REPORT

U.S. Climate Change Science Program (CCSP) Listening Session Transportation Research Board (TRB) 88th Annual Meeting Washington, D.C.

January 13, 2009

Sponsored and supported by:
Transportation Research Board (TRB);
TRB Special Task Force on Climate Chance and Energy;
U.S. Department of Transportation; and
U.S. Climate Change Science Program

Facilitated by:
Peter Schultz (Climate Change Science Program);
Virginia Burkett (U.S. Geological Survey); and
Michael Savonis (Federal Highway Administration)

On January 13, 2009, the Transportation Research Board sponsored a listening session for the U.S. Climate Change Science Program (CCSP). Transportation decision makers need adequate scientific information to combat climate change, regarding both mitigation and adaptation. This listening session allowed attendees an opportunity to describe the research, information and support that transportation stakeholders need from climate change science. The U.S. Climate Change Science Program (CCSP) integrates federal research on climate and global change, as sponsored by thirteen federal agencies, including the U.S. Department of Transportation. More information on the CCSP can be found at http://www.climatescience.gov/.

The session was lightly facilitated in order to allow for open and varying comments from all attendees. Facilitators opened with general remarks from each of their organizations and backgrounds (CCSP, USGS, and FHWA/DOT, respectively). Invitations to the session were extended to the Transportation Research Board (TRB) Special Task Force on Climate Change and Energy, the World Road Congress (PIARC), key advisors for CCSP SAP 4.7 (Gulf Coast Study), and members of the USDOT Center for Climate Change and Environmental Forecasting, although other individuals were enthusiastically included in discussions. Comments have been organized into general themes and are stated below.

Introduction by facilitators:

Mike Savonis opened the session by providing context. Work on the Gulf Coast Study highlighted a basic problem in the transportation world: how do we get climate scientists to effectively connect and communicate with decision makers and planners? Laws since the early 1990s have also reflected this difficulty.

Virginia Burkett gave an overview of the present status of climate science, including IPCC 2007 and CCSP SAP 4.7 (Gulf Coast Study). Regardless of mitigation measures, warming will continue far into the future. We will most likely see accelerated sea level rise, increases in storm surge and intensity, wide changes in temperature, and variations in precipitation and runoff. Virginia noted that transportation planners seem to be focused on the extremes of climate impacts. It is important for early collaboration between scientists and transportation officials.

Peter Schultz gave an introduction to CCSP. CCSP is hosting listening sessions to engage a variety of stakeholders in discussions on the future of climate change science and what specific needs have to be met. CCSP will record comments and questions, collect stakeholder contact information, and generate themes from received input.

1. Data resolution (spatial and temporal) and visualization
    a. We have to bring climate science to a more defined local and regional level. MPOs need to be empowered with information (city planning commissioner).
    b. Visualization of data is absolutely essential. Raw data is not useful to the average decision maker. We need an advancement of science in this regard for effective information transfer (port representative, SAP 4.7 Gulf Coast Study Advisory Board).

c. Visualization of science and risk is very important. The insurance industry would be interested in risk assessment and maybe be a good partner (city planner).
d. In order to really know what we are designing for, we need effective calculations in digestive numbers and ranges and have impacts down to the decadal scale. People are using 2030 and 2040 when planning and designing, not 2100 as many climate scientists use (Federal transportation planner).
e. Decision makers and scientists do not have the tools to assess projects at the regional level. Tools are currently too global to really help. Also, time is very important. Climate studies project out a century, but we need information that is much closer to the present (transportation researcher).
f. We need to better understand the long-term marginal cost of greenhouse gas management strategies (TRB Special Task Force on Climate Change and Energy member).
g. We need better spatial and temporal analogs. We can pick places that can help: e.g. in X number of years, London will be like Marseilles (transportation engineer, PIARC representative).
h. We must optimize our use of existing knowledge. Most transportation agencies are not getting effective translation of data in geospatial representations, including elevation (transportation researcher).
i. We need to direct future climate research to the local and regional level. We need to examine extreme events and improve the resolution of climate models (transportation researcher).
j. There is a major diurnal issue to the time problem that must be addressed (Federal transportation planner).

2. Data collection and consistency
    a. Present transportation data is too costly and difficult to collect. It is hard to make policy decisions about climate change when we do not know the population for whom we are making decisions (city planner).
    b. We need consistent data across states and sectors. For instance, FAA has a Federal Environmental Management System for data that makes comparisons easier across airports. Policy issues transcend arbitrary planning boundaries (port representative, SAP 4.7 Gulf Coast Study Advisory Board).
    c. Information (and data certainty) changes rapidly. It would be useful to have a built-in “update cycle” to capture changes in knowledge (Federal transportation planner).
    d. We have to develop a better method for data collection. There are differences between states that prevent us from modeling collectively. Main differences include units and recording time frames (city planning commissioner).
    e. How are we going to effectively measure reductions? Do we even have effective inventories now? If we want to reduce emissions by 80% by 2050, how will we know where we stand? (PIARC representative)

    f. We need better transport data, such as travel characteristics, households, and goods (PIARC representative).
    g. We need consistent data sets, calculators, etc. Some localities and regions are already doing it—we just need consistency (TRB Special Task Force on Climate Change and Energy member).
3. Impacts and Risk
    a. We need effective probability, risks, and categorizations of existing infrastructure for climate adaptation. We need to determine what is at low risk and what is at high risk (transportation engineer, PIARC representative)
    b. We need more incremental information, including impacts such as drought and precipitation (Political Science professor)
    c. We need work on how changing ecosystems will impact transportation. IPCC details long term changes in agriculture. This will impact ports, for example (International Transport Forum representative).
    d. We need to better handle information received that raises more questions. For instance, Scotland discovered the highest landslide potential due to climate change is far in the highlands where abatement is not cost-effective. How should they proceed? (PIARC representative)
    e. There is a NYC study that examines the financial sector and insurance and how climate will impact city infrastructure, such as buildings and sewer (city planner).
    f. A design standard is needed for existing infrastructure (TRB Special Task Force on Climate Change and Energy member).
4. Land use and system efficiency
    a. There is evidence that replacing signalized intersections with round-a-bouts can result in a substantial reduction of vehicle emissions. This does not require a technological revolution and is better for safety, as well. Transportation decision makers should know about this (transportation engineer).
    b. We need to tie land use planning to transportation. There is a strong correlation between how we develop land use and how we develop transportation (city planning commissioner).
    c. We need better technical support from scientists. We need help on how to incorporate climate into transportation planning. We need science based on the time scales planners use (transportation researcher).
    d. Modeling needs to be improved for land use. We need better modeling capabilities in order to produce verifiable results for decision makers (PIARC representative).
5. Policy and social science
    a. Given the current debate, can greenhouse gases effectively be incorporated as criteria pollutants? It is a question of scale: criteria pollutants are examined in small regions (TRB Special Task Force on Climate Change and Energy member).
    b. We need to be aware that the private sector needs information as well as the public sector. Most of our solutions to problems come from and are

funding by the private sector (port representative, SAP 4.7 Gulf Coast Study Advisory Board).

c. Incorporating science into policy analysis is incredibly important but is not being done effectively at present. There could be social research on the ability to utilize science in public policy (port representative, SAP 4.7 Gulf Coast Study Advisory Board).
d. Science is not objective. It is influenced by directionality, purpose, and funding. After Katrina and Rita (and Ike), planners seem to be paying closest attention to the high-profile, "sexy" impacts, such as hurricanes (Political Science professor).
e. We need effective stakeholder engagement from the variety of transportation officials—engineers, planners, etc. (Federal transportation planner).
f. We need to take action no matter what. If we wait to do something until our knowledge is perfect, then we may have waited too long (transportation engineer, PIARC representative).
g. We need to better examine the low-hanging fruit, easy-to-take measures for mitigation (International Transport Forum representative).
h. We need to examine groups, regions, and stakeholders. The maximum benefit here will be to look holistically at the issue, rather than the stovepipes we have always used (PIARC representative).

6. Finance and economics
    a. We need to consider finance. Who is paying for our infrastructure rebuilding? Programming, planning, and public-private partnerships in light of climate change need to be examined (Political Science professor).
    b. We need to include economics and the social sciences more in climate work. Marginal abatement costing needs to be explored. We need a compass to prioritize investments and incorporate scientific assessments (International Transport Forum representative).
    c. How will changes in population centers impact transportation? Market centers will change. Who will our clients be? This is another spot for the meeting of hard and soft science (PIARC representative).
7. Communicating science
    a. How do we explain programs to the general public? How do we educate the general public about issues? We can't just focus on catastrophic information (PIARC representative).
    b. We need to better communicate the calamity that climate change may bring. We have past experience in major issues that mobilized a groundswell, e.g. acid rain. We should translate information into dollar amounts, such as taxes, to better communicate the severity of the situation (transportation planner).
    c. We operate under the "deficit model", which says if we only educate the general public they should agree with us. They may just not care about the issue (Political Science professor).
    d. We need the Federal government to come out with a clear and strong statement that climate change is real and detail the specific range and

probabilities. There is not enough information with IPCC alone (Federal transportation planner).

8. Miscellaneous Needs
    a. We need effective life cycle assessments (transportation researcher).
    b. We need more exploration of the global warming potential/radiative forcing in maritime and freight aviation (International Transport Forum representative).
    c. The aviation industry is very concerned with high-altitude emissions. There is lacking research of cirrus cloud formation and particulate matter concerns and how these factors impact radiative forcing and the greenhouse effect (port representative, SAP 4.7 Gulf Coast Study Advisory Board).
    d. We still need good work on the well-known needs: full life cycle analysis, long term scale certainty, and discount rates (port representative, SAP 4.7 Gulf Coast Advisor Board).