.gov/environment/cmaq/progasst.htm>

New York, New York (Ferry)

Overview

In 2003/2004, the New York City Department of Transportation (NYCDOT) secured \$1,800,000 in CMAQ funds for the New York City Private Ferry Emission Reduction project which will retrofit 42 privately owned ferries in New York Harbor.

Background on the Lead Agency

According to its website, the NYCDOT's mission "is to provide for the safe, efficient and environmentally responsible movement of people and goods in the City of New York and to maintain and enhance the transportation infrastructure crucial to the economic vitality and quality of life of our primary customers, City residents."²⁸

Background on the Fleet Owner/Operator

Diesel engine emissions from the private ferry fleets operating in the New York Harbor are responsible for significant amounts of nitrogen oxides (NOx), particulates, and other pollutants. It has been estimated that since 9/11, ferry traffic in the Harbor has doubled.²⁹

According to information made available by the New York City Council, "New York Waterway (NYW) is the largest of the four operators providing 32,000 daily passenger trips on nineteen ferry routes between New Jersey and New York City. Seastreak provides 4,000 daily passenger trips between New Jersey and Manhattan, specifically, high speed ferry service from Highlands, NJ; Atlantic Highlands, NJ; and South Amboy, NJ to Pier 11 (Wall St.) and E. 34th St. New York Water Taxi (NYWT) provides approximately 2,000 passenger trips per day on six vessels. Each of these vessels has a 74-passenger capacity and NYWT has two 149-passenger water taxis on order. Compared to Seastreak and NYW, NYWT operates smaller vessels that are designed to make frequent stops on a route instead of shuttling passengers between two points."³⁰

28 <http://www.nyc.gov/html/dot/html/about/dotdoes.html>

29 <http://www.dieselforum.org/retrofit-tool-kit-homepage/success-stories/marine-vessels/>

30 New York City Council, "Oversight: The Fiscal Viability of Private Ferry Operators as a Mass Transit Conveyer to and From New York City," December 9, 2004 available at: <http://webdocs.nycouncil.info/attachments/64150.htm?CFID=1908326&CFTOKEN=36960698>

NEW YORK CITY PRIVATE FERRY PROJECT SNAPSHOT

Type	Nonroad
Sector	Ferry
Location	New York, NY
Lead Agency	NY City DOT
Status	Expected completion in 2008
Project	NYC Private Ferry Emissions Reduction
Funding Amount	\$1.8 million (CMAQ), \$4.8 million (FTA)
Type of Vehicles	Ferries
Type of Technology	DOC; SCR; FBC; Water Injection; Repowering
Number of Vehicles	42
Emissions Reductions	Reductions of 360 tons per year of NOx (or 36% reduction), and 11 tons per year of PM (or 49% reduction)

Attainment Status of the Area

EPA has designated NY metropolitan region as nonattainment for both ozone and particulate matter.

Project Information

The New York City Private Ferry Emissions Reduction Project is the first known successful CMAQ nonroad diesel retrofit project. The project, managed by New York State Energy and Research Development Authority (NYSERDA), began with \$1.8 million in CMAQ funding secured by NYCDOT. Subsequently, the Federal Transit Administration (FTA) provided a \$4.8 million grant to expand the program. In addition to NYSERDA, NYCDOT and FTA, other primary project sponsors and stakeholders include FHWA, the Port Authority of New York and New Jersey, and the EPA.

The project consists of an initial evaluation and demonstration program and a small pilot deployment program. Its mission was to reduce fleet emissions from private ferries, with particular focus on fine particulate matter and NOx. More than 40 ferries operated by NY Waterway, NY WaterTaxi and SeaStreak have been retrofitted. The original goal was to reduce NOx by 15% to

30% and PM by 20 to 60%. Currently, the project is realizing reductions of 360 tons per year of NOx (a 36% reduction), and 11 tons per year of PM (or 49% reduction).

As part of the program Seaworthy Systems Inc., along with Environment Canada, ESI International, and the Northeast States for Coordinated Air Use Management (NESCAUM) are charged with conducting the field demonstration with the private ferry fleets. Based on the work of these three organizations, the project will provide real world data on the costs, benefits and the range of emission control options available for the different types of ferries operating in the Harbor.

The project has been broken up into several stages, many of which are complete including the fleet characterization, initial fleet data logging, engineering analysis of best-fit technology components and the initial demonstration of ultra-low sulfur diesel (ULSD). Demonstration and deployment are underway and the project completion date is estimated to be in 2008.³¹

Richmond, Virginia

Overview

In FY 97, Richmond Regional Planning District Commission awarded the Greater Richmond Transit Co (GRTC), the transit agency for the Richmond, VA area, \$300,000 in CMAQ funds to overhaul 27 vehicle engines.

Background on the MPO

The Richmond Regional Planning District Commission is a “regional planning agency with major emphasis in the areas of transportation, local technical assistance and information services including demographic, economic and geographic information systems.”³² Formed in November of 1969, the Richmond Regional Planning District has a membership population

RICHMOND PROJECT SNAPSHOT

Type	Onroad
Sector	Transit
Location	Richmond, VA
Lead Agency	The Richmond Regional Planning District Commission
Status	Completed
Project	Bus Engine Retrofit
Funding Amount	\$300,000 in CMAQ funds
Type of Vehicles	Buses
Type of Technology	Engine Rebuild
Number of Vehicles	27
Emissions Reductions	The project reduced emissions of VOCs by 1.9 kg/day and NOx by 2.7 kg/day.

of more than 900,000 and a land area of greater than 2,100 square miles.³³

Background on the Fleet Owner/Operator

GRTC is a non-profit, jointly owned by the City of Richmond and Chesterfield County, that provides public transportation service in the greater Richmond area.³⁴ GRTC operates a fleet of 169 transit buses. These buses average approximately 34,000 miles per year each.

Attainment Status of the Area

In November 1991, the Environmental Protection Agency (EPA) classified the Richmond area as a moderate ozone nonattainment area. In 1997, EPA approved the Commonwealth of Virginia’s request for redesignation of the Richmond area from nonattainment to maintenance. On June 15, 2004, Richmond was designated as moderate non-attainment areas under the final designations for the EPA’s new eight-hour ozone standard. However, in September of the same year, EPA again reclassified Richmond. At the request of the Virginia Department of Environmental Quality, the EPA agreed to reclassify Richmond from

31 Frank S. Ralbovsky, “NYC Private Ferry Emissions Reduction Program: A Project Update,” Presented to the Northeast Clean Ports Workshop, February 1, 2006, available at: <http://www.northeastdiesel.org/pdf/Technical-NYSERDA.pdf> (slide 12)

32 The Richmond Regional Planning District Commission, available at: <http://www.richmondregional.org/>

33 Ibid.

34 GRTC Transit System, “Inside GRTC” available at: <http://www.ridegrtc.com/FrontEnd/HTML/index.html>

Richmond Area MPO Study Area Boundary

Study Area Boundary extension approved by the MPO April 13, 2006

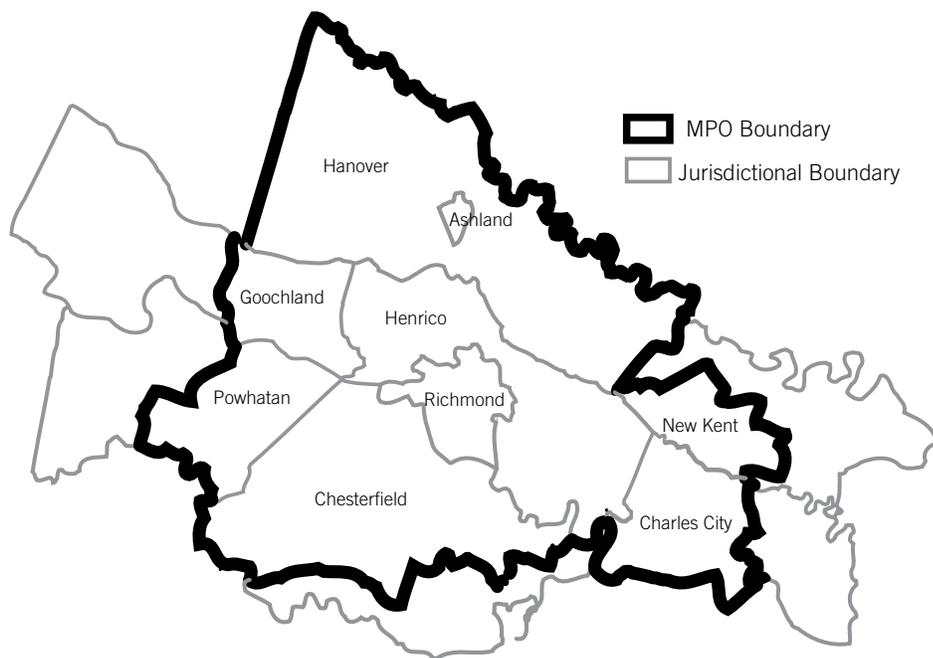


Image from the Richmond Regional Planning District Commission website at www.richmondregional.org

moderate to marginal non-attainment under the federal standards.

Project Information

In April 1993, the EPA published the final Retrofit/Rebuild Requirements for 1993 and Earlier Model Year Urban Buses.³⁵ The requirements were designed to reduce particulate matter emissions in urban areas. This was accomplished by establishing emission levels for any bus whose engine was rebuilt or replaced after January 1, 1995 if that bus operated in metropolitan areas with a 1980 population of 750,000 or more.

In 1996, GRTC began upgrading its fleet through rebuilding the bus engines and bus replacements. To date, GRTC estimates that roughly 50 buses, or about 30 % of the fleet, have rebuilt or replaced,³⁶ including the 27 that were rebuilt as part of this CMAQ project. The

\$300,000 that GRTC received in CMAQ funds were used on MY (model year) 1988-90 engines. The Emissions Reduction Analysis submitted for the project by GRTC stated that “[b]uses not scheduled for replacement in GRTC’s current bus order are subject to low emission engine upgrades mandated by the Clean Air Act (CAA). This project would put GRTC in compliance with the CAA requirement and improve the region’s air quality. Staff estimates the engine upgrades would have the impact of reducing 500 vehicle trips per day.”³⁷ For this reason, when GRTC purchased 27 rebuilt Detroit Diesel engines to meet the new standard, particulate filters were also installed.

Precise emission data is not available for this project because no testing was conducted after the new engines and filters were in place. However, according to the annual report filed with the

³⁵ 40 CFR 85 Subpart O

³⁶ Interview with GRTC official (02/08/07) familiar with the CMAQ project

³⁷ Personal email (dated 03/02/06) from Richmond Regional Planning District Commission official familiar with the project. Original data was submitted on March 28, 1996.

FHWA, the project reduced emissions of VOCs by 1.9 kg/day and NOx by 2.7 kg/day. Despite the fact that filters were included in the project, particulate matter reductions were not calculated for these vehicles.

Project Selection Process

The MPO project review and selection process in place at the time this project was selected and funded was based on allocating a certain percentage of the MPO's CMAQ and Regional Surface Transportation Program (RSTP) allocation to local governments and transportation agencies. Later, as part of a triennial federal certification review, the MPO learned that this process was not acceptable and as of December 2004 has developed a new process.³⁸ Since December 2004, the MPO has been allocating all of its RSTP and CMAQ funds to existing projects programmed in the TIP, with the exception of a few new projects that have been added to the TIP on a case by case basis.

The Richmond Regional Planning District Commission was scheduled to start this new review and selection process in 2007; however, due to the large funding balances remaining on current projects, the MPO will only be able to allocate funds to existing projects. Additionally, it is important to note that within the past couple of years, VDOT has implemented a policy of providing match funds for all RSTP and CMAQ projects (i.e., 80% federal and 20% state). Prior to the implementation of this policy, the local jurisdiction or agency sponsoring a particular project provided the 20% local match. For this particular retrofit project, the GRTC provided the local match funds, though it is unclear precisely where these funds came from. They may have been a combination of state and local funds, or, as one GRTC official suggested, the match may have come from GRTC operating funds.

Outcome and Lessons Learned

Overall, the project was deemed very successful. A GRTC representative who had worked on the project was very happy with the results, and particularly pleased that the agency was able to

³⁸ A copy of the report on this process is posted on the MPO's web site (<http://www.richmondregional.org>).

use CMAQ money to help with cleaning up the fleet rather than having to use operating funds. There were no major technical issues with the technology; a few of the filters did plug initially, but they were replaced. GRTC provided its own maintenance and installation for the filters and the engine rebuilds. In the next year, GRTC will begin a schedule of bus replacements to bring their fleet up to the 2007 emissions standards.

Stamford, Connecticut

Overview

The Connecticut Department of Transportation (ConnDOT) has been a leader when it comes to using CMAQ funds for diesel retrofit projects. It is estimated that ConnDOT sets aside between 10 and 15% of CMAQ funds annually for this purpose. In one such project, ConnDOT allocated \$205,605 in CMAQ funds to retrofit 34 transit buses in the city of Stamford.

Background on the Lead Agency

According to its website, ConnDOT "works with the public, transportation partners, state and federal legislators, and other state and local agencies to provide a safe and efficient transportation system for the people traveling in Connecticut."³⁹

Background on the Fleet Owner/Operator

CT Transit is the ConnDOT owned bus service. CT Transit provides local and express bus services in the Hartford, New Haven and Stamford region. Annually, CT Transit accommodates nearly 27 million passengers.⁴⁰

Attainment Status of the Area

Connecticut is presently in non-attainment for ozone and PM2.5.

Project Information

In a pioneering effort, CT Transit retrofitted 34 of the 55 transit buses in the Stamford fleet with

³⁹ <http://www.ct.gov/dot/cwp/view.asp?a=1380&Q=302028>

⁴⁰ <http://www.cttransit.com/>

diesel particulate filters and required the use ULSD.⁴¹

According to a ConnDOT representative, the state of Connecticut is enthusiastic about retrofits and found no hesitancy in using CMAQ funds for this “extremely successful project.”⁴² In addition, he noted that the state was compelled to do the project because of environmental justice and urban environmental issues. He did not believe that the project resulted in the region receiving any conformity credits.

Before beginning, ConnDOT did significant research in order to avoid unexpected complications. ConnDOT worked carefully to choose which engines and technologies worked best together, specifically focusing on the ability of the filter to handle fuel contamination and the temperature of the engines. This project used \$205,065 to retrofit 31 transit buses with diesel particulate filters (DPFs). In February 2006, ConnDOT expressed satisfaction with the technology, and has not had to prematurely replace any filters. The representative was not sure of the exact date that the retrofits were installed, but stated that they have been on the vehicles for a “couple of years.”

CMAQ Process

The State of Connecticut receives roughly \$30 million in CMAQ funds annually. Of this, \$10 million goes directly to support Rideshare and transit initiatives. Of the remaining \$20 million, approximately \$15 million is directed toward traffic flow improvement projects proposed through the 10 MPOs in CT. The remainder is available to fund projects that are CMAQ eligible. The projects are reviewed and scored by ConnDOT.

The Department of Environmental Protection (CTDEP) is working to have a more direct role in that process and discussions are underway to ensure projects are reviewed by CTDEP for

STAMFORD PROJECT SNAPSHOT

Type	Onroad
Sector	Transit
Location	Stamford, CT
Lead Agency	Connecticut Department of Transportation
Status	Completed
Project	Connecticut Transit—Stamford Division
Funding Amount	\$205,605
Type of Vehicles	Transit Buses
Type of Technology	DPF
Number of Vehicles	34
Emissions Reductions	

air quality benefits. In addition to this project, CMAQ funding has also been allocated to fund retrofits of both the New Haven and Hartford transit fleets, resulting in 275 retrofits. The New Haven and Hartford projects will come out of the \$10 million budget allocated to transit, as did the Stamford project.

Outcome and Lessons Learned

The ConnDOT representative stated that they found the diesel particulate filters to be more effective than anticipated, with reductions found across all categories. Some problems were reported with select engines equipped with Exhaust Gas Recirculation (EGR), however CT Transit is working with the manufacturer to overcome this problem.⁴³

New York, New York (Locomotive)

Overview

Currently work is underway in New York to secure funds for a Locomotive Retrofit and Emission Monitoring Program. The program is seeking \$1,000,000 in CMAQ funds.

Background on the Lead Agency

According to its website, the mission of the New York State Department of Transportation is to

41 Special Act No. 05-7, “Connecticut Clean Diesel Plan,” Report to the Joint Committee on the Environment of the Connecticut General Assembly January 2006 available at: <http://www.ct.gov/dep/lib/dep/air/diesel/docs/ctcleandieselplanfinal.pdf>. p 39

42 Phone interview with CONNDOT representative 02/02/06.

43 Special Act No. 05-7, “Connecticut Clean Diesel Plan,” Report to the Joint Committee on the Environment of the Connecticut General Assembly January 2006 available at: <http://www.ct.gov/dep/lib/dep/air/diesel/docs/ctcleandieselplanfinal.pdf>. p 39

“ensure our customers – those who live, work and travel in New York State – have a safe, efficient, balanced and environmentally sound transportation system.”⁴⁴

Background on the Fleet Owner/Operator

Providence & Worcester Railroad Company (PWRR) is a regional freight railroad operating in the Northeast. In fact, PWRR has “exclusive and perpetual right to conduct freight operations over the Northeast Corridor between New Haven, Connecticut and the Massachusetts/Rhode Island border.”⁴⁵ According to the project proposal, PWRR “operates a line-haul rail connection, utilizing a mix of eight locomotives (typically four at a time) between Queens, NY and New Haven, CT with substantial operation in NY State including a switch yard connection with [New York & Atlantic Railway (NYA)] at Fresh Pond Junction in Queens.”⁴⁶ Additionally, NYA operates 13 locomotives from the Fresh Pond Junction location.

Attainment Status of the Area

EPA has designated New York City as nonattainment for both ozone and particulate matter.

Project Information

The project, which is comprised of both an in-use monitoring program and a retrofit emission reduction project, is currently in the proposal phase and has not yet been allocated any funding. Funding for the first phase is being sought from CMAQ, with PWRR and NYA providing non-monetary cost share “in the form of locomotive and maintenance personnel hours during technology installation.”⁴⁷

As stated above, the project will have two components. The first would “entail a six-month in-use emission monitoring component including a mix of remote sensing device (RSD) and on-board portable emission monitoring (PEMs) at both the switchyard (Fresh Pond Junction) and on the

NEW YORK LOCOMOTIVE RETROFIT PROJECT SNAPSHOT

Type	Nonroad
Sector	Locomotive
Location	New York and Connecticut
Lead Agency	NY DOT
Status	Proposal state
Project	Locomotive Retrofit and Emission Monitoring Program
Funding Amount	\$1 million (CMAQ)
Type of Vehicles	Locomotives
Type of Technology	APUs and DOCs
Number of Vehicles	23
Emissions Reductions	2.2 tons per year of PM and 56.2 tons per year of NOx.

main line corridor (Hell Gate Bridge).⁴⁸ The project proposal notes that the benefits of in-use testing include:

- 1) “Identifying the ambient effects of implementing emission controls and idle reduction; and
- 2) Characterizing the emission and fuel consumption benefits of the rebuild/retrofit program.”⁴⁹

Additionally, the proposed project will contain an emission reductions component. These reductions will be achieved through a combination of auxiliary power unit (APU) based idle minimization technology, low NOx rebuild components, and diesel oxidation catalysts (DOC).

In total the project is estimated to reduce 2.2 tons per year of PM and 56.2 tons per year of NOx. Of this, “78% of the NOx and 77% of the PM reductions achieved will be within NY State.”⁵⁰

44 <https://www.nysdot.gov/portal/page/portal/about-nysdot/mission>

45 <http://www.pwrr.com/>

46 M.J. Bradley & Associates, “Locomotive Retrofit and Emission Monitoring Program,” November 2006.

47 Ibid.

48 Ibid.

49 Ibid.

50 Ibid.

