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**Committee on Commerce, Science, and Transportation  
United States Senate**

**Department of Transportation Activities  
on Climate Change Mitigation and Adaptation**

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Chairman Inouye, Vice Chairman Stevens, and distinguished Members, I am pleased to appear before the Committee today to discuss the various activities of the U.S. Department of Transportation as they relate both to transportation's impact on climate change and to the impacts that climate change may have on the Nation's transportation networks. I appreciate your attention on this important subject and the expertise this Committee brings to transportation and the American and global economy.

Addressing the challenge that global climate change presents will require a sustained effort over many years. The Bush Administration is committed to cutting greenhouse gas emissions and to mitigating the impacts of the climate change that occur. This Administration has devoted almost \$45 billion to support climate change-related programs, with an additional \$40 billion in loan guarantees made available to support investments in technologies that promise to reduce greenhouse gas emissions.

The Department of Transportation's principal mission is to ensure the safe, efficient, and reliable performance of our highway, transit, rail, maritime, pipeline, and aviation networks. We also support the Administration's efforts to reduce the Nation's greenhouse gas emissions, not only by working to reduce greenhouse gas emissions from transportation activities, but also by preparing for the impacts of climate change in order to protect our valuable transportation infrastructure. As we pursue each of these goals, we are always mindful of the indispensable role that transportation plays in sustaining and improving our economy, and supporting our trade, and the importance of transportation infrastructure to the millions of Americans who depend on it for their mobility and the competitiveness of their businesses. These goals are all a part of the Secretary's priorities for a safe, efficient, reliable and clean transportation network.

Reducing Transportation's Impacts

I would first like to discuss the Department's approach to the mitigation of greenhouse gas emissions from the transportation sector. Our approach focuses on: improving vehicle efficiency; increasing the use of alternative fuels; advancing the efficiency of the transportation system (often by promoting market-based measures and technological innovations); and improving our understanding of the impacts of climate change on transportation infrastructure.

Let me state at the outset that, although mandates and regulations have their place, new technologies and private sector innovations are really the keys to effectively addressing climate change without compromising the competitiveness of our transportation providers or the shippers and passengers that rely upon them. As evidence, I refer you to the European aviation regulatory model that has encouraged a decrease in overall ridership but an increase in emissions. Compare that to the more open market approach taken in the U.S. – our airlines have increased ridership while at the same time decreased emissions dramatically. Between 2000 and 2006, aviation CO<sub>2</sub> emissions in the U.S. declined by about 4 percent. During the same period in Europe, emissions increased by around 30 percent.

### *Vehicle and Engine Efficiency*

The Administration has been a leader in improving the fuel economy of the Nation's fleet of passenger vehicles and light trucks. Our record in this area speaks for itself. In April, Secretary Peters announced a proposal that would establish the first new fuel economy standards for passenger cars in more than two decades, and would update and expand fuel economy standards for light trucks. Once finalized, this rule would raise 2011 passenger car fuel economy standards by 13 percent and boost light truck fuel economy standards by a further 4 percent above the attribute-weighted standard set two years ago. Overall, the fuel economy standards of the U.S. fleet would be raised by more than 25 percent through model year 2015.

The proposal reflects the fuel economy reforms passed by Congress in December 2007 at the President's urging. Indeed, the new law, the Energy Independence and Security Act (EISA) of 2007, incorporates many of the provisions of the President's "Twenty in Ten" initiative, aimed at reducing light duty vehicle petroleum consumption by 20 percent in ten years through both improved fuel economy standards and increased use of alternative fuels.

The standards in the proposed rule would save a projected 55 billion gallons of fuel and reduce U.S. carbon dioxide emissions by 521 million metric tons over the lifetime of the regulated vehicles. It also includes provisions for trading fuel economy credits between manufacturers and vehicle classes, as well as provisions for carrying forward excess credits earned in earlier years. This proposal goes above and beyond the requirements set out by Congress.

This proposal builds on earlier initiatives to raise light truck fuel economy under prior law. The Department issued new fuel economy rules for light trucks in 2003 (covering model years 2005-2007), and in 2006 (covering model years 2008-2011). The 2006 rulemaking implemented an innovative attribute-based standard for light trucks that Congress extended to passenger cars in EISA. The two earlier rules are estimated to save 13 billion gallons of fuel over the lifetimes of the regulated vehicles.

Through the Federal Highway Administration's Congestion Mitigation and Air Quality Improvement Program (CMAQ), the Department is working with State and local

governments on a range of programs to improve urban air quality within the transportation sector. For example, DOT has cooperated with the Environmental Protection Agency's SmartWay Program initiative to retrofit trucks and truck stops with on-board and off-board auxiliary power to run vehicle lights and air conditioning and reduce truck idling. This program has reduced fuel consumption, criteria pollutant emissions, and greenhouse gas emissions, and has expanded to include idling emissions from marine, agricultural, rail, and off-road heavy-duty engines. The Federal Transit Administration funds the development and deployment of alternative fuel buses, including hydrogen fuel cell buses, and diesel-electric hybrid buses, as well as alternative fuels infrastructure for transit systems across the United States.

The Department also has focused on efficiency beyond the highway. In aviation, we have begun to implement the Next Generation Air Transportation System to modernize the U.S. air traffic system, of which I will say more in a moment. The Federal Aviation Administration is in the process of setting up a new program, CLEEN – Continuous, Low Energy, Emissions, and Noise – a research consortium focused on cost-shared efforts accelerating the maturation of lower energy, emissions, and noise technologies for aircraft and engines and advancing cleaner alternative fuels. The Maritime Administration (MARAD) is focused on new technologies to reduce the harmful emissions from marine diesel engines through research on alternative fuels (such as biodiesel) and reduced ship stack emissions.

#### *Alternative Fuels*

The Administration also is supporting research on and use of alternative fuels. The EISA requires fuel producers to supply at least 36 billion gallons of renewable fuel by the year 2022 -- a 500 percent increase in the use of renewable fuels. President Bush is calling on every vehicle manufacturer that serves the U.S. market to produce flex-fuel vehicles across its fleet, providing tax incentives for drivers to buy fuel-efficient hybrid vehicles that run on both gasoline and electricity and investing in plug-in hybrids that can cover up to 40 miles on electricity alone.

Though corn-based ethanol is currently the primary way to meet that standard, that will not always be the case, and so the Administration also is investing in next generation biofuels such as cellulosic ethanol. Since President Bush took office, the projected cost of cellulosic ethanol has dropped by more than 60 percent.

Last year, the U.S. produced about 450 million gallons of biodiesel – up 80 percent from 2006. Today, there are more than 968 biodiesel fueling stations, and hundreds of fleet operators use biodiesel to fuel their trucks. Over the last five years, the Administration has invested about \$1.2 billion in hydrogen research and development to help bring hydrogen fuel cell vehicles to market. These vehicles use no gasoline at all, and emit only clean water.

Even as the Administration focuses on alternative fuels and alt-fuels vehicles, we must ensure that the environmental improvements they bring do not erode the safety

levels that Americans expect. Through the National Highway Traffic Safety Administration, the Research and Innovative Technology Administration, and the Pipeline and Hazardous Materials Safety Administration, we have undertaken research required for the development of safety standards for future hydrogen vehicles and infrastructure.

We are exploring the potential of alternative fuels for aviation -- fuels that could have benefits for energy security as well as emissions performance. The FAA is one of the key partners in the Commercial Aviation Alternative Fuels Initiative (CAAFI). CAAFI's participants, which include airlines, manufacturers, airports, fuel producers, federal agencies and international players, are implementing a roadmap for the use of alternative fuels for commercial aviation. Commercial airlines and manufacturers are beginning to make some headway in experimental use of biofuels in jet aircraft. Using an unmodified Boeing 747, pilots for Richard Branson's Virgin Atlantic have successfully flown from London's Heathrow airport to Amsterdam using a biofuel made of a mix of coconut and babassu oil.

### *System Efficiency and the Marketplace*

As important as research may be, the Department is of course concerned first and foremost about making our networks as safe and reliable as possible. Secretary Peters has made improving the performance of those networks one of the Department's primary objectives, because severe congestion is choking our major urban areas (and, for that matter, more and more medium-sized cities), impeding the efficient flow of goods, and threatening our mobility – to the tune of about \$200 billion every year just on our highways. As we focus on increasing efficiency, we simultaneously can and should reduce the amount of needless greenhouse gas (GHG) and other emissions that those networks generate through idling, inefficient routing, and other undesirable effects.

The problem is significant. The Texas Transportation Institute estimates that highway congestion in the U.S. wastes approximately 2.9 billion gallons of fuel annually, translating into 2.6 million tons of unnecessary CO<sub>2</sub> emissions every year. We think this figure actually underestimates the costs associated with the near-constant congestion that afflicts so many of our cities and our most important highway corridors. I think all of us have experienced this first hand while stuck in traffic watching the gas tank empty as congestion brings highway speeds to a crawl.

The Department has responded with the Congestion Initiative, a multifaceted program aimed at easing highway, aviation, freight/intermodal, and border congestion. As part of the Initiative, we have focused on encouraging States and localities – which, after all, own nearly all our highways – to embrace congestion pricing and direct user fees for both their operational and environmental benefits.

Researchers have for decades predicted the beneficial environmental impacts of pricing, and we have recently seen real evidence of reduced emissions in cities around the world following adoption of congestion pricing. One study found that congestion pricing

reduced emissions up to 10 percent in the aggregate and as much as 30 percent in high pollution areas.<sup>1</sup> These benefits are obtained because efficient pricing mechanisms reduce the number of trips taken, alter trip routes, reduce trip duration, decrease variation in travel speeds, and facilitate more pollution-efficient travel speeds. A study of Atlanta during the 1996 Summer Olympics revealed significant benefits<sup>2</sup>. Several travel demand management measures were introduced to reduce traffic congestion during the 17 days of the games. The study found that daily peak ozone levels dropped 28 percent and hospitalizations for asthma fell by almost 20 percent during that time.

Moreover, with the proliferation of open road pricing technology, highway facilities can achieve free-flow conditions without intrusive tollbooths, thus obtaining the efficiency and environmental benefits of pricing without the harmful impacts of queued vehicles waiting in line to pay.

Real evidence of the emissions benefits of pricing is now available from Singapore, London, Stockholm, and Germany. Through congestion pricing, London reduced emissions of particulate matter and nitrogen oxides by 12 percent and fossil fuel consumption and CO<sub>2</sub> emissions by 20 percent. Singapore uses pricing to manage demand on its downtown road network during peak travel periods and has prevented the emission of an estimated 175,000 pounds of CO<sub>2</sub>. Stockholm's congestion pricing system, which targets congestion in the city center, has led to a 10-14 percent drop in CO<sub>2</sub> emissions. In January 2005, Germany implemented a new system to price trucks on the autobahns. These charges, which are collected electronically using Global Positioning System Satellites (GPS), are based not only on distance traveled and number of axles, but also on a vehicle's emissions class. This system has increased freight efficiency and cut freight greenhouse gas emissions by 7 percent. A 50 percent premium charge for older, more polluting trucks has doubled the replacement rate to new trucks.

Our focus on variable pricing and other direct user fees also responds to the drawbacks of a highway funding model that relies on gas tax revenues even as we strive towards increased energy independence, greater fuel economy in automobiles, development of alternative fuels, and reduced emissions. The EISA, and the increasing popularity of hybrid vehicles, presage reductions in the amount of gas tax revenue available for investment in transportation. Concerns about the viability of gas tax revenues are only exacerbated by the recent increases in fuel prices which have led to reduced vehicle miles travelled on U.S. roads (Americans drove 1.4 billion fewer miles in April 2008 than they did in April 2007, the sixth consecutive monthly drop). As the United States works to reduce emissions and promote alternative fuels, a transportation funding system that relies primarily on the gas tax undoubtedly contradicts the Nation's overall policy objectives. Pricing and other market solutions can help address concerns

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<sup>1</sup> Khalid(Daniel & Bekka., 1998. The Environmental Impact of Highway Congestion Pricing Journal of Urban Economics Volume 47, Issue 2, March 2000, Pages 180-215. ).

<sup>2</sup> Friedman & Powell. 2001 .Impact of Changes in Transportation and Commuting Behaviors During the 1996 Summer Olympic Games in Atlanta on Air Quality and Childhood Asthma. JAMA. Vol. 285 No. 7, February 21, 2001.

about the viability of the gas tax by substituting private capital and direct user fees for gas tax revenue.

Because of these benefits, tolling and direct user charges have won support from a wide range of ideological viewpoints in the United States – from Environmental Defense and the Nature Conservancy to the Competitive Enterprise Institute and the Reason Foundation. Recognizing the environmental benefits of this approach, San Francisco Mayor Gavin Newsom stated in his recent inaugural address that a “sensible congestion-pricing plan is the single greatest step we can take to protect [San Francisco’s] environment and improve our quality of life.”

All of this is to say that we view congestion pricing as a win-win concept because it generates revenues that can be used to expand and maintain highways or bridges or transit, and it provides users with price signals that encourage rational decisions about how and when to drive – yielding efficiencies that are at once an environmental and economic boon.

Anyone who has flown lately can attest to the fact that the current aviation system needs fundamental changes. I briefly made reference to the Next Generation Air Transportation System, or NextGen. As with congestion pricing, this is an area in which efficiency improvements and environmental advances go hand-in-hand. NextGen aims to improve our air traffic management procedures and route structures so that aircraft can choose more efficient routes, make quicker in-flight decisions to avoid weather and other traffic, and even operate more efficiently on the ground.

The FAA and our commercial airlines have saved 300 hundred million gallons of jet fuel and displaced over 6 million tons of carbon dioxide emissions by implementing Reduced Vertical Separation Minimums (RVSM), permitting aircraft flying in U.S. air space to operate at more efficient altitudes. FAA has achieved further improvements in system performance through the related reforms of Area Navigation (RNAV) and Required Navigation Performance (RNP) – both of which allow for the more efficient routing for commercial air traffic and more reliable service during marginal weather conditions, particularly at congested airports such as Atlanta Hartsfield. If we want to reduce jet fuel consumption and aircraft emissions without discouraging air travel, we must transform our aviation system. As we move to push Automatic Dependent Surveillance Broadcast (ADS-B) into the cockpit, we anticipate still greater efficiency gains. And, because every gallon of jet fuel not burned equates to roughly 20 pounds of displaced CO<sub>2</sub>, even small improvements yield huge GHG savings when deployed systemwide.

These advances, combined with the imperative for commercial airlines to save fuel, have produced reductions in GHG emissions that – contrary to frequent criticisms – are quite impressive. Compared to the year 2000, U.S. commercial aviation in 2006 moved 12% more passengers and 22% more freight while actually burning less fuel, thereby reducing our carbon output by a million tons. U.S. airlines have committed to

another 30% improvement by 2025. With the recent spike in fuel prices, reduction in schedules, and retirement of older aircraft, fuel consumption by U.S. airlines will continue to decline.

Internationally, the Department supports the International Civil Aviation Organization's continued leadership in the environmental arena and its decisive action in developing a comprehensive plan to mitigate aviation GHG emissions and establishing a new high-level Group on International Aviation and Climate Change to work with ICAO's 190 Member States to implement the plan. We oppose, I should emphasize, the European Union's proposal to include aviation in an "emissions trading scheme," as both unworkable and contrary to international aviation law

. In 2008, we have seen auto buyers shift toward smaller vehicles and hybrids; airlines modify their fleets (and their operations) to do more flying with fuel-efficient aircraft and to get weight off the airplane; shippers move freight to an increasingly efficient rail network; and commuters utilize transit services in greater numbers. These examples contain a common thread, and, of course, that thread is that the market itself – especially of late – will provide ample incentive for transportation providers and consumers to travel more efficiently and with reduced emissions. The Secretary has demonstrated a clear commitment to improving transit. Cumulative VMT has fallen by 17.3 billion miles since November 2006, and we estimate that greenhouse gas emissions in the transportation sector fell by an estimated 9 million metric tons for the first quarter of 2008. The pain from increased fuel prices that Americans are experiencing at the pump and in the grocery store is real and should not be minimized, but the changes we are seeing in transportation systems response to the high price of oil remind us that the marketplace can be a major ally in reducing transportation's environmental footprint and creating the conditions necessary to spur private sector environmental innovation.

#### *Better scientific understanding*

I also would like to summarize the Department's efforts to measure and prepare for the impacts that climate change may have on our transportation infrastructure. The Department's Center for Climate Change and Environmental Forecasting was designated by EISA to be the Office of Climate Change and Environment. This virtual organization is the focal point within DOT for multimodal technical expertise on transportation and climate change. Nine DOT operating administrations contribute resources to conduct strategic research, engage in policy analysis, and ensure coordination on multi-modal approaches to reducing transportation-related greenhouse gases and to mitigate the effects of global climate change on the transportation network. Recent and continuing research has focused on a range of topics, including emission modeling, evaluation of State and local efforts, early action, tax credits, alternative fuels, and urban ferries.

Most recently, the Center has focused on research requirements from EISA: first, US DOT has approved a statement of work to conduct an EISA-required report on transportation's impact on climate change and ways to mitigate transportation's contribution. The study will also consider co-benefits of fuel savings and air quality

improvement. This report will be conducted in coordination with the Environmental Protection Agency and in consultation with the United States Global Change Research Program. Second, the US DOT, in coordination with a range of other groups, is developing a Transportation and Climate Change Clearinghouse to provide one-stop shopping for transportation decision-makers and planners.

As part of the NextGen effort to advance our understanding of aviation's effects on climate, the FAA has launched the Aviation Climate change Research Initiative (ACCRI) in partnership with the National Aeronautics and Space Administration (NASA) and other agencies. This initiative will help accelerate our scientific understanding to inform policy decisions in this area.

The Department also is addressing the challenges posed by the impacts of climate change on transportation infrastructure and systems. Our Center for Climate Change and Environmental Forecasting has been studying this question for several years. Early this year, DOT released *The Impacts of Climate Change and Variability on Transportation Systems and Infrastructure: Gulf Coast Study, Phase I*. This study provides an assessment of the vulnerabilities of transportation systems in the region to potential changes in weather patterns and related impacts, as well as the effect of natural land subsidence in the region. The area examined by the study includes 48 contiguous counties in four States, running from Galveston, TX to Mobile, AL.

Based on 21 simulation models and a range of future scenarios, the study found that potential changes in climate, through both sea level rise and subsidence over the next 50-100 years, could disrupt transportation services in several key ways. Twenty-seven percent of major roads, 9 percent of rail lines, and 72 percent of area ports are at or below 4 feet in elevation above sea level, and could be vulnerable to future sea-level rise combined with non-climate related sinking of the area's land mass that is occurring in the area. The study is designed to help State and local officials as they develop their transportation plans and make investment decisions. Subsequent phases of the study are intended to focus on risks and adaptation strategies involved in planning, investment, and design decisions for infrastructure in the Gulf Coast region and nationwide. The study was performed in partnership with the U.S. Geological Survey and State and local researchers, and is one of 21 "synthesis and assessment" reports produced as part of the U.S. Climate Change Science Program.

A similar study that will soon be released is *The Potential Impacts of Global Sea Level Rise on Transportation Infrastructure*. This study was designed to produce rough estimates of how future climate change, specifically sea level rise and storm surge, could affect transportation infrastructure on the East Coast of the United States. Like the Gulf Coast Study, this study's major purpose is to aid policymakers by providing estimates of these effects as they relate to roads, rails, airports, and ports.

In sum, the Department is approaching greenhouse gas mitigation and adaptation in a comprehensive, multimodal, and innovative way, in line with the Secretary's



priorities for safety, system performance, and 21<sup>st</sup> century solutions. I commend the committee for paying attention to this important subject and appreciate the opportunity to discuss this issue with a group of individuals who are so knowledgeable about our transportation network. I look forward to your questions.