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Air Quality and Climate Change Highlights

Prepared by the Office of Natural Environment
Federal Highway Administration

U.S. Department of Transportation
Federal Highway Administration

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Announcements and Recent Events

FHWA Releases Primer on Climate Change Adaptation Guide for Transportation Systems Management, Operations, and Maintenance

The *Climate Change Adaptation Guide for Transportation Systems Management, Operations, and Maintenance: A Primer* provides information and resources to help transportation management, operations, and maintenance staffs incorporate climate change into their planning and ongoing activities. It is intended for practitioners involved in the day-to-day management, operations, and maintenance of surface transportation systems at State and local agencies. The guide assists State departments of transportation (DOTs) and other transportation agencies in understanding the risks that climate change poses and actions that can help reduce those risks. Incorporating climate change considerations into how agencies plan and execute their transportation system management and operations (TSMO) and maintenance programs helps the agency become more resilient to unanticipated shocks to the system. Adjustments to TSMO and maintenance programs—ranging from minor to major changes—can help to minimize the current and future risks to effective TSMO and maintenance. The report is available at http://www.ops.fhwa.dot.gov/publications/fhwahop15026/index.htm. In addition, FHWA has provided introductions to the guide for transportation agency executives and technical staff at http://www.ops.fhwa.dot.gov/publications/fhwahop15024/index.htm and http://www.ops.fhwa.dot.gov/publications/fhwahop15025/index.htm.

The Congestion Mitigation and Air Quality Improvement (CMAQ) Program Cost Effectiveness Tables

The MAP-21 called for the development of cost-effectiveness tables for a range of CMAQ eligible project types. The Tables are intended to assist States, MPOs and other project sponsors make the most efficient use of their CMAQ dollars in reducing on road vehicle emissions and traffic congestion. These materials provide information regarding the development of estimates of cost- effectiveness for a wide range of representative project types funded under the CMAQ Program. See http://www.fhwa.dot.gov/environment/air_quality/cmaq/reference/cost_effectiveness_tables/index.cfm. For more information, please contact Mark Glaze at mark.glaze@dot.gov or 202 366-4053.

CMAQ Project Tracking and Public Access Systems Update Complete

After almost a year, the overhaul and upgrade to the CMAQ Project Tracking (PTS) and Public Access (PAS) Systems are complete. Improvements and updates include a full program rewrite and expanded reporting features, such as, increased number of reporting categories and enhanced project descriptions; simple and advanced search features; and improved bulk project upload feature. Access to the PAS is through the FHWA CMAQ webpage or the following link: https://fhwaapps.fhwa.dot.gov/cmaq_pub/ . For more information, contact Mark Glaze at mark.glaze@dot.gov or 202 366-4053.

Health in Transportation Corridor Planning Framework

Recognizing the need for infrastructure improvements to be responsive to a broad range of community needs, a multi-disciplinary USDOT research team developed a means to incorporate public health considerations into the traditional corridor planning steps. Intended to help transportation agencies identify when and how to consider public health, the *Framework for Better Integrating Health into Transportation Decision Making* (Framework) poses questions to practitioners to identify issues to consider, suggests partnership strategies, and identifies data and tools needed to support these decisions. Using examples from current practice, the Framework Case Studies highlight real-world accomplishments of five communities that tested it in their corridor studies. The Framework and Case Studies are available at http://www.fhwa.dot.gov/planning/health_in_transportation/planning_framework/. Please contact Victoria Martinez at Victoria.Martinez@dot.gov or (787) 771-2524 for more information.

Accelerating Adoption of Alternative Fueled Vehicles Workshop

The workshop will be held on April 18, 2016 in Austin, TX and is focused on identifying opportunities to accelerate state transportation agency fleet adoption of alternative fueled vehicles (AFVs). The workshop will include presentations and discussions on available fuels and vehicles, procurement strategies, and implications of alternative fuels on fleet maintenance and operations. The workshop is part of a pooled fund effort on alternative fuels being led by the Oregon DOT. Attendees will be comprised of state DOT fleet managers, other agency fleet managers, Clean Cities coordinators, alternative fuels experts, industry association representatives, and other interested stakeholders. Outcomes of the workshop will be posted to the alternative fuels toolbox web site at: http://altfueltoolkit.org/

National Transportation Asset Management Conference

The 11th National Transportation Asset Management Conference will take place July 10-12, 2016, in Minneapolis, MN. The conference will cover a broad range of topics on surface transportation modes of interest to agencies in all stages of implementation of asset management practices. Themes will include adaptation of transportation to extreme weather events and climate change. This meeting will serve as the forum for moving MAP-21 asset management initiatives into practice and will be the venue for a wide range of federal, state, MPO/local, and transit agencies, as well as private sector practitioners and university researchers to share knowledge, sponsor peer-to-peer learning, and work together. More information can be found at http://www.cvent.com/events/11th-national-conference-on-transportation-asset-management/event-summary-deb10e67357243ee80b7301b216d3ea7.aspx. Early bird registration expires on April 10th.

PlanWorks: Round 7 of the SHRP2 Assistance Upcoming Application Period

PlanWorks is an FHWA web-based resource that supports collaborative decision-making in transportation planning and project development. The Round 7 Implementation Assistance Program (IAP) application period is from April 1 - 29, 2016. Round 7 will be the last opportunity to take advantage of the IAP's financial and technical assistance to implement SHRP2 products. For more information see the SHRP2 Solutions Webpage https://www.fhwa.dot.gov/goshrp2/.

FHWA Climate Change Questions and Answers Webpage Updated

In January 2016, the FHWA Sustainable Transport and Climate Change Team updated the Climate Mitigation *Questions and Answers* webpage. The questions and responses provide a one-stop resource for transportation and greenhouse gases (GHGs) information, issues, reports, and State and local efforts in addressing GHG emissions. The Q&A is available at http://www.fhwa.dot.gov/environment/climate_change/mitigation/q_and_a/index.cfm.

Ten Climate Resilience Pilot Final Reports Published

FHWA has so far posted final reports from ten of 19 studies that piloted approaches for conducting climate change and extreme weather vulnerability assessments of transportation infrastructure and analyzed options for adapting and improving resiliency. The studies were conducted by transportation agencies across the country and were funded in part by FHWA.

Extreme Weather Vulnerability Assessment presents the results of the project conducted by the Arizona Department of Transportation (ADOT). The study identified hotspots where highways may be vulnerable to associated hazards from high temperatures, drought, and intense storms. The project focused on the Interstate corridor connecting Nogales, Tucson, Phoenix, and Flagstaff, which includes a variety of urban areas, landscapes, biotic communities, and climate zones and presents a range of weather conditions applicable to much of Arizona.

Central Texas Extreme Weather and Climate Change Vulnerability Assessment of Regional Transportation Infrastructure presents the results of the project conducted by the Capital Area Metropolitan Planning Organization (CAMPO) and the City of Austin Office of Sustainability. The CAMPO team used a data and stakeholder-driven approach to assess risks to nine critical assets from flooding, drought, extreme heat, wildfire, and ice. The project team conducted a criticality workshop, developed local climate projections, and performed risk assessments for each asset.

District 1 Climate Change Vulnerability Assessment and Pilot Studies presents the results of the project conducted by California Department of Transportation (Caltrans) District 1. The study assessed vulnerability in four counties by scoring asset criticality and potential climate impact. It identified adaptation options at four prototype locations of vulnerable road segments. The Caltrans District 1 team formalized their adaptation methodology into a tool to assist with the evaluation and prioritization of adaptation options.

Connecticut Department of Transportation Climate Change and Extreme Weather Vulnerability Pilot Project Final Report presents the results of the project conducted by the Connecticut Department of Transportation (CTDOT). CTDOT conducted a systems-level vulnerability assessment of bridge and culvert structures from inland flooding associated with extreme rainfall events. The assessment included

data collection and field review, hydrologic and hydraulic evaluation, criticality assessment and hydraulic design criteria evaluation.

Iowa's Bridge and Highway Climate Change and Extreme Weather Vulnerability Assessment Pilot presents the results of the project conducted by the Iowa Department of Transportation (Iowa DOT). To evaluate future flood conditions, the Iowa DOT team developed a methodology to integrate climate projections of rainfall within a river system model to predict river flood response to climate change. Iowa DOT tested this methodology in two river basins to evaluate the strengths and weaknesses of technology to produce scenarios of future flood conditions. They also analyzed the potential impact of the future floods on six bridges to evaluate vulnerability to climate change and extreme weather and inform the development of adaptation options.

Maryland State Highway Administration Climate Change Adaptation Plan with Detailed Vulnerability Assessment presents the results of the project conducted by the Maryland State Highway Administration (SHA). SHA conducted a vulnerability assessment in two counties. The project team developed a three-tiered vulnerability assessment and adaptation process using flood inundation modeling, mapping, vulnerability and risk ratings, and expert input. SHA engineers, planners, and maintenance personnel used the assessment results to brainstorm adaptation measures.

Michigan DOT Climate Vulnerability Assessment Pilot Project presents the results of the project conducted by the Michigan Department of Transportation (MDOT). MDOT conducted a climate-based vulnerability assessment of primarily MDOT-owned and operated transportation infrastructure. The assessment overlaid projected climate data onto MDOT's existing asset management database to help identify locations and infrastructure that may be at risk. The assessment found that the most at-risk transportation assets were situated in the southern third of the state, where the state's larger urban areas are located. The assessment was a first step to help the department protect the transportation infrastructure investments in Michigan.

MnDOT Flash Flood Vulnerability and Adaptation Assessment Pilot Project presents the results of the project conducted by the Minnesota Department of Transportation (MnDOT). The MnDOT pilot project team conducted a vulnerability assessment of bridges, culverts, pipes, and roads paralleling streams to flooding related to increased heavy precipitation in two districts. Based on preliminary vulnerability assessment results, they selected two culverts to conduct case studies of facility-level adaptation planning that considered the potential for damage and economic losses associated with flash flooding. The project findings and recommendations are informing MnDOT's ongoing asset management planning.

Climate Change Vulnerability Assessment and Adaptation Options Study presents the results of the project conducted by the Oregon Department of Transportation (ODOT). The ODOT team engaged maintenance and technical staff and utilized asset data to assess the vulnerability of highway infrastructure in two coastal counties to extreme weather events and higher sea levels. Based on the results of the vulnerability assessment, the pilot conducted further analysis of specific adaptation sites, options, and benefits and costs for five priority storm and landslide hazard areas. Options analyzed ranged from "do nothing" scenarios to options for increased operations and maintenance and options with significant construction and engineering requirements.

Creating a Resilient Transportation Network in Skagit County: Using Flood Studies to Inform Transportation Asset Management presents the results of the project conducted by the Washington State Department of Transportation (WSDOT). The WSDOT team examined adaptation options in the Skagit River Basin (Basin), a highly vulnerable area of the state. The Basin was the focus of a major flood risk reduction study by the U.S. Army Corps of Engineers (Corps). WSDOT worked with the Seattle District of the Corps and the Skagit County Public Works Department to identify vulnerabilities and opportunities for flood risk reduction. This pilot demonstrated the importance of coordinating transportation adaptation planning with other ongoing flood risk reduction efforts like the Skagit River Flood Risk Management General Investigation Study.

The studies are available at:
http://www.fhwa.dot.gov/environment/climate_change/adaptation/resilience_pilots/2013-2015_pilots/index.cfm

Research

Life-Cycle Cost Estimation Tool for Intersection Designs

The National Cooperative Highway Research Program (NCHRP) *Web-Only Document 220: Estimating the Life-Cycle Cost of Intersection Designs* describes the Life-Cycle Cost Estimation Tool (LCCET). The LCCET spreadsheet allows users to compare alternative intersection designs based on initial construction costs, ongoing maintenance and operations costs, operational efficiencies for a variety of modes, safety effects, and emissions. Alternative designs include roundabouts and traditional intersections using stop signs and traffic signals. The tool includes criteria pollutants and greenhouse gases (GHGs) in the cost calculations. Use of the tool is designed to help provide a consistent approach to these comparisons based on benefits and costs. The report is available at http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_w220.pdf.

FHWA Staff Members Participate in TRB's Annual Meeting

FHWA Office of Natural Environment staff members moderated sessions and made several presentations at the January 2016 TRB annual meeting in Washington, DC. This year's theme, “Research Convergence for a Multimodal Future," featured over 5,000 presentations, in nearly 800 workshops, covering thousands of topics and research trends. Sessions moderated by staff included Greenhouse Gas Analysis: Tools and Methodologies in Practice that highlighted the greenhouse gas (GHG) emission reduction analysis tools and projects that FHWA has supported at state and local transportation agencies around the country; Alternative Fuel Use: Multimodal Perspective focused on the latest alternative fuel and vehicle technology research and how vehicle fuels and technology are being used for multi-modal purposes; In the Wake of Hurricane Sandy: Toward a More Resilient Transportation System in Connecticut, New Jersey, and New York discussed critical lessons learned in the wake of Hurricanes Sandy and Irene and offered insights into how to leverage results to produce resilient plans and investment decisions in each jurisdiction. Staff organized, moderated, and presented a Sunday workshop on CMAQ policy and guidance, as well as methodologies on estimating emissions benefits for CMAQ projects. Staff also presented on procedures and informational requirements needed to complete the air quality and noise analyses for highway projects; and the INVEST Sustainable Highways Self-Evaluation Tool. To access

papers or workshop proceedings from the TRB meeting, please visit, http://amonline.trb.org/. Presentation slides and posters from the meeting will be available in early March 2016.

Transportation for Sustainability Conference Presentations Published

The Transportation Research Board has published Transportation Research Circular E-C203, *Transportation for Sustainability: An International Conference* developed from presentations at the conference. Held in Washington, D.C., in May 2015, the conference explored ways in which transportation systems can promote sustainability, with one session focused specifically on climate change. The e-circular is available at http://onlinepubs.trb.org/onlinepubs/circulars/ec203.pdf.

Emissions Modeling with MOVES and EMFAC to Assess the Potential for a Transportation Project to Create Particulate Matter Hot Spots

In particulate matter (PM) nonattainment and maintenance areas, quantitative hot-spot analyses are required to assess air quality impacts of transportation projects that are identified as projects of local air quality concern (POAQC). In its 2006 rulemaking, the U.S. Environmental Protection Agency identified sample projects that would likely be POAQCs. The objective of this study was to identify project characteristics that could reasonably exclude the project from consideration as a POAQC. Scenario analyses were performed for a hypothetical project that featured a new freeway with four mixed-flow lanes and baseline traffic activity of 125,000 AADT and 8% diesel truck traffic. See http://trrjournalonline.trb.org/doi/pdf/10.3141/2570-02

Reminders

Transportation Conformity Guidance for 2012 $PM_{2.5}$ Nonattainment Areas

Reminder: In areas that are designated nonattainment under the 2012 $PM_{2.5}$ standard, transportation conformity requirements will apply for the standard on **April 15, 2016**, one year after the designation effective date, for metropolitan transportation plans, TIPs, and projects. For more information, see the guidance discussed here:

The U.S. EPA released guidance for meeting transportation conformity requirements in areas designated nonattainment for the 2012 primary annual $PM_{2.5}$ national ambient air quality standards (2012 $PM_{2.5}$ NAAQS). The guidance is intended to take the information contained in the transportation conformity rule (40 CFR Part 93) and the U.S. EPA's existing guidance for implementing conformity in multi-jurisdictional areas, and demonstrate how conformity specifically applies in the context of the 2012 $PM_{2.5}$ NAAQS. The guidance can be downloaded at: http://www3.epa.gov/otaq/stateresources/transconf/documents/420b15091.pdf.

U.S. EPA Strengthens the Air Quality Standards for Ground-Level Ozone

On October 1, 2015, the U.S. EPA strengthened the National Ambient Air Quality Standards (NAAQS) for ground-level ozone to 70 parts per billion (ppb), based on extensive scientific evidence about ozone's effects on public health and welfare. According to the Federal Register Notice, the updated standards will improve public health protection, particularly for at-risk groups including children, older adults, people of all ages who have lung diseases such as asthma, and people who are active outdoors, especially outdoor

workers. U.S. EPA projections show the vast majority of U.S. counties will meet the standards by 2025 with federal and state rules and programs now in place or underway. For more information, including a version of the final rule, please see: http://www3.epa.gov/ozonepollution/actions.html.

EPA Releases MOVES2014a

On November 4, 2015, U.S. EPA's Office of Transportation and Air Quality released MOVES2014a, a minor revision to EPA's Motor Vehicle Emission Simulator (MOVES2014) emission modeling tool. For on-road emissions, MOVES2014a adds new options requested by users for the input of local vehicle miles traveled (VMT), includes minor updates to the default fuel tables, and corrects an error in MOVES2014 brake wear emissions. The change in brake wear emissions results in small decreases in PM emissions, while emissions for other criteria pollutants remain essentially the same as MOVES2014. MOVES2014a incorporates several improvements in the calculation of non-road equipment emissions. It adds volatile organic compounds (VOCs) and toxics to the list of pollutants that can be directly estimated for non-road equipment. State and local agencies that have already completed significant work with MOVES2014 do not need to redo or revise that work with MOVES2014a. The model revision does not significantly change the criteria pollutant emissions results of MOVES2014 and therefore is not considered a new model for SIP and transportation conformity purposes. The revised model, supporting documentation, and more information on the model revision can be found on the MOVES website: http://www.epa.gov/otaq/models/moves/index.htm.

Official Release of EMFAC2014 Motor Vehicle Emission Factor Model for Use in the State of California

The U.S. EPA approved the EMFAC2014 emissions model for State Implementation Plan (SIP) and conformity purposes, effective December 14, 2015. The new model, which is based on new and improved data, calculates air pollution emissions factors for passenger cars, trucks, motorcycles, motor homes, and buses. EMFAC2014 must be used for all new regional emissions analyses and carbon monoxide (CO) and particulate matter (PM_{10} and $PM_{2.5}$) hot-spot analyses for transportation conformity purposes that are started on or after December 14, 2017. For more information, please visit: https://www.gpo.gov/fdsys/pkg/FR-2015-12-14/html/2015-31307.htm.

New Materials Needed for *It All Adds Up to Cleaner Air* Website

The FHWA would like to hear about successful programs and exemplary materials to include on the *It All Adds Up to Cleaner Air* website (http://www.fhwa.dot.gov/environment/air_quality/it_all_adds_up/). This website is a public education and partnership-building initiative developed by several federal agencies for the purpose of informing the public about the impact of their transportation choices on traffic congestion and air quality. Organizations that use *It All Adds Up* enjoy access to free customizable materials, including advertisements, billboards, and television public service announcements. Tutorials in the Education Center assist with planning, implementing, and evaluating an air quality campaign. Please contact Victoria Martinez at Victoria.Martinez@dot.gov or (787) 771-2524 for more information.

Training Opportunities

National Transit Institute Offers Introduction to Transportation Conformity Training

The National Transit Institute (NTI) has scheduled the next Introduction to Transportation Conformity course in the NYMTC offices in lower Manhattan, New York City, on April 27-29, 2016. This introductory training course presents basic information about transportation conformity requirements and the relationship of the transportation and air quality planning processes in order to prepare agency staff (federal, state and local) to participate in interagency consultation and work effectively in resolving conformity issues. For course information and registration, please visit: http://www.ntionline.com/introduction-to-transportation-conformity/

CMAQ 101 Training

The FHWA posted a 27-minute YouTube video on the Congestion Mitigation and Air Quality Improvement (CMAQ) program. The video provides a basic introduction to the program, how CMAQ funds are distributed to states, and the types of projects eligible for the CMAQ program. The training is available at https://www.youtube.com/watch?v=XKXcs0WtNHA&feature=youtu.be. For more information about the CMAQ program, please contact Emily Biondi at Emily.Biondi@dot.gov or (202) 366-9482.

Air Quality Planning Web Course Available at No Cost

The National Highway Institute (NHI) Air Quality Planning web-based training series is designed for transportation practitioners. It includes four modules: Clean Air Act Overview (FHWA-NHI-142068), State Implementation Plan (SIP) and Transportation Control Measure (TCM) Requirements and Policies (FHWA-NHI-142069), SIP Development Process (FHWA-NHI-142070) and Transportation Conformity (FHWA-NHI-142071). All courses are free. For more information, visit www.nhi.fhwa.dot.gov, search Air Quality Planning or look for the specific course number. Please contact Karen Perritt at (202) 366-9066, or karen.perritt@dot.gov with any questions or comments.

EPA Posts MOVES2014 Training Course Material

The U.S. EPA posted updated training materials for the MOVES2014 two-day hands-on training course at http://www3.epa.gov/otaq/models/moves/training.htm. On the same webpage, the U.S. EPA has also posted an abbreviated version of the MOVES2014 course materials used as a one-day training course. MOVES users who did not attend a previous hands-on training session can use the "MOVES2014 Training Materials" as a self-taught course.

MySQL Training for MOVES Model Users

Two training opportunities are available for MOVES model users. A three-hour webinar provides an introduction to MySQL Query Browser and MOVES interface. A six-hour training over two days will enable users to do MySQL programming and to write his/her own MySQL scripts and to manipulate MySQL databases including MOVES input and outputs. For more information or to schedule training, please contact John Byun at Joon.Byun@dot.gov or Paul Heishman at Paul.Heishman@dot.gov.

Web-based Training Courses Available

A variety of web-based training opportunities are accessible via the FHWA Conformity Website, at http://www.fhwa.dot.gov/environment/air_quality/conformity/training/. Training includes Air Quality Planning, Transportation Conformity, and others. Please contact Karen Perritt at Karen.Perritt@dot.gov or (202) 366-9066 with any questions or comments.

FHWA Resource Center Training Activities

FHWA's Resource Center Air Quality Technical Services Team is available to offer MOVES training, and information is available at the Resource Center website.

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FHWA Resource Center Air Quality Team

Past issues of the *Air Quality and Transportation Conformity Highlights* are available on FHWA's website: http://www.fhwa.dot.gov/environment/air_quality/conformity/highlights/. Past issues of the *Transportation and Climate Change Newsletter* are available on FHWA's website: http://www.fhwa.dot.gov/environment/climate_change/newsletter/.

Please e-mail Victoria.Martinez@dot.gov with any suggestions for future issues.