

**U.S. HOUSE OF REPRESENTATIVES
SUBCOMMITTEE ON TECHNOLOGY AND INNOVATION
COMMITTEE ON SCIENCE AND TECHNOLOGY**

HEARING CHARTER

The Role of Research in Addressing Climate in Transportation Infrastructure
Tuesday, March 31, 2009
10:00 a.m. – 12:00 p.m.
2318 Rayburn House Office Building

I. Purpose

On Tuesday, March 31, 2009, the Subcommittee on Technology and Innovation will convene a hearing to address the research agenda required to mitigate the environmental impact of the transportation infrastructure on the environment, with an emphasis on climate change. Witnesses will address the components of such an agenda and possible implementation strategies.

II. Witnesses

Mr. David Matsuda is the Acting Assistant Secretary for Transportation Policy at the U.S. Department of Transportation.

Ms. Catherine Ciarlo is the Transportation Director at the Office of Mayor Sam Adams.

Dr. Laurence Rilett is the Keith W. Klaasmeyer Chair in Engineering and Technology and the Director of the Nebraska Transportation Center at the University of Nebraska-Lincoln.

Mr. Steven Winkelman is the Director of Transportation and Adaptation Programs at the Center for Clean Air Policy.

Mr. Mike Acott is the President of the National Asphalt Pavement Association.

II. Issues and Concerns

The transportation sector has major impacts on the environment, contributing 28 percent of the total U.S. carbon emissions. Eighty-two percent of that arises from highway travel alone. The focus of mitigation efforts has largely focused on vehicle technologies and alternative fuels. However, the potential carbon-savings and other potential environmental benefits from changes and improvements to the transportation infrastructure have received less attention. Planning and design elements in surface transportation infrastructure can influence congestion, the number of vehicle miles traveled (VMT), and the amount of energy embodied in the system from the materials,

like concrete and asphalt, used to build roads. In the same vein, these planning and design factors for transportation infrastructure also impact water quality from changes to watersheds, air quality and human health, and the ecology of the natural environment.

As climate has risen in importance, many are suggesting it is imperative to reduce the environmental burden of the transportation sector, including making infrastructure changes. The American Association of State Highway Transportation Officials (AASHTO), for instance, notes that to address climate change, the transportation sector will need to reduce the growth in transportation demand and improve the efficiency of the system. They further recommend that appropriate methodologies need to be developed for accounting for greenhouse gas emissions from the surface transportation system, which would enable the development of greenhouse gas reduction performance measures for surface transportation. As noted by the Center for Clean Air Policy, the Transportation Research Board, and others, there is relatively little data and modeling capability to support such an effort.

Other infrastructure based strategies include encouraging changes in traveler behavior. Decision makers are hindered in their efforts to choose and implement many of these strategies, however, by a lack of usable information on the benefits and costs (both monetary and environmental) and traveler reaction.

Research strategies to reduce the impact of the transportation sector cut across many disciplines within transportation, from modeling and planning to materials and intelligent transportation systems. The DOT has long funded research in many of these areas (see below) but the impetus to address climate change and other environmental issues is relatively new. The following broad research categories would support efforts to create infrastructure solutions to reduce carbon emissions from transportation:

- *Forecasting and Analytical tools to support state and local global warming studies.* Transportation planners need data and models to understand the impact of their systems on climate. They also need measurable indicators to know if planning choices are meeting goals of reducing carbon emissions.
- *Tools to Assess System Performance.* Currently, transportation planners have no methods and tools to choose the best infrastructure alternatives (for instance, high-occupancy vehicle lanes versus increased access to public transit).
- *Traveler Behavior.* Research could help understand the conditions and circumstances under which travelers would make more sustainable transportation choices.
- *Demand Management.* Demand management strategies promote alternative modes of transportation and reduce the number and length of trips. Improved metropolitan travel forecasting data models would aid planners in spending transportation dollars in the most effective ways to both meet public demand and reduce environmental impact.
- *Congestion.* The Texas Transportation Institute estimated that traffic congestion in the United States resulted in 2.9 billion gallons of wasted fuel in 2007. Intelligent Transportation Systems technologies could be used in improving

traffic flow, be it through better signal timing or inducing real-time changes in traveler behavior. However, there is little data available to support the efficacy of many of these Smart technologies on reducing congestion.

- *Energy Use in Materials.* Reducing the amount of energy and materials used in transportation infrastructure reduces the overall burden of roads, bridges, and other elements of the built environment. Many new materials and technologies show promise in mitigating the lifecycle environmental costs. These include warm-mix asphalt, the use of industrial by-products in cement, and the use of recycled (ripped-up) pavement in new pavement. Research is needed to further characterize the performance of these materials and to enable their adoption.

III. Background

DOT Activities Related to Climate Change

The Center for Climate Change at the USDOT is a “virtual organization” that receives funds, staff, and technical expertise from nine modal agencies. According to the USDOT, the Center serves as the DOT’s central point for information and technical expertise on transportation and climate change, and coordinating related research and policy. Established originally in 1999 as the Center for Climate Change and Environmental Forecasting, the Center predominately focused on providing information to state and local officials on the vulnerabilities of transportation infrastructure to extreme weather patterns, rising sea levels, and other climate change impacts. Toward this goal, the Center funded approximately 20 studies and reports, such as *Surface Transportation Safety and Operations: the Impacts of Weather within the Context of Climate Change*. The Center’s current focus will be on both mitigation and adaptation to climate change for the transportation sector.

The DOT also funds research in many areas that touch on some of the issues and research categories identified above. However, only a small portion of the overall research budget is specifically environmentally related. In fiscal year (FY) 2009, the Federal Highway Administration (FHWA) funded a total of \$196 million in research, development, and deployment activities. Nineteen and a half million dollars in FY2009 supported planning and environmental research. The largest research program at FHWA is devoted to infrastructure, funded at \$66.4 million. Developing more durable infrastructure reduces the need for rebuilding and repairs can mitigate congestion and result in less energy use.

Surface Transportation Environment and Cooperative Research Program (STEP) is the primary source of funding to conduct all FHWA research on planning and environmental issues. Approximately \$1.4 million in FY2009 was devoted to Air Quality and Climate Change. The goals of this funding were to better understand the contribution of transportation to air pollution and climate change, to develop and assess analytical methods to adequately identify and reduce transportation emissions, to identify cost-effective mitigation strategies to reduce transportation emissions; and to develop information, guidance and communication strategies to provide useful technical assistance and training to State and local partners and stakeholders.

Past Committee Activities

The Subcommittee on Technology and Innovation held two hearings on transportation and the environment in the 110th Congress. The first, *Green Transportation Infrastructure: Challenges to Access and Implementation*, in May of 2007, focused on environmentally sustainable methods of managing storm water runoff from roads. Witnesses discussed both the research needs to improve these technology and the regulatory and knowledge barriers to adopting environmentally sustainable storm water runoff practices. H.R. 5161, the Green Transportation Infrastructure Research and Technology Transfer Act, introduced last Congress, directed the DOT to use the capacity of the UTC system to perform research to remove the barriers to using green transportation infrastructure.

The second, *Sustainable, Energy-Efficient Transportation Infrastructure*, in June of 2008, focused on the energy used to build transportation infrastructure, and the fuel that is wasted due to congestion or poorly planned and managed systems. The witnesses addressed R&D, policy, and technology transfer needs to increase the adoption of energy saving strategies, such as the use of industrial by-products in cement, and better controlled traffic signals.