



# Transportation and Infrastructure Issues for the Next Decade



POLICY RESEARCH INSTITUTE  
FOR THE REGION

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*This Executive Summary of the proceedings offers an overview of the symposium.  
A recording of the conference may be viewed in its entirety at PRIOR's website  
[www.princeton.edu/prior](http://www.princeton.edu/prior).*



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March 6, 2009

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The Policy Research Institute for the Region was established by Princeton University and the Woodrow Wilson School of Public and International Affairs to bring the resources of the University community to bear on solving the increasingly interdependent public policy challenges facing New Jersey, metropolitan New York, and southeastern Pennsylvania.

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# Preface

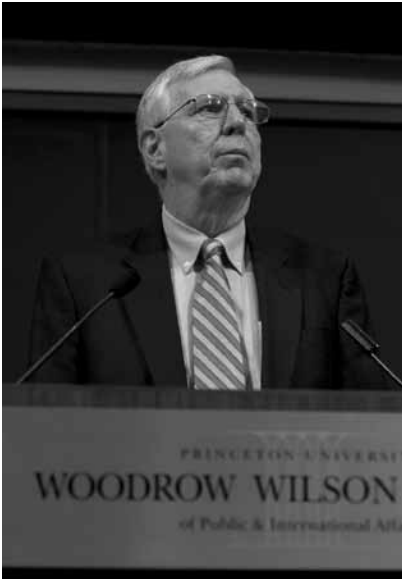
Before the current federal surface transportation law expires in September 2009, many decisions will have to be made about the structure of the new bill. The country is faced with an outdated, crumbling and inefficient hodge-podge of transportation systems and infrastructures. Decaying infrastructures that finally collapse become topics for the evening news- for example, the 2007 collapse of the I 35W Bridge in Minneapolis that killed 13 motorists during rush hour and the 2008 closure of a section of I 95 in Philadelphia for two days due to cracks in a concrete support pillar.

In addition to ameliorating outdated and dangerously deteriorating infrastructure, there is a need to plan for the future transportation needs of an ever-changing and growing region and to consider the environmental impact of whatever systems are created. In this time of economic crisis, how do we set priorities, and where is the money going to come from?

The federal stimulus package provides significant funds for our region. For example, it is estimated that New Jersey will receive \$650 million for highway projects and \$520 million for rail and bus initiatives; New York will receive \$1.3 billion for mass transit and \$1.1 billion for highways and bridges; and Pennsylvania will receive approximately \$1.7 billion for highways, bridges and transit.

According to Secretary of Transportation Ray LaHood, the money is intended to fund projects that are "...ready to go, meet environmental standards, and will create jobs starting this spring." Although the states are happy to receive the money, many stakeholders are disappointed in the amount -- and say -- that it is not ambitious enough to be transformative, particularly when the downturn in the economy has caused large state budget shortfalls.

On March 6, 2009 the Woodrow Wilson School's Policy Institute for the Region (PRIOR), the Alan M. Voorhees Transportation Center, Rutgers University, and the Rudin Center for Transportation Policy and Management, New York University, convened a symposium titled "Transportation & Infrastructure Issues for the Next Decade" to explore (1) the status of the next surface transportation authorization legislation; (2) the opportunities for new financing sources; and (3) the ways in



*PRIOR Director Richard F. Keevey*

which we may want to – and need to – link transportation to broader policy goals in energy, health, and the environment.

The conference's three panels addressed the above topics, with expert panelists who included the Commissioners of Transportation from New York City and the states of New York and New Jersey, – as well as speakers from the Surface Transportation Policy Partnership, the Brookings Institution, the American Association of State and Transportation Officials, and the Environmental Defense Fund.

The opening address was delivered by the Honorable Anthony R. Coscia, Chairman of the Board of the Port Authority of New York and New Jersey, who discussed

“Transportation and Infrastructure Needs for the Region.” Chairman Coscia outlined the Port Authority’s plans for future construction, acknowledged the difficulties in crafting fair and equitable systems to cover the costs of improving and expanding the transportation infrastructure, and encouraged the private and public sectors to engage in creative thinking to achieve these goals.

During the first panel, experts addressed the SAFETEA-LU statute that will expire shortly. Congress will have to work on a replacement bill for the next six year period during the 2009 session, but what will and what should that bill look like? Our discussants analyzed the possibilities and made recommendations for the next version of this important legislation.

The next panel discussed the complex issues surrounding the financing of infrastructure improvements, and PRIOR was fortunate to welcome transportation commissioners from New York and New Jersey, as well as the transportation director of the Environmental Defense Fund, to analyze problems and present recommendations for financing infrastructure improvements that also consider the impact on the environment.

Our luncheon speaker was the Honorable Mortimer L. Downey, Senior Advisor to Parsons Brinckerhoff and former Deputy Secretary, U.S. Department of Transportation, discussing “Philosophical and Fiscal Hurdles Facing Transportation Reauthorization.” Mr. Downey was the U.S. Deputy Secretary of Transportation from 1993 to 2001, making him the longest-serving person to ever hold the post. In offering his opinions about how the next transportation bill might be structured, he emphasized the need to take the time to do it right, rather than hurrying to meet a deadline.

The conference concluded with a panel of experts on planning and public administration providing insights and recommendations on integrating transportation, energy, the environment, and health.

The following agenda and executive summary of the proceedings offer an overview of the symposium- the video of the entire forum is available for viewing at the PRIOR website: [www.princeton.edu/prior](http://www.princeton.edu/prior).

Special thanks are offered to Sarah Johnson for her work on this publication.

Sincerely,

A handwritten signature in black ink that reads "Richard F. Keevey". The signature is written in a cursive, flowing style with a prominent loop at the end of the last name.

Richard F. Keevey, Director

# Transportation and Infrastructure Issues for the Next Decade

March 6, 2009

## Executive Summary

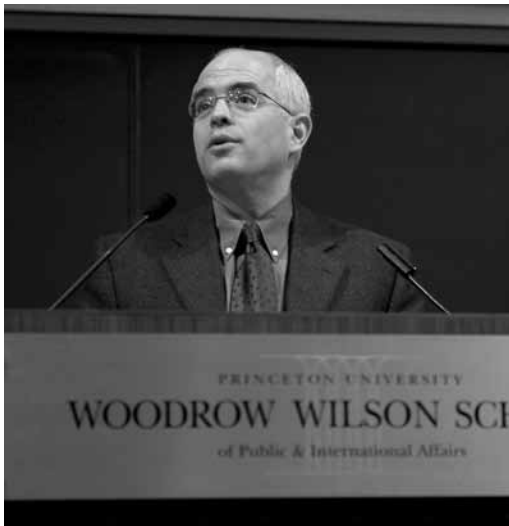
The current federal surface transportation bill, SAFETEA-LU, expires in September 2009. This is a critical moment for the United States. Even as the economy weakens, its transportation infrastructure, which must bolster that economy, is failing. It is plagued by congestion, by deferred maintenance, and outdated and insufficient systems and infrastructure. At the same time, it faces new challenges related to energy security, the environment, and public health, not to mention how to pay for what is needed. All of these call for a shift in the way we approach transportation, and perhaps approach the next bill.

The transportation sector employs 10% of the U.S. workforce, causes 42,000 deaths a year, is the largest single source of greenhouse gases, and costs the government over \$200 billion per year. There is a lot of work to be done to improve the system. The new Administration in Washington has made greening transportation and infrastructure a priority. There is new discussion of accountability, performance-based outcomes,

and sustainability. In the midst of the economic downturn, efforts to improve efficiency and lower costs are allowing consideration of innovative ideas that have not yet been implemented. This is an opportune time to create a new vision for transportation and infrastructure in coming years, and establish a plan to achieve consensus-based goals.

Against this backdrop, the Economic Recovery Act recently provided about \$150 billion for transportation and infrastructure projects. About one-third of this was for transportation, equivalent to about one extra year's worth of funding to be spread over the next two years. States must obligate half of the funds within 120 days, creating the potential for new jobs almost immediately. This has heightened questions about how we set transportation and infrastructure priorities and how we create sustainable revenue sources.

At this important juncture, the Policy Research Institute for the Region at Princeton University's Woodrow Wilson School



*Anthony Shorris, Professor and Director, Rudin Center for Transportation Policy and Management, Wagner Graduate School of Public Service, New York University*

convened an event to discuss transportation and infrastructure issues. The event was co-sponsored by New York University's Rudin Center for Transportation Policy and Management and Rutgers University's Alan M. Voorhees Transportation Center. It convened state and local government officials, think tank and advocacy group representatives, and academic experts on transportation, infrastructure, and climate change.

The forum explored the status of the next surface transportation bill, the potential for new sources of financing our transportation infrastructure, and the ways in which we may want to—and need to—link transportation to broader policy goals and legislation in energy, health, and the environment. The day consisted of five sessions—two addresses and three panel discussions. Anthony Coscia, Chairman of the Port Authority of New York and New Jersey, gave the opening address. He outlined regional transportation and infrastructure needs, described new projects, and called for a new funding mechanism for necessary improvements.

The first panel discussion was on surface transportation authorization, and included ideas from three transportation policy experts on what legislation should look like. They called for a clear national vision, broader collaboration in decision-making, and a stronger planning process. They proposed flexible funding that is interchangeable across modes of transport. There was also a strong emphasis on accountability for spending, and establishing better measurable outcomes, and performance-based incentives. Mr. Jack Basso outlined AASHTO's legislative proposals, and highlighted transportation's potential to increase economic effectiveness. Ms. Anne Canby from the Surface Transportation Policy Partnership addressed improvements that should be made in the areas of national interest, decision-making, planning, and funding. Mr. Robert Puentes from the Brookings Institution argued for focusing policy and funding on metropolitan areas, and presented data on the concentration of transportation infrastructure in metro areas.

The next panel delved deeper into the details of financing infrastructure improvements. The panel included both Commissioner Stephen Dilts of the New Jersey DOT and Commissioner Astrid Glynn from New York's DOT, as well as Mr. Michael Replogle from the Environmental Defense Fund. Commissioner Dilts outlined the strengths and weaknesses of New Jersey's transportation system, and explained what the state would receive in Economic Recovery Funds. Commissioner Glynn stressed the importance of connecting transportation's goals to broader issues of housing, the environment, and the economy. She provided advice for transportation professionals on convincing the public why infrastructure is a good investment.

Mr. Replogle called for a paradigm shift in transportation thinking, and outlined tools such as tolling and congestion pricing that should be used to increase efficiency and reduce the carbon footprint.

Over lunch the Honorable Mortimer Downey, Senior Advisor to Parsons Brinkerhoff and former Deputy Secretary of the U.S. Department of Transportation spoke about what to expect from the next round of transportation legislation. He outlined many changes he expects, and stated that he does not think there will be a new bill by September 2009. He stressed the importance of thinking comprehensively about creating effective legislation, even if it takes longer, rather than rushing to push something like the current legislation through.

The final panel of the forum asked three academics to step back to take a broader look at integrating transportation and climate change goals. Rutgers University Professor Robert Noland framed the climate change goals we are trying to meet and suggested two approaches for achieving them: changing and reducing our travel, and pursuing technological advancements. New York University Professor Zimmerman described not only transportation's effects on climate change, but also climate change's effects on transportation, highlighting the vulnerability of much of the current infrastructure system to climate change. Princeton University Professor Alain Kornhauser called for a move away from a petroleum-based economy by advancing other technologies and increasing the gasoline tax.

No one left the conference without understanding the tremendous challenges involved in improving and greening the

transportation and infrastructure systems. However, speakers urged participants to take advantage of the consensus inherent in the transportation field. Everyone wants an effective and efficient transportation and infrastructure system; we simply have to coordinate more effectively and think comprehensively to achieve this common goal. Various speakers expressed a sense of optimism that fresh leadership, new priorities, and the need to innovate will help stimulate meaningful progress.

## Opening Address:

### Transportation and Infrastructure Needs for the Region

**Honorable Anthony R. Coscia**  
*Chairman of the Board, Port Authority of New York and New Jersey*

The Honorable Anthony R. Coscia began the conference by outlining regional transportation and infrastructure needs. As Chairman of the Port Authority of New York and New Jersey, Mr. Coscia oversees some of the busiest and most important transportation links in the region, including regional ports, airports, and bridges, among other infrastructure. Chairman Coscia stressed the importance of a regional approach. He reflected on the transportation accomplishments of his predecessors of the early 20th century, who built the George Washington Bridge, the Lincoln Tunnel, and major airports. He contrasted their accomplishments with what he perceives in recent decades as an unwillingness to tackle challenging or long-term projects. Inaction, he stressed, can have an even larger price tag than the cost of major projects. The



*Hon. Anthony R. Coscia stressed the importance of a regional approach to transportation and infrastructure needs, acknowledging that today's policy makers face more difficult challenges in meeting their goals.*

Partnership for New York City estimates that airline delays cost \$2.6 billion per year in lost productivity, and traffic delays cost \$13 billion annually. The environmental effects of gridlock are another significant cost we incur through inaction.

Chairman Coscia acknowledged that policy makers today do face new challenges. Rapid population growth may bring an additional 3 million people to this region by 2030. Today transportation decisions must consider new factors such as airborne pollutants and energy independence. Transportation can also be viewed a tool to provide equal economic opportunity to individuals by making employment accessible, and that must be considered in decisions.

Next Chairman Coscia outlined what the Port Authority plans to build and how they plan to

pay for it. In an effort to achieve “the highest possible goals for efficiency, for environmental sustainability, and for overall quality of life issues,” the Port Authority is heavily prioritizing mass transit. More than \$8 billion dollars—almost one-third of the Port Authority’s 10-year capital budget is allocated to regional or mass transit projects. Their two most significant projects are the \$3 billion ARC tunnel project, a new tunnel under the Hudson River, and \$3.3 billion of investments into the PATH rail system that connects New Jersey and New York. In addition to doubling the capacity into Manhattan, the ARC tunnel is projected to take 22,000 cars a day off the road and eliminate 65,000 tons per year of greenhouse gas emissions. The project will receive federal funds from the stimulus package, and may begin as early as summer 2009. PATH system improvements will include replacing every car and renovating stations, and will result in a 20% increase in capacity. The PATH system has been largely under-funded and ignored, resulting in underutilization, and the new investment represents the Port Authority’s prioritization of mass transit.

Airline travel is also critical to the region, Chairman Coscia emphasized. The regional airports served 110 million passengers last year. The Port Authority is building new terminals and expanding runway capacity, as well as working to alleviate flight delays. Last year the Port Authority acquired Stewart Airport in Newburgh, New York to spread out air traffic and alleviate regional delays. In the area of Port Commerce, the Port Authority will invest \$600 million in intermodal systems and an on-dock rail system that will put 1.5 million containers annually directly onto trains rather than trucks.

Although we know what we need to build, Chairman Coscia said, we need to determine

an equitable and adequate way to pay for it. Under-investment in transportation and infrastructure is a national issue, not an issue unique to this region. He emphasized the need to develop a new system for funding infrastructure with financing mechanisms that allow us to generate capital and funnel it to necessary long-run investments. He compared the current financing challenge to the creation of the municipal debt market in the 1930s, and called for similar out-of-the-box thinking. More creative exploration of public-private partnerships is needed to make more capital available for transportation projects while still prioritizing public interest.

Chairman Coscia supports President Obama's national infrastructure bank proposal, which would prioritize all infrastructure improvements comprehensively rather than allocating funds among modal silos such as highways, airports, or mass transit. Chairman Coscia applauded the Obama Administration's swift action to pass a stimulus plan with the tools they had, and looked forward to more comprehensive action in the future when time constraints are not so extreme. The Chairman closed by encouraging policy makers to view the current challenges as opportunities to explore innovative concepts that have been discussed but not yet implemented.

## Discussion

Three distinct questions followed Chairman Coscia's presentation. The first involved air travel, and why the Port Authority took a position against auctioning slots at airports. Chairman Coscia indicated that the Port Authority opposed several programs that the Federal Aviation Administration (FAA) proposed during the last administration because they felt the programs would actually constrain capacity

rather than expand it. The Port Authority also viewed the auctioning of airport slots as an overly simplified solution to a complicated problem of air traffic congestion. The root of the problem, Chairman Coscia argued, is the antiquated ground-based radar air traffic control system. The Port Authority has advocated for FAA and federal investment in a new satellite-based system that would allow for more efficiency in air space.

A second question asked why the ARC project to create a new tunnel under the Hudson River would not include connectivity to Penn Station. Chairman Coscia outlined a number of practical limitations on the scope of the project that prevent connectivity to Penn Station, including: current engineering and construction limitations, the depths of tunnels for existing transportation and utility lines, and minimizing disruption from construction. In the event of an emergency, it may be possible for a train to switch lines to get to Penn Station.

The final question was about transportation projects' effects on local communities, and about truck transport of goods on local roads. Chairman Coscia stated that the only way to accomplish major transportation projects is by incorporating local communities in decision-making. Addressing community concerns creates better projects, and all major Port Authority projects include substantial community involvement. Chairman Coscia described tradeoffs between truck and rail transport, both of which go through communities. The Port Authority is exploring water-borne methods of moving freight, but intermodal systems require interagency cooperation.

## Session II:

### Surface Transportation "Authorization"

Richard F. Keevey, Director of Princeton University's Policy Research Institute for the Region (PRIOR), moderated this panel discussion. Professor Keevey framed the discussion by pointing out that the current Transportation Authorization Bill is more complex than previous bills due to the Obama Administration's new emphasis on climate change.

#### Peter J. "Jack" Basso

*Director of Program Finance and Management,  
American Association of State and Highway  
Transportation Officials*

Representing the American Association of State and Highway Transportation Officials' (AASHTO), Mr. Basso emphasized that federal transportation programs need to be consolidated and reformed to address national interest. We must work to achieve national goals in the areas of safety, preservation, congestion, operation, freight, and the environment. Transportation improvement will enhance economic competitiveness by reducing congestion, enhancing rural and urban area accessibility, and supporting national security and national disaster response.

More specifically, Mr. Basso outlined AASHTO's authorization proposals. He argued for restoring the portion of federal highway funds apportioned to states to 90 percent. AASHTO proposes a highway program that would have a minimum of \$375 billion over six years. Preservation needs, including interstate, national highway, and bridge preservation, amount to \$28 billion per year,



*Jack Basso emphasized that federal transportation programs need to be consolidated and reformed to address national interest, working to achieve national goals in the areas of safety, preservation, congestion, operation, freight, and the environment.*

according to AASHTO's estimates. In the area of freight improvements, AASHTO would like to allocate \$18 billion from the Highway Trust Fund towards intermodal access to ports, international gateway improvements, truck corridors, and truck-only lanes. They propose spending \$2.6 billion on highway safety and \$3 billion to improve performance in both urban and rural areas, preferably for low-cost, quick-turnaround improvements. AASHTO proposes \$11 billion toward congestion improvement in urban areas and statewide connectivity. There must be investment in rural areas and in environmental programs as well. Transit should be a high priority, particularly a comprehensive focus on passenger rail. The stimulus package's provision of funding for Amtrak is a good starting point. AASHTO proposes an 80/20 type of capital program for states in the range of \$5 billion annually to fund freight and rail programs.

Mr. Basso offered several thoughts on funding. Funding should be interchangeable among various modes of transportation to advance intermodal objectives. Purchasing power must be restored; fuel tax has not been adjusted at the federal level since 1993. Legislatively, AASHTO argues for robust

programs that address highways, transit, freight, and passenger rail, in the amount of around \$545 billion for the next six years. The current federal-state funding split—about 45% state and 55% federal for capital programs—should be maintained. We need to adopt a long-range approach to funding surface transportation that moves away from dependence on the gas tax to other methods such as a vehicle miles traveled (VMT) system. Climate change legislation may provide new revenue. Mr. Basso said we need about \$450 billion to accomplish the goals outlined. AASHTO recommends creating a commission that would make funding recommendations to Congress.

To ensure accountability, AASHTO proposes a state-driven performance measurement system. AASHTO suggests that states be required by federal law to develop regularly reported performance measures. Mr. Basso closed by urging attendees to recognize that we are currently at a crossroads and must be the visionary leaders that set a bright course for future generations.

### Anne P. Canby

*President, Surface Transportation Policy Partnership*

Ms. Canby stressed that the new authorization provides an opportunity to reexamine transportation and infrastructure programs in light of changes that the Obama Administration brings—namely a focus on climate and energy issues. Today transportation has a silo approach where each mode of transport has separate funding sources that are typically hoarded rather than shared. Ms. Canby urged transportation professionals to escape that model and pursue more cross-modal opportunities.



*President of the Surface Transportation Policy Partnership, Anne Canby urged transportation professionals to escape the silo-approach model, where each mode of transport has separate funding sources that are typically hoarded rather than shared, pursue more cross-modal opportunities.*

There are institutional, programmatic, and procedural barriers that we must address as we move forward with the new legislation. It is important to bring all the players to the table, including local and regional representatives, rather than focusing on a few states, highway corridors, or rail lines. The Economic Recovery Act is a step to put more funds on the table, and although never enough, \$50 billion is not paltry.

Ms. Canby addressed four broad topics in her presentation: national interest, decision-making, planning, and funding. To address national interest, transportation officials must think broadly about a transportation system that embraces climate issues, connects the national economy to the world, and provides a more effective set of travel options that facilitate job creation. We need a national program with national goals and accountability. The current system established in Title 23, “provide[s] for a federally assisted state program” that undermines

the Department of Transportation's (DOT) accountability because they simply funnel money to grant recipients. She argued for restructuring the federal-state relationship to require states to meet national goals. We must move away from the donor-donee mentality and focus on objectives and outcomes.

In the decision-making arena, Ms. Canby questioned whether the institutional construct we have today will work for the challenges we need to address. In major metropolitan areas we must have more integrated decision-making authorities and include the private sector. We lack institutional models in this regard. Local governments and transportation agencies are not currently accountable to each other for the transportation and land-use problems they create. We should work to build credibility for Metropolitan Planning Organizations (MPOs) at the regional and national level.

Ms. Canby argued for a much stronger planning process. Rather than focusing on specific projects, investment decisions should be based on a plan that includes a vision, baselines, established goals, and measurement mechanisms. There is existing planning language that can be used to strengthen current law. For example, Ms. Canby argued that long-range transportations plans should no longer be exempt from the National Environmental Policy Act (NEPA). Additionally, we should create a single analytical process that examines the tradeoffs for any type of additional capacity, whether it is highway, transit, rail or another type of capacity.

Finally, Ms. Canby addressed funding, which she deemed the biggest challenge. As of

yet, there has been no action by the Obama Administration to raise revenue through a gas tax or VMT tax, and it is not clear what will come out of the White House in the future. In Ms. Canby's view, for real change to happen, new revenues must come with changes to program structure such as creating national objectives and accountability. Ms. Canby offered an essential question we should ask about funding: What are the problems we need to solve, and how do we portray them so the public can understand the connection between the cost of transportation and the price people pay? Driving is largely unconstrained and user fees are almost nonexistent. Ms. Canby argued that rail needs to be included in systems-wide funding discussions, as using more rail will save wear and tear on the roadway. Finally, public-private partnership must be further explored.

Ms. Canby closed by asking whether we are ready to rethink the basic transportation mission, lay out federal goals, and hold ourselves accountable, and whether we are prepared to broaden decision-making and strengthen the planning process.

## Robert Puentes

*Senior Fellow and Director of Metropolitan Infrastructure Initiative, Brookings Institution, Washington, DC*

Mr. Puentes reported on the Brookings Institution's analysis of the recovery package. Broadly, it includes \$152 billion for infrastructure at large, not just transportation. Infrastructure is a critical asset, and maximizing it is going to help the country handle the economic, environmental, and social challenges it faces. Because most of the nation's infrastructure assets coalesce in urban areas, Mr. Puentes focused his presentation on

metro areas and their role in the infrastructure conversation. The nation's top 100 metros comprise only 12% of the American land mass but are home to two-thirds of the population and produce three-quarters of GDP. Metro areas are the economic engines of the country, and should be the focus of economic recovery plans.

Mr. Puentes offered three critiques of the federal government's treatment of metropolitan areas in the area of transportation and infrastructure. First, the Federal Transportation Program inhibits metropolitan areas' ability to improve transportation and infrastructure services by failing to provide leadership or direction. Second, the federal government is outdated and fails to recognize the primacy of metropolitan areas. The uneven split that favors highways over mass transit

*In his presentation, Robert Puentes outlined the Brookings Institution's three-pronged strategy for addressing federal transportation concerns. First, the federal government needs to establish a bold national vision for transportation and infrastructure in metro areas; second, it must empower metropolitan areas to do innovative problem solving tailored to local realities; and third, it must optimize performance at all levels by developing outcome goals and measuring progress.*



reflects outdated systems. Third, the federal government is underperforming and failing to maximize efficiencies that would result from viewing transportation comprehensively rather than modally. A lack of accountability or performance measures exacerbates underperformance.

Mr. Puentes outlined what he considers has gone wrong at the federal, state, local, and metro levels. At the federal level, he argued that the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 did not accomplish its goals of giving MPOs a lead role in regional decision-making. At the state level, many areas have not embraced metropolitan decision-making. States tend to undermine spending in metropolitan areas, cooperation is difficult, and institutional interests cause problems. At the local level, parochial interests dominate and impede decisions that are good for metros. Linking transportation with land use is challenging because local governments guard their power over land use decisions tightly. The metropolitan level suffers from “soft regionalism”—discussion of regional cooperation but no real joint decision-making.

Mr. Puentes then outlined the Brookings Institution's three-pronged strategy for addressing these concerns. First, the federal government needs to establish a bold national vision for transportation and infrastructure in metro areas. Second, the federal government must empower metropolitan areas to do innovative problem solving tailored to local realities. Third, the federal government must optimize performance at all levels by developing outcome goals and measuring progress. Specifically, the federal government needs to fix and protect the interstate system, focus on freight improvements, and enhance inter-metropolitan area movement.

In other areas the federal government should step aside and allow states and metro areas to experiment. Restrictions to market mechanisms should be removed. Regarding funding, Mr. Puentes argued that all options, including a gas or VMT tax, should be left on the table.

## Discussion

The first couple of questions considered which outcomes we should be measuring and whether our evaluation models are adequate. Panelists responded by stating that we should use the accountability that is part of the economic recovery funding as an experiment to increase accountability, and should look beyond transportation to measure transportation's role in affecting outcomes on broader issues such as climate change. Our evaluation models need to be updated and improved, and we can look internationally for good examples. Measures should be connected to the end outcomes we want to achieve. This will ensure that we measure the right things, such as carbon emissions reduced rather than simply transportation-related outputs.

The panelists were also asked how they would eliminate a silo approach, as proposed, and integrate transportation with housing and land use despite segmented political interests in Washington. They indicated that the Obama Administration and Congress have expressed interest in integrated decision-making, and suggested that federal funds be used to incentivize integrated transportation and infrastructure planning.

Panelists were asked to predict what will happen in transportation and infrastructure legislation when the current bill expires on

September 30, 2009. They responded that other issues would take priority at the federal level, and we are not likely to see a new bill by September 30th. A thorough reevaluation of the role of transportation in the United States, and achieving legislation that produces significant change, will require a lot of time, learning, and discussion.

When asked about the possibility of truly creating a national vision on transportation and infrastructure, panelists were optimistic and reported that diverse groups have already agreed on many central goals. They thought a national vision should be short and basic to ensure true consensus, and avoid getting bogged down in the small set of divisive issues.

Other issues that were discussed included increasing funding for bicycle and pedestrian improvements, and thinking more about intercity travel. One participant suggested that rather than just thinking about federal programs, we could think about several super regions in the country where it would be easier to build consensus. Finally, it was stated that looking at housing and transportation in an integrated way will help reduce household expenses.

## Session III:

### Financing Infrastructure Improvements

Martin Robins, Senior Policy Fellow at the Alan M. Voorhees Transportation center at Rutgers University moderated this panel discussion. He opened the discussion by emphasizing that we are at a crossroads with transportation policy. He was encouraged to see such strong attendance and qualified

panelists discussing such an important issue at a critical time.

## Honorable Stephen Dilts

*Commissioner, Department of Transportation,  
State of New Jersey*

Commissioner Dilts outlined the strengths of New Jersey's transportation system. He stated that New Jersey has a world-class transportation system, including a mature, largely completed interstate system, one of the best toll road systems in the country, and the only statewide mass transit system. New Jersey has a transportation management center in Woodbridge where multiple agencies work under one roof to monitor traffic. There is a similar rail operation in Kearny, and the centers communicate with each other. Under Governor Corzine New Jersey has invested heavily in infrastructure, almost doubling funding for bridges and increasing funding for pavement. Even before stimulus funds, New Jersey will spend \$2.8 billion on transportation between November 2008 and December 2009, more than it has ever spent in a year. Stimulus funds will complement New Jersey's goals of improving transportation and creating jobs at the same time. Commissioner Dilts said he was glad transportation is largely an arena of consensus.

Commissioner Dilts admitted that New Jersey's transportation system is not perfect. Long-term under-investment has resulted in 312 structurally deficient bridges that need \$13.6 billion in repair, and over half of the pavement on New Jersey's highways and interstates is at unacceptable levels. Congestion costs drivers 52 hours per year, which amounts to \$8.6 billion in lost productivity for the state. The mass transit system is approaching capacity, and many



*New Jersey Department of Transportation Commissioner Stephen Dilts noted that while the state has a world-class transportation system, the system is still far from perfect. Decisions at the federal level will affect how New Jersey moves forward with addressing some of the problem areas.*

places in New Jersey are still unreachable by mass transit. Governor Corzine has called for improved transportation management, including funding across modes and better inter-agency coordination. A new capital investment strategy brings managers of all modes together to discuss funding decisions. The best example of success through collaboration is the ARC Tunnel Project, which will alleviate the 100-year old rail tunnel that is New Jersey's choke point into New York City. The new ARC tunnel will allow more express service, and expanded service to the west and south. It will create 6,000 jobs per year and 44,000 permanent jobs, and will double rail capacity into New York City. This will be accomplished through a funding formula that shares resources, including funds from the Turnpike Authority, DOT, and the stimulus package.

Commissioner Dilts was thankful that New Jersey has a trust fund that goes back to 1984, which is currently allowing the state to maintain its levels of commitment and spending on transportation and infrastructure, despite the downturn. Decisions at the federal level, particularly the reauthorization of the federal trust fund that expires in September 2009, will affect how New Jersey moves forward. Folks at the federal level are still debating whether to move on a gas tax or look at VMT, and that will certainly affect state level decision-making. Addressing the stimulus package, Commissioner Dilts said that it did not create any new rules or processes but rather prioritized rapid spending in the existing system. States have 120 days to obligate half of their stimulus funds. New Jersey will obligate all of its funds and move forward quickly. The state will receive \$469 million for its highways and \$425 for transit, and counties and local governments will get \$162 million that will be managed through Metropolitan Planning Organizations (MPOs). Information about spending stimulus funds on highways and transit is available on the Internet, and MPOs should make their decisions soon also. The sooner the money is spent, the sooner jobs are created and money is funneled into the economy.

Commissioner Dilts closed by urging participants not to lose the consensus that the transportation field currently enjoys. He reiterated his commitment to spending state funds wisely, and showing the public that “a dollar invested in transportation does make a difference.”

## Honorable Astrid C. Glynn

*Commissioner, Department of Transportation,  
State of New York*

Commissioner Glynn opened by summarizing the bleak state of affairs in the economy and the transportation and infrastructure sector. Identified infrastructure needs far outweigh identified revenues, and existing resources are not sustainable even at the current level of service. Both the Federal Highway Trust Fund and New York’s state trust fund have required infusions from other sources in recent years. About half of the revenues in the state trust fund pay interest on bonds issued in past years; in coming years up to 80% of the fund’s revenues could go to interest payments. Commissioner Glynn was pleased that the federal government recognized transportation’s importance and utility in stimulating the economy by allocating what amounts to an extra year of federal funding to transportation in the stimulus package. New York will put the funds to good use within 120 days and thereafter by putting people to work.

There is no silver bullet to solving funding problems, Commissioner Glynn said. We need to look for funding in every place possible, including gas taxes, public-private partnerships, value capture alternatives, and tax credit bonds. Policy makers must ask why they have not succeeded in getting public support for such funding so far. Commissioner Glynn does not think transportation officials have made the dire need for funds clear to the public, nor have they convinced the public that transportation is a good place to invest. In convincing the public to spend more on transportation, officials must remember that transportation does not exist for its own purposes. It exists to support daily activities, and we take the system for granted until

something goes wrong. When society cannot move, our economy quite literally stops.

Commissioner Glynn then addressed the broader implications of transportation. It produces one-third of the nation's greenhouse gases. We will not be able to meet reduction goals unless we consider transportation's role. Transportation funds should be distributed in a way that rewards states with low carbon footprints per capita, rather than giving states incentives to sell more gas. Achieving environmental goals for transportation may be costly. Transit is more costly than highways, which means we need to revisit operating subsidies.

Commissioner Glynn reiterated other speakers' calls to break down silo thinking and work inter-modally. Many of the slots being fought over at regional airports were servicing commuters going to other cities in the northeast. If the region could develop a strong northeast corridor and feeder system, we could free up significant capacity at airports. She stated that DOTs have not done a good job of giving people convenient, reliable information about all modes of transportation in the same place. The traveler information system 5-1-1 has begun to provide this, and the New York Metropolitan Area now has a multimodal information system that will be statewide by next summer. Such information will begin to integrate the transportation system.

More broadly, Commissioner Glynn called for transportation professionals to redefine goals and find new revenue sources to support requests for funding. Climate change is an opportunity to reshape how we prioritize transportation funding and to look at how climate change revenues could help make



*New York DOT Commissioner Astrid Glynn concluded that in order for the transportation industry to get the funding it desperately needs, policy makers must pay attention to what communities want, look for solutions across silos, deliver on promises, and focus on broader society goals.*

transportation cleaner. Increasing efficiency includes prioritizing transit, improving multimodal trip planning and congestion alerts, and investing in efficient equipment (LED traffic signals, retrofitted construction equipment, weather-tight snowplow garages).

Commissioner Glynn concluded by saying that to convince the public to invest in transportation, the field needs to make a couple of changes. First, transportation professionals need to commit to faster action on projects and provide clear answers when things are not working well. Second, transportation officials must realize that transportation cannot succeed by itself, but must integrate goals with housing, employment and the environment. We must invest more in technology as a problem solver. In sum, the transportation industry must pay attention to what communities want, look for solutions across silos, deliver on promises, and focus on broader society goals. Without such changes, transportation will not get the funding it desperately needs.

## Michael Replogle

*Transportation Director, Environmental Defense Fund*

Mr. Replogle opened by saying that the transportation industry needs a paradigm shift. He focused his comments on how we can align transportation financing and pricing with system management goals. The current dependence on the gas tax is failing as a model, and will be even less adequate as VMT per capita decreases. Demographic changes, new residential investment patterns, and the economic crisis will change the way transportation needs to be done. We must find a way to modernize our transportation system while reducing its environmental footprint. We need to better align how we raise money for transportation with the goals we have for the transportation system. The public has to be confident that funds they contribute will lead to improved services and performance or they won't support increased funding or pricing changes.

We must use new tools such as intelligent transportation systems, pricing strategies, and smart traffic and transit management to deliver better mobility and reduce transportation's environmental footprint. Mr. Replogle said we cannot build our way out of congestion problems. The way that street space and transport services are priced and managed determines how customers use the transportation system. Consumer behavior is affected by how often we pay and how we pay, as well as by how much we pay for different services. The current pricing structure favors driving. People generally do not pay to use roads and bridges, and car insurance is priced as a fixed-price rather than a variable-priced good. So-called "free"

parking costs more than \$500 billion per year. However, public transit always costs the consumer something.

Mr. Replogle gave examples of how public-private partnerships might be designed to improve transportation performance. Our ability to leverage private capital into transit investment will improve if we eliminate constraints in the legal framework and price existing roads to better operate at peak productivity. On England's Darrington-to-Disforth A1 Highway, a private road operator receives a bonus if they keep the road free flowing at or above its rated capacity. Many cities are trying to extract more value from parking by using public-private partnerships to better operate surface or street parking.

Toll roads and congestion pricing have potential to increase productivity and reduce the environmental footprint of transportation, according to several examples Mr. Replogle presented. Congestion pricing is a promising way to keep roads operating at highly productive levels, such as is currently done in Orange and Riverside Counties in California. Tolls are adjusted based on the time drivers save by using toll lanes, depending on the traffic congestion at that time. Places that have area-wide congestion prices such as Sweden and London see 30-50% reductions in congestion delay and 15% reductions in emissions. Tolling existing roads can be done on a trial basis, and if people recognize that they get expanded travel choices, they will favor permanent tolling. Germany targets heavy trucks with GPS-based tolling devices, which has allowed them to toll 9,000 miles of roadway and raise over \$4 billion a year. It has also reduced trucks on the roads, which has reduced emissions. These are the types of productivity achievements that we can



*Michael Replogle focused his comments on how transportation financing and pricing can be aligned with system management goals, and how new tools such as intelligent transportation systems, pricing strategies, and smart traffic and transit management can deliver better mobility and reduce transportation's environmental footprint*

unlock, Mr. Replogle said, if we can navigate the political challenges involved.

Some innovative ideas are being used in the United States already. Some states have pilot programs that levy user charges on heavy commercial vehicles. Progressive Insurance Company has a policy that offers consumers the ability to save 40-60% on car insurance by driving fewer miles and less aggressively. The Brookings Institution found that if all drivers were offered pay-by-the-mile car insurance policies, it would cut VMT by 8% and reduce greenhouse emissions accordingly. Two-thirds of households would save money under such pricing and of these, the average household would save \$270 per vehicle annually. Mile Meter, a Texas company, lets drivers purchase insurance for

a set number of miles they plan to drive in six months.

Mr. Replogle thinks the relatively small price signal that comes from a greenhouse gas cap and trade program alone will fall well-short of achieving all the cost-effective GHG reductions we can obtain in the transportation sector due to widespread market failures. We need to pay attention broadly to transportation investment policies and how they affect the number of miles we drive and the communities we build. There is potential to invest a portion of cap and trade revenues back into transportation projects that will reduce greenhouse gas emissions, and tie that funding to GHG reduction planning at the state and metropolitan levels. A bill called CLEAN-TEA that was introduced to Congress in March proposed setting aside 10% of the future auction allowance revenue for transportation investments. Many transit agencies could undertake greening initiatives that can be measured and put into a greenhouse gas option allowance market and sold as emission reduction credits. Getting the data and institutional capacity to do this will be crucial. Transportation funding must give state, regional, and local governments incentives to innovate to advance ideas like these.

## Discussion

A brief question and answer session followed, and included a number of diverse questions. There were a couple questions about congestion pricing. When asked if reducing congestion on one road would simply move congestion elsewhere, Mr. Replogle responded that this may happen if you do not use VMT fees and road user

charges for the entire road network in an area. He emphasized that we are not yet at the stage where there is broad public awareness of or support for comprehensive network pricing, but we can view congestion pricing as giving people who want to pay for a better level of service the opportunity to choose. Demonstration projects in Seattle and Portland (OR) have shown the potential for system-wide pricing to cut congestion and pollution, but until such pilot programs are taken to scale, limited congestion pricing of partial elements of the road network will be the only option offered. We are early in the paradigm shift of transportation thinking.

Commissioners Glynn and Dilts both answered state-specific questions. When asked about funding sources in New York Commissioner Glynn indicated that they are exploring tolling, a traditional gas tax, and green-bates, among others. The funding shortfall is so significant that all options must stay on the table. They are also working to obtain the right to design and build projects, which may allow for tolling new places. Commissioner Dilts indicated that New Jersey has an ongoing partnership with Amtrak to ensure complementary service between Amtrak and New Jersey Transit. He also explained that the ARC Tunnel will extend services to 16 counties, but there will still be more counties that lack service. They are beginning to identify funds to meet the growing demand for transit in South Jersey.

There was also discussion of the balance between public and private bus service, and using the stimulus package as an opportunity to help educate the public on the costs of transportation and the importance of infrastructure to the national economy.

## Luncheon Speaker

### Honorable Mortimer L. Downey

*Senior Advisor to Parsons Brinkerhoff and former Deputy Secretary, U.S. Department of Transportation*

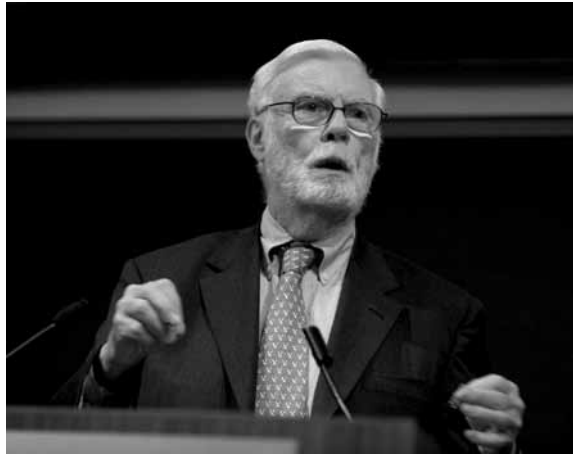
Advisor Downey focused his address on what can be expected to come out of the legislative process in Washington in the next year or two. Mr. Downey is very familiar with the legislative process, as he has been involved in some way or another with the last twelve transportation authorization bills. The last piece of legislation, the Safe Accountable Flexible Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) was not considered effective. This time, there is an expectation for change. There were two commissions established on how to raise and spend transportation funds. There is also increased public debate on transportation issues, and this bill will include transit and safety rather than just highways. A new challenge for the surface transportation legislation is how to integrate intercity rail.

Overall, Mr. Downey emphasized, the context is one of change. Unlike other industrialized countries, the United States is still a growing country with changing demographics and an opportunity to grow the economy. If we can grow our population and economy significantly, maybe we can pay off the debts that will otherwise be passed on to future generations. Our geography is also changing. Growth is concentrated in major metropolitan areas and larger “mega-regions,” and transportation focus should be there. We have not shaped our planning and institutions to focus on moving between big cities, but we need to do so by working more significantly with the MPOs.

Our current transportation demands are different than they were when the last big transportation decisions were made—in the era of the interstate. We now have NAFTA and more north-south transportation movements. An economy that is more oriented towards imports requires us to move goods out of the ports and distribute them across the country. Freight traffic is destined to grow and put new demands on the system. There are many roadways in the country that will be well above the level of congestion that they have today, and the intersections of those roadways are major choke points in moving goods. Railroads are also over capacity. We need new institutions to facilitate public-private partnerships and overcome capacity limitations.

Not only are our systems over capacity, Mr. Downey said, but they are also underperforming in many areas. We are wasting effort in moving things around because of greater congestion. The percentage of GDP that is spent on simply owning things and moving them around had dropped from 18% in the 1980s to 11%, but is now rising again. That is not a good sign when other pressures in the economy have also been requiring more resources. The current economic condition is affecting the resources that might be available to invest in the next authorization bill. It will be more difficult to make the case for transportation spending to a public that is being negatively affected by the economy. The environment is also a concern. We should be asking what a transportation system that consumes 30% of the energy used in the country can do to alleviate its contribution to this problem for the country, world, and future generations.

Mr. Downey reminded the audience that



*In his presentation, Mortimer Downey noted that current transportation demands are different than when the last big transportation decisions were made, in the era of the interstate. Not only are transportation systems over capacity, but they are also underperforming.*

change in transportation policy happens slowly, and whatever gets decided remains in place for a long time. We go on autopilot for decades, as with the federal highway system for example, and then we are not quite sure where to go. The 1991 ISETEA bill began to shift thinking away from the interstate system and toward the connection between transportation and the environment. However, ISETEA did not have enough momentum to change overall thinking, and was diluted by the next rounds of legislation. Today we must regroup and decide where we are really going.

Turning to funding, Mr. Downey said that all of the modes of transportation are in uncertain times. The Trust Fund, which has been a mainstay for financing this system, was bailed out with \$8 billion last summer. Congress authorized more money to be spent under SAFETEA-LU than was coming in. The barrier to using general revenues for transportation has been broken, and that could change the nature of program financing. Currently, transportation policy provides secure funding that is available in predictable amounts. Recently the Office of Management

and Budget (OMB) proposed that transit and highway and airport investment be done annually through the appropriations process. Mr. Downey thought this would be terrible for predictability of funding, and would not ensure that projects that are begun would be completed. Flexible funding is essential, and the recovery program pushed farther in that direction.

We need legislation that will match the new geography and economy, and we need federal leadership in investment. The federal government should not be doing central planning, but should create a context in which states know what they are doing and how to measure success. Legislation must support innovation in designing, financing, and managing projects. The existing legislation expires on September 30th, 2009, but deadlines do not mean much in the federal government. Congress has done all the hearings they need to do, and stakeholders are mobilized with their positions. The new Secretary of Transportation Ray LaHood is well steeped in what transportation professionals would like to achieve, but he may not enter the debate soon enough due to the backdrop of the economic downturn and the Trust Fund problem. The Policy Commission and the Financing Commission have provided their reports, which reflect quite similar thinking. They concluded that we need a new transportation vision if we want public support for funding, and they found that we are not investing enough. We need direct user charges, but each commission concluded that the fuel tax is still important and should be increased. A third commission was formed to coordinate between governmental entities, and recommended making decisions on an intergovernmental basis.

Summarizing, Mr. Downey reiterated all of the challenges to creating comprehensive and effective transportation policy, but he was optimistic about the prospects for solid leadership that can bring success. The economic recovery program put infrastructure on the national agenda. Although some wanted more infrastructure funds, \$150 billion is a healthy amount. It is an additional one-year's expenditure spread over the next two years. If there were more funds than that, they may not have been spent in time. This is a key year for climate change as well with the UN conference scheduled for Copenhagen at year end. There is movement in the Senate and Congress to address transportation in the context of climate change.

A successful authorization bill, whether it comes by September 30th (which is probably impossible) or by 2010, should effectively address all of these major issues. Including funding for research and technology is essential. Funding must be flexible and performance-based measurement must be in place. Goods movement will be an important part of the new legislation. Mr. Downey concluded that no matter how long it takes, we cannot sacrifice getting the bill we need for the bill we have to have. We must remember that we are thinking about the next decade and beyond.

## Session V:

### Climate Change: Integrating Transportation, Energy, the Environment, and Health

#### Robert B. Noland

*Professor and Director, Alan M. Voorhees Transportation Center, Rutgers University*

Dr. Noland opened by framing the climate change goals we are trying to meet. Looking at greenhouse gas emissions, he demonstrated that everything matters. In New Jersey, transportation accounts for a third of greenhouse gas emissions, and electricity accounts for a quarter. On a national level, personal travel accounts for two-thirds of transportation-related emissions. The goal is to limit atmospheric carbon to 550 parts per million; we are currently around 385 parts per million. To limit global temperature increase to 2 degrees, we must reduce carbon emissions by 80% by 2050, which would be below 1990 levels. This requires urgent action across all sectors. New Jersey's fairly aggressive target is an 80% reduction by 2050 relative to a 2006 base. California has a 1990 base for their 80% reduction. New York is less aggressive. The Copenhagen Summit later this year will likely focus on a 60-80% reduction.

Dr. Noland suggested two approaches to reducing emissions from transportation. First, we can reduce the amount and intensity of travel, which is partially about shifting to more efficient modes of transport. Second, we can pursue technology changes, which improve vehicle efficiency and reduce the carbon intensity of the fuel. Dr. Noland offered several ideas for reducing the amount and intensity



*Dr. Robert Noland suggested two approaches to reducing greenhouse gas emissions from transportation.—first, reduce the amount and intensity of travel, which is partially about shifting to more efficient modes of transport; second, pursue technology changes, which improve vehicle efficiency and reduce the carbon intensity of the fuel.*

of travel. A gasoline tax can be calculated based on the carbon content of the fuel. Reducing speed limits and congestion and making parking pricing more effective would also help. Allowing buses to travel faster than cars may encourage more mass transit use. Additionally, we can encourage more mixed land use and transit-oriented development. At the local level, road pricing to avoid urban congestion may be effective. At the national level, Dr. Noland prefers a gas tax because it directly targets what we are trying to reduce—carbon. Encouraging people to walk or cycle for local trips can be accomplished through urban design and traffic calming. Increasing car sharing or carpooling is also desirable. Increasing public transport is essential, but only if it is integrated with land use decisions.

Turning to how we can use technology to reduce emissions, Dr. Noland argued that we could do much better with our corporate average fuel economy (CAFE) standards. We have the knowledge to obtain much higher fuel efficiency. We can switch to less carbon intensive biofuels, however the current focus

on corn-derived biofuels is counter-productive since they have a larger negative impact on climate change than gasoline because there is an initial release of carbon when crops are planted. Electric vehicles are more promising than carbon-neutral fuel but we have to decarbonize electricity. Coal is still the source of 50% of U.S. electricity generation. Plug-in hybrids would still be powered mainly from coal in many states. New Jersey is about 50% nuclear, so its carbon emissions are not as bad in those terms. In Dr. Noland's opinion, improving vehicle fuel efficiency is the most important factor. Every little bit matters when we need an 80% reduction by 2050.

Dr. Noland shifted his comments to other modes of transport—aviation, international shipping, and freight transport. Globally, aviation represents 2-3% of carbon emissions. However, air travel has other environmental effects that are more harmful to the environment than carbon emissions. Airplanes form contrails that react in the atmosphere and form cirrus clouds, which have negative impacts on climate change. High altitude nitrogen oxide emissions further increase the net radiative forcing from aviation. Between 2000 and 2050 NASA predicts a 4-5% annual increase in air traffic, much of which will come from Asia. These issues are not being considered in current policy discussions. Remediation options are limited. It is unlikely that we can have electric planes, so airplanes will need liquid biofuels. There is research on algae-based fuel, which would require less land to grow. Improving air traffic management efficiency may not decrease contrail formation because flying higher generates more contrails. Another option would be to aim policies at avoiding where contrails form. Additionally, we could implement carbon taxes on aviation, which

Europe will do in 2011, or increase landing charges for less efficient aircrafts.

In freight transport, which accounts for 18% of carbon emissions, there is a lot that can be done to improve truck efficiency. Truck stops can be electrified and idling can be reduced. Trucks can have automatic tire inflation devices and wider tires, and we can reduce truck speeds. Shipping is an important issue due to its high growth. Currently international shipping accounts for 3-4% of carbon emissions. Shipping can cause reduced precipitation, and emits sulfate aerosols, which cause 60,000 deaths annually. Sails are being put on ships to take advantage of the wind.

Dr. Noland concluded by reiterating that we need to think holistically across all modes to make progress. In the short term, vehicle efficiency must be improved. Other policies such as land use changes and improving biofuels may take much longer to implement.

## Rae Zimmerman

*Professor of Planning and Public Administration, Robert F. Wagner Graduate School of Public Service, New York University*

Dr. Zimmerman framed her comments as a push-pull dynamic between transportation and climate change. Climate change affects transportation, and obviously transportation affects climate change. Surface temperatures are increasing, the average sea level is rising, and the North Hemisphere's snow cover is shrinking. The New York City Panel on Climate Change in its "Climate Risk Information" report released February 17, 2009 is predicting that toward the end of the century the city's mean annual temperature will be as much as 7.5 degrees Fahrenheit higher, its sea



*Dr. Rae Zimmerman urged transportation professionals to look for co-benefits when striving for technology and behavioral changes, since funding is limited. The goal should be to improve transit infrastructure to a state of good repair while also making the infrastructure sustainable.*

level as much as 12-23 inches higher, and its precipitation 5-10% higher.

Dr. Zimmerman outlined many ways climate change will affect transportation. Intense heat will create material and steel deterioration, popping of concrete, overheated vehicles, and warped rail lines and roadways. Increased precipitation will wear materials away faster. Seal level rise may cause salt-water damage to roadways. The examples of hurricane Katrina and flooding of New York subways during intense storms illustrate that although we expect transportation to move us out of emergencies, it cannot do so if it is under water. Maps show what areas of New York City are expected to be underwater in the future; they include all three airports and much of the subway. Climate change may compromise fuel production sites and pipelines. Most oil refining in the United States is done in low-lying areas that are highly vulnerable.

Dr. Zimmerman then spoke about the inverse—how transportation affects climate change. Clearly transportation is increasingly contributing to carbon dioxide emissions.

According to a U.S. Department of Energy report, transportation emissions increased by 25.6% between 2006 and 1990 levels, which was close to half the increase in total carbon emissions for all sectors. Petroleum accounts for 98% of transportation's emissions. Transportation is the largest consumer of energy. Light duty vehicles account for over half of transportation's energy use. Vehicle miles traveled, car ownership, and traffic congestion are all increasing. These patterns vary by location; Chicago, Houston, and Los Angeles have the most congestion in the country.

Dr. Zimmerman urged transportation professionals to look for co-benefits when striving for technology and behavioral changes, because there are not enough funds for everything. Our goal should be to improve aviation, roads, and transit infrastructure to a state of good repair while also making the infrastructure sustainable. Transportation is also a key element of security initiatives. It is possible to address security and sustainability simultaneously. We need to take a broad systems approach rather than looking at each goal in isolation. As an example, Dr. Zimmerman agreed that we do not want to be oil dependent, but we cannot risk becoming dependent on lithium for batteries, for example, if we switch to electric cars.

In conclusion, Dr. Zimmerman stated that climate change is here, road-based transportation is a major contributor, and we need multiple approaches to think about how we transport ourselves.

## Alain Kornhauser

*Professor of Operations Research and Financial Engineering and Director of the Program in Transportation, Princeton University*

Dr. Kornhauser focused his presentation on what he considers the fundamentals. Climate change is a global problem stemming from our way of life, and it needs a big solution, although many little solutions will help. The problem is related to the size of our population and our desired standard of living. It is unlikely that we will try to alter the size of our population, and reducing standards of living is not the preferred way to address climate change either.

What is transportation's role? Dr. Kornhauser argued that we must come back to the fact that transportation is an intermediate good that allows us to achieve the standard of living that we want. If we are getting something out of it, we should pay for it. In fact, we are largely paying for it. The average household spends \$8500 per year on transportation—almost \$1 trillion nationally per year. Dr. Kornhauser does not consider elements such as land use or ride sharing transportation issues but rather standard of living issues. We choose to live in a certain place, to carpool or not, or to buy an SUV because those things are part of the standard of living we want.

We developed a petroleum economy because petroleum is an abundant, inexpensive, highly portable energy source. Climate issues are associated with carbon elements that come out of our use of petroleum. Dr. Kornhauser said transportation has adapted to help cope with similar crises in the past. Since the Clean Air Act passed, transportation has made the air we breathe cleaner. Catalytic converters helped move away from lead-containing fuels,



*Climate change is a global problem stemming from our way of life, but people are reluctant to change their standard of living. The only way to truly address climate change without compromising the standard of living is to find a new, clean energy source, noted Dr. Alain Kornhauser.*

CAFE standards improved, two-cycle engines were banned—transportation technology has made significant progress.

Dr. Kornhauser concluded that the only way to address climate change without compromising our standard of living is to find a new, clean energy source. Is electricity the answer? While we may not be able to power planes or ships with batteries, it may well be feasible to power land transportation, the largest contributor of transportation emissions, with electricity, by direct contact and/or batteries. (A hundred years ago a large portion of land transportation was powered by electricity.) It depends on whether electricity is generated in an environmentally neutral way or not. Since the Three Mile Island accident, we have not built one nuclear power plant. There has been zero effort placed in making nuclear technology safer or cheaper. Nuclear has the baseload capacity and the carbon neutrality to power the lion's share of ground transportation. In

the meantime, the Energy Bill invests in technology to make coal cleaner, which, if achieved economically could also replace petroleum as ground transportation's energy source. Battery technology is difficult; we have not made much progress in improving batteries in the 150 years we have been making them.

Dr. Kornhauser argued that we also need to make petroleum more expensive by imposing an exorbitant sin tax on it. He was amazed how afraid everyone is to tax gasoline. Our purchasing power with the existing gasoline tax has significantly depreciated, and the public needs to make the same level of contribution today as they made ten years ago if they want the same level of service. Dr. Kornhauser thinks we should treat gasoline the same way we have treated cigarettes. Once we realized they were bad for us, we began taxing them. People are willing to pay more for gas when prices rise, and drive a little less. They would do the same if a gas tax were increased.

## Discussion

The primary discussion topics were around land use, how to raise funds and change behavior, and problems with nuclear power. Panelists discussed differing opinions on land use decisions. The argument was made that many people do not have the choice to live in walkable neighborhoods because the supply is constrained and where there is supply, it is expensive. It seems we have gone backward rather than forward with land use in the past ten years, still building more low-density suburban sprawl. Land use regulations determine whether sprawl will happen or not; developers cannot usually make those decisions. There has been change in some areas, particularly around transit-oriented

development. One conference participant argued that where people live is not simply a lifestyle choice, but a decision that is shaped by federal programs such as the Federal Housing Administration's home loans in the suburbs. Federal programs have the ability to shape development patterns, and perhaps we should begin insuring mortgages on multifamily homes in high-density areas to provide incentives for urban living.

A few questions were related to how to raise funds or change public behavior and preferences. A city official shared that their main obstacle to mixed use and transit-oriented development is not zoning regulations but public opinion. Panelists responded that an increase in a gas tax would help the public respond to prices and change preferences and behavior. Gasoline is not currently subject to the sales tax in New Jersey because it is considered a necessity. We currently have one of the lowest gas taxes in the world, and panelists thought it should be increased.

There was also discussion about nuclear power. Problems with it are significant, but so are its benefits. Some think nuclear power plants would pose a risk of nuclear proliferation, or send a signal to other countries that nuclear power is okay. However, it is a big stationary source of electricity that be produced cheaply once a plant is built, and has no greenhouse effects. On the other hand, resistance to nuclear just gives us more reason to reduce or change how we travel.

# Appendix A

## Conference Agenda

### Transportation and Infrastructure Issues for the Next Decade

March 6, 2009

*Co-sponsored by the Policy Research Institute for the Region at the Woodrow Wilson School of Public and International Affairs, Princeton University, The Rudin Center for Transportation Policy and Management, New York University and the Alan M. Voorhees Transportation Center, Rutgers University*

#### Welcome and Opening Remarks

**Richard F. Keevey**, Director, Policy Research Institute for the Region,  
Woodrow Wilson School, Princeton University

**Anthony Shorris**, Director, Rudin Center for Transportation Policy & Management  
Wagner Graduate School, New York University

**Robert B. Noland**, Professor and Director, Alan M. Voorhees Transportation Center,  
Bloustein School of Planning and Public Policy, Rutgers University

#### Session I—OPENING ADDRESS: Transportation and Infrastructure Needs for the Region

**Honorable Anthony R. Coscia**, Chairman of the Board, Port Authority of New York and  
New Jersey

#### Session II—Surface Transportation "Authorization"

##### Moderator:

**Richard F. Keevey**, Director, Policy Research Institute for the Region,  
Woodrow Wilson School, Princeton University

##### Panelists:

**Anne P. Canby**, President, Surface Transportation Policy Partnership

**Peter J. "Jack" Basso**, Director of Program Finance and Management, American  
Association of State and Highway Transportation Officials

**Robert Puentes**, Senior Fellow and Director of Metropolitan Infrastructure Initiative,  
Brookings Institution, Washington, D.C.

## Session III—Financing of Infrastructure Improvements

### Moderator:

**Martin Robins**, Senior Policy Fellow, Alan M. Voorhees Transportation Center, Rutgers University

### Panelists:

**Honorable Stephen Dilts**, Commissioner, Department of Transportation, State of New Jersey

**Honorable Astrid C. Glynn**, Commissioner, Department of Transportation, State of New York

**Michael Repogle**, Transportation Director, Environmental Defense Fund

## Session IV—Luncheon Speaker

**Honorable Mortimer L. Downey**, Senior Advisor to Parsons Brinkerhoff and former Deputy Secretary, U.S. Department of Transportation

## Session V—Climate Change: Integrating Transportation, Energy, the Environment, and Health

### Moderator and Panelist

**Robert B. Noland**, Professor and Director, Alan M. Voorhees Transportation Center, Rutgers University

### Panelists:

**Rae Zimmerman**, Professor of Planning & Public Administration, Robert F. Wagner Graduate School of Public Service, New York University

**Alain Kornhauser**, Professor of Operations Research and Financial Engineering and Director of the Program in Transportation, Princeton University

## Closing Remarks

**Richard F. Keevey**, Director, Policy Research Institute for the Region, Woodrow Wilson School, Princeton University



