

AASHTO/FHWA/FTA Climate Change Symposium

Summary Report

Prepared for:

American Association of State Highway and Transportation Officials
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Table of Contents

Background and Introduction	1
Day 1	1
Day 2	4

Background and Introduction

From August 5-6, 2010 the American Association of State Highway Transportation Officials (AASHTO), in coordination with the Federal Highway Administration (FHWA), the Federal Transit Administration (FTA), AASHTO's Environmental Technical Assistance Program, AASHTO's Climate Change Technical Assistance Program, and AASHTO's Standing Committee on Planning, conducted a Climate Change Symposium. Approximately 140 people attended the symposium, including representatives from over 40 state departments of transportation (DOTs), FHWA, FHWA division offices, and FTA.

The purpose of the symposium was to provide information – policy-oriented and technical – to support state DOTs in their efforts to address the challenges of climate change, including both greenhouse gas (GHGs) emissions reduction and climate adaptation. Additionally, it was intended to support relationship-building among state DOTs to strengthen knowledge sharing and best practices related to transportation and climate change.

The first day provided a broad policy perspective on transportation and climate change, with a focus on GHG mitigation and the integration of GHG reduction considerations in transportation planning, project development, and operations. The second day focused largely on climate adaptation; it concluded with a discussion of critical needs for state DOTs in addressing climate change (both mitigation and adaptation) effectively. The symposium included presentations from a wide range of speakers, along with facilitated breakout sessions addressing key issues in mitigation and adaptation.

Day 1

Highlights from each of the sessions are included below.

- **Welcome and Introduction**—In her opening remarks, Paula Hammond, Secretary of Transportation for Washington State DOT and Chair of AASHTO's Climate Change Steering Committee, emphasized the importance of network-building in order to more effectively address climate change issues. John Horsley from AASHTO talked about his organization's commitment to supporting state DOT initiatives to address climate change, both now and in the future. Speaking on behalf of FHWA, Gloria Shepherd discussed the importance of using performance measures in GHG emission reduction efforts, particularly in state DOT plans.
- **The Challenge of Climate Change**—Steve Seidel from the Pew Center on Global Climate Change provided a brief overview of the science surrounding climate change, noting that although the science is complex and uncertainties exist, there is still strong, credible scientific evidence showing that climate change is occurring, that it is caused largely by human activities, and that it poses significant risks. He noted that although much of the debate is focused on the costs of taking action, the impacts are effectively irreversible, and the risks of not acting appear to far outweigh the costs. David Herring from the National Oceanic and Atmospheric Administration (NOAA) discussed the role of communications and science literacy, noting that it is often difficult for the public to distinguish between credible and noncredible sources and that the media often tend to show positions on both sides without a clear context about the scientific evidence. He talked about the importance of fostering dialogue and understanding between the public, scientists, and politicians to reduce the amount of fear, uncertainty, and doubt that often surrounds issues related to climate change.
- **Federal Policy Status Report**—John Stoodly from the Office of Senator Kit Bond (R-Mo) discussed the challenges faced in the Senate in elevating climate change to a long-term public interest given the current challenges faced with the economy and the recent healthcare legislation. Alexander Barron from the U.S. House Energy and Commerce Committee noted similar current legislative challenges, but

stressed the importance of maintaining a long-term vision when gathering support for climate change, particularly in the areas of the economy, the existing energy infrastructure, and environmental concerns. Sarah Dunham from the U.S. Environmental Protection Agency (EPA) provided an overview of the EPA's proposed approach to addressing GHG emissions, which is modeled after its approach to criteria pollutants and which will be supported by a variety of tools and regulatory guidance. She noted actions taken related to renewable fuels standards, vehicle efficiency standards, and incentive/partnership programs, such as SmartWay in the freight sector. Horst Greczmiel of the Council on Environmental Quality (CEQ) discussed the draft CEQ guidance on considering the effects of climate change and GHG emissions under the National Environmental Policy Act (NEPA). He talked about how the NEPA process is designed to support good decisionmaking by helping to understand the consequence of actions, and highlighted the use of a "reasonable" approach. Mr. Greczmiel noted CEQ's request for input on the draft guidance, particularly in regard to thresholds, and encouraged those in attendance to provide comments.

- **Integrating GHG Reduction Strategies in Transportation Planning: State Policy Developments**—In this session speakers highlighted approaches being taken in several states to integrate GHG reduction strategies into the transportation planning process. John Zamurs from the New York State DOT provided an overview of New York State's Energy Plan and Climate Action Plan, specifically the underlying policy framework and the implementation strategies employed. Brian Smith from Washington State DOT discussed his agency's sustainable transportation efforts in response to House Bill 2815 and Executive Order 09-05, which involve economical and balanced strategies that incorporate planning, environment, and operations. Margi Lifsey Bradway from Oregon DOT reviewed her agency's inter-agency collaborative efforts at integrating GHG reduction into policy and planning efforts through vehicle efficiency, low carbon fuels, system efficiencies, and VMT reduction. Rob Rundle from San Diego Association of Governments (SANDAG) provided a Metropolitan Planning Organization's (MPO) perspective on implementing California's Senate Bill 375 through "hybrid efforts" that combine demand management and system efficiency, transportation system development, and pricing strategies to maximize GHG reduction.
- **EPA's MOVES Model**—Laura Berry from the EPA provided an overview of MOVES2010 and its ability and level of accuracy for estimating on-road GHG emissions at the national, county, and project scales. She noted that MOVES2010 improves emissions estimates by accounting for different operating modes (e.g., braking, cruising, idling), and can be used at the national, county, or project scale.
- **Transportation Strategies to Reduce GHG Emissions: a National Perspective**—David Greene from Oak Ridge National Laboratory discussed the role of technologies and alternative fuels in helping achieve GHG reductions in the transportation sector. He made the point that markets tend to undervalue future energy savings relative to expected value, and highlighted the role of fuel economy standards in reducing fuel consumption. In order to compensate for this undervalue of energy efficiency, he suggested developing a comprehensive policy that focuses on energy efficiency, renewable/low-carbon fuels, and ultimately a transition to sustainable energy (e.g., electricity, hydrogen). Linda Lawson, of the U.S. DOT, reviewed the U.S. DOT's Report to Congress on *Transportation's Role in Reducing U.S. Greenhouse Gas Emissions*, focusing on the strategies for GHG reduction that are included (in the areas of low carbon fuels, vehicle fuel efficiency, system efficiency, and reducing carbon intense travel activity) and the intended use of the report for highlighting policy options rather than making specific recommendations. Diane Turchetta from FHWA discussed transportation actions included in state climate action plans, noting that these plans are typically strategy scoping documents with sketch-level emissions analysis, and are not comparable to fiscally constrained transportation plans. She discussed the range of GHG mitigation strategies included in state climate action plans, and estimates of emissions reductions projected for these strategies. She also noted sources of uncertainty in GHG

projections, particularly related to external factors, such as enactment and implementation of strategies, and other variables that determine effectiveness of various strategies.

- **Transportation Strategies to Reduce GHG Emissions: State Initiatives**—In this session, speakers from four state DOTs discussed GHG reduction strategies – covering strategies related to transportation planning, operations, maintenance, and construction. Don Halligan from Maryland DOT discussed the challenges that Maryland faces in addressing GHG mitigation in transportation planning, particularly given recent rapid population growth and development. He highlighted plans for more compact, smart growth development, but also noted concerns about housing affordability. He noted that Maryland’s climate action plan includes a wide range of strategies, including provisions for increased implementation of land use and location efficiency, transit, pay-as-you-drive (PAYD) insurance, intercity connectivity, bike and pedestrian mode share, road pricing, transportation technology, and major project assessment. Gary McVoy from New York State DOT highlighted the important role that operations plays in reducing New York’s transportation GHGs and stressed the integral role it should be playing in partnerships around the country for creating a sustainable society. He reviewed a number of effective and innovative efforts in New York, including efforts to utilize alternative fuels in NYSDOT’s fleets, promote vehicle efficiency (e.g., the Clean Pass Program, allowing low-emissions, energy-efficient vehicles to use high occupancy vehicle lanes), and to improve traffic management (e.g., signal timing, incident response, ramp metering), as well as to “green” state buildings. Frank Pafko from Minnesota DOT reviewed Minnesota’s carbon sequestration efforts as part of FHWA’s Carbon Sequestration Pilot Project. Due to the limited potential for non-fragmented reforestation along their roadways, Minnesota DOT used grasslands and living snow fence plantings for sequestration. Dianna Noble from Texas DOT highlighted her agency’s sustainable pavement efforts, particularly recycled asphalt pavement, recycled asphalt shingles, warm mix asphalt, and permeable friction course asphalt, in helping to reduce GHG emissions. As these efforts are newly developed, the extent of their impacts on GHG emissions remains uncertain.
- **Breakout Groups on GHG Mitigation Strategies & Report-Outs**—The first day’s breakout group session focused on mitigation strategies in three topic areas: (a) integrating GHG reduction in transportation planning; (b) integrating GHG in transportation construction, maintenance, and operations; and (c) climate change action plans. Each group was asked to respond to five questions: (1) what mitigation actions are your states taking or exploring?; (2) what have you found regarding effectiveness of strategies?; (3) what challenges have you faced?; (4) what research are you undertaking?; and (5) what research is needed? Highlights of the discussion from each of the groups are noted below.
 - 1) **What mitigation actions are your states taking or exploring?** The transportation planning group noted the prevalence of engaging stakeholder groups and developing land use planning tools. Within transportation construction, maintenance, and operations, members of the group mentioned the use of warm mix asphalt, improved signal timing, employing solar and/or geothermal technology at rest stops, anti-idling campaigns, encouraging carpooling, and increased recycling (e.g. tires, concrete). Those states involved in climate change action planning are engaged in a variety of activities including increased building efficiency (e.g. solar panels at maintenance facilities, LED lights, green building certification) and concentrated land use efforts.
 - 2) **What have you found regarding effectiveness of strategies?** Among other strategies, the transportation planning group highlighted the use of communication tools for effectively conveying messages to the public as well as leadership action in assisting land use planning efforts. The transportation construction, maintenance, and operations group members stressed the importance of combining strategies to achieve the greatest result for achieving stated objectives. The climate change action planning group members emphasized the significant impact of public behavior and perception on strategy implementation and effectiveness.

- 3) **What challenges have you faced?** All groups mentioned the political challenges faced when implementing strategies, both in the short- and long-term. Additionally, each group mentioned funding challenges and the impact this has on the ability to achieve desired results. The transportation construction, maintenance, and operations group in particular noted the difficulty of finding environmentally preferred materials, as they do not tend to be readily available. Those states involved in climate change action planning commented on the impact that DOT organizational structure can have on implementation success of strategies.
- 4) **What research are you undertaking?** State DOTs are undertaking a wide variety of research efforts. For transportation planning, these include looking at the social and economic implications involved in reducing vehicle miles traveled (VMT), increasing outreach to the public, and looking more closely at land use in rural areas. For transportation construction, maintenance, and operations these include GHG estimation tools for construction projects and travel system efficiency modeling capabilities.
- 5) **What research is needed?** In the area of transportation planning, research needs include improved methods for applying performance measures, particularly as it relates to GHG reduction goals and measuring strategy effectiveness. For transportation construction, maintenance, and operations, research needs include developing better measures of baselines to quantify the benefits of strategies and more information about promoting behavior change. Climate change action planning would benefit from more education tools for communicating efforts with the public, DOT staff members, and elected officials. Another research need mentioned involved establishing GHG emissions baselines/inventories.

Day 2

Highlights from each of the sessions are included below.

- **Setting the Stage: Adaptation’s Role in State Climate Action Plans, Federal Climate Policy, and State Climate Policies**—Linda Lawson from the U.S. DOT focused on the products of the Interagency Climate Change Adaptation Task Force and their relevancy for state DOTs in their climate change efforts. Vicki Arroyo from the Georgetown Climate Center discussed the focus, content, and strategies that various states have employed in their adaptation planning efforts. The most common components are provisions for creating an inventory, emphasis on coordination, design standards, and details on conducting risk assessments, specifically in the context of planning.
- **Understanding the Effects of Climate Change on Transportation**—Michael Savonis from FHWA reviewed the projected effects of climate change such as sea-level rise, increases in heavy downpours, thawing permafrost, and increases in extreme heat, and their potential transportation impacts. He also discussed the U.S. DOT’s ongoing efforts to help state DOTs address these impacts, including the Gulf Coast Study, the Interagency Climate Change Adaptation Task Force, and the Third National Climate Assessment Principles. Rob Kafalenos, also from FHWA, discussed the *Regional Climate Change Effects* report, which synthesizes information on climate change projections from multiple studies to help summarize existing scientific projects for transportation decision makers to help them plan for climate change effects, specifically at the regional level.
- **National Efforts to Reduce the U.S. Transportation System’s Vulnerability to Climate Change Effects**—Butch Wlaschin from FHWA discussed the role of the collaborative FHWA Adaptation Working Group effort in helping the agency identify its overall adaptation strategy. This strategy is focused on supporting objectives such as transportation planning, asset management, preliminary engineering and project development, project design and construction, operations, safety, federal lands,

and cross-cutting issues. Michael Culp, also from FHWA, presented on the recently launched pilot study meant to test FHWA's climate change vulnerability/risk assessment conceptual model. The model is designed to help transportation decision makers identify assets that are most exposed to the threats from climate change and/or could result in the most serious consequences as a result of those threats. Michael Meyer from the Georgia Transportation Institute of Georgia provided an overview of the *NCHRP 20-83(5) study, Climate Change and the Highway System: Impacts and Adaptation Approaches*. When complete, this study will include an adaptation planning framework to help state DOTs more adequately prepare their infrastructure and operations for accommodating projected climate change impacts.

- **State-Level Adaptation Initiatives**—In this session, representatives from several state DOTs discussed their efforts related to adaptation. Garth Hopkins from California DOT presented on his agency's current adaptation efforts, which are building off of the state's 2009 Climate Adaptation Strategy to generate a vulnerability assessment for the state's transportation infrastructure. The assessment will include a "hot spot map" of areas that are susceptible to climate change impacts and an adaptation plan that assesses adaptation options and prioritizes projects based on projected climate change risks. Michael Coffey from Alaska DOT presented on the climate change impacts that Alaska has already been experiencing (including longitudinal shoulder cracking, thaw settlement, and melting/warming permafrost). The agency's climate change response strategy includes greater investment in a sustainable infrastructure, integrated and coordinated decision making, and performance feedback. Nancy Boyd from Washington State DOT (WSDOT) reviewed her agency's response to a state legislative mandate for five state agencies, including the DOT, to develop an integrated response strategy to climate change. WSDOT's adaptation strategy includes scenario planning, sea level rise mapping, scour monitoring, vulnerability assessment, and risk assessment. Danielle Spila from Pennsylvania DOT reviewed the transportation elements of Pennsylvania's Climate Change Action Plan, which focus on supporting the existing infrastructure and planning adequately for necessary future improvements to accommodate projected temperature extremes and more severe weather events.
- **Breakout Groups on Adaptation & Report-Outs**—Participants were broken up into four breakout groups to answer the following five questions:
 - 1) **For states that have not considered climate change effects and adaptation planning yet, what is the primary barrier to doing so?** The lack of urgency that many states feel surrounding climate change effects is a contributing factor. Particularly for those states lacking a coastline, climate change effects are not viewed as a relevant, prominent issue. Representatives mentioned that concerns about the day-to-day system operations often take priority over long-term climate change considerations. Additionally, lack of political support presents a significant barrier to initiating climate change planning efforts. Many state DOTs are facing financial difficulties and are unable to convince their leadership and/or the public that spending money on long-term climate change effects is justified. One group also mentioned that some state DOTs are unsure of the first steps needed to initiate adaptation efforts.
 - 2) **For states who have, what was the driver for incorporating climate effects into transportation planning?** For many of these states, climate change planning efforts began through a state mandate, which have since evolved into more advanced efforts. Some state representatives noted that their efforts began as environmental concerns. Federal initiatives and support have helped focus many states' attention on the issue and have resulted in increased DOT involvement. Information sharing between states has successfully motivated some DOT leaders to initiate and devote resources to identifying state-specific climate change adaptation strategies. For Alaska in particular, climate change effects have already begun, so adaptation was a necessity rather than an elected choice.

- 3) **What are the most significant barriers to implementation of adaptive strategies? What tools are needed?** One of the most frequently mentioned barriers was the lack of funding available to state DOTs and the challenges they face in trying to accomplish a great deal with limited funds. Many representatives mentioned the difficulties in planning for the uncertainties of climate change—particularly when making short-term investments for projects that will need to last through the long-term (i.e. new bridge height in coastal states). Concerns about return on investment and how worthwhile it is to plan for climate change given uncertainties was also a barrier. Communicating effectively with the public as to what is considered a long-term versus a short-term need presents issues for securing funding and gaining support for adaptation-related projects. Overall, representatives most frequently mentioned moving beyond the current project approach and taking a system-wide approach as an effective way to move beyond current barriers. The tools that are needed include updating federal emergency response requirements so that dedicated resources can be used toward improving existing infrastructure rather than simply replacing it, gathering additional LIDAR data for more accurate climate change projections, asset management tools, and identifying best practices for emergency response communication efforts.
- 4) **Who do you see as the key partners/stakeholders in reducing vulnerability to climate effects/implementing adaptation measures?** Key partners and stakeholders include the governor, homeland security, Federal Emergency Management Agency (FEMA), United States Geological Survey (USGS), local partners, energy infrastructure, tribal partners, AASHTO, FHWA, FTA, professional organizations, members of academia, and the public. Participants emphasized the importance of regional collaboration.
- 5) **What research is needed?** Research needs include updating the USGS 100 year storm projection maps and FEMA’s 100 year flood boundaries. State DOTs would benefit from a collection effort of best practice adaptation strategies, including how states approach the concept of salvage and reuse (materials, facilities, etc.) and working through the NEPA process when climate change is a potential consideration. Many groups mentioned developing a tool for conducting a cost/benefit analysis on adaptation efforts—particularly the costs of inaction—to help with communication efforts. For operations in particular, identifying those materials that are best able to handle potential effects of climate change (extreme weather and constant submersion under water) would offer many benefits.
- **Where Do We Go from Here?**—Emil Frankel from the Bipartisan Policy Center discussed *Transportation Research Board (TRB) Special Report 299: A Transportation Research Program for Mitigation and Adaptation to Climate Change and Conserving Energy*, providing an overview of the research approach and emphasizing the report’s findings that bundling strategies is the most effective and realistic way to meet reduction goals. He noted that transportation agencies should focus on reducing transportation’s dependence on oil as a driving goal in order to meet desired reduction targets. Shari Schaftlein from FHWA discussed outcomes from the 2010 TRB Environment and Energy Research Conference and gathered feedback from participants on the desired focus for additional workshop efforts to discuss cross-cutting climate change issues and research needs.
 - **Closing Remarks**—Paula Hammond from Washington State DOT closed the symposium by reiterating the importance of interdisciplinary dialogue and collaboration in working to address climate change effects, particularly in forums like the one provided by this symposium.