OFFICE OF

NATURAL ENVIRONMENT

U.S. Department of Transportation
Federal Highway Administration

Office of Planning, Environment, and Realty

https://www.fhwa.dot.gov/environment/

FHWA's Office of Natural Environment (HEPN) develops and implements programs and activities to minimize the adverse impact of transportation on the natural environment.

The Federal Highway Administration's (FHWA) Office of Planning, Environment, and Realty offers research opportunities to improve transportation decision-making and promote efficiency while protecting communities and the environment. The Office supports and conducts research that:

- Informs Decisions
- Reduces Environmental Impacts
- Improves Quality of Life
- Accelerates Project Delivery
- Advances Transportation Planning

Research Focus

The Office of Natural Environment conducts comprehensive research to support the development and implementation of programs and activities that enhance sustainability, improve resilience, and reduce energy use, air quality impacts, and noise impacts on our highway system. Programs and activities include the Congestion Mitigation and Air Quality Improvement (CMAQ) program, transportation conformity, analysis and assessment of air quality, resources to support climate resilience and implementation of the Promoting Resilient Operations for Transformative, Efficient, and Cost-saving Transportation (PROTECT) Program, highway traffic noise, and programs to support the development of alternative fuel corridors including the National Electric Vehicle Infrastructure (NEVI) Programs and the Charging and Fueling Infrastructure (CFI) Discretionary Grant Program.

Staff Contact: Connie Galloway, 804-775-3378.

FEATURED RESEARCH ACTIVITIES

CMAQ Emissions Calculator Toolkit

The CMAQ Emissions Calculator Toolkit contains spreadsheet-based tools to assist State Departments of Transportation (SDOTs), Metropolitan Planning Organizations (MPOs) and project sponsors to generate emissions benefit information for potential CMAQ projects. A total of 19 tools now available provide the ability to analyze over 60 different project types. Each of the Emissions Calculator Tool postings is accompanied by thorough documentation on tool usage and a training webinar recording. Additional tools are being developed to address other project types including: nonroad idle reduction and parking pricing. A companion resource, the CMAQ Input Data Dictionary, includes definitions for 480 data inputs used in the Toolkit calculations for CMAQ eligible projects.

Staff Contact: Mark Glaze, 202-366-4053.

National Highway Institute (NHI) Training on Climate Resilience

FHWA's instructor-led training course, Addressing Resilience in Highway Project Development & Preliminary Design (142085/142085A), and four companion web-based training courses (142081/142082/142083/142084) focused on resilience to climate change and extreme weather events. The target audience includes engineering, project planning and environmental staff, and others seeking to integrate climate change considerations into their practices.

Staff Contact: Rob Kafalenos, 202-366-2079.

Nature-Based Techniques for Coastal Highway Resilience: Implementation Lessons Learned

Natural infrastructure such as dunes, wetlands, living shorelines, reefs, and beaches can protect highways from coastal flooding while offering environmental benefits. FHWA followed up with former pilot project participants and other transportation agencies that had considered nature-based solutions and developed brief resource summarizing implementation lessons learned to support other agencies considering such resilience solutions.

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Climate Change Resilience Handbooks

FHWA change affects all aspects of the national transportation system. Planners, engineers, and asset managers need to know how to address the impacts of climate change in their work to make transportation systems more resilient to current and future environmental risks. Four handbooks from the FHWA are designed to support a range of disciplines by providing technical information, techniques, best practices, and results of peer exchanges.

- Integrating Natural Hazard Resilience into the Transportation Planning Process (New)
- Addressing Resilience to Climate Change and Extreme Weather in Transportation Asset Management (April 2023)
- Pavement Resilience: State of the Practice (March 2023)
- Geohazards, Extreme Weather Events and Climate Change Resilience Manual (February 2023)

Staff Contacts: Allison Yeh, 202-366-4649, Rob Kafalenos, 202-366-2079, and Elizabeth Habic, 202-366-1701.

Air Quality Modeling Refinements

FHWA is engaged in numerous efforts to support improvements to dispersion modeling techniques. This includes testing of AERMOD source types and evaluation of AERMOD, evaluating dispersion algorithms, special roadway configurations, and vehicle induced turbulence algorithms. Additional research areas include processing tools to prepare AERMOD inputs. Part of this research is conducted in partnership with the Environmental Protection Agency.

Staff Contact: Victoria Martinez, 787-771-2524.

Database for Air Quality and Noise Analysis (DANA) Tool and Traffic Noise Model Aide (TNMAide)

FHWA released version 2.1 of the DANA Tool, which combines and processes existing traffic data to produce properly formatted inputs to the EPA's MOVES emissions model. This updated version of DANA also integrated the related TNMAide, which was a spreadsheet tool. Please see the updated User's Guide for details. FHWA is also assisting with research on multiple Use Case Studies from a variety of organizations.

Staff Contact: David Kall, 202-366-6276.

Noise Research and Data

In 2024 FHWA released the next version of the Traffic Noise Model 3.2, which integrated TNM with the Roadway Construction Noise Model (RCNM). FHWA has begun work on improving about the memory usage of the software for the next version - TNM 3.3.

We are working on updating multiple FHWA noise documents, research reports, and handbooks. We have started with the Construction Noise Handbook and the updated documents will be released as they are completed.

FHWA continues to support NCHRP research to update the acoustical database for TNM, including the Reference Energy Mean Emissions Level (REMEL) database, and the assignation of sub-source heights.

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Alternative Fuels Corridor Program

In accordance with the Bipartisan Infrastructure Law (BIL), FHWA has designated alternative fuel corridors to support installation of EV charging, hydrogen, propane, and natural gas fueling infrastructure at strategic locations along major national highways. This supports needed changes in the transportation sector that assists in reducing greenhouse gas emissions and improves the mobility of passenger and commercial vehicles that employ these technologies across the United States. The FHWA has updated and redesignated the corridors on an annual basis by soliciting nominations from State and local officials. For more information see https://www.fhwa.dot.gov/environment/alternative_fuel_corridors/.

Staff Contact: Will Stein, 952-913-3443.

Air Quality Selected Facts and Figures Brochure

FHWA updated the *Transportation Air Quality Selected Facts and Figures* booklet that provides an overview of facts and figures regarding the linkages between transportation and air quality. The focus is primarily on transportation-related emissions trends, policies, technologies, and standards that effect on-road mobile sources, including automobiles, light-duty trucks, and heavy-duty trucks. The publication is a handy reference for transportation practitioners and an information resource for citizens on transportation air quality issues. Previous editions are available. https://www.fhwa.dot.gov/environment/air_quality/publications/fact_book/

Staff Contact: Victoria Martinez, 787-771-2524

CMAQ Project Dashboard & Annual Project Snapshots

FHWA completed an update to the CMAQ Project Dashboard, adding CMAQ funded projects from FY22. The Dashboard provides a map of projects by state as well as filters to easily sort projects by year of obligation, funding, project type, and subcategory for all states. FHWA also published Annual Projects Shapshots for FY21 and FY22 that summarize the various types of project funded in that fiscal year, and shares a few specific project highlights.

Staff Contact: Karen Perritt, 202-366-9066.

Innovative Air and Noise Pollution Reduction Strategies

FHWA is conducting research to identify innovative, effective, and feasible air and noise pollution reduction strategies to provide State Departments of Transportation (DOTs) with a more robust set of federally supported options, especially when standard approved methods do not work. Phase 1 of the research used a literature review and interviews with subject matter experts to identify 28 strategies and create a data collection plan for the ten most promising strategies. A Phase 1 summary report is expected to be available on the FHWA air quality website in late 2024. Phase 2 is expected to collect field data and analyze existing data for several strategies to provide information on the feasibility and effectiveness of those strategies.

Staff Contact: David Kall, 202-366-6276.

MOVES4 Electric Vehicle Market Share Sensitivity Analysis

FHWA is assessing the sensitivity of U.S. Environmental Protection Agency's (EPA's) MOtor Vehicle Emissions Simulator version 4 (MOVES4) to the market share of electric vehicles using four future projection scenarios. A report that includes the sensitivity results for six pollutants is expected to be available on the FHWA air quality website in late 2024.

Staff Contact: David Kall, 202-366-6276.

Sustainable Transportation Curriculum for Colleges, Universities, and Transportation Professionals

FHWA has developed a semester-long curriculum to help students and transportation professionals understand and apply the Infrastructure Voluntary Evaluation Sustainability Tool, INVEST. The curriculum introduces students to sustainability principles and transportation, and emphasizes key concepts, indicators, and performance measures. The semester-long course can be taught independently, or in a more inclusive, modular fashion as part of an existing lecture, course, or program. A wide array of teaching and learning materials are available, including course syllabus, lecture plans and slides, reading materials, instructional aids for professors, and real-world applications of INVEST to demonstrate how it can be used to assess sustainability of transportation projects, plans, and programs.

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