

Air Quality Community of Practice

Establishing and Coordinating Motor Vehicle Emissions Budgets

State-of-the-Practice

Requested by:

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Disclaimer

This State-of-the-Practice Report summarizes the discussions of Air Quality Community of Practice members who spoke as individual members of the community and did not necessarily represent their agency’s views or positions. In addition, the contents of the report do not necessarily represent the views or positions of AASHTO or the Center for Environmental Excellence.

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INTRODUCTION

The Center for Environmental Excellence by AASHTO (Center) established an Air Quality Community of Practice (COP) in 2008. The purpose of the Air Quality COP is to assemble a group of State DOT practitioners to have a focused discussion on the state of the practice, emerging issues, and research data needs on particular issues, as well as on other air quality issues of interest. This effort has essentially two goals, the first of which is to extend the State DOTs' networks and contacts, enabling them to share experiences and learn from each other. In this regard, this effort expands and supplements a November 2008 Air Quality Practitioner's Conference that was held in Albany, New York¹. The second goal is to develop State-of-the-Practice Reports on selected focus areas. To date, the Air Quality COP effort has produced the following reports:

- State-of-the-Practice Report on *Mobile Source Air Toxics* in May 2009;²
- State-of-the-Practice Report on *Short Term Impacts from Construction Equipment and Operations* in March 2010;³
- State-of-the-Practice Report on *Air Quality Interagency Consultation* in June 2010;⁴
- State-of-the-Practice Report on *Establishing Air Quality Background Concentration Levels for Projects* in December 2010;⁵
- State-of-the-Practice Report on *Use of Transportation Control Measures and Reasonably Available Control Measures in Approved or Submitted State Implementation Plans* in April 2011;⁶ and
- State-of-the-Practice Report on *Public Education Programs* in January 2012.⁷

The Air Quality COP consists of representatives from thirteen State DOTs, FHWA, FTA, and AASHTO. The Air Quality COP members considered a range of possible topic areas and agreed on *Establishing and Coordinating Motor Vehicle Emissions Budgets* for this report. States are required to develop motor vehicle emissions budgets (MVEBs) as part of their air quality State Implementation Plans (SIPs) in nonattainment and maintenance areas. Local transportation planning organizations use the MVEB to demonstrate that projected emissions from transportation plans, programs, and projects are equal to, or less than the budget, as required by the federal transportation conformity rule. These budgets serve as a cap for motor vehicle emissions for the various pollutants in these areas. While MVEBs have been in use subsequent to the Clean Air Act (CAA) Amendments of 1990 and issuances of the US Environmental Protection Agency's (EPA's) Transportation Conformity regulations, recent changes to the National Ambient Air Quality Standards

(NAAQS) for nitrogen dioxide (NO₂), particulate matter (PM), and ozone together with changes to emissions models have prompted interest among State DOTs to take a fresh look at how State DOTs, Metropolitan Planning Organizations (MPOs), and State Air Agencies work together and the processes they use to establish emissions budgets. The State DOTs are interested in streamlining this process as much as possible so they can more quickly adjust the budgets, when necessary and appropriate to do so, in response to changes in the air quality standards and emissions models. This is especially true when dealing with emissions model changes, since such changes could result in conformity determinations being made with the latest emissions model when the SIP MVEBs were established using a different model. In some cases, this mismatch in models can create a situation where projected motor vehicle emissions budgets exceed the MVEB in the SIP because the new models result in higher emissions.

If an area can not demonstrate conformity according to schedules prescribed in the EPA conformity regulations, areas have a 1-year grace period to make the determination before there is a conformity lapse and the use of Federal-aid funds is restricted. During the 12 month grace period, only transportation projects in the most recent conforming metropolitan transportation plan and transportation improvement program (TIP) can be funded or approved. Once an area is in a conformity lapse, the use of Federal transportation funds is restricted to "exempt projects" such as safety projects and certain mass transit projects, transportation control measures (TCMs) from an approved SIP, and project phases that were authorized by the FHWA/FTA prior to the area going into nonconformity. However, during this period no new non-exempt projects can be amended into the metropolitan transportation plan and TIP.

If an area's emissions estimates exceed the MVEB(s), transportation officials have the option of changing the mix or timing of the projects in the metropolitan transportation plan and/or TIP to bring them back under budget. However, the strategies that transportation officials have under their control to reduce emissions may not be sufficient by themselves to meet the MVEBs. It may therefore be necessary to revise the MVEBs in the SIP, especially if the SIP budgets were developed using an older model that projected fewer emissions. To accomplish this, a SIP revision is required and the State air quality agency may need to identify additional control measures from on-road sources or other sources of pollution in order to increase the budget for on-road emissions. Since this process can be time consuming it is important to have a streamlined and well coordinated process for establishing and revising MVEBs.

This focus area will therefore summarize: EPA and FHWA/FTA requirements and guidance documents for establishing MVEBs; how the various State DOTs, MPOs, and State Air Quality agencies coordinate and work together to develop, modify, and implement the budgets; State practices for changing the MVEBs in response to changes to air quality standards and/or emissions models; technical details such as which models were used to generate traffic and emissions data; and research needs.

EPA REGULATIONS/GUIDANCE

EPA has established a number of regulatory and guidance documents that relate to the establishment and coordination of MVEBs, and how changes to air quality standards and models can affect the conformity process and potentially the MVEBs. The following is a summary of several of these documents and websites.

Transportation Conformity Rule:⁸ EPA's Transportation Conformity Regulations contain several sections that are applicable to MVEBs. The most relevant sections for purposes of this report are:

Section 93.101, Definitions, Motor Vehicle Emissions Budget: This section defines a MVEB as that portion of the total allowable emissions defined in the submitted or approved control strategy implementation plan revision or maintenance plan for a certain date for the purpose of meeting reasonable further progress milestones or demonstrating attainment or maintenance of the NAAQS, for any criteria pollutant or its precursors, allocated to highway and transit vehicle use and emissions.

Section 93.101, Definitions, Safety Margin: This section defines a safety margin as the amount by which the total projected emissions from all sources of a given pollutant are less than the total emissions that would satisfy the applicable requirement for reasonable further progress, attainment, or maintenance.

Section 93.102(d) Grace period for new nonattainment areas: This section indicates that the transportation conformity provisions will not apply with respect to a NAAQS for 12 months following the effective date of a final nonattainment designation for areas or portions of areas which have been continuously designated attainment or not designated for any NAAQS for ozone, carbon monoxide (CO), PM₁₀, PM_{2.5} or NO₂ since 1990 and are subsequently redesignated to nonattainment or designated nonattainment for any NAAQS for any of these pollutants.

Section 93.105, Consultation: This section requires States to provide detailed consultation procedures whereby representatives of the MPOs, and State and local transportation and air quality planning agencies, and other organizations with responsibilities for developing, submitting, or implementing provisions of a SIP must consult with each other and with EPA, FHWA, and FTA on the development of the SIP, the transportation plan, the TIP, and associated conformity determinations. The rule lists specific topics that the consultation procedures must address such as the roles and responsibilities of the various agencies involved in the SIP development process, the process for evaluating and choosing a model and associated methods and assumptions for use in conformity determinations, evaluating events that will trigger new conformity determinations (i.e. EPA adequacy finding on a new MVEB, revisions to a MVEB, etc.). States are given

the flexibility to tailor their consultation process to address the specific topics so that they are effective in their own State.

Section 93.111 Criteria and procedures: Latest emissions model: This section indicates that conformity determinations must be based on the latest available emission model approved by EPA. If a new model is established, EPA will consultate with DOT to establish a grace period before the new model must be used for transportation conformity purposes. The grace period will be published in the *Federal Register*.

Section 93.118, Criteria and procedures: Motor vehicle emissions budgets: This section indicates that the transportation plan, TIP, and project not from a conforming transportation plan and TIP must be consistent with the MVEB(s) in an approved SIP, or to the MVEB in submitted SIP revisions or maintenance plans if EPA has declared the MVEB(s) adequate for transportation conformity purposes, and the adequacy finding is effective. However, it notes that MVEBs in submitted SIPs do not supersede the MVEBs in approved SIPs for the same CAA requirement unless EPA specifies otherwise in its SIP approval. Conformity is satisfied if it is demonstrated that emissions of the applicable pollutants or pollutant precursors are less than or equal to the MVEB(s) established in the approved or submitted SIP(s).

Section 93.124, Using the motor vehicle emissions budget in the applicable implementation plan (or implementation plan submission): This section indicates that the MPO and DOT may not infer additions to the MVEB(s) that are not explicitly intended by approved or submitted SIP(s). Unless the SIP explicitly quantifies the amount by which motor vehicle emissions could be higher while still allowing a demonstration of compliance with the milestone, attainment, or maintenance requirement and explicitly states an intent that some or all of this additional amount should be available to the MPO and DOT in the emissions budget for conformity purposes, the MPO may not interpret the budget to be higher than the implementation plan's estimate of future emissions. In addition it indicates that a conformity demonstration shall not trade emissions among budgets which the approved or submitted SIP allocates for different pollutants or precursors, or among budgets allocated to motor vehicles and other sources, unless the implementation plan establishes appropriate mechanisms for such trades.

Final Rule: Air Quality Designations for the 2008 National Ambient Air Quality Standards:⁹ On April 30, 2012, EPA issued air quality designations for most areas in the United States for the 2008 primary and secondary ozone NAAQS. Each area that is designated as not meeting the 2008 standards is assigned a nonattainment classification of Marginal (closest to meeting the standards), Moderate, Serious, Severe, or Extreme (farthest from meeting the standards), as described in the Implementation Rule noted below. States must submit SIPs to EPA by 2015 - within three years of the final nonattainment area designations - that demonstrate attainment of the new standards.

Areas designated nonattainment must have a new regional conformity determination with analysis for the 2008 standards not later than 1 year after the effective date (probably in July 2012). Initial analysis will follow “interim” conformity procedures, probably using emission budgets (if available) for the 1997 standards. Future analyses will use emission budgets developed for the 2015 SIP submittals, after EPA finds them “adequate.”

Final Rule: *Implementation of the 2008 National Ambient Air Quality Standards for Ozone: Nonattainment Area Classifications Approach, Attainment Deadlines and Revocation of the 1997 Ozone Standards for Transportation Conformity Purposes:*¹⁰ On April 30, 2012, EPA also signed a final rule to establish the air quality thresholds that define the classifications assigned to all nonattainment areas for the 2008 ozone NAAQS which were promulgated on March 12, 2008. In the rule EPA is also granting reclassification for selected nonattainment areas that voluntarily reclassified under the 1997 ozone NAAQS; establishes December 31 of each relevant calendar year as the attainment date for all nonattainment area classification categories; and provides for the revocation of the 1997 ozone NAAQS for transportation conformity purposes to occur one year after the effective date of designations for the 2008 ozone NAAQS. This is the “Phase 1” Implementation rule; a second rule will be finalized later to cover matters related to SIP development.

Proposed Rule: *Implementation of the 2008 National Ambient Air Quality Standards for Ozone: Nonattainment Area Classifications Approach, Attainment Deadlines and Revocation of the 1997 Ozone Standards for Transportation Conformity Purposes:*¹¹ In this rule EPA proposed: 1) thresholds for classifying nonattainment areas for the 2008 ozone NAAQS promulgated by EPA on March 12, 2008; 2) the timing of attainment dates for each classification; and 3) to revoke the 1997 ozone NAAQS 1-year after the effective date of designations for the 2008 ozone NAAQS for transportation conformity purposes only.

Transportation Conformity Rule Restructuring Amendments:¹² This final rule restructures several sections of the existing transportation conformity rule and makes changes to certain definitions so that the rule applies to any new or revised NAAQS that EPA establishes. These amendments are intended to minimize the need to make future changes to the conformity rule to reference new or revised NAAQS. EPA has previously undertaken two conformity rulemakings for the purpose of addressing a new or revised NAAQS, and due to CAA requirements, EPA will continue to establish such new or revised standards in the future.

Transportation Conformity Rule: *MOVES Regional Grace Period Extension:*¹³ This final rule extends the grace period before the Motor Vehicle Emission Simulator model (currently MOVES2010a) is required for regional emissions analyses for transportation conformity determinations. This final rule provides an additional year to the previously established two-year conformity grace period, which is now extended to March 2, 2013. In addition to providing an additional year before this new model must be used for regional conformity analysis, it gives State and local agencies additional time to update their SIP MVEBs with this new model if they so choose.

EPA Official Release of the MOVES2010 Motor Vehicle Emissions Model for Emissions Inventories in SIPs and Transportation Conformity:¹⁴ This notice, dated March 2, 2010, approves the use of MOVES2010 in official SIP submissions to EPA and for regional transportation conformity analyses outside of California. It also started a two-year grace period before the MOVES2010 emission model is required to be used in new regional emissions analyses for transportation conformity determinations outside of California. In the notice, EPA strongly encourages areas to use the interagency consultation process to examine how MOVES2010 will affect future transportation plan and TIP conformity determinations so, if necessary, SIPs and MVEBs can be revised with MOVES2010 or transportation plans and TIPs can be revised as appropriate prior to the end of the MOVES2010 conformity grace period. EPA also encourages State and local air agencies to consider how the release of MOVES2010 will affect analyses supporting SIP submissions under development. However, SIPs that have already been approved by EPA are not required to be revised solely based on existence of the new model. Also, States that had already submitted SIPs or submitted SIPs shortly after EPA's approval of MOVES2010 are not required to revise these SIPs simply because a new motor vehicle emissions model is now available.

EPA - Policy Guidance on the Use of MOVES2010 and Subsequent Minor Revisions for State Implementation Plan Development, Transportation Conformity, and Other Purposes:¹⁵ This guidance describes how and when to use the MOVES2010 emissions model (and subsequent minor revisions like MOVES2010b) for SIP development, transportation conformity determinations, and other purposes. It also includes information regarding the use of MOVES2010 model for estimating mobile source air toxics and greenhouse gas (GHG) emissions. The guidance indicates that while there are no SIP or conformity requirements for these emissions, MOVES2010 is EPA's best tool for estimating air toxic and greenhouse gas emissions from on-road mobile sources.

Chronological List of Additional Transportation Conformity Rulemakings: EPA has a website that lists the sequence of the conformity rule amendments since transportation conformity was amended as part of the 1990 CAA. State and local officials are encouraged to visit this website to provide them with a full understanding of the conformity process and the importance of having a good interagency coordination process to effectively and efficiently deal with changes to MVEBs and air quality standards. The website can be found at <http://www.epa.gov/otaq/stateresources/transconf/conf-regs-c.htm>.

Policy and Technical Guidance Website: This EPA website contains policy guidance issued by EPA and/or U.S. DOT to assist state and local transportation and air quality agencies implement the transportation conformity program, including how to handle changes to MVEBs and air quality standards. Policy guidance can be found on a range of topics such as changes to or revocation of air quality standards; how the requirements for conformity determinations apply in areas that contain more than one MPO, a donut area, parts of more than one state, or any combination which in turn require more detailed interagency consultation procedures; the process EPA uses to determine the adequacy of MVEBs in the SIP; etc. It also includes information on the use of the MOVES2010 and the EMFAC (short for Emission Factor) 2007 emissions models. The EMFAC2007 model

is a computer model that can estimate emission rates for on-road mobile sources and is used for SIP and transportation conformity purposes in California. The website can be found at <http://www.epa.gov/otaq/stateresources/transconf/policy.htm>.

FHWA/FTA REGULATIONS/GUIDANCE

Statewide Transportation Planning; Metropolitan Transportation Planning; Final Rule:¹⁶ The transportation planning regulations require States to have a documented process(es) for consulting with and considering the concerns of non-metropolitan officials when making transportation decisions in their Statewide Transportation Planning and Programming processes. Section 23 CFR 450.208 specifically addresses “Coordination of Planning Process Activities” and lists the types of coordination efforts the statewide planning process must address. The one most relevant to air quality is the requirement for State air quality agencies to coordinate with the State DOT to develop the transportation portion of the SIP consistent with the CAA. The metropolitan planning provisions also contain coordination requirements. For example, Section 450.312(b) requires a written agreement between the State DOT, State air quality agency, affected local agencies, and the MPO if the metropolitan planning area (MPA) does not include the entire air quality nonattainment or maintenance area. The agreement, among other things, needs to describe the cooperative planning process of all projects outside the MPA but within the nonattainment or maintenance area. In addition, Section 450.312(c) requires that a written agreement be established between the MPO and the designated air quality planning agency if the MPO in a nonattainment or maintenance area is not the designated air quality planning agency under the CAA. The agreement, among other things, must describe their respective roles and responsibilities for air quality related transportation planning.

Transportation Conformity Website: This website has a wide range of information on the conformity process including the transportation conformity rule, the EPA MOVES model, guidance for PM hotspot quantitative analysis, etc. Perhaps the most relevant information for this report is the information on selected transportation conformity practices for a number of areas around the country, including examples of interagency coordination procedures. This site also contains nonattainment area maps for the 1997 8-hour ozone and PM_{2.5} air quality standards. The website can be found at http://www.fhwa.dot.gov/environment/air_quality/conformity/.

Transportation Conformity: A Basic Guide for State and Local Officials:¹⁷ This Guide was prepared to help State and local officials understand the basic provisions of the transportation conformity process and how conformity requirements relate to transportation investments in their communities. The guide provides an overview of the major elements of the conformity process, and discusses the implications of conformity on metropolitan transportation plans, TIPs, and transportation projects. With regard to interagency consultation, the guide states that, “Experience has shown that ongoing coordination and communication between Federal, State and local transportation and air

quality agencies is vital to a smoothly running conformity process. In addition, a clear understanding of roles and responsibilities of participating agencies is essential.”

*Air Quality Planning for Transportation Officials:*¹⁸ This FHWA guide provides an overview of the transportation-related air quality planning requirements of the CAA. The guide stresses the importance of transportation agencies participating in the air quality planning process to ensure decisions reflect community priorities including mobility. It also states that the transportation and air quality planning processes must be firmly integrated, and that transportation agencies need to be fully aware of interagency consultation requirements.

OVERVIEW OF THE STATE-OF-THE-PRACTICE FOR ESTABLISHING AND COORDINATING MOTOR VEHICLE EMISSIONS BUDGETS

The State DOTs, MPOs, and State Air Quality agencies coordinate and work together to develop, modify, and implement the MVEBs in their SIPs. Having good procedures and interagency processes in place is necessary to quickly and efficiently respond to changes in air quality standards and/or emissions models which can result in the need to update the emissions budgets and/or make new conformity determinations. For example, States are now in a period of transitioning over to the use of the new MOVES 2010 or MOVES 2010a emissions models for regional and project level conformity determinations. In addition, EPA released MOVES 2010b in March 2012, and plans to release MOVES 2013 in early 2013. EPA indicates that while MOVES 2010b is not considered a new model and results in only small impacts on emissions, MOVES 2013 will be a major update and will be considered a new model for SIP and conformity purposes with a new conformity grace period. So while improvements and updates to emissions models will continue to be made, it's likely that MVEBs in the SIPs will need to be continually refined and updated with the use of the new models in order to avoid conformity problems.

The State DOT's are using a variety of procedures and interagency coordination processes for establishing and coordinating MVEBs. These efforts include such processes as forming Interagency Consultation Groups and air quality working groups; developing Memorandum of Agreements (MOAs) and by-laws for conducting interagency consultation meetings; and developing Transportation Conformity SIPs which include consultation procedures. The State DOTs have found that these efforts help to foster positive interagency coordination, consultation, and cooperation between Federal, State and local transportation and air quality agencies.

This section contains an overview of selected State DOT's procedures for establishing and coordinating the development of their MVEBs. The section is not intended to be an all inclusive listing of practices in the selected States. Many States have multiple nonattainment and maintenance areas and each of these areas can have multiple budgets as

a result of the various mobile source pollutants. Consequently, this section provides information on selected area(s) and selected pollutant(s) within the States noted below that represent the overall processes in their respective States.

California

The San Francisco Bay Area

The San Francisco Bay Area is designated as an ozone (marginal) nonattainment area for the 1997 8-hour ozone standards, and nonattainment for the 2006 PM_{2.5} standard. It is also designated as a CO maintenance area. The Bay Area Air Quality Management District (BAAQMD) has primary responsibility for protecting air quality in the San Francisco Bay Area. In collaboration with its regional agency partners, the Metropolitan Transportation Commission (MTC) and the Association of Bay Area Governments (ABAG), the Air District is responsible for preparing SIPs to attain State and national air quality standards, including the ozone and PM standards.

In 2001, a revised Bay Area 2001 Ozone Attainment Plan was prepared for the 1-hour ozone standards by the BAAQMD, the MTC, and the ABAG.¹⁹ The plan was prepared in response to EPA's partial approval and partial disapproval of the Bay Area's 1999 Ozone Attainment Plan, and established new volatile organic compounds (VOC) and Nitrogen Oxides (NOx) emission budgets for 2006 for all subsequent years. These budgets were found adequate by EPA for conformity purposes on February 14, 2002. Although the Bay Area is designated a marginal nonattainment area for the 1997 8-hour ozone standards, it attained the standards on time and has a "clean data" finding that makes development of a SIP with MVEBs for those standards unnecessary. However, no ozone maintenance SIP has been developed. Therefore, the regional transportation plan and TIP conformity determinations for ozone are based (under "interim" analysis procedures specified in the conformity regulations) on the previous 1-hour ozone budgets. The area is nonattainment (marginal) for the 2008 ozone standards but no SIP development has yet started for these standards.

The California Air Resources Board (CARB) submitted a revised CO maintenance SIP in 2004 for 10 areas in California that have attained the federal air quality standards for CO since the early 1990s.²⁰ This maintenance plan contains CO MVEBs for 2003 and 2018 which apply to all subsequent analysis years as required by the federal conformity regulation, including: any interim year conformity analyses, the 2018 horizon year, and years beyond 2018.

The PM_{2.5} SIP has not yet been submitted but will include MVEBs. The Air District staff plans to issue a draft version of the PM_{2.5} SIP for public review and comment in the spring of 2012 and submit the SIP to CARB by September 2012. CARB will review the PM_{2.5} SIP and plans to forward the plan to EPA by December 2012.

Analysis Tools

The 2006 NO_x and VOC budgets for the ozone nonattainment area were based on MTC's estimate of 2000 – 2010 travel growth. Vehicle activity data include both vehicle miles traveled (VMT) and vehicle trips. County VMT distribution by speed was supplied by MTC. CARB applied EMFAC 2000/BURDEN emission factors for 2006 to develop a motor vehicle inventory for that year. The on-road motor vehicle inventory was then reduced by the benefit of the proposed TCMs and Smog Check Program improvements. While the Bay Area uses EMFCA2007 for conformity purposes, they have been able to demonstrate conformity against the budgets that were developed using EMFAC 2000. Traffic data for future analysis years was developed using travel demand model outputs and EMFAC fleet/usage planning assumptions. The travel demand model was verified several years ago using Highway Performance Monitoring System (HPMS) data.

The CO MVEBs were derived from the projected inventory in each of the 10 planning areas using the EMFAC 2002 emissions model, with minor adjustments. The travel activity data used with EMFAC2002 emission rates were updated by the local transportation agencies, and reflect the latest planning assumptions in force at the time the budgets were developed.

The EMFAC 2007 emissions model is the current model in California for conformity use, and is being used to develop PM_{2.5} emission budgets. However, the fleet and other planning assumptions are hard-coded into EMFAC, so a new version of the model must be released by CARB at least every five years to meet FHWA's "latest planning assumptions" requirements. The EMFAC 2011 model was released by CARB in October 2011, and is currently being reviewed by EPA and CARB to ensure that it is usable for both regional and project-level analysis purposes before EPA officially "makes it available" for conformity use. FHWA has notified the Bay Area that the planning assumptions in EMFAC 2007 have expired and that it will no longer make conformity determinations based on analysis that uses EMFAC 2007 after December 31, 2012. It's not yet clear whether and which MVEBs in the Bay Area may need revision to address the EMFAC 2011 model for conformity purposes. In certain other parts of the state, test runs indicate that some EMFAC 2007 based MVEBs cannot be met using EMFAC 2011 so SIP revisions will be necessary in those areas. At present, about half of the major nonattainment areas appear to need at least one MVEB updated.

Interagency Consultation

The BAAQMD develops the SIP including MVEBs and control measures with input on travel demand modeling for assorted analysis years from the MPO (MTC) and following the interagency consultation procedures as shown in the Conformity SIP. Once approved by MTC and BAAQMD, the SIP including MVEBs is submitted to CARB for review and submittal to EPA for SIP approval. Caltrans is involved in the consultation process.

The Bay Area's Conformity SIP implements the conformity interagency consultation process for the nine-county San Francisco Bay Area.²¹ It includes procedures to be used

by the MTC, Caltrans, State and local air quality agencies, FHWA/FTA, and EPA when making conformity determinations. Staff members from the various agencies that are involved in the conformity process participate in a Task Force of the Bay Area Partnership. This “Conformity Task Force” is open to all interested parties and at a minimum includes staff from Federal, State and local transportation and air quality agencies, regional planning agencies, and transit operators. The document covers consultation procedures for the regional transportation plan and TIP; general consultation structure and process; circulation of materials and receiving of comments; agency roles and responsibilities for travel demand forecasts, emissions models, demographics, etc.; and consultation on conformity analyses. The document also covers consultation for SIP development; model assumptions, design, and data collection; monitoring of TCMs; project and program procedures; conflict resolution; and public involvement.

Caltrans reports that there is less formal consultation between CARB, local/regional air districts, MPOs, and Regional Transportation Planning Agencies (RTPA) during the development of the EMFAC emissions model, other than for the acquisition of MPO/RTPA travel demand model run output which is used with modifications in developing regional emission inventory estimate processes within the model. Vehicle fleet registration data used by CARB when updating EMFAC are acquired from the state Department of Motor Vehicles and are usually not reviewed as part of the formal interagency consultation.

Colorado

Denver Metro Area/North Front Range 1997 8-hour Ozone Nonattainment Area

On November 20, 2007, EPA designated the Denver Metro Area/North Front Range (DMA/NFR) region as a marginal 8-hour ozone nonattainment area for the 1997 ozone standards. The area includes seven full counties consisting of Adams, Arapahoe, Boulder, Broomfield, Denver, Douglas, Jefferson and two partial counties consisting of Larimer and Weld. After extensive analysis, and stakeholder and public meetings, the Colorado Air Quality Control Commission adopted an Ozone Action Plan²² on December 12, 2008, to demonstrate attainment by 2010. The overall action plan includes elements that were included in the federally-enforceable SIP, such as emissions inventories, and MVEBs for transportation conformity purposes. Colorado submitted its 2010 attainment demonstration SIP, including the MVEBs, for the 1997 8-hour ozone standards to EPA on June 18, 2009, and on August 5, 2011, EPA published a Final Rule which approved the SIP and MVEBs.²³

The 8-hour ozone nonattainment area encompasses multiple MPOs and transportation planning regions. The Denver Regional Council of Governments (DRCOG) is the MPO responsible for transportation planning in the seven-county Denver metropolitan area and a portion of southwest Weld County. Likewise, the North Front Range Transportation and Air Quality Planning Council (NFRT&AQPC) is the MPO responsible for transportation planning in the urbanized portions of Larimer and Weld counties. Finally, the Upper Front Range Transportation Planning Region (UFRTPR), which is not a

designated MPO, is responsible for transportation planning in the rural portions of Larimer, Weld, and Morgan counties.

Because of the different institutional arrangements and different schedules and timelines for transportation plans and programs development, the ozone SIP establishes 2010 VOC and NO_x MVEBs for two subareas as well as for the total nonattainment area for the two MPOs serving the Denver Metro Area/North Front Range nonattainment area. The nonattainment-area wide budgets are to be used for the initial conformity determination; however, consistent with EPA regulations and guidance, the MPOs may use the subarea budgets for subsequent conformity determinations.

On April 30, 2012, EPA designated the DMA/NFR region area as a marginal nonattainment area for the 2008 ozone standards.

Analysis Tools

The SIP indicates that for the underlying transportation modeling, the roadway and transit links in DRCOG's 2005 and 2015 Cycle 2 (2007) networks were truncated to include only the portion of the network within the 8-hour ozone nonattainment area. VMT estimates from these networks were interpolated to obtain 2006 and 2010 baseline VMT estimates for purposes of developing the SIP emissions inventories. Likewise, the 2005 and 2015 (2007) networks from the North Front Range MPO were truncated to include only the portion of the network within the 8-hour ozone nonattainment area. The VMT estimates were interpolated to obtain 2006 and 2010 baseline VMT estimates. Where there was overlap between the North Front Range and DRCOG networks in Weld County, the DRCOG network was used. In areas where there was no MPO network, the FHWA HPMS and CDOT networks, plus a growth factor, were used to calculate VMT.

The 2006 and 2010 VMT estimates were used with emission factors obtained from the EPA Mobile 6.2 Emission Factor Model to calculate emissions. Emissions were calculated on a link-by-link basis. Speeds were obtained from the MPO transportation networks and the roadway speed limit was used for CDOT links. The ambient temperatures for the regional emissions analysis were derived from the meteorological modeling performed for the attainment demonstration for a typical ozone episode period. The motor vehicle mix was obtained from the CDOT automated traffic counters.

Appendix C of the Technical Support Document for the 8-Hour Ozone SIP contains detailed information on model assumptions and parameters for each source category.²⁴ Colorado has also developed a document, entitled, *The SIP Planning Process: An Overview of The Clean Air Act's (CAA) Requirements for State Implementation Plan (SIP) Development & Approval*.²⁵ This document includes a summary of the SIP planning process for the CO, PM, and ozone nonattainment and maintenance areas. This document also summarizes the various agency responsibilities as well as the MVEBs that have been established for each of the CO, PM, and ozone areas.

Interagency Consultation

Colorado had developed several MOAs to facilitate the interagency consultation process. The MOA for the *Transportation Conformity Evaluations Conducted Under the Eight Hour Ozone Standards*²⁶ provides guidance, and establishes the agency responsibilities and coordination procedures, for the establishment of MVEB for the 8-hour ozone nonattainment or maintenance areas and subareas. In addition, it includes interagency consultation procedures and agency responsibilities for the conformity review process and for dispute resolution. This MOA includes the Colorado Department of Public Health and Environment; CDOT; Regional Air Quality Council, which is the lead air quality planning agency for the Denver metropolitan area; DRCOG; NFRT&AQPC, which is the lead air quality planning agency for the North Front Range region; and UFRTRP.

The MOA for *Air Quality and Transportation Integration*²⁷ defines the specific roles and responsibilities of the Air Pollution Control Division of the Colorado Department of Public Health and Environment and the Division of Transportation Development of CDOT in the performance of air quality and transportation planning and modeling for the nonattainment and maintenance areas in the State. The MOA includes the agencies' responsibilities for evaluating the models and input parameters such as population and population growth rates, employment, number of households, daily VMT, speeds by roadway type, etc. for the conformity process. It also includes agency responsibilities for development of the SIPs.

Maryland

Baltimore 1997 8-Hour Ozone Nonattainment Area:

The Baltimore region was designated a moderate 1997 8-hour ozone nonattainment area. The region includes Baltimore City and the surrounding Counties of Baltimore, Carroll, Anne Arundel, Howard and Harford. On June 15, 2007, the Maryland Department of the Environment (MDE) submitted an Ozone SIP to demonstrate how they were going to attain the 8-hour ozone standards by June 15, 2010, in the Baltimore metropolitan area.²⁸ A significant portion of this document is related to reducing NOx and VOC emissions in order to reduce ozone pollution. The MDE is responsible for creating an inventory for NOx and VOC emissions that details the current and predicted future emissions created by all the different emission sources in the state.

Analysis Tools

The 2008 and 2009 mobile emissions inventories were calculated using EPA's MOBILE6.2 emissions model and the HPMS model. The SIP indicates that VMT data is usually obtained from the Maryland DOT (MDOT), and the Baltimore Metropolitan Council (BMC). MDOT is responsible for the traffic related inputs to include VMT and speed estimates using the State Highway Administration (SHA) universal database, hourly patterns, vehicle classification patterns, VMT adjustments, seasonal patterns and growth rates based on HPMS. MDOT maintains a reformatted version of the SHA universal

database that includes all of the state highway segments in the State. It is updated every three years in conjunction with EPA's National Emissions Inventories requirements. Maryland implemented the PPSUITE post-processing software for MOVES emissions modeling and it is used by MDOT, MDE and BMC. PPSUITE is a post-processor for emission analysis developed to link a transportation model to the federally-sponsored MOBILE emission estimates program. It represents an enhanced version of the former Post Processor for Air Quality (PPAQ). PPSUITE uses the universal database to calculate VMT and speeds needed for emissions modeling for SIP development and inventories. The BMC transportation modeled link-based data is used in the emission modeling of the Baltimore Ozone Nonattainment Area for conformity determinations. A detailed explanation of the model and the emission estimating methodology can be found in Appendix F of the SIP.²⁹

As part of the development of the SIP, MDE in consultation with the Baltimore Regional Transportation Board (BRTB), which is the federally designated MPO for the Baltimore region, and MDOT establishes MVEBs. The MVEBs for 2008 Reasonable Further Progress and 2009 attainment are based on the projected 2008 and 2009 mobile source emissions accounting for all the mobile control measures and projected regional growth.

Since the Baltimore region did not obtain the ozone standards by June 15, 2010, they were bumped up to a Serious ozone nonattainment area.³⁰ As a result, a new attainment demonstration SIP is being prepared and is due to EPA by September 30, 2012. MDE is required to submit a 2011 Rate of Progress demonstration and a 2012 Attainment Plan with new MVEBs for 2011 and 2012 using the new MOVES2010a model.

On April 30, 2012, EPA designated the Baltimore area as a moderate nonattainment area for the 2008 ozone standards.

Interagency Consultation

The MDE developed interagency consultation procedures, pursuant to EPA regulations, for both transportation conformity determinations and SIP development in the Baltimore Region in 1996.³¹ These procedures were later updated in 2006 in response to the enactment of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) and subsequent changes to the conformity regulations.³² The procedures were developed in consultation with state and local air quality and transportation agencies, the BRTB, EPA, FHWA, and FTA. The interagency consultation procedures include both general and specific procedures to be undertaken by MPOs, the State DOT, and US DOT with State and local air quality agencies and EPA before making conformity determinations; and by State and local air agencies and EPA with MPOs, the State DOT, and USDOT in developing the SIP including development of the MVEBs.

The interagency consultation procedures are based on the premise that the "Consultation Agencies" be afforded the opportunity to participate in each step of the transportation and air quality planning processes. The procedures include schedules for the preparation of the

region's TIP and updates of the long range transportation plan and all major steps where consultation is required. The procedures also include consultation procedures that respond to the specific requirements of the EPA conformity regulations. For example, the procedures outline the roles and responsibilities of BRTB, MDE, and MDOT for both the conformity and SIP development processes. In addition the procedures include conflict resolution and public consultation procedures. MDOT notes that these procedures have been working smoothly in the Baltimore region for many years.

Bylaws have also been established for conducting meetings of the Interagency Consultation Group (ICG) of the BRTB.³³ These bylaws are intended only to provide structure, clarity, and expediency in promoting the business of the ICG. The MVEBs are discussed by the ICG before placement in the SIPs. In situations where a timely review of a conformity status is helpful, there is an effort to ensure that members are informed prior to meetings of the ICG and/or BRTB's Technical Committee.

New York

Introduction

New York State (NYS) has eight ozone nonattainment areas for the 1997 8-hour ozone standards, one nonattainment area for the PM_{2.5} standards, and two CO maintenance areas. The New York-Northern New Jersey-Long Island NY-NJ-CT area, which is nonattainment for both ozone and PM_{2.5}, and maintenance for CO, is an extremely complex area. This area includes 24 ozone nonattainment counties, 22 PM_{2.5} nonattainment counties, and 14 CO maintenance counties over three States. These areas also include multiple MPOs. For example, the New York-Northern New Jersey-Long Island, NY-NJ-CT PM_{2.5} nonattainment area includes nine MPOs.

Because of the complexity of developing and coordinating MVEBs in a complex area such as the New York-Northern New Jersey-Long Island, NY-NJ-CT area, sub-area budgets are developed separately for the New York, New Jersey and Connecticut portions of this area. The affected MPO technical staffs cooperate to ensure that key transportation planning assumptions at boundaries are consistent and agree on key milestone years. Otherwise, the three States develop budgets independently. As a result, NYS has sub-area CO, NO_x and VOC (for ozone), and PM_{2.5} MVEBs for the New York portion of the New York-Northern New Jersey-Long Island, NY-NJ-CT nonattainment and maintenance areas. NYS has also developed NO_x and VOC MVEBs for the Poughkeepsie ozone nonattainment area; and a CO MVEB for the Syracuse CO maintenance area.

On April 30, 2012, EPA designated the New York-Northern New Jersey-Long Island NY-NJ-CT area as a marginal nonattainment area for the 2008 ozone standards.

Analysis Tools

In NYS, the Department of Environmental Conservation (NYSDEC) uses a consistent approach to developing MVEBs and on-road emissions inventories statewide. The process

is documented in their *New York State On-Road Inventory Technical Documentation* report.³⁴ This document contains an explanation of the inputs and methodology that was used in creating both the “Ozone Season Day” and “annual” on-road mobile emissions inventories. It indicates that all on-road mobile emissions were estimated using EPA's MOBILE6.2 emission model and that NYS is modeled by using individual inputs for each of the 62 counties. Each area receives varying temperature, traffic, and/or air quality programs such as fuel programs, inspection and maintenance programs, and anti-tampering programs. The document further states that “Base-year” inventory inputs were derived from 2002 data where applicable and reflect the programs and controls that were in effect in 2002; and that future projection inventories were modeled using the latest modeling assumptions and future control programs. In order to yield more accurate “annual” inventories the modeling was done using month specific inputs and then combining these monthly results to obtain the annual inventory.

The VMT used to develop the mobile source emissions and MVEBs is based on FHWA-approved HPMS data for the base year for each SIP. This VMT is split by each large urban area, and into one small urban area aggregate bin and one local aggregate bin. Factors related to population and economic trends are used to disaggregate the HPMS data into county inventories in a manner consistent with CAA periodic inventory requirements. VMT by time period is calculated based on National Personal Transportation Survey data and local counts. Regression of long term historical trends is used to project the base year inventories into the applicable future SIP milestone years. Speeds by time period and roadway type were developed by NYSDOT planning staff in consultation with the MPOs. These are due to be updated in the future. The emission inventories are calculated using the latest emissions model, motor vehicle registration age distributions in the SIP base year, and vehicle (source type) class VMT share based on traffic count data.

Interagency Consultation

To meet the emissions test requirements in the conformity regulations, the eight MPOs that are subject to transportation conformity in NYS validate their modeled estimates of traffic volume to local counts. Per the procedures recommended by the NYS ICG for air quality conformity, each MPO that is subject to MVEBs reconciles and calibrates its VMT estimates in the model base year to match the corresponding HPMS-based VMT for the area in the same year. Each MPO generates speed and delay somewhat differently based on local factors and commonly accepted sources, i.e. Bureau of Public Road formulas, HCM2010, etc. The NYS ICG reviews revised and new MPO travel demand models and must concur that each model is sufficient per EPA's Transportation Conformity regulations and FHWA guidance prior to use in regional emissions analyses for conformity. All MPO analyses use emissions model input parameters that are the most recent approved parameters developed by NYSDEC. The NYS ICG meets on a monthly basis.

NYSDOT annually provides to the NYSDEC a list of all actions requiring a conformity determination that calendar year. NYSDOT, in consultation with the NYSDEC, and in cooperation with affected MPOs, also provides transportation data and transportation related parameters to the NYSDEC for calculation of mobile source emissions for

applicable SIP revisions. The NYSDEC develops all proposed MVEBs, selects air quality models and develops non-transportation related inputs and parameters used to develop the emissions budgets in the applicable SIP revisions during the SIP revision process in consultation with NYSDOT, affected MPOs, affected local air and transportation agencies, USDOT, and EPA. The NYSDEC also provides NYSDOT and the affected agencies with draft proposed applicable revisions to the SIP, draft emissions budgets, and pertinent supporting documentation that are expected to be submitted to EPA. Affected agencies have 30-days to provide comments on these documents. If there are any disagreements on these documents they are resolved through established “Resolution of Conflict” procedures.

The interagency consultation process has been consistent for many years, and VMT growth in NYS is somewhat modest compared to other areas. Thus, most budgets that are developed are within reach by the affected MPOs. In the past, a CO budget proved difficult for one MPO to meet. After consultation, NYSDEC found a safety margin that could be apportioned to the motor vehicle emissions budget and the budget was revised in a timely manner. The schedule slipped slightly and the area was technically in a lapse for two weeks. However, the issue was addressed in a timely manner and no “corrective actions” were required by EPA or FHWA/FTA.

The biggest transportation planning schedule challenge arises when the latest emissions model is revised by EPA (e.g. the transition from MOBILE5B to MOBILE 6 and from MOBILE6.2 to MOVES2010a). These issues are still being addressed in the transition to MOVES. However, the draft emissions inventory for MOVES has been provided to all the MPOs prior to formal submittal to EPA through the NYS ICG process. The MPOs are currently reviewing the proposed budgets and inventories and working to get up to speed on use of the MOVES model.

Pennsylvania

Introduction

Pennsylvania has a relatively unique approach to developing MVEBs in that PennDOT uses a consultant contract to develop emissions budgets. The consulting firm coordinates with PennDOT and the Pennsylvania Department of Environmental Protection (PaDEP) throughout the process and they in turn coordinate with the MPOs/Regional Planning Organizations (RPOs) to get their input. PennDOT recently initiated a study in response to this COP effort to document its process for developing MVEBs for all the nonattainment and maintenance areas in the State. The study entitled, “*Pennsylvania’s Process for Establishing and Coordinating Motor Vehicle Emissions Budgets*”³⁵ represents a comprehensive look at how Pennsylvania estimates emissions from highway vehicles for inclusion into SIPs and other emission inventories, and the interagency coordination procedures that are used. The report notes that the highway vehicle emissions inventory serves as the MVEB for specific pollutants or precursors for areas that have requirements for regional transportation conformity.

According to the study, Pennsylvania has 23 ozone nonattainment or maintenance areas, involving 37 counties. In addition, there are 14 PM_{2.5} (annual and daily NAAQS) nonattainment areas involving 19 full and six partial counties. Since the nonattainment areas do not correspond with MPO or RPO boundaries a total of 23 ozone MVEBs and 14 PM_{2.5} MVEBs are calculated, corresponding to individual counties or groups of counties, such that MPOs and RPOs may find conformity independently of each other.

On April 30, 2012, EPA designated five marginal nonattainment areas in Pennsylvania for the 2008 ozone standards.

Analysis Tools

The budgets in Pennsylvania that have been approved by, or were developed but not submitted to, EPA were developed using the Mobile6.2 emissions model. However, these MVEBs were evaluated and some will be updated with the MOVES2010a model for conformity purposes. New MVEBs will be established for 2018 in ozone areas. New MVEBs for PM_{2.5} are being recalculated based on analysis years of 2002 and 2009, and future years to be determined for Philadelphia, and 2002, 2007, an interim year, and 2025 for all other areas. Only the future year's inventories will become MVEBs upon an EPA adequacy finding or approval.

For current inventory and SIP MVEB analyses in Pennsylvania, the MOVES2010a model is applied using the *inventory-based* approach. Under this method, actual VMT and population are provided as inputs to the model, and MOVES is responsible for producing the total emissions for the region. Pennsylvania chose this approach based on analysis run times, less intensive post processing, and increased quality control. In Pennsylvania, a mix of local and default data is used for emissions calculations. Local data sources are used for all inputs that have a significant impact on calculated emission rates.

In Pennsylvania, the development of highway emissions inventories and MVEBs has focused on: 1) a robust, consistent statewide analytical process, 2) use of available local data planning assumptions, 3) use of analytical tools to aid in analysis efficiency and quality control; and 4) evaluation of alternative scenarios of future traffic growth in each region.

The emission calculation process has been integrated with periodic updates to local planning assumptions that are used for SIPs, EPA's National Emissions Inventory, and regional transportation conformity analyses conducted throughout the state.

Traffic data sources vary by region and include the use of regional travel demand models and PennDOT's Roadway Management System traffic information. PennDOT obtains this information from periodic visual and electronic traffic counts. Pre and post processing tools have been developed to translate and calculate the traffic data needed to run the MOVES model. Pennsylvania uses a post processor named PPSUITE, which analyzes highway operating conditions, calculates highway speeds, compiles VMT and vehicle type mix data, and prepares MOVES runs and processes MOVES outputs.

Eight Pennsylvania MPOs have regional travel demand models that are used to estimate and forecast roadway volumes and VMT based on regional demographic forecasts. The models typically support regional planning efforts and the transportation conformity analyses conducted in each region. For SIP and other highway emissions inventories, travel model forecasts are evaluated with other available forecasts and historic trends to assist in identifying growth rates applicable for SIP purposes.

Traffic growth rates for Pennsylvania emissions inventories are based on an assessment of available data sources such as the PennDOT's growth rate forecasting system, and the Regional travel model, if available.

Interagency Consultation

PennDOT is responsible for conducting all highway vehicle modeling for SIP and inventory purposes. Through interagency consultation with MPOs and the review of available forecasting data sources, PaDEP and PennDOT work to ensure that forecast VMT and associated MVEBs address potential uncertainties. Such efforts include the review of historic VMT trends, the review of MPO regional model forecasts, the review of demographic forecasts for each county, the review of growth of nearby regions and counties, and VMT growth rates. PaDEP consults with the two local air agencies encompassing Philadelphia and Allegheny Counties.

Seven Pennsylvania MPOs, encompassing 23 counties, are a partner in the inter-agency consultation process. These MPOs are those with robust travel demand models, emissions modeling capabilities and expertise, and who opted to independently perform regional conformity analyses. They are specifically included in the interagency consultation regarding all mobile source aspects of SIPs, MVEBs, control strategy analyses, and regional conformity.

PennDOT is responsible for performing emissions modeling, developing SIP MVEBs, regional conformity and all other mobile source emissions estimates on behalf of all other MPOs and RPOs in the state. The RPO is responsible for making conformity determinations through the approved process. PaDEP leads SIP efforts related to the NAAQS with support from local air quality agencies and PennDOT.

Pennsylvania also established an Air Quality Working Group to ensure the partners remain current with all transportation-air quality requirements related to conformity. The group includes seven large MPOs, PennDOT, PaDEP, EPA, FHWA, and FTA representatives. This group meets quarterly to discuss upcoming needs, share results of technical and process issues, coordinate efforts, and share knowledge of rules, regulations, models, data inputs, etc. Emissions and travel model use, inputs, sensitivity and ongoing update requirements and good practices are major agenda items.

Texas

Houston-Galveston-Brazoria 1997 8-Hour Ozone Nonattainment Area:

On March 10, 2010, the Texas Commission on Environmental Quality (TCEQ) adopted an Attainment Demonstration SIP Revision and a Reasonable Further Progress (RFP) SIP Revision for the Houston-Galveston-Brazoria (HGB) severe 8-hour ozone nonattainment area.³⁶ The HGB area includes 8-counties consisting of Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, and Waller counties. The TCEQ was required to submit a 1997 8-hour ozone SIP revision addressing the severe ozone nonattainment requirements of the CAA to EPA by April 15, 2010, which demonstrates attainment of the standards by no later than June 15, 2019.

On April 30, 2012, EPA designated the HGB area as a marginal nonattainment area for the 2008 ozone standards.

Analysis Tools

As required by the EPA, this SIP revision includes, among other things, MVEBs for NO_x and VOC for transportation conformity purposes for the milestone years 2008, 2011, 2014, 2017, and 2018. The MVEBs are calculated by subtracting the on-road mobile control strategy emission reductions that are necessary to demonstrate RFP from the uncontrolled, projected on-road mobile source emissions for each RFP milestone year.

The development of the RFP inventories was done by the Houston-Galveston Area Council (H-GAC), at the request and under the direction of the TCEQ, using the Houston-Galveston Area 2018-Rate-of-Further-Progress SIP Emissions Inventories On-road Mobile Sources MOBILE6 Modeling Information Guidance (December 16, 2008). The updated on-road mobile source emissions inventories and control strategy reduction estimates are based on the latest planning assumptions and the latest version of the EPA emission factor model, which was Mobile 6.2 at the time of the SIP development.

The SIP indicates that the MOBILE6.2 model was applied for each county and RFP evaluation to calculate the emission factors in grams per mile of NO_x and VOC. Pollutant emission factors were estimated by speed, hour, road type, and vehicle class. MOBILE6 defaults were replaced by local input values that were developed to yield emission factors characteristic of the HGB area peak ozone season climatic conditions, vehicle fleets, activity, and emission control programs particular to each HGB area evaluation.

To develop the inventories the H-GAC travel demand model network links were used, summarized by county, network functional classification (or road type), and 28 vehicle types. The outputs of the VMT estimation process are estimates of hourly link VMT by average peak ozone season weekday for the H-GAC 2002, 2008, 2011, 2014, 2017, 2018 and 2019 travel demand model networks (each consisting of an AM Peak assignment, Mid-Day assignment, PM Peak assignment and Overnight assignment) and for each of the added intrazonal links. These estimates are consistent with the HPMS model.

Appendix 9 of the SIP entitled: *Houston-Galveston-Brazoria 1997 Eight-Hour Ozone Nonattainment Area Reasonable Further Progress On-Road Mobile Source Emissions Inventories*³⁷ provides detailed documentation of the on-road mobile inventory development process.

The RFP MVEB reflects the on-road mobile emissions inventories for each RFP milestone year, the on-road mobile reduction strategies used to demonstrate RFP, and a 10 percent transportation conformity safety margin. The SIP indicates that the RFP control strategy produces more than the required emissions reductions for each milestone year. Therefore, some of the excess emissions reductions for each milestone year is used to provide a safety margin. This safety margin is less than the total emissions reductions needed for the RFP demonstration so even if this safety margin is used, the HGB area will still demonstrate RFP for each milestone. A transportation conformity safety margin is allowed when there is an excess in emission reductions required to demonstrate RFP for a milestone year.

The TCEQ is planning to update the on-road mobile source emission inventories for the HGB area Attainment Demonstration SIP that was adopted on March 10, 2010. This SIP revision will include an updated MVEB using the latest version of the MOVES model, and is scheduled to be proposed for public comment in the latter part of 2012, with adoption for final submission to EPA during 2013.

A pre-analysis consensus plan from the Texas Transportation Institute (TTI) for development of 2018 future case on-road mobile emission inventories is currently out for review.³⁸ In addition, a draft timeline to update the RFP MVEBs is also under review.³⁹ The inventories will use VMT estimates from the latest available travel demand model output from H-GAC, along with the MOVES2010a version of the model. These 2018 and RFP on-road emissions inventories will form the basis of the revised attainment demonstration and RFP MVEBs used for conformity purposes.

Dallas-Fort Worth (DFW) 1997 8-Hour Ozone Nonattainment Area:

On May 23, 2007, the TCEQ adopted an Attainment Demonstration SIP Revision⁴⁰ and a RFP SIP Revision for the DFW ozone moderate nonattainment area which includes 9-counties consisting of Collin, Dallas, Denton, Ellis, Johnson, Kaufman, Parker, Rockwall, and Tarrant. The attainment SIP revision was required to demonstrate attainment of the 1997 8-hour ozone standards by the June 15, 2010, attainment deadline. However, since the DFW area was unable to attain the ozone standards by the attainment date, EPA published a final determination of nonattainment and reclassification of the DFW 1997 8-hour ozone nonattainment area from moderate to serious on December 20, 2010.

As a result of the reclassification, the TCEQ was required to submit a new attainment demonstration SIP to the EPA by January 19, 2012. This SIP must meet the criteria for serious nonattainment areas as contained in the CAA and demonstrate attainment by no later than June 15, 2013.

During the development of the new attainment demonstration SIP revision and the RFP SIP Revision, which includes the development of new MVEBs, TCEQ held stakeholder meetings and received public comments on their proposals. During the comment period, comments were received from a wide range of groups including, but not limited to, the North Central Texas Council of Governments (NCTCOG), the North Texas Clean Air Steering Committee, and the Regional Transportation Council (RTC) of the NCTCOG. The TCEQ also has an advisory group, the Dallas-Fort Worth Photochemical Modeling Technical Committee (DFW PMTC), to assist the agency in addressing technical and scientific issues relating to air quality modeling for the DFW area. The committee includes representatives from industry, county and city government, environmental groups, and the public. Based on preliminary discussions with NCTCOG, TCEQ, EPA and TxDOT, the proposals also solicited comments on the use of the MOVES2010a model and strong support was received for its use from both EPA and the RTC in the DFW area.

On April 30, 2012, EPA designated the DFW area as a moderate nonattainment area for the 2008 ozone standards.

Analysis Tools

The on-road mobile source emission estimates for the new attainment demonstration SIP and RFP SIP revision are based on EPA's MOVES2010a model, whereas the MVEBs in the previous SIP submission were based on EPA's MOBILE6.2 model since the final version of MOVES2010a was not yet available.⁴¹ The SIPs note that the higher estimated NO_x emissions from MOVES2010a slightly increased the modeled 2012 future design values at all monitors and at one of its monitoring sites by 2+ ppb, but the results were still below the threshold for demonstrating attainment of the ozone standards. MVEBs were developed using the MOVES2010a models for both NO_x and VOC emissions for 2012.

For major metropolitan areas, the primary source of vehicle activity is typically the local travel demand model, which is run by TTI, TxDOT, or the MPO. For the attainment demonstration SIP, the TCEQ contracted with the NCTCOG to develop the on-road mobile source emission inventories. The DFW travel demand model has been validated using a large number of traffic counts collected in the area by TxDOT, and the VMT estimates from the DFW area travel demand model are calibrated to outputs from HPMS. VMT is allocated to the appropriate vehicle types based on roadway classification counts collected in the local area by TxDOT. Prior to matching the VMT estimates with MOVES2010a emission rates, hourly operating speeds for each roadway segment are post-processed from the travel demand model output based on vehicle volume-to-capacity ratios.

Interagency Consultation

The TCEQ is responsible for SIP development in Texas including establishing and revising motor vehicle emissions budgets. TCEQ used a Pre-analysis Consensus Plan⁴² to document technical modeling issues that are needed for the development of MVEBs. This plan was developed as a streamlining aid for transportation conformity by the Transportation/Air Quality Technical Working Group (TWG). The TWG was driven by

the consultation process and supports the consultation partners to address conflict resolution. It has become an ongoing forum that includes informational sharing (training, information, collection of data that may be needed for consultative decisions and guidance) and to address issues before they become problematic. "Consultation partners" refers to the specific nonattainment/maintenance MPO currently undergoing transportation conformity, and includes representatives from the respective MPO, EPA, FHWA, FTA, TxDOT and the TCEQ. Consultation partners are a subset of TWG. In early 2004 the TWG members consisting of EPA, FHWA, FTA, TCEQ, TxDOT, and the nonattainment area MPOs formed a subcommittee to standardize the conformity documentation submitted by nonattainment area MPOs.⁴³ The TWG reviewed the proposed conformity documentation structure on several occasions. Comments from the Consultation Partners were then reviewed and the proposed changes were presented to the Consultation Partners and the TWG in February 2007. The purpose of this documentation is to: 1) ensure that all information needed by the reviewing agencies is included in the conformity documentation; and 2) ensure that a standard format is used which would expedite the review and approval process. The documentation includes a detailed outline and a list of required documents and information that is required for conformity review. The interagency process and the standardized conformity documentation have expedited the conformity process by reducing errors, and defining the responsibilities of consultation partners has reduced turn-around time and individual agency review time.

To further enhance interagency coordination and expedite the conformity process, conformity partners through TWG developed several different flow charts and checklists. The first is a Pre-analysis Consensus Plan which requires the agency developing the conformity information to document such items as the demographics that will be used, travel demand model validation year, nonattainment counties in the airshed, land-use model, travel demand model, VMT adjustments, etc. This checklist is intended as an informal guideline to be used in preparing and reviewing transportation conformity documentation and or SIP MVEB development and is not intended to replace or supersede Federal requirements.

For MVEB development this plan may be coordinated and developed by the TCEQ or by the MPO and/or TxDOT under direction of the TCEQ. It is shared with consultation partners for comment, but TCEQ is responsible for all aspects of SIP development. TxDOT provides technical support to the MPOs upon request. This technical support may include any level of assistance requested by the MPOs related to travel demand modeling and or emissions modeling analysis necessary for development of MVEBs. Some Texas MPOs request assistance, others do not. If there is a nonattainment area without MPO jurisdiction, then TxDOT would conduct work as requested by and under the direction of TCEQ for MVEB development; that situation does not currently exist.

Virginia

Fredericksburg 1997 8-Hour Ozone Maintenance Area:

The City of Fredericksburg, and Spotsylvania and Stafford Counties constitute a maintenance area for the 1997 8-hour ozone standards. Fredericksburg was previously designated nonattainment area for the 1997 ozone standards, but had the opportunity to apply for redesignation to attainment status since monitoring data for 2004 showed air quality improvement. The George Washington Air Quality Committee (GWAQC), which was designated as the lead planning organization for the area by the Department of Environmental Quality (VDEQ), helped develop both the maintenance plan and the redesignation request for the area.⁴⁴ DEQ conducted a public hearing on these proposals on April 20, 2005, and the maintenance plan and redesignation request were sent to EPA for review and approval. The final approval for these documents was published in the Federal Register on December 23, 2005.

The maintenance plan established 2004, 2009, and 2015 MVEBs for VOCs and NO_x. These budgets represent the level of mobile source emissions that can be emitted in the area while supporting the air quality plan. The 2009 NO_x and VOC MVEBs each include a safety margin of 0.25 tons/day to accommodate updated planning assumptions and estimates for the conformity and maintenance processes. The 2015 MVEBs included a 0.25 tons/day NO_x safety margin and a 1.6 ton/day VOC safety margin. These safety margins were taken from the surplus of emission reductions below the attainment year cap.

As a result of EPA's issuance of the new MOVES2010 model, the MVEBs in the Fredericksburg Maintenance Plan needed to be updated. This update was created with input from VDOT and the Fredericksburg Area MPO. VDEQ conducted a public hearing about this proposed update on September 19, 2011, and the updated maintenance plan and technical support document were sent to EPA for review and approval on September 26, 2011.⁴⁵ The updated maintenance plan revises the previous 2009 and 2015 NO_x budgets using the MOVES model to help ensure that the area can continue to demonstrate conformity. Since the existing VOC MVEBs allow a seamless transportation conformity process when using MOVES2010a, the existing VOC MVEBs are not being revised. The new NO_x budgets include a 2 ton/day safety margin for 2009 and a 3 ton/day safety margin for 2015 to help ensure conformity. As of the date of preparation of this report, EPA has not yet responded to this latest submission.

On April 30, 2012, EPA designated the City of Fredericksburg, and Spotsylvania and Stafford Counties as unclassifiable/attainment for the 2008 ozone standards.

Analysis Tools

The 2004, 2009, and 2015 VOCs and NO_x MVEBs in the 1997 ozone maintenance plan were calculated using EPA's MOBILE6.2 mobile source model. VDOT provided daily VMT, average speed data for each road type by jurisdiction, and annual growth rates that

were used to forecast VMT into the future. Also, the Virginia Department of Motor Vehicles provided registration data that was specific to each jurisdiction.

The proposed NO_x MVEBs included in the updated maintenance plan were developed using the new MOVES2010a emissions model. VDOT provided jurisdictional, road-specific, average daily VMT and speed data for calendar year 2007 that were based on the region's travel demand model, and average growth rates that were compounded annually to estimate VMT for the years of 2009 and 2015. In the 1997 ozone maintenance plan, calendar year 2004 VMT was estimated from calendar year 2002 data. In the updated maintenance plan, the 2002 basis is replaced by 2004 VMT data provided by VDOT.

Interagency Consultation

On July 9, 2007, the VDEQ submitted a revision to its Transportation Conformity SIP.⁴⁶ The SIP addresses the three provisions of the EPA Conformity Rule required under SAFETEA-LU: 40 CFR 93.105 (consultation procedures); 40 CFR 93.122(a)(4)(ii) (control measures) and 40 CFR 93.125(c) (mitigation measures). EPA approved this SIP by Direct Final Rule on November 20, 2009, with an effective date of January 19, 2010. The SIP contains detailed procedures, and the specific roles and responsibilities that the MPOs, lead planning organizations, VDEQ, VDOT, and Virginia Department of Rail and Public Transportation must undertake for interagency consultation; conflict resolution and public consultation with each other and with local or regional offices of EPA, FHWA, and FTA on the development of control strategy SIP revisions including emissions inventories, and MVEBs; and transportation plans, TIPs, and associated conformity determinations. The interagency consultation provisions indicate that it is the affirmative responsibility of the lead agency to initiate the consultation process. The lead agency for transportation conformity purposes is the MPO in metropolitan areas and VDOT in non-metropolitan areas. The lead agency is responsible for notifying other participants that the consultation process is starting. They are also responsible for convening meetings, assuring that all relevant documents and information are supplied to all participants in the consultation process in a timely manner, preparing summaries of consultation meetings, maintaining written records of the consultation process, providing final documents and supporting information to each agency after approval or adoption, and assuring the adequacy of the interagency consultation process with respect to the subject document or decision.

Wisconsin

Milwaukee-Racine and Sheboygan County 1997 8-Hour Ozone Nonattainment Areas:

The State of Wisconsin currently has seven counties designated as nonattainment for the 1997 8-hour ozone NAAQS. These counties include Kenosha, Milwaukee, Ozaukee, Racine, Washington and Waukesha Counties in the Milwaukee-Racine Nonattainment Area and Sheboygan County in the Sheboygan County Nonattainment Area. Both nonattainment areas measured attainment of the 1997 ozone NAAQS based on 2006 – 2008 ozone monitoring data. This monitoring data was the basis for the redesignation

request to attainment that was submitted to the EPA by the Wisconsin Department of Natural Resources (WDNR) on September 11, 2009.⁴⁷

The EPA was unable to act on the WDNR's redesignation request because deficiencies were identified with a portion of Wisconsin's VOC Reasonably Available Control Technology (RACT) rules. On April 22, 2010, EPA notified WDNR of these deficiencies. In response, the WDNR revised the State's VOC RACT rules to address the deficiencies and asked the Wisconsin Natural Resources Board (NRB) to adopt the revised rules at its meeting held on August 10, 2011. The NRB adopted the rules and on September 1, 2009, the WDNR submitted the revised rules to EPA and supplemented the submittal on November 16, 2012, and again on January 26, 2012. In the February 22, 2012 Federal Register,⁴⁸ EPA proposes to approve the rules based on its findings that they are consistent with the Control Technique Guidelines documents issued by EPA in 2006 and 2007 and that they satisfy the RACT requirements of the CAA. The comment period on the proposal ended on March 23, 2012.

On April 30, 2012, EPA designated the Sheboygan County area as a marginal nonattainment area for the 2008 ozone standards.

Analysis Tools

Due to the delay from the VOC RACT rule deficiencies, however, EPA notified WDNR on July 19, 2011, that updated emission inventories would need to be submitted and that the most current mobile source emissions model, MOVES2010a, would need to be used to estimate the on-road mobile source emissions. The September 2009 redesignation request used MOBILE6.2 for the on-road mobile source emissions.

As a result, WDNR developed updated NO_x and VOC emission inventories for 2005, 2008, 2015, and 2022 as a supplement to the original redesignation request for the Milwaukee-Racine Nonattainment Area and the Sheboygan County Nonattainment Area.⁴⁹ The 2005 on-road mobile emission estimates for the on-road inventory were created by using the EPA MOVES2010a model and EPA's latest technical guidance on the MOVES model. EPA's action on Wisconsin's comprehensive emissions inventories is still pending. In addition, the WDNR developed NO_x and VOC MVEBs based on the 2015 and 2022 emission inventories. The MVEBs were developed as part of the interagency consultation process which involved the Federal, State, affected MPOs, and local agencies.

Briefly, the traffic data processed to prepare input files for the MOVES model include:

- VMT by road type and speed class obtained from the Southeastern Wisconsin Regional Planning Commission for the Milwaukee-Racine Nonattainment Area and from the Bay-Lake Regional Planning Commission for the Sheboygan County Nonattainment Area.
- Vehicle age distributions for cars and light trucks developed by WDNR in 2007, using inspection and maintenance program data. For the heavy trucks, buses and motorcycles, the MOVES default vehicle age distributions were used.

- VMT by vehicle class distribution, provided by Southeastern Wisconsin Regional Planning Commission and WisDOT in 2007, covered some of the vehicle classes used by MOVES. To fill the gaps, WDNR used default VMT by vehicle class distributions from the MOBILE6 and MOVES models.
- Vehicle population obtained by dividing the VMT by the MOVES default values of miles per vehicle.
- After emissions were calculated using the MOVES model, the emissions for the projected years (2015 and 2022) were increased to include an uncertainty factor, i.e., to provide a safety margin for the MVEBs.

In the February 9, 2012 Federal Register⁵⁰ EPA indicates that it proposes to approve the requests from the WDNR to 1) redesignate the Milwaukee-Racine and Sheboygan areas to attainment for the 1997 8-hour ozone standards, 2) the state's plans for maintaining the 1997 8-hour ozone NAAQS through 2022 in the above-mentioned areas, and 3) the 2005 comprehensive emissions inventories for the Milwaukee-Racine and Sheboygan areas as meeting the requirements of the CAA. In addition, EPA notes that it finds the 2015 and 2022 MVEBs to be adequate and is proposing to approve them for the Milwaukee-Racine and Sheboygan areas. The 30-day comment period on the proposal ended on March 12, 2012.

Interagency Consultation

Wisconsin is in the process of revising its draft MOA for determining conformity of transportation plans, programs and projects to SIPs.⁵¹ This document establishes a uniform policy for interagency consultation processes involving all affected agencies such that the requirements of the CAA and the consultation procedures included in the transportation conformity regulations are met. It also describes the MVEB development and coordination process.

The MOA indicates that WDNR, Wisconsin MPOs located in EPA designated non-attainment and maintenance areas (e.g. Southeastern Wisconsin Regional Planning Commission and the Bay-Lake Regional Planning Commission), WisDOT, Wisconsin Local Public Transit Agencies, FHWA, FTA, and EPA will comprise the Wisconsin Transportation Conformity Interagency Consultation Workgroup. This workgroup consults and makes technical and policy recommendations on transportation conformity issues, including the establishment of MVEBs. The forum uses a variety of communication methods for consultation including meetings, written and electronic correspondence, workshops, site visits, telephone discussions, and websites.

The Wisconsin Transportation Conformity Interagency Consultation Workgroup process is initiated and directed by the designated lead agency (i.e. the agency with the legal obligations and professional expertise). The MOA lists the lead agencies for the various transportation conformity-related tasks and events. For example, WDNR is listed as the lead agency for development of MVEBs, periodic emissions inventories, air quality modeling, etc; EPA, or WDNR, or MPO are listed as the lead agency for review of on-road mobile source emissions models and methods; and the MPO or WisDOT, or WDNR are

noted as the lead agency for the development/review of travel demand models or any other analytical methods used to predict VMT. However, the MOA indicates that any of the Interagency Consultation Workgroup member agencies may initiate the consultation process to address pertinent air quality or transportation planning issues related to transportation conformity events.

The MOA indicates that the WDNR will include the relevant MPOs and WisDOT in its SIP development process from the beginning by establishing a specific workgroup for addressing any concerns of the transportation community. The purpose of this work group is to provide a forum to build consensus on the various issues. Through this cooperative planning process, WDNR will establish the MVEBs specified in the SIP.

Wisconsin anticipates that all the agencies will have signed the MOA by the end of the State's fiscal year (June 30, 2012).

RESEARCH, REPORTS, AND WEBSITES

The following is a summary of selected research documents, reports, and websites that are relevant to the development and coordination of MVEBs at the Federal and State level.

EPA – Website on Transportation Related Documents: This website includes specific guidance documents that provide guidance for crediting emission reductions from programs such as commuter programs, heavy duty diesel retrofits, alternative fuels, anti-idling programs, land use strategies, transportation control measures, etc. All these strategies can be used to help an area stay within its allocated MVEB(s). The website can be found at http://www.epa.gov/otaq/stateresources/policy/pag_transp.htm.

EPA - Website on the MOVES (Motor Vehicle Emission Simulator) Model: This website contains information on the use of the MOVES model for SIP and conformity purposes, for estimating greenhouse gases and fuel consumption, training sessions, technical details on the design and inputs for MOVES, and information on previous versions of the MOVES model. More specifically this website includes documents such as the *MOVES2010a User Guide*, and *Using MOVES to Prepare Emission Inventories in State Implementation Plans and Transportation Conformity: Technical Guidance for MOVES2010, 2010a and 2010b* that are used by States in the development of their emissions inventories, MVEBs, and SIPs. The new MOVES emission modeling system estimates emissions for mobile sources covering a broad range of pollutants and allows multiple scale analysis. The MOVES model currently estimates emissions from cars, trucks, and motorcycles. EPA plans to add the capability to model non-highway mobile sources in future releases. The website can be found at <http://www.epa.gov/otaq/models/moves/index.htm>.

EPA – *Modeling and Inventories Website:* This website contains information on modeling and emissions inventories. For example, it includes information on the MOVES model, the NONROAD emission inventory model, fuels models, Greenhouse Gas Emissions Model, special modeling in support of the Heavy Duty Engine /Vehicle and Highway Diesel Final Rule, special modeling in support of the Tier 2/Gasoline Sulfur Final Rule, etc. It also contains the document, "*Procedure for Emission Inventory Preparation - Volume IV: Mobile Sources*". Modeling is EPA's method for estimating emissions from on-road vehicles, non-road sources, and fuels. Inventories are calculations of total emissions of a pollutant for a given area at a defined time and set of conditions. The website can be found at <http://www.epa.gov/otaq/models.htm>.

FHWA – *Website on Air Quality Models & Methodologies:* This website indicates that many different software programs and other modeling techniques are utilized to conduct air quality analyses. It includes summaries of various EPA models that can be used to predict emissions of different pollutants from on-road and non-road sources, to calculate delays and queues that occur at signalized intersections, and to provide estimates on how commuter benefits can impact vehicle emissions, as well as fuel use and costs. It also includes summaries of some tools that FHWA developed based on the EPA models to make emission inventory calculations in rural or small urban areas and to provide user-friendly interfaces to some of the models. The website can be found at http://www.fhwa.dot.gov/environment/air_quality/methodologies/.

FHWA – *Transportation Conformity Research Website:* This website notes that a variety of research has been conducted by FHWA, EPA, and others related to all aspects of transportation conformity. This includes some research on models such as Modifying Link-Level Emissions Modeling Procedures for Applications within the MOVES Framework; Multi-Pollutant Emissions Benefits of Transportation Strategies; Emissions Benefits of Land Use Planning Strategies; Sample Methodologies for Regional Emissions Analysis in Small Urban and Rural Areas; Implications of the Implementation of the MOBILE6 Emissions Factor Model on Project-Level Impact Analyses Using the CAL3QHC Dispersion Model; etc. The website can be found at http://www.fhwa.dot.gov/environment/air_quality/conformity/research/index.cfm.

NCHRP 25-25/Task 07 [Completed] - *Evaluation of Mobile Models: MOBILE 6.1, MOBILE 6.2 and MOBILE6/CNG:*⁵² MOBILE6 is a highway mobile source emission factor model developed by EPA that calculates factors for NO_x, VOC, and CO in grams of pollutant per mile traveled. The latest version of the model includes emissions factors for particulate matter and components that contribute to secondary formation of PM_{2.5} from exhaust, brake wear, and tire wear. Concerns were previously expressed about the accuracy and reliability of the model. Consequently, the objective of this research effort, which was completed in 2004, was to evaluate MOBILE6.1/6.2 for accuracy and to understand and assess the validation of these modules. This included assessments of the emission factors related to particulate matter, the emission factors related to air toxics, and the emission factors when compressed natural gas is specified as the fuel.

NCHRP 25-25/Task 65 - Synthesis of Greenhouse Gas Emission Inventory

Methodologies for State Transportation Departments:⁵³ State DOTs are increasingly performing GHG emission inventories of their operations. This research provides GHG accounting procedures to help State DOTs prepare a GHG emission inventory of their operations as well as to increase consistency across state DOT inventories. The report provides an overview of GHG accounting basics, identifies emission sources relevant to State DOTs, points to methods for completing GHG emission estimates, provides approaches for obtaining or approximating data, and discusses resources and materials available to State DOTs to help them complete operational GHG inventories.

Future Research Needs

The Air Quality COP recommends the following additional research measures be developed and implemented to advance the state-of-the-practice for establishing and coordinating MVEBs:

- **Evaluate Alternative Growth Scenarios for SIP Development** – Unlike transportation conformity, SIPs and MVEBs are often created and not updated for longer periods of time. As a result, special consideration should be given to estimating future conditions to support regional SIP goals and future transportation conformity determinations. Additional research and guidance may assist States in addressing key issues regarding the impacts of changing economic conditions, including the impacts of new vehicle sales and fuel prices.
- **Develop Vehicle Age Assumptions for Future Years** - Vehicle age assumptions are a key input to the emission process both for SIPs and conformity. Additional thought and insights may be needed in developing assumptions for these parameters for future years. This may include methods to develop historic averages or develop the expected value of this data for the SIP MVEB year.
- **Develop Additional Sensitivity Analyses for Key MOVES Input Parameters** - The sensitivity of additional MOVES input parameters is important to identifying what agencies should concentrate resources on when creating MVEBs, as these involve future year forecasts. Key items may include vehicle age and vehicle type, speed by roadway type and vehicle type, and proportion of VMT on ramps.
- **Conduct a Nationwide NCHRP Research Effort to Document the State of the Practice for Determining MVEB Safety Margins** - This COP report on developing MVEBs documents the safety margins in NYC, Houston, TX, and Fredericksburg, VA. A Nationwide NCHRP Research or Synthesis report could expand on this limited data set. This effort could include additional examples of practices for developing MVEB safety margins, relative and absolute magnitude of the margins, pollutants to which they apply, and the analytical or non-analytical methodology used to determine the margins. In addition, it could also include a summary of any “lessons learned” or benefits received by the areas utilizing safety margins, and any obstacles to providing such safety margins. This research

recommendation was included in the AASHTO Transportation Environmental Research Ideas (TERI) database on May 15, 2012.⁵⁴ The TERI database is AASHTO's central storehouse for tracking and sharing new transportation and environmental research ideas.

- **Evaluate Emissions Trading Practices** - EPA's conformity regulations allow emissions trading among the various emissions sources only if the implementation plan establishes appropriate mechanisms for such trades. This effort could include a research or national survey effort to document current emissions trading mechanisms between various emissions sources and any obstacles to providing such mechanisms.
- **Document Streamlining Practices for Developing Emissions Inventories and MVEBs** - Revising and updating emissions inventories and MVEBs can be time consuming and staff intensive. Efforts to streamline these processes would make it less time consuming and more efficient should they need to be updated due to changes in air quality standards or the issuance of new emissions models. This effort could document the methods for streamlining and improving the inventory and MVEB processes from both the technical and process perspectives.

SUMMARY

This report contains an overview of selected State DOT's procedures for establishing and coordinating the development of their MVEBs. The report is not intended to be an all inclusive listing of practices in the selected States. Many States have multiple nonattainment and maintenance areas and each of these areas can have multiple budgets as a result of the various mobile source pollutants. Consequently, this report provides information on a selected area(s) and selected pollutant(s) that are representative of the overall processes in their respective States. This report was developed because recent changes to several air quality standards and EPA's emissions model have prompted interest among State DOTs to take a fresh look at how State DOTs, MPOs, and State Air Agencies work together and the processes they use to establish emissions budgets.

This State-of-the-Practice Report summarizes EPA and FHWA/FTA requirements and guidance documents for establishing MVEBs; how the various State DOTs, MPOs, and State Air Quality agencies coordinate and work together to develop, modify, and implement the budgets; State practices for changing the MVEBs in response to changes to air quality standards and/or emissions models; technical details such as which models were used to generate traffic and emissions data; and research needs.

EPA's Transportation Conformity regulations require conformity determinations to be based on the latest available emissions model approved by EPA. Once a new model is established, EPA consults with DOT to establish a grace period before the new model must be used for transportation conformity purposes. On March 2, 2010, EPA announced the

approval of the MOVES2010 model for SIP submissions and for regional transportation conformity analyses outside of California. This announcement also started a two-year grace period, which was later extended to three-years, before the new MOVES2010 emission model is required to be used in new regional emissions analyses for transportation conformity determinations.

In response to the issuance of this new emissions model, most of the selected States noted in the report have updated their MVEBs, or in the process of doing so, because the new MOVES2010a model predicts higher VOC and NO_x emissions in most areas, thus making it more challenging to demonstrate conformity against existing SIP budgets. The ability to demonstrate conformity can be a driving force to determine if an area will go through the process to update its budgets. One area in this study, for example, updated its NO_x budget using the MOVES model but not its VOC budgets since they could still demonstrate conformity against the existing VOC budget using the new MOVES model.

A number of the selected areas have included conformity safety margins when their SIPs indicate that control strategies will produce more than the required emissions reductions for each milestone year. A transportation conformity safety margin is allowed when there is an excess in emission reductions required to demonstrate RFP, attainment, or maintenance. Also a number of the selected States/areas have developed subarea budgets especially in complex nonattainment and maintenance areas that have multiple jurisdictions and different schedules and timetables for transportation plans and TIPs. This allows the jurisdictions to find conformity independently of each other.

State DOTs are interested in streamlining the process for establishing and coordinating the development of their MVEBs so they can more quickly adjust the budgets, when necessary and appropriate to do so, in response to changes in air quality standards and emissions models. One State that has done so is Pennsylvania which has a relatively unique approach to developing MVEBs in that PennDOT uses a consultant contract to develop emissions budgets. The consulting firm coordinates with PennDOT and the PaDEP throughout the process and they in turn coordinate with the MPOs/RPOs to get their input. PennDOT recently completed a study that represents a comprehensive look at how Pennsylvania estimates emissions from highway vehicles for inclusion into SIPs and other emission inventories, and the interagency coordination procedures that are used.

While most of the selected States are still in the process of updating their MVEBs for the 1997 8-hour ozone standards using EPA's new MOVES2010a model, EPA recently designated nonattainment areas for the 2008 8-hour ozone standards; and has already announced that it may issue a major new update to the MOVES model in 2013. Such changes will likely require the MVEBs to once again be updated. Consequently, other States may want to consider the PennDOT process, or develop alternative streamlining processes, for establishing and coordinating the development of their MVEBs.

In addition, State DOTs are using a variety of interagency coordination procedures and processes to better integrate the transportation and air quality planning processes and for developing MVEBs. The primary interagency consultation processes are contained in the

State's Transportation Conformity SIP which is required by EPA's conformity regulations. These procedures are often supplemented with MOAs, by-laws for conducting interagency consultation meetings, interagency consultation groups, and air quality working groups. State DOTs have found that these efforts help foster positive interagency coordination, consultation, and cooperation; and create a framework for improving working relationships.

This report also includes recommendations by the Air Quality COP for additional research measures that would help advance the state-of-the-practice for establishing and coordinating MVEBs.

ACRONYMS AND ABBREVIATIONS

The following acronyms and abbreviations are used in this report:

AASHTO - American Association of State Highway and Transportation Officials
ABAG - San Francisco Association of Bay Area Governments
BAAQMD – San Francisco Bay Area Air Quality Management District
BMC - Baltimore Metropolitan Council
BRTB - Baltimore Regional Transportation Board
CAA – Clean Air Act
CALTRANS – California Department of Transportation
CAL3QHC – Air Quality Dispersion Model
CARB - California Air Resources Board
CDOT –Colorado Department of Transportation
CFR – Code of Federal Regulations
CNG – Compressed Natural Gas
CO - Carbon Monoxide
COP – Community of Practice
DFW - Dallas-Fort Worth
DFW PMTC - Dallas-Fort Worth Photochemical Modeling Technical Committee
DMA/NFR - Denver Metro Area/North Front Range
DRCOG - Denver Regional Council of Governments
EMFAC – California's Emission Factor model
EPA – US Environmental Protection Agency
FHWA – Federal Highway Administration
FTA – Federal Transit Administration
GDOT – Georgia Department of Transportation
GHG – Greenhouse Gas
GWAQC - George Washington Air Quality Committee
HCM – Highway Capacity Manual
H-GAC - Houston-Galveston Area Council
HGB - Houston-Galveston-Brazoria Area
HPMS - Highway Performance Monitoring System

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ICG - Interagency Consultation Group
IDOT – Illinois Department of Transportation
MDE - Maryland Department of the Environment
MDOT - Maryland Department of Transportation
MNDOT – Minnesota Department of Transportation
MOA – Memorandum of Agreement
Mobile – EPA’s Emission Factor Model
MOVES – EPA’s Motor Vehicle Emission Simulator Model
MPA – Metropolitan Planning Area
MPO – Metropolitan Planning Organization
MTC - San Francisco Metropolitan Transportation Commission
MVEB – Motor Vehicle Emissions Budget
NAAQS – National Ambient Air Quality Standards
NCDOT – North Carolina Department of Transportation
NCHRP - National Cooperative Highway Research Program
NCTCOG - North Central Texas Council of Governments
NFRT & AQPC – Denver North Front Range Transportation and Air Quality Planning Council
NO₂ – Nitrogen Dioxide
NO_x – Nitrogen Oxides
NRB - Wisconsin Natural Resources Board
NYSDEC - New York State Department of Environmental Conservation
NYSDOT – New York State Department of Transportation
PaDEP - Pennsylvania Department of Environmental Protection
PennDOT – Pennsylvania Department of Transportation
PM – Particulate Matter
Ppb – Parts Per Billion
PPSUITE - Post-Processing Software for MOVES Emissions Modeling
RACT - Reasonably Available Control Technology
RFP - Reasonable Further Progress
RPOs - Regional Planning Organizations
RTC - Regional Transportation Council
RTPA - Regional Transportation Planning Agencies
SAFETEA-LU - Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users
SHA - State Highway Administration
SIP – State Implementation Plan
TCEQ - Texas Commission on Environmental Quality
TCMs – Transportation Control Measures
TERI - Transportation Environmental Research Ideas
TIP – Transportation Improvement Program
TTI - Texas Transportation Institute
TWG - Transportation/Air Quality Technical Working Group
TxDOT – Texas Department of Transportation
UFRTPR – Denver Upper Front Range Transportation Planning Region
VDEQ - Virginia Department of Environmental Quality

VDOT – Virginia Department of Transportation
VMT - Vehicle Miles Traveled
VOC - Volatile Organic Compounds
WDNR - Wisconsin Department of Natural Resources
WisDOT – Wisconsin Department of Transportation
WSDOT – Washington State Department of Transportation

REFERENCES

- ¹ AASHTO, *Air Quality Practitioner's Conference*, Albany, N.Y., November 17-20, 2008.
- ² AASHTO, State-of-The-Practice Report on *Mobile Source Air Toxics*, May 2009, available at http://environment.transportation.org/pdf/communities_of_practice/mobile_soruce_air_toxics_final_063009.pdf.
- ³ AASHTO, State-of-the-Practice Report on *Short Term Impacts from Construction Equipment and Operations*, March 2010, available at http://environment.transportation.org/pdf/communities_of_practice/airqualconstr.pdf.
- ⁴ AASHTO, State-of-the-Practice Report on *Air Quality Interagency Coordination*, June 2010, available at http://environment.transportation.org/pdf/communities_of_practice/eq%20interagency%20coordination%20report%206%2021%2010%20final.pdf
- ⁵ AASHTO State-of-the-Practice Report on *Establishing Air Quality Background Concentration Levels for Projects*, December 2010, available at http://environment.transportation.org/pdf/communities_of_practice/aqcopbackconc12-17-10.pdf.
- ⁶ AASHTO State-of-the-Practice Report on *Use of Transportation Control Measures and Reasonably Available Control Measures in Approved or Submitted State Implementation Plans* in April 2011, available at <http://environment.transportation.org/pdf/announcement/eq%20tcms-racms%20report%204%2021%2011.pdf>.
- ⁷ AASHTO State-of-the-Practice Report on *Public Education Programs* in January 2012, available at http://environment.transportation.org/pdf/communities_of_practice/aqpublicedreport.pdf.
- ⁸ EPA, *Transportation Conformity Regulations*, updated March 2010, available at <http://www.epa.gov/otaq/stateresources/transconf/regs/420b10006.pdf>
- ⁹ EPA, Final Rule: *Air Quality Designations for the 2008 National Ambient Air Quality Standards*, dated April 30, 2012, available at <http://www.epa.gov/ozonedesignations/2008standards/regs.htm>.
- ¹⁰ EPA, Final Rule: *Implementation of the 2008 National Ambient Air Quality Standards for Ozone: Nonattainment Area Classifications Approach, Attainment Deadlines and Revocation of the 1997 Ozone Standards for Transportation Conformity Purposes*, dated April 30, 2012, available at <http://www.epa.gov/ozonedesignations/2008standards/documents/20120430classificationfr.pdf>.
- ¹¹ EPA, Proposed rule on the *Implementation of the 2008 National Ambient Air Quality Standards for Ozone: Nonattainment Area Classifications Approach, Attainment Deadlines and Revocation of the 1997 Ozone Standards for Transportation Conformity Purposes*, 77 FR 8197, dated February 14, 2012, available at <http://www.gpo.gov/fdsys/pkg/FR-2012-02-14/pdf/2012-3284.pdf>.

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¹² EPA, *Transportation Conformity Rule Restructuring Amendments*, 77 FR 14979, dated March 14, 2012, available at <http://www.gpo.gov/fdsys/pkg/FR-2012-03-14/pdf/2012-6207.pdf>

¹³ EPA, *Transportation Conformity Rule: MOVES Regional Grace Period Extension*, 77 FR 11394, dated February 27, 2012, available at <http://www.gpo.gov/fdsys/pkg/FR-2012-02-27/pdf/2012-4484.pdf>.

¹⁴ EPA, *Notice of Official Release of the MOVES2010 Motor Vehicle Emissions Model for Emissions Inventories in SIPs and Transportation Conformity*, dated March 2, 2010, available at <http://www.gpo.gov/fdsys/pkg/FR-2010-03-02/html/2010-4312.htm>

¹⁵ EPA - *Policy Guidance on the Use of MOVES2010 and Subsequent Minor Revisions for State Implementation Plan Development, Transportation Conformity, and Other Purposes*, dated December 2009, available at <http://www.epa.gov/otaq/models/moves/documents/420b12010.pdf>.

¹⁶ U.S. DOT, *Statewide Transportation Planning; Metropolitan Transportation Planning; Final Rule*; 72 FR 7224, dated February 14, 2007, available at <http://www.regulations.gov/search/Regs/home.html#documentDetail?R=09000064802ac8ea>.

¹⁷ FHWA, *Transportation Conformity: A Basic Guide for State and Local Officials*, dated 2010, available at http://www.fhwa.dot.gov/environment/air_quality/conformity/guide/.

¹⁸ FHWA, *Air Quality Planning for Transportation Officials*, available at <http://www.fhwa.dot.gov/environment/aqplan/index.htm>.

¹⁹ Bay Area Air Quality Management District, *Revised San Francisco Bay Area Ozone Attainment Plan For The 1-Hour National Ozone Standard*, dated October 24, 2001, available at http://www.baaqmd.gov/~media/Files/Planning%20and%20Research/Plans/2001%20Ozone%20Attainment%20Plan/oap_2001.ashx

²⁰ California Air Resources Board, *2004 Revision to the California State Implementation Plan for Carbon Monoxide Updated Maintenance Plan For Ten Federal Planning Areas*, dated July 22, 2004, available at http://www.arb.ca.gov/planning/sip/co/final_2004_co_plan_update.pdf.

²¹ California DOT, *San Francisco Bay Area Transportation Air Quality Conformity Interagency Consultation Procedures*, dated August 4, 1994, available at [http://yosemite1.epa.gov/R9/r9sips.nsf/AgencyProvision/96F466AA42A9520388256A5C0055F5EC/\\$file/BA+T+CONFORMITY.PDF?OpenElement](http://yosemite1.epa.gov/R9/r9sips.nsf/AgencyProvision/96F466AA42A9520388256A5C0055F5EC/$file/BA+T+CONFORMITY.PDF?OpenElement).

²² Colorado Air Quality Control Commission, *Denver Metro Area & North Front Range: Ozone Action Plan Including Revisions to the State Implementation Plan*, dated December 12, 2008, available at http://raqc.org/postfiles/sip/ozone_8hr/Final_OZSIP_2008_AQCCapproved121208.pdf

²³ EPA, *Approval and Promulgation of State Implementation Plans; State of Colorado; Attainment Demonstration for the 1997 8-Hour Ozone Standard, and Approval of Related Revisions*, 76 FR 47443, dated August 5, 2011, available at <http://www.gpo.gov/fdsys/pkg/FR-2011-08-05/pdf/2011-19807.pdf#page=1>.

²⁴ Colorado Department of Health and the Environment, *Appendix C: Emissions Inventories for the Denver Ozone State Implementation Plan*, dated October 29, 2008, available at www.colorado.gov/airquality/documents/deno308/.

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²⁵ Regional Air Quality Council, *The SIP Planning Process: An Overview of The Clean Air Act's (CAA) Requirements for State Implementation Plan (SIP) Development & Approval*, available at <http://raqc.org/sip/>.

²⁶ Colorado DOT, *Multi-Agency Memorandum of Agreement for Transportation Conformity Evaluations Conducted Under the Eight Hour Ozone Standard*, dated March 14, 2008. For more information contact CDOT by email at Jill.Schlaefer@dot.state.co.us.

²⁷ Colorado DOT and Colorado Department of Public Health and Environment, *Memorandum of Agreement for Air Quality and Transportation Integration*, dated May 10, 2002. For more information contact CDOT by email at Jill.Schlaefer@dot.state.co.us.

²⁸ Maryland Department of the Environment, *Baltimore Nonattainment Area 8-Hour Ozone State Implementation Plan and Base Year Inventory*, dated June 15, 2007, available at http://www.mde.state.md.us/programs/Air/AirQualityPlanning/Documents/www.mde.state.md.us/assets/document/AirQuality/BALT_OZONE_SIP/BALT_OZONE_SIP.pdf.

²⁹ Maryland Department of the Environment, *Appendix F, Baltimore Area Mobile Source Emissions Technical Support Document*, dated February 2007, available at http://www.mde.state.md.us/programs/Air/AirQualityPlanning/Documents/www.mde.state.md.us/assets/document/AirQuality/BALT_OZONE_SIP/Appendix_F_MobileSourceEmissionTSD.pdf.

³⁰ EPA, *Designation of Areas for Air Quality Planning Purposes; Maryland; Determination of Nonattainment and Reclassification of the Baltimore 1997 8-Hour Ozone Nonattainment Area*, dated February 2, 2012, available at <https://www.federalregister.gov/articles/2012/02/01/2012-2218/designation-of-areas-for-air-quality-planning-purposes-maryland-determination-of-nonattainment-and>.

³¹ Maryland Department of Environment, *Interagency Consultation Procedures for Transportation Conformity Determinations and State Implementation Plan Development in the Baltimore Region*, dated 1996. For more information contact MDOT by email at hsimons@mdot.state.md.us.

³² Maryland Department of Environment, *Revision to Maryland's Transportation Conformity State Implementation Plan*, dated November 9, 2006, available at http://www.mde.state.md.us/programs/Air/AirQualityPlanning/Documents/www.mde.state.md.us/assets/document/Air/Conformity_SIP_Draft.pdf.

³³ Interagency Consultation Group (ICG) of the Baltimore Region Transportation Board, *ICG Meeting Bylaws*, dated 1999. For more information contact MDOT by email at hsimons@mdot.state.md.us.

³⁴ New York State Department of Environmental Conservation, *New York State On-Road Inventory Technical Documentation*, dated March 2008. For more information contact Patrick Lentlie at plentlie@dot.state.ny.us.

³⁵ Michael Baker Jr., Inc., *Draft: Pennsylvania's Process for Establishing and Coordinating Motor Vehicle Emissions Budgets*. For more information contact Michael Baker at MICHAELBA@pa.gov.

³⁶ Texas Commission on Environmental Quality, *Houston-Galveston-Brazoria Attainment Demonstration and Reasonable Further Progress State Implementation Plan Revisions for the 1997 Eight-Hour Ozone Standard*, dated March 10, 2010, available at http://www.tceq.texas.gov/implementation/air/sip/HGB_eight_hour.html.

³⁷ Houston-Galveston Area Council, *Appendix 9: Houston-Galveston-Brazoria 1997 Eight-Hour Ozone Nonattainment Area Reasonable Further Progress On-Road Mobile Source Emissions Inventories*, dated

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February 2009, available at

http://www.tceq.state.tx.us/assets/public/implementation/air/sip/hgb/hgb_sip_2009/09018SIP_APP9_ado.pdf

³⁸ Texas Transportation Institute, *Pre-Analysis Plan: Houston-Galveston-Brazoria Area, County-Level, MOVES-Based On-Road Mobile Source Modeling Emissions Inventories for 2018*. For more information contact TxDOT by email at jackie.ploch@txdot.gov

³⁹ Draft Deliberative, *Houston-Galveston-Brazoria (HGB) State Implementation Plan (SIP) Revision(s) to Update the Motor Vehicle Emission Budgets (MVEBs) Timeline*. For more information contact TxDOT by email at jackie.ploch@txdot.gov.

⁴⁰ Texas Commission on Environmental Quality, *Dallas-Fort Worth Eight-Hour Ozone Nonattainment Area Attainment Demonstration Texas*, dated May 23, 2007, available at http://www.tceq.state.tx.us/assets/public/implementation/air/sip/dfw/dfw_ad_sip_2007/2006013SIPNR_ado_Intro_052407.pdf.

⁴¹ Texas Commission on Environmental Quality, *Dallas-Fort Worth Attainment Demonstration Sip Revision For The 1997 Eight-Hour Ozone Standard Nonattainment Area*, adopted December 7, 2011, available at http://www.tceq.texas.gov/airquality/sip/dfw_revisions.html

⁴² Texas DOT, *Pre-analysis Consensus Plan for Transportation Conformity*, dated December, 19, 2009. For more information contact TxDOT by email at jackie.ploch@txdot.gov.

⁴³ Texas DOT, *Texas Conformity Documentation*, dated June 30, 2007. For more information contact TxDOT by email at jackie.ploch@txdot.gov.

⁴⁴ Commonwealth of Virginia Department of Environmental Quality, *Maintenance Plan for The City of Fredericksburg, Spotsylvania County and Stafford County 8-hour Ozone Nonattainment Area, and Request for Redesignation To Attainment for The City of Fredericksburg, Spotsylvania County, and Stafford County 8-hour Ozone Nonattainment Area*, dated May 2, 2005, available at <http://www.deq.virginia.gov/Programs/Air/AirQualityPlans/OzoneandPM25RegionalPlanningActivities.aspx>

⁴⁵ Commonwealth of Virginia Department of Environmental Quality, *Maintenance Plan Update for the City of Fredericksburg, Spotsylvania County, and Stafford County 1997 8-Hour Ozone NAAQS Maintenance Area: NOx Motor Vehicle Emissions Budget Revisions Based on MOVES2010a and Technical Support Document for the Fredericksburg Area 1997 8-Hour Ozone NAAQS Maintenance Area: NOx Motor Vehicle Emissions Budget Revisions Based on MOVES2010a*, available at <http://www.deq.virginia.gov/Programs/Air/AirQualityPlans/OzoneandPM25RegionalPlanningActivities.aspx>

⁴⁶ *Virginia Conformity SIP (Regulation for Transportation Conformity)*, available at: <http://lis.virginia.gov/000/reg/TOC09005.HTM.HTM#C0151>

⁴⁷ Wisconsin Department of Natural Resources, *8-Hour Ozone Redesignation Request and Maintenance Plan for The Milwaukee-Racine 6-County Subpart-2 Moderate Nonattainment Area; Sheboygan County Subpart-2 Moderate Nonattainment Area; Door County Subpart-1 Basic Nonattainment Area; and Manitowoc County Subpart-1 Basic Nonattainment Area*, dated September 2009, available at <http://dnr.wi.gov/air/pdf/allcntsredesreq090209.pdf>.

⁴⁸ EPA, *Proposed Rule: Approval and Promulgation of Implementation Plans; Wisconsin; Volatile Organic Compound Emission Control Measures for Milwaukee and Sheboygan Ozone Nonattainment Areas*, 77 FR 10424, dated February 22, 2012, available at <http://www.gpo.gov/fdsys/pkg/FR-2012-02-22/pdf/2012-4171.pdf>

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⁴⁹ Wisconsin Department of Natural Resources, *Updated Emissions Inventory and Motor Vehicle Emissions Budgets For The State Of Wisconsin's September 2009 8-Hour Ozone Redesignation Request and Maintenance Plan Submittal for the Milwaukee-Racine 6-County Subpart-2 Moderate Nonattainment Area and the Sheboygan County Subpart-2 Moderate Nonattainment Area*, dated July 2011, available at http://dnr.wi.gov/air/pdf/1997o3_redesignationrequestsupplement.pdf.

⁵⁰ EPA, *Proposed Rule to Approval and Promulgation of Implementation Plans and Designation of Areas for Air Quality Planning Purposes; Wisconsin; Redesignation of the Milwaukee-Racine and Sheboygan Areas to Attainment for 1997 8-Hour Ozone Standard*, 77 FR 6727, dated February 9, 2012, available at <http://www.gpo.gov/fdsys/pkg/FR-2012-02-09/pdf/FR-2012-02-09.pdf>.

⁵¹ Wisconsin Department of Natural Resources, *Draft 2011 Memorandum of Agreement Regarding Determination of Conformity of Transportation Plans, Programs and Projects to State Implementation Plans*, dated September 20, 2011, available at <http://dnr.wi.gov/topic/airquality/documents/transconformitymoav16.pdf>.

⁵² NCHRP 25-25/Task 07 [Completed] - *Evaluation of Mobile Models: MOBILE 6.1, MOBILE 6.2 and MOBILE6/CNG*, dated June 30, 2004, available at [http://onlinepubs.trb.org/onlinepubs/archive/NotesDocs/25-25\(7\)_FR.pdf](http://onlinepubs.trb.org/onlinepubs/archive/NotesDocs/25-25(7)_FR.pdf)

⁵³ NCHRP 25-25/Task 65 - *Synthesis of Greenhouse Gas Emission Inventory Methodologies for State Transportation Departments*, dated July 2011, available at [http://onlinepubs.trb.org/onlinepubs/nchrp/docs/NCHRP25-25\(65\)_FR.pdf](http://onlinepubs.trb.org/onlinepubs/nchrp/docs/NCHRP25-25(65)_FR.pdf)

⁵⁴ AASHTO, *TERI Database*, available at http://environment.transportation.org/teri_database/view_ideas.aspx?focus_filter=1.