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ADMINISTRATION PROPOSALS ON CLIMATE CHANGE AND ENERGY INDEPENDENCE

(110–44)

HEARINGS

BEFORE THE

COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE HOUSE OF REPRESENTATIVES

ONE HUNDRED TENTH CONGRESS

FIRST SESSION

MAY 11 AND 16, 2007

Printed for the use of the
Committee on Transportation and Infrastructure

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U.S. House of Representatives
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Washington, DC 20515

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May 11, 2007

SUMMARY OF SUBJECT MATTER

TO: Members of the Committee on Transportation and Infrastructure

FROM: Committee on Transportation and Infrastructure Staff

SUBJECT: Hearing on Administration Proposals on Climate Change and Energy Independence

PURPOSE OF HEARING

On Friday, May 11, 2007, at 10:00 a.m., in Room 2167 Rayburn House Office Building, the Committee on Transportation and Infrastructure will receive testimony from the Secretary of Transportation, the Administrator of the United States Environmental Protection Agency, the Administrator of the United States General Services Administration, the Assistant Secretary of the Army for Civil Works for the Army Corps of Engineers, Acting Architect of the Capitol, and the Chief Administrative Officer of the House of Representatives on executive and legislative branch proposals and actions on climate change and energy independence.

BACKGROUND

This memorandum briefly summarizes climate change and its potential impacts. It then focuses in more detail on administration proposals and policies regarding climate change and energy independence. It will also look at legislative branch proposals and policies regarding climate change and energy independence.

Climate Change

In February, 2007 the Intergovernmental Panel on Climate Change[1] (IPCC) declared that evidence of atmospheric warming is "unequivocal."[2] The IPCC also stated with "very high

[1] Recognizing the problem of potential global climate change, the World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP) established the Intergovernmental Panel on Climate Change (IPCC) in 1988. It is open to all members of the UN and WMO. The role of the IPCC is to assess on a comprehensive, objective, open and transparent basis the scientific, technical and socio-economic information relevant to understanding

confidence"[3] that human activities have resulted in global warming. The results of this warming may result – and to a degree may already be resulting – in sea level rise, increased hurricane and storm activity, changed precipitation patterns resulting in more frequent floods and droughts, among other potential impacts.

The IPCC defines climate change as "any change in climate over time, whether due to natural variability or as a result of human activity."[4] While some climate change can occur as a function of natural variability, the IPCC notes that the warming that has occurred, and is expected to continue, is "*very likely* due to an observed increase in anthropogenic greenhouse gas concentrations"[5] which are a result of human activities such as industrial processes, fossil fuel consumption, and changes in land use, such as deforestation.[6]

Current and projected global warming occurs because of the "greenhouse effect." The greenhouse effect is a natural process in which the atmosphere absorbs heat – resulting in a warm and habitable earth. Specifically, visible sunlight passes through the atmosphere without being absorbed. Some of the sunlight that strikes the earth is absorbed and converted to heat, warming the surface. The surface then emits some of this heat back into the atmosphere where it is absorbed by greenhouse gases such as carbon dioxide (CO_2), methane, and nitrous oxides, among others. For the previous 10,000 years, the greenhouse effect has produced an average global temperature of 57 degrees Fahrenheit. The absence of greenhouse gases would result in an inhospitable planet unable to support most life forms with an average temperature well below freezing.

Human activities that emit greenhouse gases to the atmosphere increase the amount of heat that gets absorbed before it could otherwise escape into space. Anthropogenic, or human, emissions of greenhouse gases therefore enhance the natural greenhouse effect and cause global warming.

It is without question that global warming has occurred, and is occurring. Average surface temperatures have increased by an estimated 1.4 degrees Fahrenheit between 1900 and 2005. Eleven of the last 12 years (1995-2006) rank among the 12 warmest years of global surface temperature[7] since 1850.[8] Other observations of observed climate change include:[9]

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the scientific basis of risk of human-induced climate change, its potential impacts and options for adaptation and mitigation. The IPCC does not carry out research nor does it monitor climate related data or other relevant parameters. It bases its assessment mainly on peer reviewed and published scientific/technical literature. http://www.ipcc.ch/about/about.htm (accessed 9 May 2007)

[2] IPCC, February 2007. *Climate Change 2007: The Physical Science Basis – Summary for Policymakers.* p.5

[3] The IPCC uses "the following levels of confidence…to express expert judgments on the correctness of the underlying science: *very high confidence* at least a 9 out of 10 chance of being correct; *high confidence* about an 8 out of 10 chance of being correct." IPCC, February 2007. *Climate Change 2007: The Physical Science Basis – Summary for Policymakers.* p.5.; Virtually certain >99% probability of occurrence, Extremely likely>95%, Very likely>90%, Likely>66%... *Climate Change 2007: The Physical Science Basis – Summary for Policymakers.* p.4.

[4] IPCC, February 2007. *Climate Change 2007: The Physical Science Basis – Summary for Policymakers.* p.2

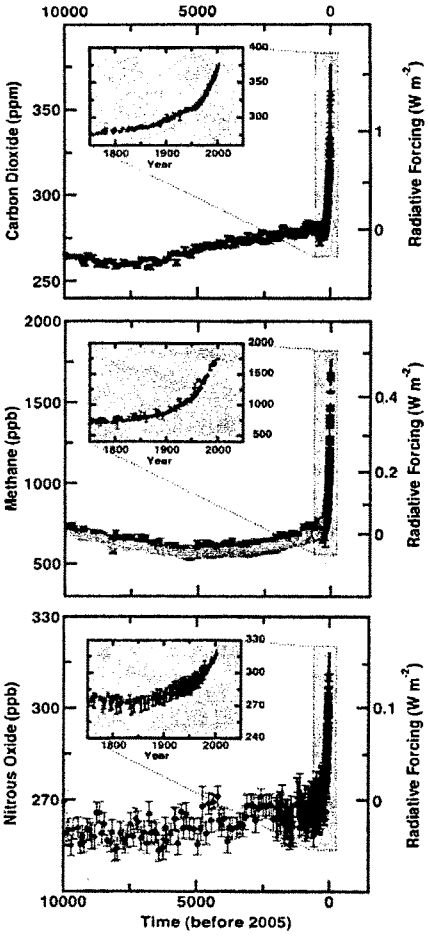
[5] IPCC, February 2007. *Climate Change 2007: The Physical Science Basis – Summary for Policymakers.* p.10

[6] IPCC, February 2007. *Climate Change 2007: The Physical Science Basis – Summary for Policymakers.* p.2

[7] The average of near surface air temperature over land, and sea surface temperature. *Climate Change 2007: The Physical Science Basis – Summary for Policymakers.* p.5

[8] IPCC, February 2007. *Climate Change 2007: The Physical Science Basis – Summary for Policymakers.* p.5

[9] IPCC, February 2007. *Climate Change 2007: The Physical Science Basis – Summary for Policymakers.* pp.7-8; Emanuel, K.A. 2005. "Increasing Destructiveness of Tropical Cyclones Over the Past 30 Years." *Nature.* 436; 686-88; Webster, P.J., et al. 2005. "Changes in Tropical Cyclone Number, Duration, and Intensity in a Warming Environment, Science." *Science.* 309: 1844-46.



- The IPCC estimates that the total 20th Century sea level rise is 0.17 meters (.55 feet). They have "high confidence" that observed sea level has increased from the 19th to the 20th centuries;.
- Average Arctic temperatures have increased at almost twice the global average rate in the past 100 years;
- Satellite data since 1978 shows that annual average Arctic sea ice extent has shrunk by 2.7 percent per decade;
- Temperatures in the Arctic permafrost layer (including areas of Alaska) have increased since the 1980s, and the maximum area covered by seasonally frozen ground has decreased by about 7 percent in the Northern Hemisphere since 1900;
- Precipitation changes have taken place including increased precipitation events in eastern sections of North and South America, northern Europe, and central Asia, and drying or drought events in the Sahel, the Mediterranean, southern Africa, and sections of south Asia;
- Increased frequency of heavy precipitation events over most land areas;
- Increased frequency of high-intensity (category 4 and 5) tropical cyclones (hurricanes) globally since 1970 as a function of increased sea surface temperatures among other factors.

The IPCC reports that:

> *Global atmospheric concentrations of carbon dioxide, methane and nitrous oxide have increased markedly as a result of human activities since 1750 and now far exceed pre-industrial values determined from ice cores spanning many thousands of years. The global increases in carbon dioxide concentration are due primarily to fossil fuel use and land-use change, while those of methane and nitrous oxide are primarily due to agriculture.*[10]

[10] IPCC, February 2007. *Climate Change 2007: The Physical Science Basis – Summary for Policymakers.* p.2

The figure below comes from the 2007 IPCC report and shows the observed increases in greenhouse gases over time.[11]

While a variety of greenhouse gases play a role in atmospheric warming, carbon dioxide is the most common and "the most important anthropogenic greenhouse gas." Prior to 1800, the beginning of the Industrial Revolution (when fossil fuels, such as coal, began to be used on a wide scale), there were roughly 280 parts per million (ppm) of CO_2 in the atmosphere.[12] In 2005, 379 ppm of CO_2 were measured in the atmosphere. This "concentration of carbon dioxide in 2005 exceeds by far the natural range over the last 650,000 years (180 to 300 ppm) as determined by ice cores." **As a result of these increasing levels, carbon dioxide is attributed to account for approximately 80 percent of all observed global warming.**

Other greenhouse gases do play an important part in observed global warming. Methane had a pre-industrial (pre-1800) value of around 715 ppb in the atmosphere. In 2005 it was measured at a level of 1,774 ppb. Methane is around 60 times more effective at capturing heat energy than CO_2. However, it lasts fewer years in the atmosphere than CO_2, and is produced in significantly lower amounts. It is estimated that methane will account for 15 to 17 percent of all global warming experienced this century. Nitrous oxide concentration has increased from a pre-1800 level of approximately 270 ppb to 319 ppb in 2005.

The IPCC projects that "continued greenhouse gas emissions at or above current rates would cause further warming and induce many changes in the global climate system during the 21st century that would *very likely* be larger than those observed during the 20th century."[13]

Climate Change Impacts

The IPCC projects a number of environmental, ecosystem, and public health impacts will take place as a result of climate change.

For example, climate scientists hold that an increase in sea surface temperature – driven by climate change – will likely result in an increased frequency of higher intensity (categories 4 and 5) hurricanes.[14] While the deadly hurricane season of 2005 cannot be directly linked to changes in the earth's climate, it does echo these concerns. In just one storm, Hurricane Katrina, 1,118 people were confirmed dead, and 135 are still missing and presumed dead. Direct damage to residential and non-residential property is estimated at $21 billion. Damage to public infrastructure is estimated at another $6.7 billion. Almost one-half of the region's population that was affected by the storm has still not returned to their homes. And nearly 124,000 jobs were lost as a result of the hurricane.[15] The impacts of Hurricanes Katrina and Rita might be considered a harbinger of future economic and human impacts as a result of climate change.

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[11] IPCC, February 2007. *Climate Change 2007: The Physical Science Basis – Summary for Policymakers.* p.3

[12] Ppm (parts per million) or ppb (parts per billion) is the ratio of the number of greenhouse gas molecules to the total number of molecules of dry air.

[13] IPCC, February 2007. *Climate Change 2007: The Physical Science Basis – Summary for Policymakers.* p.13

[14] Emanuel, K.A. 2005. "Increasing Destructiveness of Tropical Cyclones Over the Past 30 Years." *Nature.* 436; 686-88; Webster, P.J., et al. 2005. "Changes in Tropical Cyclone Number, Duration, and Intensity in a Warming Environment, Science." *Science.* 309: 1844-46.

[15] American Society of Civil Engineers – Hurricane Katrina External Review Panel. 2007. *The New Orleans Hurricane Protection System: What Went Wrong and Why.*

Observed and anticipated impacts cited by the IPCC include:[16]

- Increased heat-related mortality has been observed in Europe;
- Disturbed forests due to increased incidences of fire and pests;
- Coastal flooding impacts due to sea level rise, and increased frequency and/or severity of storms;
- Average annual river runoff and water availability is projected to increase by 10-40 percent at high latitudes and in some wet tropical areas;
- Average annual river runoff and water availability is expected to decrease by 10-30 percent in some presently dry regions in the mid-latitudes, and in the dry tropics;
- Heavy precipitation events will increase in frequency, adding to flood risk;
- Water supply storage in glaciers and snow pack will decline. This decline is anticipated to reduce water availability in regions supplied by melting snow from major mountain ranges – home to one-sixth of the world's population;
- Approximately 20-30 percent of plant and animal species are likely to be at increased risk of extinction if global average temperature increases exceed 1.5-2.5 degrees Celsius;
- Acidification of the ocean due to increasing CO_2 is expected to have negative impacts on marine shell forming organisms (shellfish and corals) and their corresponding ecosystems;
- Crop productivity is projected to increase slightly in mid to high latitudes and spring planting seasons may begin earlier in some areas. Crop production is expected to decrease in the tropics;
- Coastal wetlands will be negatively affected due to sea level rise, and decrease in sediment;

Federal Climate and Energy Independence Policies

Research has been the primary vehicle for U.S. action on climate change.[17] Research funding reached $5.1 billion in fiscal year (FY) 2004.[18] Federal expenditures for science and technology research, voluntary programs, international assistance, and tax incentives received budget authority of $5.8 billion in FY2006 and a budget request of $6.5 billion in FY2007.

Expenditures on climate-related programs are spread across more than a dozen agencies. The Department of Energy has traditionally had the largest share (more than 44 percent) of the climate budget, followed by the National Aeronautics and Space Administration (NASA) (approximately 20 percent).[19]

Implementation of the Federal Government's climate programs are coordinated by the Cabinet-level Committee on Climate Change Science and Technology Integration. Programs generally fall within one of four major areas:

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[16] IPCC, April 2007. *Climate Change 2007: Climate Change Impacts, Adaptation and Vulnerability – Summary for Policymakers.* Pp.4-8

[17] Congressional Research Service. 2007. *Climate Change: Federal Expenditures.* (January 22, 2007). Summary

[18] Congressional Research Service. 2007. *Climate Change: Federal Expenditures.* (January 22, 2007). Summary

[19] Congressional Research Service. 2007. *Climate Change: Federal Expenditures.* (January 22, 2007). Summary

- Climate Change Science Program (CCSP): includes the Global Change Research Program (GCRP) and the Climate Change Research Initiative (CCRI);
- Climate Change Technology Program (CCTP): includes the National Climate Change Technology Initiative (CCTP is also included in the Advanced Energy Initiative);
- International assistance: includes the Asia-Pacific Partnership;
- Tax provisions or incentives that "may" reduce greenhouse gas emissions.[20]

There is currently no statutory or regulatory regime to explicitly limit greenhouse gas reductions. The current administration heavily relies on voluntary initiatives (in which individuals or companies voluntarily engage in a desired activity, in lieu of government regulation) to reduce the growth of greenhouse gas emissions.[21] The Administration's 2002 Climate Action Report lists more than 50 Federal Government programs to deal with emissions and climate change.[22] Of these, only six can be described as "regulatory" - the rest are voluntary.[23] The "regulatory" programs were not, however, enacted to explicitly deal with climate change or greenhouse gas emission reduction – but are rather energy efficiency or air quality initiatives.[24] Compared to the voluntary programs, the six listed 'regulatory' programs have been more effective at reducing emissions over the previous decade.[25]

In 2002, the Administration did announce its Global Climate Change Initiative. A major element of this program was not to reduce total emissions – but only the rate of increase of emissions (referred to by the Administration as emissions intensity.) Because of improvements in technology, and market-driven moves towards efficiency emissions reduction is expected in the absence of any formal or explicit action to reduce emissions. While the Administration announced an intention for the nation to voluntarily reduce emissions intensity by 18 percent, 14 percent of that was expected to occur anyway. In essence, then, the Administration's Global Climate Change Initiative, was expected to only lower emissions intensity by 4 percent above what would have occurred anyway. The Government Accountability Office, however, "did not find a specific basis or rationale for the Administration's decision to establish a 4-percentage-point reduction goal beyond the already expected reductions."[26]

Department of Transportation

The Subcommittee on Highways and Transit has jurisdiction over the Federal Highway Administration and the Federal Transit Administration. Both administrations oversee a number of

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[20] Congressional Research Service. 2007. *Climate Change: Federal Expenditures.* (January 22, 2007). Summary
[21] Congressional Research Service. 2007. *Climate Change: Federal Laws and Policies Related to Greenhouse Gas Reductions.* (January 8, 2007). Summary
[22] Congressional Research Service. 2007. *Climate Change: Federal Laws and Policies Related to Greenhouse Gas Reductions.* (January 8, 2007). Summary
[23] Congressional Research Service. 2007. *Climate Change: Federal Laws and Policies Related to Greenhouse Gas Reductions.* (January 8, 2007). Summary
[24] Congressional Research Service. 2007. *Climate Change: Federal Laws and Policies Related to Greenhouse Gas Reductions.* (January 8, 2007). Summary
[25] Congressional Research Service. 2007. *Climate Change: Federal Laws and Policies Related to Greenhouse Gas Reductions.* (January 8, 2007). Summary
[26] Government Accountability Office. 2003. *Preliminary Observations on the Administration's February 2002 Climate Initiative.* (October 1 2003) GAO-04-131T

programs pertinent to energy conservation efforts. The Subcommittee on Aviation has jurisdiction over the Federal Aviation Administration.

The Federal Highway Administration (FHWA)—Since the 1950s, vehicle exhaust fumes have been recognized as a major contributor to air pollution in urban areas. There are a number of programs in place to tie transportation decision–making to air quality, as well as programs to reduce vehicle emissions and encourage alternative forms of transportation.

Transportation Conformity—The Clean Air Act Amendments of 1990 and the Intermodal Transportation Efficiency Act of 1991 (ISTEA) established a close linkage between clean air goals and transportation investments. This linkage has been retained in subsequent surface transportation reauthorizations. The Clean Air Act requires that, in areas experiencing air quality problems, transportation planning must be consistent with air quality goals. This requirement is enforced through the transportation conformity process. Where air quality goals are not being met, sanctions on highway program funds may be imposed under the Clean Air Act as an incentive for areas to comply with air quality planning requirements.

Congestion Mitigation Air Quality Program—The Congestion Mitigation and Air Quality Improvement Program (CMAQ) provides funding for projects that contribute to air quality improvements and reduce congestion. It provides funds to State DOTs, MPOs, and transit agencies to invest in projects that reduce emissions from transportation-related sources.

Eligible uses of CMAQ funds include: public transportation improvements, traffic flow improvements, transportation demand management, bicycle and pedestrian projects, alternative fuel projects, inspection and maintenance programs, intermodal freight transportation, public education and outreach, idle reduction technology, intelligent transportation systems, diesel retrofits for on-road motor vehicles and for non-road engines used in highway construction projects, purchase of integrated, interoperable emergency communications equipment, and advanced truck stop electrification. Construction of additional highway capacity, other than construction of high-occupancy vehicle lanes, is not an eligible of CMAQ funds.

The FHWA recently published Interim Guidance that would deny transit agencies the flexibility to use CMAQ funds for the first three years of operating costs for new transit projects. This proposed change goes well beyond Congressional intent, and deprives local communities of a resource in their effort to reduce traffic congestion and air pollution.

Bicycle and Pedestrian Programs—The FHWA also provides resources for a number of programs that promote alternative transportation modes, such as bicycling and walking. These programs include:

- The Safe Routes to School program, which provides funding for infrastructure projects and educational programs that make it easier and safer for kids to walk or bike to school;
- The Nonmotorized Transportation Pilot Program, which establishes pilots in four communities to demonstrate the extent to which walking and bicycling can carry a significant portion of the transportation load;
- The Recreational Trails Program, which provides funding for a variety of trails, and mandates that at least 30 percent of the funds be used for nonmotorized trails;
- The Transportation Enhancements Program, of which a significant portion of the funding is used to create bicycle and pedestrian trails;

- The full-time Bicycle and Pedestrian Coordinator, required in each state, who is in charge of facilitating the increased use of nonmotorized transportation.

The Federal Transit Administration (FTA)—The FTA administers federal funding to support a variety of locally planned, constructed, and operated public transportation systems throughout the U.S. These systems provide an effective means of increasing mobility and relieving congestion. According to the American Public Transportation Association, more than 10 billion passengers used public transportation last year, the highest level since 1957.

In the President's Fiscal Year 2008 budget, the Administration proposed a $300 million reduction from the SAFETEA–LU guaranteed funding level for the FTA's highly competitive Capital Investment Grants program. This proposed reduction could delay the implementation of many important transit projects around the country, and ignores the significant pipeline of New Start projects seeking funding.

Within the proposed $300 million reduction from Capital Investment Grants, $100 million would be cut from the new Small Starts program, which is authorized in SAFETEA–LU for $200 million a year for each of fiscal years 2007, 2008 and 2009. The FTA has yet to issue final regulations for this new program, which is designed to assist communities in constructing lower cost fixed guideway transit services.

DOT's Congestion Initiative— In May 2006, the U.S. Department of Transportation announced an initiative to reduce congestion on the nation's transportation system. This plan was designed to provide Federal, State, and local officials tools to reverse congestion.

The Administration's budget proposes $175 million for this new congestion reduction initiative. Included within this total is $100 million for Urban Partnership Agreements, under which DOT proposes to make these funds available to a select number of large-scale pilot projects, based on their willingness to implement a comprehensive congestion reduction strategy. That strategy would include demonstration of some form of congestion pricing, commuter transit services, commitments from employers to expand work schedule flexibility, and faster deployment of real-time traffic information. The remaining $75 million will be divided equally among three programs: Corridors of the Future program, which enables the Secretary to target a small number of projects that show they can help expand capacity and improve operations along heavily congested interstate travel and trade corridors; Real-Time System Management Information Programs; and $425 million to expand congestion-related research activities under the Intelligent Transportation Systems Research and Development program.

In addition, the Department's congestion initiative attempts to "reduce or remove barriers to private sector investment in the construction, ownership, and operation of transportation infrastructure."

The Subcommittee on Railroads, Pipelines, and Hazardous Materials has jurisdiction over the Federal Railroad Administration (FRA) and the Pipeline and Hazardous Materials Administration (PHMSA). Both agencies oversee a limited number of programs pertinent to energy conservation efforts.

Freight Rail. In the past 26 years, railroads have made enormous fuel efficiency gains. In 2006, one gallon of diesel moved one ton of freight an average of 414 miles, the approximate distance from Washington, DC to Boston, MA. This is a 76 percent improvement since 1980, when one gallon of diesel fuel moved one ton of freight an average of 235 miles. The Association of American Railroads (AAR) attributes the increased fuel efficiency to new, high horsepower locomotives, improved information technology systems, reduced idling, and new locomotive crew training programs.

Railroads are also investing in new technologies for additional fuel efficiency and emissions reductions. For example, General Electric will soon unveil the world's first 4,400 horsepower mainline hybrid locomotive that will be capable of capturing energy dissipated during braking and store it in a series of sophisticated batteries. That stored energy can be used by the crew on demand—reducing fuel consumption by as much as 15 percent and emissions by as much as 50 percent compared to most of the freight locomotives in use today.

Railroads significantly reduce highway congestion. A single intermodal train can take up to 280 trucks (the equivalent of more than 1,100 cars) off our highways. The American Association of State Highway and Transportation Officials (AASHTO) found that if one percent of the long-haul freight that currently moves by truck in the U.S. moved by rail, fuel savings would be approximately 110 million gallons per year and annual GHG emissions would fall by some 1.3 million tons. If 10 percent of long-haul freight now moving by truck moved by rail instead, annual GHG emissions would fall by nearly 13 million tons.

Passenger Rail. Passenger rail can significantly help reduce congestion, GHG emissions, and energy consumption. The Texas Transportation Institute estimates the annual cost of highway congestion in the U.S. is $63 billion for wasted time (3.7 billion hours) and wasted fuel (2.3 billion gallons) sitting in traffic. According to the Department of Energy's *Transportation Energy Data Book,* one full passenger train can take 250-350 cars off the road, for a GHG savings of 1,900-2,600 tons per year. If the passenger train's fuel included 10 percent biodiesel, the GHG savings would be 3,000-4,100 tons per year. Passenger rail also consumes less energy, with automobiles' energy intensity at 3,549 British Thermal Units (BTUs) compared to 2,751 BTUs for passenger rail.

The benefits of passenger rail can also be extended to congestion in the skies. According to the *Transportation Energy Data Bank,* commercial airlines consume 3,587 BTUs versus 2,751 BTUs for commuter rail or 2,935 BTUs for corridor trains. According to AASHTO, passenger rail is competitive with air travel for distances of 500 miles or less. Over 80 percent of all trips exceeding 100 miles in length are less than 500 miles.

The Pipeline and Hazardous Materials Safety Administration— PHMSA is the federal agency charged with the safe and secure movement of almost one million daily shipments of hazardous materials by all modes of transportation. The agency also overseas the nation's 2.2 million miles of gas and hazardous liquid pipelines, which account for 64 percent of the energy commodities consumed in the United States.

Pipelines are important tools to improve energy efficiency. For example, the City of Tampa Bay, Florida is currently constructing a pipeline to deliver jet fuel from the Port of Tampa Bay to the Tampa Bay airport. When completed, the pipeline would take 157 trucks off the road daily.

PHMSA is working on a number of projects to improve energy independence. For example, it is collaborating with the U.S. Department of Agriculture to develop standards to improve the design, construction, and testing of pipelines and high pressure containers carrying ethanol and hydrogen fuels.

It is also working to develop new standards to increase energy efficiency, including standards to increase the maximum operating pressure for certain gas transmission pipelines to improve gas supply and reliability. This will result in more efficient energy delivery, and also help to lower the delivery's cost.

The Federal Aviation Administration—The Federal Aviation Administration's prime mission is to ensure the safe operation of the aviation system. The FAA forecasts that airlines are expected to carry more than 1 billion passengers by 2015, increasing from approximately 744 million in 2006. As demand for aviation services continues to grow, so too does aviation's impact on the environment.

The FAA's preliminary computations by the Agency's Joint Planning Development Office show that aviation noise and emissions are likely to increase by 140-200 percent under future aviation growth scenarios unless aggressive actions are taken to control and reduce aviation's environmental footprint. Historically, most of the substantial aviation environmental gains have come from new technologies. The FAA's goal is to have a fleet of quieter, cleaner aircraft that operate more efficiently with less energy. The FAA states that solutions that involve technology improvements in engines and airframes in a foreseeable timeframe require successful maturation and certification of new technologies within the next 5-8 years.

The Administration's FAA reauthorization proposal includes two new environmental programs. The first program would allow the FAA to fund six projects at public-use airports that would take promising environmental research concepts that have been proven in the laboratory into the actual airport environment for demonstration. Eligible projects would demonstrate whether research would measurably reduce or mitigate aviation impacts on noise, air quality or water quality in the airport environment. The second program would direct the FAA to enter into a cooperative agreement with the Partnership for Air Transportation Noise and Emissions Reduction (PARTNER) Center of Excellence to form a research consortium for the development, maturing and certification for continuous lower energy, emissions and noise (CLEEN) engine and airframe technology. The consortium's work is to be carried out over the next decade and have performance objectives for aircraft fuel efficiency, nitrous oxide emissions from aircraft engines, aircraft noise, alternative fuels, and retrofit technologies.

U.S. Environmental Protection Agency

The Environmental Protection Agency (EPA) climate change programs largely rely on voluntary initiatives to reduce greenhouse gas intensity, spur new investments, and remove barriers to the introduction of cleaner technologies. The EPA does not have explicit regulatory programs to lower greenhouse gas emissions. It is involved with other agencies (like the Department of Energy) in producing rules to require the use of a given percentage of renewable fuels, pursuant to the Energy Policy Act of 2005. In addition to these activities, EPA has a long-term global change research program. This research is coordinated through the CCSP and focuses on understanding

the effects of climate change on air and water quality, ecosystems, and human health in the United States.

EPA has voluntary programs to reduce emissions and promote energy efficiency in the transportation arena (the SmartWay Transport Partnership), to promote energy efficiency (Energy Star), and greenhouse gas reduction (Climate Leaders.) Climate Leaders is an EPA voluntary partnership that encourages individuals and other organizations to develop long-term, comprehensive climate change strategies. This is one of EPA's pre-eminent climate change programs. The Government Accountability Office (GAO) has criticized the Climate Leaders program. Chief amongst these criticisms was that "EPA and DOE expect participants in their voluntary emissions reduction programs to complete a number of actions; however, participants' progress toward completing those actions, as well as the agencies' efforts to track accomplishments, has varied."[27] In other words, EPA (and the Department of Energy for its corresponding program) has not been able to effectively show results. In addition, while companies had joined the program, GAO found that not all of them had even set performance goals for themselves, nor were many companies enrolled in the program.[28]

General Services Administration

The Public Building Service (PBS) within the General Services Administration provides workplaces for the federal workforce of over a million federal employees. PBS is the largest real estate organization in the country, with an inventory of over 342 million square feet of workspace for federal workers. PBS holds title to about 1,500 governments owned buildings and acquires space through either leasing or new construction. PBS also repairs, alters, and renovates existing facilities.

The Energy Center of Expertise is an office within the PBS. The Center reduces federal utility costs by encouraging energy efficiency and reduced energy use. PBS's client agencies expect that the energy center will negotiate utility contracts that are both cost –effective and environmentally responsible. The energy center procures electricity, natural gas, water, and sewage services. According to the energy center their new program, the Natural Gas Program, is a program that specializes in providing natural gas to federal facilities, along with supply management. The energy and water management program monitors the utility use and cost data in all GSA buildings nationwide. The total annual cost of this program is approximately $250,000,000.

The Federal Government is the Nation's single largest energy user, and as such should lead by example. In January 2007, President Bush signed Executive Order 13423 which requires federal agencies to reduce greenhouse gas emissions through a reduction in energy intensity of 3 percent a year or 30 percent by the end of fiscal year 2015 (compares with 2 percent per year and 20 percent overall from EPA 2005). Federal Energy Management Program provides several project planning resources for both existing buildings and new construction.

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[27] Government Accountability Office. 2006. *EPA and DOE Should Do More to Encourage Progress Under Two Voluntary Programs.* (April 2006) GAO-06-97

[28] "As of November 2005, 38 of the 74 firms had established goals, while most of the other 36 firms, including 13 that joined in 2002, were still working to establish goals; most of the remaining firms had joined the program recently and had not yet established goals." Government Accountability Office. 2006. *EPA and DOE Should Do More to Encourage Progress Under Two Voluntary Programs.* (April 2006) GAO-06-97. p.3

Army Corps of Engineers – Civil Works

The United States Army Corps of Engineers, the largest engineering organization in the world, provides engineering and related support for the country in four areas: military construction and support, engineering research and development, support to government agencies, and water and natural resources management. The corps is responsible for the development, management, and maintenance of the nation's water resources. The corps does not collect or interpret scientific information related to climatology; rather, it utilizes information provided by other entities, such as NOAA, USGS, and NASA.

Hurricanes Katrina and Rita highlighted the need for the corps to adapt its development and management of water resources to variances in climate and the possibility of large-scale natural disasters. To that end, the corps designated the following responsibilities to address outstanding issues in water management projects: coping with droughts and floods due to changing precipitation patterns, evaluating the implications of changes in hurricane frequency or intensity along coasts, addressing fluctuating need and values by balancing water allocation among competing users, reducing vulnerability of ecosystems to stream flow and wetlands maintenance and growth, and progressing towards holistic, integrated planning and management of river basins and watersheds.

While the Corps may be moving towards improving its responses to climate change in some areas, it is not clear whether it incorporates modern climate science principles and findings into its planning, construction, and operation of water-resource projects.

Legislative Branch Climate and Energy Independence Policies

Office of the Architect of the Capitol

The Architect of the Capitol is responsible to the United States Congress for the maintenance, operation, development, and preservation of the United States Capitol Complex, which includes the Capitol, the congressional office buildings, the Library of Congress buildings, the Supreme Court building, the U.S. Botanic Garden, the Capitol Power Plant, and other facilities.

The Office of the Architect of the Capitol has implemented a number of projects, is conducting audits and studies, and has plans to save energy and increase efficiencies in operation of the legislative operating complex. The Architect of the Capitol, in accordance with requirements under the Energy Policy Act of 2005, reduced energy consumption by 6.5 percent in FY2006, against a baseline set in FY2003.

To achieve these energy reductions the Architect of the Capitol has installed lower energy lighting systems, low-flow water devices, more efficient heating and cooling equipment, purchased only Energy Star appliances and equipment, among other measures.

The Architect of the Capitol has also undertaken a number of energy audits. The Government Accountability Office advocates use of energy audits because they "identify cost-effective systemwide energy-efficiency and renewable-energy projects."

The Architect of the Capitol states that it will continue seeking to promote energy-efficiency practices and implementing energy reduction measures by implementing such programs as:

potentially installing either a green or solar roof over the Rayburn House Office Building; purchasing Green Energy from energy retailers such as Pepco Energy Services; improve energy and water metering to accurately measure usage rather than estimating it; continue analyses for reduced energy consumption.

The Architect of the Capitol also operates the Capitol Power Plant. It is used to generate steam and chilled water used for heating and cooling of the 23 building located in the legislative complex. It does not produce electricity. Electricity is purchased from Pepco. The Architect of the Capitol states that the power plant uses three fuels: coal (49 percent), natural gas (43 percent), and fuel oil (8 percent). In his testimony for the May 11, 2007 hearing, the Architect of the Capitol states that "Fuel selection is made based on a combination of economics and equipment availability." The Washington Post has reported that in 2000 the Architect of the Capitol took steps to remove coal from the fuel mix. However, senatorial preferences resulted in coal remaining as the predominant fuel used by the Capitol Power Plant.[29] The Architect of the Capitol states that air quality improvements have been made and will continue to be made.

Office of the Chief Administrative Officer

The Office of the Chief Administrative Officer (CAO) provides operations support services and business solutions to the U.S. House of Representatives in a variety of areas, including information technology, finance, budget management, human resources, payroll, child care, food and vending, procurement, logistics and administrative counsel.

In March, 2007 the Office of the Chief Administrative Officer of the U.S. House of Representatives was directed by the House leadership to take steps to reduce the environmental impacts associated with operation of the House building complex. The Chief Administrative Officer reviewed operating procedures based on energy conservation, sustainability, and other related matters.

The Chief Administrative Officer determined that the House complex was responsible for approximately 91,000 tons of greenhouse gas emissions during FY2006. Electricity use was the largest source of emissions. Fuel for the House complex came from a variety of sources including coal, nuclear, natural gas, renewables, and fuel oil.

Following this analysis of the House complex energy usage, the Chief Administrative Officer is implementing the following recommendations:

1. Operate the House in a carbon neutral manner;
2. Shift to 100 percent renewable electric power;
3. Aggressively improve energy efficiency;
4. Adopt sustainable business practices;
5. Continued leadership on sustainability issues;
6. Offset to ensure carbon neutral operations.

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[29] Washington Post. 2007. "Reliance on Coal Sullies 'Green the Capitol' Effort." (21 April 2007) http://www.washingtonpost.com/wp-dyn/content/article/2007/04/20/AR2007042002128.html (accessed 10 May 2007)

WITNESSES

PANEL I

The Honorable Mary E. Peters
Secretary of Transportation
U.S. Department of Transportation

The Honorable Stephen Johnson
Administrator
U.S. Environmental Protection Agency

The Honorable John Paul Woodley, Jr.
Assistant Secretary of the Army for Civil Works
Department of the Army

The Honorable Lurita Alexis Doan
Administrator
U.S. General Services Administration

PANEL II

Mr. Stephen T. Ayers, AIA
Acting Architect of the Capitol and
Deputy Architect/Chief Operating Officer
United States Congress

Mr. Daniel P. Beard
Chief Administrative Officer
U.S. House of Representatives

U.S. House of Representatives
Committee on Transportation and Infrastructure

James L. Oberstar
Chairman

David Heymsfeld, Chief of Staff
Ward W. McCarragher, Chief Counsel

Washington, DC 20515

John L. Mica
Ranking Republican Member

James W. Coon II, Republican Chief of Staff

May 14, 2007

SUMMARY OF SUBJECT MATTER

TO: Members of the Committee on Transportation and Infrastructure

FROM: Committee on Transportation and Infrastructure Staff

SUBJECT: Hearing on 'Climate Change and Energy Independence: Transportation and Infrastructure Issues'

PURPOSE OF HEARING

On Wednesday, May 16, 2007, at 11:00 a.m., in Room 2167 Rayburn House Office Building, the Committee on Transportation and Infrastructure will receive testimony from witnesses testifying on climate change and energy independence issues for surface transportation, public buildings, aviation, and water resources and maritime transportation.

BACKGROUND

This memorandum summarizes climate and energy independence issues in surface transportation, public buildings, aviation, and water resources and infrastructure. The Committee on Transportation and Infrastructure held a hearing on Administration proposals on climate change and energy independence on May 11, 2007. An appendix at the end of this memorandum briefly summarizes climate change and its potential impacts.

Climate Change and Energy Independence Issues for Surface Transportation

According to the Environmental Protection Agency, 27.7 percent of the total greenhouse gas emissions produced by the U.S. come from the transportation sector, second only to electricity generation.

Highway and Transit

Federal Highway Administration (FHWA)

There are a number of programs in place to tie transportation decision–making to air quality, as well as programs to reduce vehicle emissions and encourage alternative forms of transportation.

Transportation Conformity—The Clean Air Act Amendments of 1990 and the Intermodal Transportation Efficiency Act of 1991 (ISTEA) established a close linkage between clean air goals and transportation investments. This linkage has been retained in subsequent surface transportation reauthorizations. The Clean Air Act requires that, in areas experiencing air quality problems, transportation planning must be consistent with air quality goals. This is determined through the transportation conformity process. Where air quality goals are not being met, sanctions on highway program funds may be imposed under the Clean Air Act as an incentive for areas to comply with air quality planning requirements.

Congestion Mitigation Air Quality Program—The Congestion Mitigation and Air Quality Improvement Program (CMAQ) provides funding for projects that contribute to air quality improvements and reduce congestion. It provides funds to State DOTs and MPOs to invest in projects that reduce emissions from transportation-related sources. In addition, CMAQ funding is often "flexed" to transit agencies to fund public transportation projects.

Eligible uses of CMAQ funds include: public transportation improvements, traffic flow improvements, transportation demand management, bicycle and pedestrian projects, alternative fuel projects, inspection and maintenance programs, intermodal freight transportation, public education and outreach, idle reduction technology, intelligent transportation systems, diesel retrofits for on-road motor vehicles and for non-road engines used in highway construction projects, purchase of integrated, interoperable emergency communications equipment, and advanced truck stop electrification. Construction of additional highway capacity, other than construction of high-occupancy vehicle lanes, is not eligible for CMAQ funds.

Transportation Enhancements—Transportation Enhancements (TE) provide funding opportunities to help expand transportation choices and enhance the transportation experience, including pedestrian and bicycle infrastructure and safety programs, scenic and historic highway programs, landscaping and scenic beautification, historic preservation, and environmental mitigation.

Nomotorized Transportation Programs—Nonmotorized forms of transportation, such as walking or riding a bike, are inexpensive, widely practicable, and present a simple way for people to get from place to place in an environmentally friendly manner. Several federal programs are helping to encourage Americans to incorporate nonmotorized forms of transportation into their daily lives.

Nonmotorized Transportation Pilot Program—Section 1807 of SAFETEA-LU provides $25 million over four years for each of the four participating communities: Columbia, Missouri; Marin County, California; Minneapolis, Minnesota; and Sheboygan, Wisconsin. Each of the four communities is working to create a nonmotorized transportation network, consisting of sidewalks, lanes, and pedestrian and bicycle trails that connect with transit stations, schools, residences, businesses, and community centers. The goal of this program is demonstrate the extent to which walking and bicycling can represent a significant portion of the transportation mode share, particularly when infrastructure is designed to make nonmotorized transportation easy and safe. The data resulting from this pilot will help to quantify the potential for mode shift.

The Safe Routes to School program—Established under section 1404 of SAFETEA-LU, this program provides $612 million over four years for the states to establish programs to encourage kids to walk and bike to school. Each state receives a minimum of $1 million, with remaining funds being awarded on the basis of student involvement. Funds can be used for a variety of infrastructure and educational purposes, including sidewalks, traffic calming, bicycle parking, traffic crossing improvements, public awareness campaigns, and student training in bicycle and pedestrian safety. The program requires states to appoint a full-time Safe Routes to School coordinator to oversee their state's program, and created a national clearinghouse to allow states to share information and successful strategies. By encouraging walking and biking to school, the program strives to create new, environmentally-friendly habits that today's children will learn and pass along to future generations.

Conserve by Bicycling program—This program, included in the 2005 Energy Policy Act, was authorized but never funded. If provided with the authorized level of funding, the program would make available $6.2 million to create pilot projects in 10 communities throughout the U.S. Communities involved would use education and outreach to convert motor vehicle trips to bicycle trips. The program also would require each community to document energy savings achieved as a result of the program, and instructs the Secretary to work with the National Academy of Sciences to create an Energy and Bicycling Research Study. Currently there is a significant lack of data on the prevalence and impacts of nonmotorized forms of transportation; this program represents a strong step in creating data sets that would allow transportation officials to more accurately gauge the effects that bicycling as opposed to driving can have on the environment.

Federal Transit Administration (FTA)

The FTA administers federal funding to support a variety of locally planned, constructed, and operated public transportation systems throughout these systems. FTA assists communities in supporting public transportation by issuing grants to eligible recipients for planning, vehicle purchases, facility construction, operations, and other purposes.

Public transportation use conserves energy, reduces oil dependence and improves air quality. According to the American Public Transportation Association:

- Current transit use reduces U.S. petroleum consumption by a total of 1.4 billion gallons of gasoline annually compared to single occupancy automobile use.
- If Americans rode transit at the rate of 10 percent of daily travel, the U.S. would reduce its dependence on oil imported from the Persian Gulf by more than 40 percent.
- Transit agencies are subject to regulations regarding emissions, scrap tires, vehicle air-conditioning systems, stormwater runoff from facilities, and hazardous waste management.
- Public transportation reduces pollution by producing 95 percent less carbon monoxide, more than 92 percent fewer volatile organic compounds (VOCs) ad nearly half as much carbon dioxide and nitrogen oxides (NOx) for every passenger mile traveled as compared to traveling with private vehicles.
- Public transportation reduces annual emissions for pollutants that create smog, VOCs and NOx, by more than 70,000 tons and 27,000 tons respectively compared to single occupancy automobile use.

- Most rail transit vehicles emit little or no pollution because they are electrically propelled.
- Most buses, ferryboats and commuter rail locomotives increasingly use cleaner alternative fuels.

Transit Capital Investment Programs—The transit capital investment program provides capital assistance for three primary activities: new and replacement buses and facilities, modernization of existing rail systems, and new fixed guideway systems (New Starts). These systems provide local communities an effective means of increasing mobility and relieving congestion. According to the American Public Transportation Association, over 10 billion passengers used public transportation last year, the highest level since 1957.

Clean Fuels Grant program and the National Fuel Cell Bus Technology Development Program (NFCBTP)—These programs offer incentives for increasing alternative fuels use in the transit program. Both programs provide grant funds for capital costs, and NFCBTP also addresses certain operating costs, technical issues, and institutional issues for fuel cell vehicles. Clean fuel or alternative fuel vehicle-related equipment or facilities acquired under the grant programs currently have a 90 percent federal share of the net project cost.

Railroads

Railroads emitted 2.5 percent of the transportation sector's emissions total.

Freight Rail

In the past 26 years, railroads have made enormous fuel efficiency gains. In 2006, one gallon of diesel moved one ton of freight an average of 423 miles, the approximate distance from Washington, D.C., to Boston, Massachusetts. This is a 80 percent improvement since 1980, when one gallon of diesel fuel moved one ton of freight an average of 235 miles. The Association of American Railroads (AAR) attributes the increased fuel efficiency to new, high horsepower locomotives, improved information technology systems, reduced idling, and new locomotive crew training programs.

Railroads are also investing in new technologies for additional fuel efficiency and emissions reductions. For example, General Electric will soon unveil the world's first 4,400 horsepower mainline hybrid locomotive that will be capable of capturing energy dissipated during braking and store it in a series of sophisticated batteries. That stored energy can be used by the crew on demand—reducing fuel consumption by as much as 15 percent and emissions by as much as 50 percent compared to most of the freight locomotives in use today.

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In the 2005 Energy Policy Act, Congress authorized $65 million in funding to develop a public-private research partnership to demonstrate railroad locomotive technologies that increase fuel economy, reduce emissions, and lower costs of operation.

Passenger Rail

Passenger rail can significantly help reduce congestion, GHG emissions, and energy consumption. The Texas Transportation Institute estimates the annual cost of highway congestion in the U.S. is $63 billion for wasted time (3.7 billion hours) and wasted fuel (2.3 billion gallons) sitting in traffic. According to the Department of Energy's *Transportation Energy Data Book*, one full passenger train can take 250-350 cars off the road, for a GHG savings of 1,900-2,600 tons per year. If the passenger train's fuel included 10 percent biodiesel, the GHG savings would be 3,000-4,100 tons per year. Passenger rail also consumes less energy, with automobiles' energy intensity at 3,549 British Thermal Units (BTUs) compared to 2,751 BTUs for passenger rail.

The benefits of passenger rail can also be extended to congestion in the skies. According to the *Transportation Energy Data Bank*, commercial airlines consume 3,587 BTUs versus 2,751 BTUs for commuter rail or 2,935 BTUs for corridor trains. According to AASHTO, passenger rail is competitive with air travel for distances of 500 miles or less. Over 80 percent of all trips exceeding 100 miles in length are less than 500 miles.

Climate Change and Energy Independence Issues for Public Buildings

The General Services Administration (GSA) is the central management agency of the Federal Government. GSA was created in 1949, after the Hoover Commission recommended a central management entity for Federal personal and real property activities, telecommunications, and automatic data processing equipment. GSA owns more than 1,600 Federal buildings totaling 181 million square feet of space, which provide office space for 470,000 Federal workers. GSA leases 166 million square feet of space in 7,300 leased properties, which provides office space for 590,000 Federal workers. It also provides space in Federal buildings for child-care and telecommuting. The inventory ranges from 2,500-square-foot border crossing stations along the northern border, to million square foot courthouses located in major metropolitan areas.

GSA is required by both executive order and statute to reduce energy consumption in buildings under its custody and control, such as office buildings, warehouses, laboratories, and courthouses. GSA invests in energy retrofit projects as well as incorporating energy management into its business plans for construction and modernization projects for federally owned buildings.

The Architect of the Capitol is responsible to the United States Congress for the maintenance, operation, development, and preservation of the United States Capitol Complex, which includes the Capitol, the congressional office buildings, the Library of Congress buildings, the Supreme Court building, the U.S. Botanic Garden, the Capitol Power Plant, and other facilities. The Subcommittee has jurisdiction over construction and repair and alteration projects of the Architect of the Capitol (AOC).

Although the General Services Administration has a robust energy conservation program, the Subcommittee continues to monitor the design, construction, and repair and alteration practices

of the Public Building Service to ensure the latest energy conservation technologies and design plans are effectively incorporated into the overall building program.

Climate Change and Energy Independence Issues for Aviation

As demand for aviation services continues to grow, so too does aviation's impact on the environment. The Federal Aviation Administration (FAA) forecasts that airlines are expected to carry more than one billion passengers by 2015, increasing from approximately 744 million in 2006. At the same time, fuel costs are rising, causing air carriers to actively search for increased fuel efficiencies, which may have positive impacts on the environment. Fuel costs are also driving air carriers, airports and manufacturers to look at innovations in alternative fuels. In addition, many airports are trying to increase capacity while mitigating environmental impacts on the local communities they serve.

Climate Change and Energy Independence Issues for Water Resources and Maritime Transportation

Climate change could negatively impact water resources as well as water infrastructure. The U.S. government's interagency climate research program, the U.S. Global Change Research Program, has stated:

> In many cases and in many locations, there is compelling scientific evidence that climate changes will pose serious challenges to our water systems.

Increased evaporation of surface water and decreased precipitation in some areas can lead to drought in some areas, as well as higher concentration of contaminants in surface water. Increased precipitation and extreme weather events can lead to increased runoff and contamination of surface water as well as an increase in water-borne disease outbreaks. A 2001 study in the *American Journal of Public Health* showed that between 1948 and 1994, 68 percent of all waterborne-disease outbreaks in the U.S. occurred after rainfall events that ranked in the top 20 percent of all precipitation events by the amount of water deposited. Climate change is anticipated to result in a higher frequency of extreme wet weather events in some areas. Sea level rise will result in increased saltwater intrusion into coastal aquifers and water supply intakes in rivers. Warmer water temperatures can result in increased microbial and algal growth in surface water and water distribution systems. Warmer winter temperatures and earlier springs can result in decreased snow-pack and earlier runoff from snow melt. Uncertainty does exist as to the specific location, timing, and magnitude of these anticipated impacts.

Design features for water infrastructure such as sewage systems, wastewater treatment facilities, drinking water facilities, ports, levees, and dams should take into account potential climate change impacts such as changes in temperature, temperature ranges, level and frequency of precipitation, coastal water levels, frequency and magnitude of storm surges, and wind speed. These changes could potentially create different stresses on infrastructure design than traditional or original designs.

The Subcommittee on Water Resources and Environment has fewer areas that fall under its jurisdiction that emit greenhouse gases than other Committee on Transportation and Infrastructure

subcommittees. As a result, where other subcommittees are considering mitigation efforts to reduce energy expenditures and greenhouse gas emissions, the Water Resources and Environment Subcommittee will focus on adaptation actions to address climate change impacts. Adaptation actions can help to reduce the severity and costs of climate change impacts, and can be viewed as risk-management strategies that can complement mitigation efforts. Among the areas that can be adapted to reduce climate change impacts are coastal zoning, land-use planning, building codes, and water infrastructure design (dams, wastewater treatment facilities, sewer infrastructure.)

The Subcommittee on Water Resources and Environment has jurisdictional authority over the processes used by wastewater treatment facilities. A by-product of these processes is methane gas – a greenhouse gas emission. The Subcommittee can explore whether incentives or controls over these emissions are prudent.

The Subcommittee on Coast Guard and Maritime Transportation has opportunities for mitigation and adaptation actions. Vessels and port facilities fall under its jurisdiction. In addition, adapting port infrastructure to better handle stresses (sea level rise, storm surges, changed storm frequency and magnitude) from climate change impacts can also fall under its purview.

WITNESSES

PANEL 1 – SURFACE TRANSPORTATION

Mr. Jonathan Lash
President
World Resources Institute

Mr. William W. Millar
President
American Public Transportation Association

Mr. Edward Hamberger
President
Association of American Railroads

Mr. Andy D. Clarke
League of American Bicyclists
Executive Director

Mr. Edward Hall
General Manager of Engine Technology
General Electric

Mr. Tom Rader
President
Colorado Railcar

Mr. Greg Cohen
President & CEO
American Highway Users Alliance

PANEL 2 – PUBLIC BUILDINGS

Mr. R.K. Stewart, FAIA
President
The American Institute of Architects

Mr. William Prindle
Executive Director
American Council for an Energy Efficient Economy

Mr. Jeff Harris
VP for Programs
Alliance to Save Energy

xxx

Mr. Chris O'Brien
Chairman
Solar Energy Industries Association

PANEL 3 – AVIATION

Mr. Jim May
President and CEO
Air Transport Association

Mr. Greg Principato
President
Airport Council International – North America

Mr. Michael McQuade
Senior VP for Science and Technology
United Technologies Corporation

Mr. Richard L. Altman
Facilitator
Commercial Aircraft Alternate Fuels Initiative Facilitator

PANEL 4 – WATER RESOURCES

Dr. Gerald E. Galloway
President
American Water Resources Association
On behalf of:
Glenn L. Martin Institute Professor of Engineering
University of Maryland

Mr. Brian Richter
Director
Global Freshwater Initiative
The Nature Conservancy

Mr. Alf W. Brandt
Principal Consultant
Committee on Water, Parks & Wildlife
State of California Assembly

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APPENDIX

Climate Change

In February 2007, the Intergovernmental Panel on Climate Change[1] (IPCC) declared that evidence of atmospheric warming is "unequivocal".[2] The IPCC also stated with "very high confidence"[3] that human activities have resulted in global warming. The results of this warming may result – and to a degree may already be resulting – in sea level rise, increased hurricane and storm activity, changed precipitation patterns resulting in more frequent floods and droughts, among other potential impacts.

The IPCC defines climate change as "any change in climate over time, whether due to natural variability or as a result of human activity."[4] While some climate change can occur as a function of natural variability, the IPCC notes that the warming that has occurred, and is expected to continue, is "*very likely* due to an observed increase in anthropogenic greenhouse gas concentrations"[5] which are a result of human activities such as industrial processes, fossil fuel consumption, and changes in land use, such as deforestation.[6]

Current and projected global warming occurs because of the "greenhouse effect." The greenhouse effect is a natural process in which the atmosphere absorbs heat – resulting in a warm and habitable earth. Specifically, visible sunlight passes through the atmosphere without being absorbed. Some of the sunlight that strikes the earth is absorbed and converted to heat, warming the surface. The surface then emits some of this heat back into the atmosphere where it is absorbed by greenhouse gases such as carbon dioxide (CO_2), methane, and nitrous oxides, among others. For the previous 10,000 years, the greenhouse effect has produced an average global temperature of 57 degrees Fahrenheit. The absence of greenhouse gases would result in an inhospitable planet unable to support most life forms with an average temperature well below freezing.

Human activities that emit greenhouse gases to the atmosphere increase the amount of heat that gets absorbed before it could otherwise escape into space. Anthropogenic, or human, emissions of greenhouse gases therefore enhance the natural greenhouse effect and cause global warming.

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[1] Recognizing the problem of potential global climate change, the World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP) established the Intergovernmental Panel on Climate Change (IPCC) in 1988. It is open to all members of the UN and WMO. The role of the IPCC is to assess on a comprehensive, objective, open and transparent basis the scientific, technical and socio-economic information relevant to understanding the scientific basis of risk of human-induced climate change, its potential impacts and options for adaptation and mitigation. The IPCC does not carry out research nor does it monitor climate related data or other relevant parameters. It bases its assessment mainly on peer reviewed and published scientific/technical literature. http://www.ipcc.ch/about/about.htm (accessed 9 May 2007)

[2] IPCC, February 2007. *Climate Change 2007: The Physical Science Basis – Summary for Policymakers.* p.5

[3] The IPCC uses "the following levels of confidence…to express expert judgments on the correctness of the underlying science: *very high confidence* at least a 9 out of 10 chance of being correct; *high confidence* about an 8 out of 10 chance of being correct." IPCC, February 2007. *Climate Change 2007: The Physical Science Basis – Summary for Policymakers.* p.5.; Virtually certain >99% probability of occurrence, Extremely likely>95%, Very likely>90%, Likely>66%... *Climate Change 2007: The Physical Science Basis – Summary for Policymakers.* p.4.

[4] IPCC, February 2007. *Climate Change 2007: The Physical Science Basis – Summary for Policymakers.* p.2

[5] IPCC, February 2007. *Climate Change 2007: The Physical Science Basis – Summary for Policymakers.* p.10

[6] IPCC, February 2007. *Climate Change 2007: The Physical Science Basis – Summary for Policymakers.* p.2

It is without question that global warming has occurred, and is occurring. Average surface temperatures have increased by an estimated 1.4 degrees Fahrenheit between 1900 and 2005. Eleven of the last 12 years (1995-2006) rank among the 12 warmest years of global surface temperature[7] since 1850.[8] Other observations of observed climate change include:[9]

- The IPCC estimates that the total 20th Century sea level rise is 0.17 meters (.55 feet). They have "high confidence" that observed sea level has increased from the 19th to the 20th centuries;
- Average Arctic temperatures have increased at almost twice the global average rate in the past 100 years;
- Satellite data since 1978 shows that annual average Arctic sea ice extent has shrunk by 2.7 percent per decade;
- Temperatures in the Arctic permafrost layer (including areas of Alaska) have increased since the 1980s, and the maximum area covered by seasonally frozen ground has decreased by about 7 percent in the Northern Hemisphere since 1900;
- Precipitation changes have taken place including increased precipitation events in eastern sections of North and South America, northern Europe, and central Asia, and drying or drought events in the Sahel, the Mediterranean, southern Africa, and sections of south Asia;
- Increased frequency of heavy precipitation events over most land areas;
- Increased frequency of high-intensity (category 4 and 5) tropical cyclones (hurricanes) globally since 1970 as a function of increased sea surface temperatures among other factors.

The IPCC reports that:

> *Global atmospheric concentrations of carbon dioxide, methane and nitrous oxide have increased markedly as a result of human activities since 1750 and now far exceed pre-industrial values determined from ice cores spanning many thousands of years. The global increases in carbon dioxide concentration are due primarily to fossil fuel use and land-use change, while those of methane and nitrous oxide are primarily due to agriculture.*[10]

The figures below are from the 2007 IPCC report and show the observed increases in greenhouse gases over time.[11]

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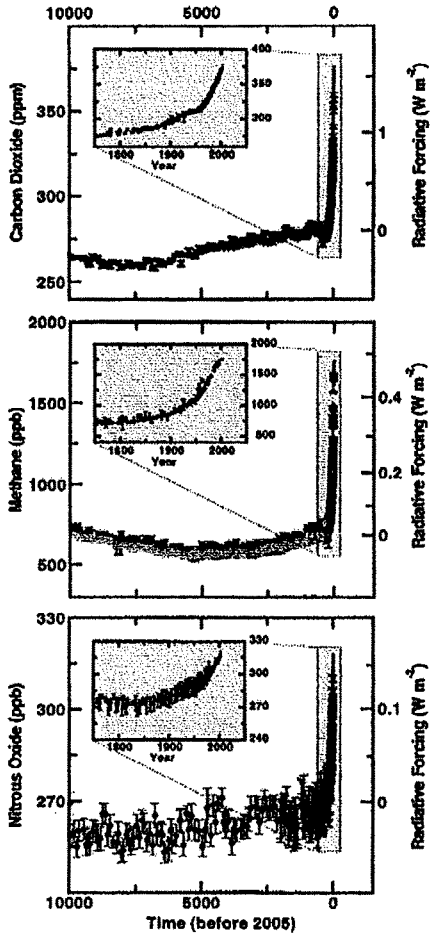
[7] The average of near surface air temperature over land, and sea surface temperature. *Climate Change 2007: The Physical Science Basis – Summary for Policymakers.* p.5

[8] IPCC, February 2007. *Climate Change 2007: The Physical Science Basis – Summary for Policymakers.* p.5

[9] IPCC, February 2007. *Climate Change 2007: The Physical Science Basis – Summary for Policymakers.* pp.7-8; Emanuel, K.A. 2005. "Increasing Destructiveness of Tropical Cyclones Over the Past 30 Years." *Nature.* 436; 686-88; Webster, P.J., et al. 2005. "Changes in Tropical Cyclone Number, Duration, and Intensity in a Warming Environment, Science." *Science.* 309: 1844-46.

[10] IPCC, February 2007. *Climate Change 2007: The Physical Science Basis – Summary for Policymakers.* p.2

[11] IPCC, February 2007. *Climate Change 2007: The Physical Science Basis – Summary for Policymakers.* p.3



While a variety of greenhouse gases play a role in atmospheric warming, carbon dioxide is the most common and "the most important anthropogenic greenhouse gas." Prior to 1800, the beginning of the Industrial Revolution (when fossil fuels, such as coal, began to be used on a wide scale), there were roughly 280 parts per million (ppm) of CO_2 in the atmosphere.[12] In 2005, 379 ppm of CO_2 were measured in the atmosphere. This "concentration of carbon dioxide in 2005 exceeds by far the natural range over the last 650,000 years (180 to 300 ppm) as determined by ice cores." **As a result of these increasing levels, carbon dioxide is attributed to account for approximately 80 percent of all observed global warming.**

Other greenhouse gases do play an important part in observed global warming. Methane had a pre-industrial (pre-1800) value of around 715 ppb in the atmosphere. In 2005 it was measured at a level of 1,774 ppb. Methane is around 60 times more effective at capturing heat energy than CO_2. However, it lasts fewer years in the atmosphere than CO_2, and is produced in significantly lower amounts. It is estimated that methane will account for 15 to 17 percent of all global warming experienced this century. Nitrous oxide concentration has increased from a pre-1800 level of approximately 270 ppb to 319 ppb in 2005.

The IPCC projects that "continued greenhouse gas emissions at or above current rates would cause further warming and induce many changes in the global climate system during the 21st century that would *very likely* be larger than those observed during the 20th century."[13]

Climate Change Impacts

The IPCC projects a number of environmental, ecosystem, and public health impacts will take place as a result of climate change.

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[12] Ppm (parts per million) or ppb (parts per billion) is the ratio of the number of greenhouse gas molecules to the total number of molecules of dry air.

[13] IPCC, February 2007. *Climate Change 2007: The Physical Science Basis – Summary for Policymakers.* p.13

For example, climate scientists hold that an increase in sea surface temperature – driven by climate change – will likely result in an increased frequency of higher intensity (categories 4 and 5) hurricanes.[14] While the deadly hurricane season of 2005 cannot be directly linked to changes in the earth's climate, it does echo these concerns. In just one storm, Hurricane Katrina, 1,118 people were confirmed dead, and 135 are still missing and presumed dead. Direct damage to residential and non-residential property is estimated at $21 billion. Damage to public infrastructure is estimated at another $6.7 billion. Almost one-half of the region's population that was affected by the storm has still not returned to their homes. And nearly 124,000 jobs were lost as a result of the hurricane.[15] The impacts of Hurricanes Katrina and Rita might be considered a harbinger of future economic and human impacts as a result of climate change.

Observed and anticipated impacts cited by the IPCC include:[16]

- Increased heat-related mortality has been observed in Europe;
- Disturbed forests due to increased incidences of fire and pests;
- Coastal flooding impacts due to sea level rise, and increased frequency and/or severity of storms;
- Average annual river runoff and water availability is projected to increase by 10-40 percent at high latitudes and in some wet tropical areas;
- Average annual river runoff and water availability is expected to decrease by 10-30 percent in some presently dry regions in the mid-latitudes, and in the dry tropics;
- Heavy precipitation events will increase in frequency, adding to flood risk;
- Water supply storage in glaciers and snow pack will decline. This decline is anticipated to reduce water availability in regions supplied by melting snow from major mountain ranges – home to one-sixth of the world's population;
- Approximately 20-30 percent of plant and animal species are likely to be at increased risk of extinction if global average temperature increases exceed 1.5-2.5 degrees Celsius;
- Acidification of the ocean due to increasing CO_2 is expected to have negative impacts on marine shell forming organisms (shellfish and corals) and their corresponding ecosystems;
- Crop productivity is projected to increase slightly in mid to high latitudes and spring planting seasons may begin earlier in some areas. Crop production is expected to decrease in the tropics;
- Coastal wetlands will be negatively affected due to sea level rise, and decrease in sediment;

[14] Emanuel, K.A. 2005. "Increasing Destructiveness of Tropical Cyclones Over the Past 30 Years." *Nature*. 436; 686-88; Webster, P.J., et al. 2005. "Changes in Tropical Cyclone Number, Duration, and Intensity in a Warming Environment, Science." *Science*. 309: 1844-46.

[15] American Society of Civil Engineers – Hurricane Katrina External Review Panel. 2007. *The New Orleans Hurricane Protection System: What Went Wrong and Why.*

[16] IPCC, April 2007. *Climate Change 2007: Climate Change Impacts, Adaptation and Vulnerability – Summary for Policymakers.* Pp.4-8

HEARING ON ADMINISTRATION PROPOSALS ON CLIMATE CHANGE AND ENERGY INDEPENDENCE

Friday, May 11, 2007

HOUSE OF REPRESENTATIVES,
COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE,
Washington, DC.

The Committee met, pursuant to call, at 10:00 a.m., in Room 2167, Rayburn House Office Building, the Honorable James Oberstar [Chairman of the Committee] presiding.

Mr. OBERSTAR. It is a gentle gavel this morning; I don't want to fray the sensitivities of my colleagues who were in session. All of us were in session until 1:30 this morning. There isn't anyone here who has gotten more than five hours of sleep, unless they were cheating on the Floor last night.

I thank our witnesses, but I especially thank our colleagues who have braved the lack of sleep and the late night session to be here this morning.

The issue before us today is the first of two hearings, but there likely will be others over the period of this Congress, on global climate change and on the energy independence issue, which reminds me that I still have on my bookshelves the energy independence program of the Nixon Administration, a volume that I pored through last night that has some very valid and thoughtful recommendations of 35 years ago that are valid today.

Our economy is so dependent on hydrocarbons that we have a special responsibility in this Committee to examine the reach, the breadth, the effect, of all that we do in transportation, since it does account for 60 percent of our energy consumption in America. Over 60 percent of all energy is consumed in heating water: water to make steam for power plants; heating water in your radiators of your cars or trucks; heating water for use at home.

We don't think about this very often, but it is a function that can be displaced. Hydrocarbons can be displaced by solar power. This is an effort which we launched in this Committee at the outset of the session by passing legislation to retrofit or, I called it at the time, futurefit the Department of Energy with photovoltaic cells. This is also an initiative that, actually, I launched 30 years earlier, in 1977, with a bill to retrofit all Federal office buildings with photovoltaic cells. Unfortunately, that program was sidetracked by an election, the election of 1980, in which President Reagan came in and abolished the whole alternative energy program.

"But for as long as Europeans can remember, the frozen bastions of the north have hovered on the margins of their world a fearsome unknown realm nurturing fantastic tales of terrible beasts and grotesque landscapes. The boreal oceans were a source of piercing winds, vicious storms, and unimaginably cold winters with the ability to kill. At first, only a few Irish monks and the hearty Norse dared sail to the fringes of the ice. King Harald Hardradi of Norway and England is said to explore the expanse of the northern ocean with a fleet of ships in about 1040 A.D., beyond the limits of the land to a point so far north he reached pack ice three meters thick. He wrote, "There lay before our eyes at length the darksome bounds of a failing world."

It is a remarkable book. The Little Ice Age describes the vast oscillations of weather and of, more importantly, climate. The author writes, "Complex interactions between the atmosphere and the ocean govern Europe's climate. A constantly changing pressure gradient reigns over the North Atlantic and much of Europe's climate. Its influence as pervasive in the north as the celebrated southern oscillation of the Southwestern Pacific that governs El Niños and tropical weather. The North Atlantic oscillation is a seesaw of atmospheric pressure between a persistent high over the Azores and an equally prevalent low over Iceland."

It seems like an arcane piece of scientific information until you understand that the North Atlantic oscillation governs the position and strength of the North Atlantic storm track and the rain that fails on Europe, especially during winter. The extreme swings of the North Atlantic oscillation are part of the complex atmospheric-ocean dynamics of the North Atlantic that include sea surface temperature anomalies, the strength of the gulf stream, atmospheric wave structure, and the distribution of sea ice and icebergs. These interactions are poorly understood, but there seems little doubt that many of the swings in the North Atlantic oscillation result from changes in sea surface temperatures in the North Atlantic.

That continued over a period of 1,000 years, until, in the early 1300s there was dramatic swing from a warm period in which agriculture thrived, in which the icebergs disappeared, in which the Norse were able to explore the North Atlantic all the way to shores of the North American continent. Then the climate swung. That cycle of warm weather ended with a reversal of the North Atlantic oscillation, which brought a bone-chilling winter that immobilized shipping over a wide area, where thousands more perished from hunger and disease.

The subtle climate of earlier years gave way to unpredictable wild weather, marked by warm and very dry summers in the 1320s and 1330s, and a notable increase in storminess and wind strength in the English Channel and the North Sea. The moist mild westerlies that nourished Europe turned off rapidly as the North Atlantic oscillation moved from one extreme to the other.

The little ice age had begun. That little ice age devastated Europe: famine, plague, and destruction of agriculture, people, and cattle.

We are in a different age today, and it is our task to better understand what the forces are and what the consequences are. The international geophysical year, the exploration of the Greenland ice

cap, the exploration of Antarctica, the measurements that have been taken of over two miles of ice on the Greenland ice cap by differing teams of scientists show that today there is more carbon in the atmosphere than any time in the last 420,000 years. If we had no carbon in the atmosphere, the land would be uninhabitable; we would have the little ice age, only much greater, much more powerful. But too much carbon in the atmosphere causes the dramatic swings and shifts of power and shift that we are experiencing today.

There is much written about the atmosphere, but little about the ocean, the great ocean circulating current or the great ocean conveyor belt. It is the most powerful of all ocean currents. This massive force studied by Dr. Wallace Broker of Columbia University has been present for the last 100,000 years, but only definitively understood in the last 15 or 20. The magnitude of the great ocean circulating current can be best described by a Swedish scientist, Sverdrup, who measured it. He can best compare the flow of all the rivers of the world in one day, or all the rainfall that touches the earth, which is measured in trillions of gallons, in one day. That is a Sverdrup unit.

The great ocean circulating current has the force of 20 Sverdrup units, meaning 20 million cubic meters a second. It is over five miles wide, it is over two to three miles deep in the ocean; starts in the North Atlantic, in the Arctic, and moves with vast amounts of salt down through the North Atlantic, the South Atlantic, into the Pacific, through the Philippines, moves through South Africa, and then back up and gives off its warmer temperature to shield Northern Europe. The great ocean circulating current is beginning to weaken because of the melting of the polar ice cap and the dilution of the saltiness of the North Atlantic and the Arctic ocean water that has the moderating effect on the Pacific and the moderating effect on Northern Europe.

We don't know for sure what will happen because of melting of the polar cap, the weakening of the conveyor belt. But we do know that when that has happened in the past, that the climate system has shut down and an ice age began. We may be in the midst of a warming climate, but we may also be on the edge of the next ice age.

The consequences for health are extraordinary. The female orphalese mosquito dies at 63 degrees temperature or below. There is a belt five degrees north and five degrees south of the equator in which that mosquito thrives. A million people a year die of malaria; 200 million are afflicted by malaria. I was one of them when I lived in Haiti. I contracted malignant tertian malaria. You either die or, if you live, you don't get it again. That belt is now expanding to 10 degrees north and 10 degrees south of the equator. That means that in the next five years we will see 400 million to 500 million people afflicted by malaria and 2 million or more deaths.

Similarly, in the tropics, a bonebreak fever is carried by a vector which dies out at 1500 feet of altitude, where the temperature is roughly in the mid-60s. Two hundred thousand people a year die of bonebreak fever. I never contracted it, but I saw people who did. It's a horrible disease. That disease is now at 3,000 feet of altitude

in the tropics. Nearly a half million people may die of bonebreak fever.

If we don't understand the consequences of global climate change on the earth, the water, the rain, including the lack of rain, and on increasing moisture, then we can surely pay attention to the health consequences of global climate change and begin to do something about it. The Administration has proposed a number of steps which our witnesses today are going to spell out in very thoughtful and well presented testimony. I read this extensively last night, since we had plenty of time, and I look forward to their testimony.

Mr. OBERSTAR. The Chair recognizes the gentleman from Florida.

Mr. MICA. Well, thank you, and good morning, as we try to recoup from last night's marathon.

Nice to see the smiling faces of Secretary Peters; Mr. Johnson, our EPA Administrator, and Ms. Stone. Thank you for your great job at GSA. And what is it, Colonel Woodley? Assistant Secretary Woodley, great. Welcome, from the Department of Army. Look forward to all of your testimony.

Now, I don't claim to be an expert on global warming. In fact, in February I was beginning to wonder whether we were really actually having global warming. February was just as cold as could be. I had a $900 heating bill, Ms. Norton, which is the highest I have ever had in the District, and I go back to Florida and I tell people it was so cold in Washington, I tell my constituents you could actually see Members of Congress with their hands in their own pockets, which was quite a spectacle. But, again, I don't claim to be an expert.

It is simple to look at where some of the greenhouse gases and some of our problems with adding to the heating of the planet come from. I got that little chart up there. You can't see it very well; they didn't do a good job, but it just shows power generation. Thirty-three percent greenhouse gases come from power generation. And just to state the problem in the realm in which we have some say, transportation, which is automobile, trucks, airplanes, accounts for another 27 percent. If you add that up, it is about 60 percent of the emissions problems.

It is strange the way we do some of these things. We are in a comfortable room here. Actually, the power generated for the air conditioning is coming from a plant which should have been changed out, but it is run by coal which comes from West Virginia, which Senator Byrd has insisted we keep no matter whether it produces the highest source of emissions or not. I know we have put some scrubbers and some other thing on our particular plant.

I wanted to change out a light bulb the other day and I just asked staff to pull one out back here. These are the kinds of light bulbs we use in the Capitol. But I wanted to change out a light bulb and we are back to where we were, I think, about 12 years ago. I had to fill out a form, one person had to come up and actually look at the light bulb, then two people came up, one to present the light bulb, another one with a form, and one to install it. These are the more energy fluorescent light bulbs. So we are doing them one at a time.

So whether it is power generation or electric, changing out to more efficient fuels, the Capitol isn't a very good example. We will

hear from I guess the second panel—we have got the acting architect—on what we are doing here.

We know what, I guess, some of the problems are, and then we have to look at the solutions and what our policy is. Again, it is not a very good policy, whether it is the U.S. Capitol. As far as power generation, I have identified the problem of solving the problem, it is Congress. In France, 75 percent of their power is generated by nuclear; and old nuclear, we are not talking about the technology we have today. Again, our Federal policy keeps us from doing things.

I have learned a little bit about light water pebble reactors, which have almost no meltdown possibility, that can be used, even in residential areas. South Africa is one of the countries. Even Iran and North Korea are looking for—of course, part of the use they claim is for power generation, peaceful power generation. But, again, our policy is not what it should be. And nuclear is emissions-free.

We also have natural gas. I am the only Florida Member to vote to drill in the Everglades back in my days in the legislature, and we take oil out of the Everglades even today safely, but we can do it in the Gulf. You can't do it with a Federal policy that when one year says we are going to be 100 miles off, the next year we say 120 miles off, the next year we say 200 miles off. We jerk around those who produce this. Natural gas, low emissions can be produced safely, and we have an abundance of it. That is not the only answer; solar and wind are also viable solutions, hydro. But it is our Federal policy. Cafe standards. We are going to have to increase our cafe standards.

Now, I am a conservative Republican and supporter of industry, but we have got to set the policy and increase the mileage that our cars are getting. So we are standing in the way with outdated Federal policy.

Power permitting is another problem.

Then, finally, mass transit and transit. First of all, we are just not going to solve this with shifting the biofuels. I know that the agriculture folks are having a heyday, they had one last night, although that is not all said and done. But biofuels, if we use the entire U.S. corn crop, would only provide 3.7 percent of our transportation fuel needs. So it is not an answer. It also uses a lot of energy in its production. So we do need to look at other ways of powering vehicles, whether it is automobiles, trucks, or aircraft. We need to be doing more with Secretary Peters in looking at alternative fuels for aircraft. Very soon, the Europeans will probably impose a tax on us because airplanes do produce a lot of emissions, significant emissions.

Finally, again, in the area of moving people efficiently and freight efficiently, railroads can move a ton of freight more than 400 miles on one gallon of fuel, and rail emits 6 to 12 times fewer pollutants than other modes of transportation. But, again, we don't have in place a system. We move freight at an average of 21 miles an hour in the United States.

Then, moving people, we move people long distance by a Soviet system that is called Amtrak. It is out of date and it is an impediment to us actually moving lots of people by long distance. As far

as high-speed rail, it has closed the door to high-speed rail development in the United States, made it impossible. We look at what is going on around the world. I visited, last August, China. Maglev, next generation technology, China. Even Romania is privatizing its rail. But not the United States, because of our policy and some special interests who want to make certain that we do not have an alternative means of transportation that can be fuel-efficient, that can protect the environment, less emissions. But there is only one thing standing in our way, our Federal policy.

I am pleased to yield back.

Mr. OBERSTAR. I thank the gentleman for his statement and his observations. I guess I broke union rules. I just went and changed the light bulb on my own; I put it in and didn't ask them permission to do it.

Mr. MICA. I hope they file a complaint against you.

Mr. OBERSTAR. File a complaint, then. Get the IBEW after me.

I am quite sure that all other Members have erudite statements about global climate change, and those will all be entered into the record so that we may proceed forthwith to our panel.

Secretary Peters, thank you very much for being with us. We appreciate your presentation, which I read at length last night. You are the first.

TESTIMONY OF THE HONORABLE MARY E. PETERS, SECRETARY OF TRANSPORTATION, U.S. DEPARTMENT OF TRANSPORTATION; THE HONORABLE STEPHEN JOHNSON, ADMINISTRATOR, U.S. ENVIRONMENTAL PROTECTION AGENCY; THE HONORABLE JOHN PAUL WOODLEY, JR., ASSISTANT SECRETARY OF THE ARMY OF CIVIL WORKS, DEPARTMENT OF THE ARMY; AND THE HONORABLE LURITA ALEXIS DOAN, ADMINISTRATOR, U.S. GENERAL SERVICES ADMINISTRATION

Secretary PETERS. Mr. Chairman, thank you so much.

Chairman Oberstar, Ranking Member Mica, and Members of the Committee, I am grateful for the opportunity to come before you today to testify on climate change and energy independence. In my testimony today, I would like to explore with you how this Committee and the Department of Transportation can work together on shaping transportation infrastructure to enhance energy security and to reduce greenhouse gas emissions.

Most importantly, we need to find ways to improve the efficiency of our existing transportation system and to direct limited investment capital to where it is most needed and can make the largest difference. This is the fundamental rationale for the Congestion Initiative and Next Generation Finance Reform Initiative for aviation. Both endeavors can be powerful tools for reducing petroleum consumption and greenhouse gas emissions, as well as saving time and money for travelers.

While the Congestion Initiative involves a number of different elements, today I would like to focus on three of those elements most relevant to saving fuel and curbing emissions. In December, with the help of this Committee, the Department issued a request for proposals for metropolitan areas to enter into what we call Urban Partnership Agreements, or UPAs, with the agency. As an

urban partner, a metropolitan area will commit to implementing a comprehensive strategy to respond to urban congestion, including congestion pricing demonstrations, enhanced transit services, increased use of telecommuting, and advanced technology deployment. In exchange, the Department will support its partners with available resources using current budget authority, as well as regulatory flexibility and expertise.

The heart of the Urban Partnership Agreement is a congestion pricing format that, done right, can reduce congestion and save drivers substantial amounts of time and fuel. Pricing can also incentivize mass transit use and foster high speed, reliable bus rapid transit service. It can improve in-service fuel economy while reducing criteria pollutants and greenhouse gas emissions by cutting out the stop-and-go movement and allowing vehicles to operate at closer to optimal speeds.

Congestion pricing has also been in the news lately, most recently with the proposal by New York City Michael Bloomberg, to implement a cordon pricing program in which drivers would pay a fee to enter downtown Manhattan during the workday. Mayor Bloomberg's proposal is the kind of bold thinking that leaders across the Country need to embrace if we hope to win the battle against traffic congestion and climate change.

We are also working to improve aviation congestion. The Federal Aviation Administration has saved millions of gallons of jet fuel and over 6 million tons of carbon dioxide emissions over the past two years by implementing reduced vertical separation minimums, permitting aircraft to fly in U.S. airspace and operate at more efficient altitudes. The FAA has achieved further improvements in system performance through the related reforms of the Area Navigation System and Required Navigation Procedures, both of which increase the efficiency with which we use our airspace and with which airplanes operate.

If we want to reduce jet fuel consumption and aircraft emissions without discouraging air travel, we must transform our aviation system. We need a reauthorization bill passed by Congress that provides for the Next Generation Air Transportation System. I commend the Committee for holding today's hearing. We all share an enormous responsibility of ensuring that future generations can experience the freedom of efficient and vital American transportation systems. I look forward to answering your question, and thank you for entering my full statement in the record. Thank you, Mr. Chairman.

Mr. OBERSTAR. Thank you very much. We will have some questions later on.

Now we have Mr. Johnson, Stephen Johnson, Administrator, Environmental Protection Agency. Appreciate your being here.

Mr. JOHNSON. Thank you, Mr. Chairman. Chairman Oberstar, Mr. Mica, and Members of the Committee, thank you for the opportunity to testify today about climate change and energy security. As we continue to work to evaluate our obligations under the recent Supreme Court decision in Massachusetts v. EPA, the Administration will continue moving forward, both domestically and internationally, to address the serious challenge of global climate change.

In keeping with the agency's commitment to address the Supreme Court's ruling expeditiously and responsibly, we recently signed the formal notice that starts the public process for considering the California waiver petition process. We will hold public hearings on May the 22nd and May the 30th.

In 2002, President Bush committed to cut U.S. greenhouse intensity, that is, the ratio of greenhouse gas emissions to economic output, by 18 percent through the year 2012, a goal that we are on target to meet. According to EPA data reported to the United Nations Framework Convention on Climate Change, U.S. greenhouse gas intensity declined by 1.9 percent in 2003, by 2.4 percent in 2004, and another 2.4 percent in 2005. Put another way, from 2004 to 2005, the U.S. economy increased by 3.2 percent while greenhouse gas emissions increased by only 0.8 percent.

Under the President's leadership, our Nation is making significant progress in tackling greenhouse gas emissions. According to the International Energy Agency, from 2000 to 2004, U.S. emissions of carbon dioxide from fuel consumption grew by 1.7 percent while our economy expanded by nearly 10 percent. This percentage increase was lower than that was achieved by Japan, Canada, the original 15 countries of the European Union, India, and China. IEA data also show that during this time the United States reduced its carbon dioxide intensity by 7.2 percent. This is better, for example, than Canada, Japan, or even the EU 15.

I would also note that the U.S. is on track to meet, and possibly exceed, the President's goal to reduce greenhouse gas intensity by 18 percent by 2012. By contrast, only two of the original EU 15 countries in the Kyoto Protocol are on target to meet their Kyoto targets.

Over the last six years, this Administration has invested more than any other nation in the world, $37 billion, in a comprehensive climate change agenda. EPA climate change programs include a wide array of domestic and international partnerships which rely on voluntary measures to reduce greenhouse gas intensity, spur new investments, and remove barriers to the introduction of cleaner technologies. I would be happy to speak in greater detail about EPA's many climate partnership programs that include the Asia Pacific Partnership on Clean Development and Climate, Energy Star, the SmartWay Transport Partnership, the Methane to Markets Partnership.

The President's efforts are also focusing on strengthening energy security. In his 2007 State of the Union address, the President challenged the Nation to address our growing reliance on oil. He called for reducing gasoline consumption by 20 percent in the next 10 years, while doing so in a way that keeps America's economy growing and protects our environment. This 20-in-10 plan includes a proposed requirement for 35 billion gallons of alternative fuel in 2017, building upon EPA's current renewable fuel standard.

Another focus of EPA is the development of risk management strategies to ensure carbon dioxide injection and long-term geologic storage are conducted in an environmentally responsible manner. We have determined that underground injection of carbon dioxide is subject to the Underground Injection Control Program of the Safe Drinking Water Act, which regulates injection activities to

protect current and future sources of drinking water. EPA has developed UIC permitting guidance that recommends treatment of injection wells associated with research and development projects as experimental technology wells. Our goal is to provide guidance that facilitates permits, while encouraging environmentally responsible injection activities.

Mr. Chairman, I am also proud to say on September 1st, 2006, we, EPA, became the first Federal agency to achieve 100 percent green power. EPA is also a Federal Government leader in the use of green buildings, having eight major new facilities that are or will be silver or gold certified under the U.S. Green Building Council rating system.

Again, thank you for the opportunity to testify. Before I take questions, I would ask that my full written statement be submitted for the record.

Mr. OBERSTAR. Without objection, the full statement will be in the record. The complete statement of all witnesses, as statements of all Members, will be included in the record.

The Assistant Secretary of the Army for Civil Works, the Honorable John Woodley, Jr. Thank you very much for being here.

Mr. WOODLEY. Thank you, Mr. Chairman, for the opportunity to be here today to discuss how the U.S. Army Corps of Engineers Civil Works Program is addressing global climate change. I have a detailed statement I have submitted and, with your permission, will summarize it here.

Over the last century, the Corps of Engineers, along with other Federal agencies, has helped develop this Nation's water resources. We are constantly improving our ability to manage those resources, including measures to address water-related issues that are arising due to changing weather patterns and climate change. The Corps' flood and storm damage reduction mission directly involves understanding and responding to extremes of weather variability and long-term trends in climate. Significant changes in either weather patterns, or in climate, can affect our ability to supply water from our Nation's multipurpose reservoirs to 55 million municipal and industrial consumers, to facilitate safe and reliable waterborne transport on our Nation's inland waterways, and to produce nearly 25 percent of the Nation's hydroelectric power. It could also affect our ability to restore and sustain aquatic ecosystems and endangered and threatened species.

While the Corps of Engineers does not have the mission to perform climate data collection, the Corps has been involved in climate change impact studies since 1979. The Corps has participated in a number of workshops with its Federal and State agency partners in efforts to evaluate the development of technical and scientific methods for incorporating climate change information into forecasts, flood and drought frequency analyses, and planning evaluation approaches for new projects, as well as for existing ones.

Two of the Corps' significant activities, hydroelectric power and inland navigation, relate directly to energy independence and climate change, and all of our mission areas could be affected by climate change. Hydroelectric power helps make us less dependent on foreign energy sources. The Corps is the single largest producer of hydroelectric power energy in the United States. It operates and

maintains 75 multiple purpose hydropower projects, generating about 78 billion kilowatt hours of electricity per year. The Corps accounts for about 24 percent of the Nation's hydroelectric power capacity and about 3 percent of the total electric power capacity of the United States. This output makes the Corps the fourth largest electric utility in the United States, one which uses no imported fuel and emits no greenhouse gases.

The Corps maintains the Nation's inland waterway navigation system, which is an important part of the national transportation system. Waterborne transportation is often capable of moving commodities and products more efficiently than they could be moved over land, potentially reducing fuel consumption and greenhouse gas emissions.

Because all of our missions can be affected by significant shifts in weather or climate, it is important to the Corps to account for these possibilities in our project planning and operation. To that end, the Corps is pursuing an expanded use of risk-based planning. The risk-based planning process considers uncertainties such as the effects of climate change evaluated through multiple possible scenarios of future environmental conditions. The ongoing work in the Louisiana Coastal Protection and Restoration Study is an example of the application of this process.

There are many avenues through which the U.S. Army Corps of Engineers Civil Works Program can help address the difficult scientific, technical, and operational issues raised by the uncertainty associated with climate change and its potential impacts on water resource management. We have the necessary authorities to conduct a broad program of necessary first steps that are part of a longer-term proactive adaptive management strategy.

The Corps of Engineers is a leader in innovative, yet practical cost-effective approaches and is working to incorporate potential climate change impacts in the planning and management of our key water-based infrastructure. We are well positioned to respond to the Nation's needs now and in the future.

Mr. OBERSTAR. Excellent. Thank you very much for your presentation. The Corps has within its reach the ability to make big impacts on our energy picture.

Our next witness may have an even bigger impact on energy, Lurita Doan, Administrator, GSA.

Ms. DOAN. Good morning, Chairman Oberstar, Ranking Member Mica, and Members of the Committee. I am Lurita Doan, Administrator of GSA. GSA has an extraordinary commitment to energy-saving initiatives and I am very pleased to have this opportunity to discuss GSA's endeavors here today.

A critical part of GSA's mission is to provide responsible choices that help our client agencies meet their environmental obligations. Our offerings include the construction and leasing of energy-efficient buildings, the procurement of renewable utility services, environmentally friendly telework and other alternative workplace arrangements, and a selection of the latest alternative fuel vehicles and a wide range of environmentally preferable office products.

From the space and services provided by our Public Building Service to the products and services provided by our Federal Acquisition Service, I am proud of the leadership GSA demonstrates and

the assistance we provide to the Federal community to meet or exceed the targets set by Congress in the Energy Policy Act of 2005 and the targets set by President Bush's new Environmental Executive Order.

I am also proud that GSA's efforts to achieve energy efficiency through good practices, new technologies, innovations, and plain old common sense have helped reduce our energy usage as well as our operating costs. Today I would like to discuss GSA's leadership in energy-efficient green buildings, GSA's offerings of environmentally responsible products and services, and GSA's government-wide telework initiative, including our centers that relieve Federal employees from daily traffic snarls and also reduce greenhouse gas emissions.

GSA's achievements and initiatives in these areas are detailed in my formal statement already submitted to the Committee. For now, I will focus on a few highlights.

Through PBS, our Public Building Service, for instance, GSA has an opportunity and a responsibility to lead the Federal Government by example and demonstrate how we can reduce energy consumption by integrating energy efficiency into building designs, while still creating superior workplaces, and GSA is doing just that. For example, GSA operates its buildings at costs that are 5 percent below comparable buildings in the private sector, and GSA pays 12 percent less for its utilities because we can drive costs down through the leverage buying power of the entire Federal Government.

Similarly, our Federal Acquisition Service offers agencies a wide array of energy saving services and products, including alternative fuel vehicles and hybrid electric vehicles. Perhaps most Americans don't know this, but GSA is one of the Nation's largest purchasers of alternative fuel vehicles. With over 100 contractors on GSA schedules, agencies can find a host of services that help them audit their current usage, that properly meter their buildings, and evaluate alternative energy options.

On a third front, GSA is a co-lead agency for Federal telework and established a no-cost trial of the GSA telework centers. Based on data from our 14 centers, we estimate that telework at these centers annually save nearly 2.8 million travel miles, which in turn saves 115,000 gallons of fuel and avoids 2.3 million pounds of emissions.

Sustainable design, meanwhile, is a holistic approach to constructing, modernizing, and operating buildings that seek to balance costs, environmental, social, and human benefits with functional needs of our customer agencies. GSA uses the U.S. Green Building Council LEED certification in the design of new construction and GSA is a leader in sustainable design and has earned a LEED rating for 19 buildings to date, with 60 more planned.

Mr. Chairman, whether it is sophisticated lighting systems, wind power, or telework, GSA is fully committed to achieving and exceeding the goals of the Energy Policy Act and the President's Executive Order. As Administrator, I feel blessed that GSA has a talented, creative, and innovative workforce. GSA has some of the resources to help our client agencies and our Nation become more

conscientious stewards of our air, land, and water but, truthfully, more are needed.

I also want to help folks in the business infrastructure sector understand that if you build it, GSA will come. We need more energy infrastructure, whether it is wind power, hydroelectric, photovoltaic, more E85 stations, more bio products, we need it. If you build it, we will come.

I would be happy now to respond to any questions from you or Members of the Committee. Thank you.

Mr. OBERSTAR. Thank you very much, Ms. Doan. Mr. Mica tells me that you are from New Orleans originally.

Ms. DOAN. I am indeed.

Mr. OBERSTAR. That is my wife's home.

Well, Secretary Peters, it occurred to me, as I read your statement last night and listened to you again this morning, you quoted, with much approval, Mayor Bloomberg and his cordon pricing program, and also quoted him asking what options do we have. Should we continue to have wasted time, lost business, higher prices, or should we charge a modest fee to encourage people to take mass transit?

We encountered that issue in the safety round in the TEA-21 and in SAFETEA-LU on two scores, one on seat belt usage—which the Governor of New Jersey should have paid attention to—and, second, on alcohol and driving. And in the complex negotiations within the Committee, and then between our Committee and the Senate, we settled on incentives rather than penalties.

You seem to be endorsing the mayor's support for a penalty, rather than provide incentives for people to use transit. Wouldn't an incentive payment of some sort, a subsidy of transit, be a better approach, comparable to what we did in TEA-21 and SAFETEA-LU on seat belt and on .08 alcohol?

Secretary PETERS. Mr. Chairman, I certainly do believe in incentives and, as you discussed, during the negotiations for SAFETEA-LU we did arrive at incentives and they have worked very well, especially in the seat belt law area, extremely good progress.

The truth is that in New York City, as well as here in Washington, D.C. and in many other areas, transit benefits are given or incentives are provided to employees to use transit. In fact, at our building, I believe as well as many other buildings here in the U.S. Government headquarters, we charge employees who choose to drive and park, but we give them benefits, transit benefits authorized by Congress if they use transit. That is the case in New York City as well with many of the employers, and yet Midtown Manhattan is still very, very congested.

Mayor Bloomberg has said that you pay a price. Either you pay a price for coming into the city, as he has suggested, or you pay a price in lost time and lost productivity.

Mr. OBERSTAR. Let me contrast that with Denver, under Mayor Wellington Webb, where he said we don't want your pollution in the center city; leave your car outside. We will give you a ride free on our Circulator System in the center of the city. Keep the pollution out and your experience in our city will be a much happier one.

In Portland, in the center of the city they have a circulator system, a trolley that you ride free, get on and off as many times as you wish. When you get beyond a certain zone, then you pay.

In the transit account of the Highway Trust Fund, municipalities under 200,000 population can use their transit grants for capital account as well as for operating comp, but those above 200,000 are not allowed to do that by current law.

Would you support changing the law to allow large municipalities to use funds for operating assistance in order to encourage greater transit use?

Secretary PETERS. Mr. Chairman, as you are aware, during the first three years of operation, in most cases, CMAQ funds, for example, can be used for operation. That has been——

Mr. OBERSTAR. But not for those above 200,000.

Secretary PETERS. Not for those above 200,000, sir. I would support maximum flexibility for State and local governments.

Mr. OBERSTAR. Thank you. That is excellent. I appreciate that. It is nice to have a straightforward answer. Not that you don't, but it is all too often we have an Administration witness, they don't know what OMB is going to say. That is a good candid, straightforward answer. I appreciate it. Excellent.

Mr. Johnson, let me find my notes. Here we are. The Supreme Court, on April 2nd, said that EPA has to take into account CO2 as an air pollutant and that you do have the ability to set emission standards for motor vehicles. It also said there is no conflict between setting CO2 standards to protect public health and welfare under the Clean Air Act, and that there is no conflict between that and the Department of Transportation setting fuel economy standards. What does EPA intend to do now in the aftermath of the Supreme Court decision?

Mr. JOHNSON. Well, as you point out, the decision that the Supreme Court made on April the 2nd does present a series of complex issues, the one you mentioned being one of them. We are currently evaluating what the Supreme Court said, considering those kind of issues, the intersection between the Clean Air Act and Department of Transportation's activities. We are considering all options. We are moving expeditiously. This is an important issue. But we are also moving responsibly.

Mr. OBERSTAR. Well, there is an opportunity now, with that decision, and I encourage EPA to move ahead vigorously with it.

Secretary Woodley, some years ago—goodness, 20 plus years ago—this Committee directed the Corps to evaluate the potential for low-head hydro application on streams other than those where we have the major projects, and then come back and report to Congress on those 5 kW and above. Are you familiar with that report?

Mr. WOODLEY. It must have been before my time, Chairman.

Mr. OBERSTAR. Have you update—yes, go ahead.

Mr. WOODLEY. It must have been before my time.

Mr. OBERSTAR. It was, yes.

Mr. WOODLEY. I can tell you——

Mr. OBERSTAR. Probably when you were still in college.

[Laughter.]

Mr. WOODLEY. Although 25 years is a long time to spend evaluating anything, even for the Corps of Engineers, it would not be unprecedented.

Let me respond seriously, though, that I have seen low-head applications in place, particularly in New England, where they are being vigorously pursued. I think that there is a great potential there for development that would require very little infrastructure and would present substantial opportunities for more additional hydroelectric power from our facilities, using water that——

Mr. OBERSTAR. Well, we are going to get together with you too and with the Chief of Engineers and revisit the issue and harness the Corps' ability to deliver real engineering results, as it does. I have such great admiration for the Corps and all of its work, but in your statement you talk about adaptive management—that the Nation's water resource infrastructure can be adapted to address subtle changes and trends. Now, I don't want to be picky, but we have not seen much subtle change in a long time.

I have a compilation over the last 20 years of the costs of disaster relief expenditures by FEMA and by the private insurance sector, and it adds up to $35 billion from 1980 to 2000, and $115 billion by the private sector insurance companies, and if you look at the progression, if you go back to 1980, FEMA disaster relief was in the range of $850 million. It fluctuates, it goes down, it goes up, but then from 1990 on it is $2 billion, $2.5 billion, $4.3 billion, $3.6 billion, $4.3 billion, $4.4 billion. The private sector keeps going up. There is a progression. And that doesn't include the $27 billion-plus of Hurricanes Katrina and Rita.

We are seeing a steady progression, if you just measure it in cost, of an increase of storms of powerful effect on people, on communities, and on our total public works infrastructure. And then you go on to say, generally, however, we have formulated our projects to address storms that are more likely to occur. I think that the gentleman from Louisiana to my left, Dr. Boustany, would say we are way passed evaluating things that are likely to occur. We need to protect against storms of a magnitude that we haven't yet imagined.

Now, Ms. Doan, I followed with great interest your many discussions of pilot projects, building modernizations, and projects that are nearby in Suitland, Maryland, or as far away as San Francisco. There is a highly commendable record of accomplishment in GSA, but GSA is the landlord of 367 million square feet of civilian office space, and the electricity bill is $5,800,000,000 a year. We have to do a whole lot more than we are doing now, and we intend to give GSA the authority and the encouragement and the incentive to accelerate this initiative.

If we can get a bill through the Senate that we passed in the House to convert the Department of Energy, which should be the symbol for America of conversion to photovoltaics, then we can carry that pilot all the way through the rest of the Federal Government and save an enormous amount of cost to the taxpayer, and of CO2 emissions to the environment.

Are you ready to get on board with that?

Ms. DOAN. GSA strongly supports photovoltaic efforts as a way of providing alternative energy. In fact, we have a very strong

track record in that area. We have worked very hard and we just started another effort just last month in the Denver Federal Center. In addition to that, we think that it makes an enormous amount of economic sense. We also want to expand our efforts a little bit further into our land border ports of entry program on the roofs where it makes sense, where we have enormous amounts of solar power available to us. In fact, in Waltham, Massachusetts, we have an integrated solar roof where 45 to 50 percent of the total building supplies—the solar roof on top of it provides for their electricity needs. So we are very much in support of these initiatives.

Mr. OBERSTAR. Thank you very much.

The gentleman from Louisiana, Dr. Boustany.

Mr. BOUSTANY. Thank you, Mr. Chairman. Thank you for holding this hearing.

Secretary Peters, we have all followed the increased ethanol usage with a great deal of interest. Granted, we know there are limitations agriculturally with some of the technology and even pipelines for distribution, so there are going to be problems that we will face with these limitations. I am curious to know—what is the Department doing with regard to aviation fuel alternatives and biofuels and the like?

Secretary PETERS. Congressman, that is a very good question. In fact, aviation has increased their fuel efficiency by 33 percent in about the last 10 years, so they certainly have stepped up to do a lot of things. Currently, both Boeing and GE are making forays into alternative fuels for aviation, and they are also beginning, at airports, to look at the opportunities for ground-based equipment to be alternatively fueled, perhaps electrified vehicles, so that they aren't burning fuel.

We are also looking at ways when jets are taxiing, after they have landed and gotten off the active taxiway, and whether there are ways to move that jet with a lower cost technology, such as a nose wheel motor, that would prevent them from running those jet engines while they are on the ground. So there are a number of things underway for doing that, as well as fuel options. As I mentioned, both Boeing and GE are looking very heavily into fuel options for aviation as well.

Aviation is one of those forms of transportation where they absolutely are looking very hard to conserve fuel whenever they can because it is such a large part of their expenses.

Mr. BOUSTANY. Thank you. What will be the U.S. policy if the EU imposes an aviation fuel emissions tax? Could you elaborate a little bit on that?

Secretary PETERS. Congressman, we are very opposed to that. We are very opposed to a unilateral measure such as EU is considering for aviation, and feel very strongly that the whole issue of emissions and global warming, climate change are global issues, not issues that are specific to the European Union. I have also talked with my counterparts in China. They are opposed, as well as many other countries also. So we do intend to push back very hard against the EU on this unilateral measure.

Mr. BOUSTANY. Thank you.

Mr. OBERSTAR. If the gentleman would yield for just a moment.

Mr. BOUSTANY. Certainly. Yes.

Mr. OBERSTAR. I assure the gentleman further time.

Our Committee did conduct an extensive session in Belgium with the European Commission, with the minister of transport, European Parliamentary Members of their transport Committee, that included an extensive discussion of the emissions trading regime for aviation that the European community is moving forward on, and their goal is to implement an emissions trading scheme for aviation by 2011, 2012. Their goal was also to impose it on the United States in our airspace.

We made it very clear on a bipartisan basis that this is our sovereignty and that we will deal with it. We also told Europe that we were 10 years ahead of them on noise. We put in place a noise reduction rule in 1990, legislation that I initiated as Chair then of the Aviation Subcommittee, and Europe didn't come along until 10 years afterward. We want credit for what the United States did. We will deal with our issue in our sovereign airspace and Europe can deal with yours in European sovereign airspace. We ought to harmonize it for the benefit of the world, but we have to bring the rest of the world along with us.

I thank the gentleman for his time.

Mr. BOUSTANY. Thank you, Mr. Chairman.

Mr. Johnson, in March of 2007, you convened a climate change working group within the EPA's Office of Water, and specifically in your written testimony you mentioned mitigation, adaptation, and research. Can you go into greater detail as to what this working group will assess, and how do you think water programs and water quality infrastructure can mitigate the release of greenhouse gases?

Mr. JOHNSON. Well, thank you very much, sir. The reason why we convened this work group is that there are a number of issues that we must address, as we look at global climate change and its potential impacts, and one of those is on sea level rise and the concern for our oceans and our coastal waterways, what that means for not only the environment, but also where we get our water for drinking water, as well as wastewater treatment.

So we convened a group inside the agency to take a very close look at the tools under the Clean Water Act and how we could use those tools and how we can use those tools to help to mitigate or to better understand, but mainly to make sure that we are able to address any changes that may occur from greenhouse gas emissions. So we have started that effort not only inside the agency, but with our Federal partners and, in some cases, as we have looked at some of our precious natural resources like the Chesapeake Bay with our State partners there as well.

Mr. BOUSTANY. I thank you.

Secretary Woodley, I think you mentioned in your verbal testimony that you did not need additional authorities, and I guess I would like to pursue that a little further. Do you see that you need any additional authority as you look at your project studies, and specifically do you need authorities in addition to Section 707, Section 729, Section 731 of the Water Resources Development Act of 1986?

Mr. WOODLEY. No, sir. Thank you for the question. We believe that the authorities that we are currently operating under are suf-

ficiently broad to allow us to take into account climate change issues as they apply both within our planning processes and within our operational measures within the program.

Mr. BOUSTANY. So you are looking at climate change when you look at the impact on flood, storm, and drought risk in the U.S., also the impact on hurricane activity intensity, storm surge, sea rise level, associated flooding? These are all things with your current authorities that you are able to address?

Mr. WOODLEY. Yes, sir.

Mr. BOUSTANY. Okay. And will incorporating these types of climate change analyses increase the cost of conducting studies? In other words, are non-Federal project sponsors who currently pay 50 percent of all study costs willing to bear this increased cost, and has there been some dialogue with the non-Federal cost share sponsors?

Mr. WOODLEY. I would say that our cost share sponsors are interested in the best planning process that we can achieve. They are interested in a planning process that is comprehensive and that takes into account all the risks that their populations will face. So we have not had—I am certainly not aware of any difficulties or issues that have been raised with our partners in that regard.

Mr. BOUSTANY. Thank you, Mr. Woodley.

Ms. Doan, is GSA doing anything to reduce Government facilities' dependence on the existing energy grid?

Ms. DOAN. Yes. GSA is working very hard to generate independence from the grid. As I mentioned earlier, we are making enormous efforts in different types of energy. We have made efforts to use wind power, hydroelectric power, of course, photovoltaic or solar power, but in addition to that, we will be removing some of our energy from the grid.

In fact, many areas where we are generating power, we then return energy to the grid. Our new effort that we have begun at the Denver Federal Center will do exactly that. In addition, at the FDA here in Maryland we have a heating plant that does exactly that, and it is cogeneration of power.

Mr. BOUSTANY. I thank you.

Mr. Chairman, I yield back.

Mr. OBERSTAR. I thank the gentleman and the witnesses.

Now, the Chair recognizes the gentlewoman from the District of Columbia, Ms. Norton.

Ms. NORTON. Thank you, Mr. Chairman. Thank you very much for this important and timely hearing.

If I could just do a little demonstration for a moment. Behind this curtain is sunlight. That is sunlight, Mr. Chairman.

[Laughter.]

Ms. NORTON. I do that demonstration because I sat in a hearing recently, and everybody who came into the room said, oh, it is freezing in here, it is freezing in here. And, of course, I looked around and we were all closeted in these curtains, and I recognized that there is an AV. You know, at home, when you look at television, you don't close down the sunlight.

It does seem to me that a lot of what the Federal Government has to be doing has to begin at home, and I do want to know—I want somebody to find out when the idea began that we had to

close up all of the curtains and depend on these things here as we preach to the Country what they are supposed to be doing. Maybe it is the best thing to do, but I am not sure it is.

I think anybody who either shuts out sunlight or uses a great deal of electricity has the burden of demonstrating why they are doing so. That is why I applaud the speaker, who has taken a lead for the Capitol complex in light bulbs, where we are supposed to immediately convert 2,000 desk lamps and, within six months, 10,000.

I applaud it because, frankly, I don't think the problem with the Federal Government is leading by example; I think it is much more serious than that, because it is typical, Mr. Chairman, to underestimate the effect the Federal Government could have on changing energy policy just by what it does itself within its own operations. We are the big kahuna, and if you want to drive down the cost of all of this, the Federal Government leads in doing it and then others follow.

Our ability to affect the marketplace is incalculable, almost, here. Ms. Peters and I have had a running dispute that I want to just cite when it comes to leading by example, and perhaps to contrast that with Administrator Doan, because I think GSA has had decades, before climate change became much of an issue, of leadership, rather muted leadership, not preaching it, but certainly trying to practice more of it than I think is known.

On the other hand, just to give a perfect example, because I read your testimony, Ms. Peters, about some of the things you want to do. Some of those things sound to me to be very progressively moving in the direction of encouraging local jurisdictions. It seems small, but there is limited money. One of them, I noted in your testimony you want to fix bottlenecks in our transportation systems, include the efficiency of our existing road system, and direct limited investment capital where it is most needed.

You are about to be in the center of the storm at the Department of Transportation. This Committee, for 20 years, worked to get the Department of Transportation a new building. Now you have a new building close to South Capital Street, in one of the great entry portals to the city. It is great all right. It is so great that you can't get in it or out of it. Well, there is a lot of vacant land around it and the District is about to build a new Nationals baseball stadium, and the District is hustling with all kinds of changes in roads.

The Federal Government gave, to its credit, because this is where the Navy Yard is, the Department of Transportation, the U.S. Capitol, $20 million to expand the Navy Yard subway. We are trying to use every church lot to have people park, rather than have them bring their cars anywhere close. The people who own the stadium are going to shuttle people in.

The Department of Transportation has a brand new, brand new building and a brand new garage that is empty, or almost empty. If they want to use part of it, that is all right, but most of the people have gone home by the time the night games, which are when most night games.

A creative proposal came forward from the people who own the stadium, who said that there are certain people that they know will

drive, and those are the people who have those season tickets. They paid a lot for them. And they offered to vet those people in a way that no Federal employee is vetted; in a way that none of us or our staff is vetted. I was able to get the Navy Yard, which is along the same stretch of land, to agree that anybody who has a DOD pass around his neck—and that can be a contractor—can park there if they are going to a night game at the ballpark.

Talk to the GSA and to the credit of the GSA, to the credit of the owner who runs the Department, who built this structure, the owner now of the structure, all of them said, given all the vetting you are talking about, it seems to be the highest and best use of the garage at night. Some revenue will come to the Federal Government; the cars, instead of being stretched along South Capital and M Street, which is the worst bottleneck in the city, those cars will go into the garage. I don't want to say, Mr. Chairman, because it is very elaborate what they will do. These are people who are willing to anything because it is a very small group of people that we are talking about, the people who can afford those tickets, and they are willing to go through that.

When we sat down with the security people, we recognized that they wouldn't want to take that responsibility. So we had talked to Ms. Peters' predecessor; she seemed to be open to this, to see the common sense value of this. But when it came to the Secretary, despite all she has had to say here this morning, she would rather see the bottleneck around her own Department of Transportation than see the garage used at night by people who have been vetted at the highest use. They used the Federal Government's highest use vetting in order to come forward with a plan.

So the whole notion of the Administration, Madam Secretary, proposing in this year's budget $175 million to expand capacity and improve operations along heavily congested interstate travel and trade corridors does not seem consistent. All I am saying is the Department of Transportation has a burden not only of leading by example, but of explaining, if we are not able to do something about that congestion when that ballpark opens on April, what the Department has done. The Department of Transportation must explain what it has done to ameliorate the very congestion that you claim it is your mission to ameliorate throughout the Country. You need to start right where you live, in the Department of Transportation.

I want to say that we will be holding a series of hearings, Mr. Chairman, on energy conservation in Federal real estate, because we own real estate throughout the Country and, by ourselves, could have a significant effect on energy matters. But we are not going to start with those forms of conservation that cost money. We are going to start with ordinary, old fashioned conservation like dimming lights after certain hours, making officials in Federal buildings responsible for that policy, keeping temperatures down, and allowing air conditioning and heating not to reflect the kind of temperature you find in movie theaters, when you come in and you are cold, or a hearing room and you are cold, but keeping those temperatures down.

I believe that we have underestimated what the Federal Government itself can do, not by pilot projects. And the testimony here

has been full of pilot projects and small things. I do want to say GSA has, for decades, been building in such—with some cost, building into construction and into requirements some important energy-efficient saving matters, but I take my time, Mr. Chairman, to say that the Department of Transportation—and I am here to hear any response she has to make—has left me to my own devices. And I tell you, as a Member of Congress, I am not going to sit here and watch the Department of Transportation become the center, the vortex of the congestion of which I speak. If I have been left to my remedies as a Member of Congress, I have my remedies, and I intend to take them.

Secretary PETERS. Madam, would you like me to respond?

Mr. OBERSTAR. The gentlewoman's time has expired, but the Chair will entertain the Secretary's response.

Secretary PETERS. Mr. Chairman, thank you so much.

Congresswoman, indeed, the new DOT building is a green building. We worked very closely with GSA to ensure that that building is not only energy efficient, but takes maximum opportunity to use natural light, as opposed to having to put artificial lighting in the building.

The issue with which you and I had a discussion has to do with using a single-entrance underground parking garage, as you mentioned, for season ticketholders. Madam Congresswoman, I evaluated that request very, very carefully. The exterior of the building has been hardened against terrorist attacks, as should be done in buildings built for the Government in a post-9/11 environment. The parking lot has not been hardened. I consulted security experts in this field and, to a person, they told me that it constituted too great a risk for the building and the employees of the building to allow parking of non-government employees in there.

I very carefully evaluated that request——

Ms. NORTON. Did you talk about how these people will have been vetted at a level beyond what Government employees have been vetted?

Secretary PETERS. Madam Congresswoman, I did. My responsibility at the end of the day is to ensure the safety and security of our employees and the building for which I have responsibility. I consulted safety experts. I have made a decision, and the decision is not one that does not look carefully at the option that you put forward.

Mr. OBERSTAR. The matter is one of great importance. It carries over from that of energy efficiency to one of security, and it is a matter that can be explored in further inquiries.

The gentleman from Maryland, Mr. Gilchrest.

Mr. GILCHREST. Thank you, Mr. Chairman. A quick comment, then a few questions.

Recently, I read this book called Human Options. It is about a 30 year old book by Norman Cousins, a journalist and author well respected from the 1940s through the early 1980s. There is a quote in that book that says, "history is a vast early warning system." So taking that quote into this framework, we can use both an understanding, being knowledgeable about political history with these issues and how they have been dealt with and how successful they have been, and both certainly from the early discussions here about

climate change, an understand of the geologic history of the planet is not unimportant for each of you to have a clear understanding of, as far as where do we go with climate change, where do we go with greenhouse gases with emissions from automobiles or power plants, or even where we park when we go to a baseball game.

So I would hope that all of you collaborate and integrate your ideas and your ingenuity, whether it is NOAA or USGS or the Department of Transportation, the Corps of Engineers, GSA, EPA, etc., because this is much bigger than one agency can handle. It is much bigger than one entity in the Government can handle. We have heard about silos and stovepipes and all of those things, and we have run out of time to deal with it in any way effectively. So I appreciate your time here and your efforts that you are all making in the individual agencies and departments that you represent, but it is so important, even with the remaining time in this Administration, for each of you to collaborate as much as is possible.

The first question I have is to Mr. Johnson. Mr. Johnson, how do you see the California new vehicle emission law affecting the rest of the Country and affecting the rest of the Country on how people purchase vehicles?

Mr. JOHNSON. Well, California has a petition before the agency now, which we are evaluating. We have two public comment periods, actually hearings, one here in Washington, D.C. on May the 22nd and on May the 30th one in Sacramento, California; and those are the very questions that we are asking as part of the petition process, is asking for public comment on the California petition requesting a waiver——

Mr. GILCHREST. Just on another level, though, do you see what California is doing as a very positive opportunity that the Nation can take advantage of, along with, I don't know, the several other States involved in that as well?

Mr. JOHNSON. Well, we are looking at the petition and we will await the public comments that we get before we comment on the merits or not of the petition. Again, the issue of global climate change is serious, and, as you pointed out, sir, it is one that requires really every one, from each of us as an individual, to departments, the Federal Government, to business and global.

Mr. GILCHREST. On that same line of thinking, as you respond to Massachusetts v. EPA with regard to the vehicles and other source of greenhouse gas emissions, how are you responding to that Supreme Court decision, in a collaborative fashion; an idea, well, greenhouse gases are not the same as coal particulates, they are not the same as mercury, but when we see the potential of sea level rise and the potential for various mosquitoes moving from one latitude to another latitude, there is an effect of that accelerated introduction of greenhouse gases that we haven't seen in geologic history. So if you could just give me some idea of how you are dealing with that issue.

Mr. JOHNSON. Well, we are in active discussions with all the departments, particularly the Department of Transportation, given the nature of Massachusetts v. EPA, and there are many complex issues, not only that present themselves focusing on the transportation sector, but also, then, what are the ramifications for other sectors given the Supreme Court decision. So it is a complex issue.

We are very actively working at all levels within the Administration to address this.

Mr. GILCHREST. Is this something that you think the Administration or EPA can handle under the existing structure of, let's say, the Clean Air Act, or is there some accommodation that needs to be made, some adjustment, or anything that Congress needs to do?

Mr. JOHNSON. Well, certainly, the President wants Congress to act on his 20-in-10 proposal of 20 percent reduction on our dependence on foreign oil in 10 years, the two components being the alternative fuel standard of 35 billion gallons and, of course, then, revising the cafe standard. So there is something, yes, that can be done legislatively. With regard to the Clean Air Act, it is a broad, sweeping authority and we are currently evaluating it in light of the recent Supreme Court decision.

Mr. GILCHREST. You think a cap-and-trade program similar to, but certainly more broad than, the one that helped significantly reduce acid rain, sulfur dioxide—or the matter in which we got lead out of gasoline or what we have done with CFCs—do you think that can play a role in this?

Mr. JOHNSON. Well, certainly, there are a lot of tools, ranging from voluntary programs, partnership programs, to cap-and-trade programs, to taxes, to a variety of other incentive kinds of programs that can all work to address the issue. At the moment, our focus, certainly at EPA, is looking at the Supreme Court decision and what does that mean for motor vehicles.

Mr. GILCHREST. Just a last question, Mr. Chairman, if I may.

Do you think we have the time to deal with greenhouse gas emissions based on the IPCC recommendation of trying to stay below 450 or 500 parts per million of CO2 in the atmosphere with a voluntary program by 2050?

Mr. JOHNSON. Again, I think that there are a variety of tools that we have, both domestically as well as globally. As you point out, it is not only just the United States, it is not just the European Union, but also developing countries. Certainly——

Mr. GILCHREST. I think, though, the U.S. has enormous influence around the world.

Mr. JOHNSON. In fact——

Mr. GILCHREST. And when the U.S. moves, people respond.

Mr. JOHNSON. Well, in fact, as a Nation, as I mentioned in my testimony, we, as a Nation, have spent, since 2001, $37 billion on research, on technology, and even some tax incentives, which is more than any other country in the world. So we are taking this issue very, very seriously. We have made progress. We clearly have more to do.

If I could, Mr. Chairman, one of the issues that came up about what individuals can do. Energy Star products, you know, that little blue star that is on light bulbs or on computers, last year, by Americans buying Energy Star products, they saved $14 billion—that is with a "B," billion dollars—in energy costs. And if you want to put that in terms of greenhouse gas emissions, that saved greenhouse gas emissions equivalent to 25 million automobiles, just by people buying products that have that Energy Star label, refrigerators, computers, light bulbs.

So clearly an opportunity, whether you are an individual, whether you are a Federal facility or commercial facility, here in the United States and around the world, we see people making a difference.

Mr. OBERSTAR. I thank the gentleman, who has now departed, for his questions and for your responses; it is right on.

In that spirit, there is a company in my district that manufactures an electric car that you can run for a whole year on what it costs you to run your refrigerator for a whole year.

The gentleman from Illinois, Mr. Lipinski.

Mr. LIPINSKI. Thank you, Mr. Chairman. I thank you for also holding this hearing. It is important that we look in all areas, especially those we see in transportation, to see how much energy is used. So we are looking at climate change, but also, just in general, trying to save energy and become more energy independent in our Country. It is very important to look at this.

I wanted to say to Chairwoman Norton that I don't know how long it took me before I actually realized that there were windows behind the curtains in these hearing rooms. I just saw it hanging there, I just thought they were decoration covering the wall, but I finally found out there were actually windows back there. I chose my office based on facing south. I won't have an office unless it faces towards the sun, so that tells you a little bit about where I am looking.

I want to ask Administrator Doan a question to first start. You had said that the GSA has an opportunity and responsibility to lead the Federal Government by example, and Chairwoman Norton also talked about the responsibility that the Federal Government has. It is not just the example that helps, but it has an actual impact on the market.

I introduced a bill recently, a bipartisan bill, the Bright Energy Savings Act, which directs the GSA to replace light bulbs. Whenever a light bulb is replaced—not to take all of them out right away and change them, but whenever a light bulb needs to be replaced, doing so with a high efficiency light bulb. Right now, most likely, this would be a compact fluorescent bulb, although later this year there is a new generation of halogen lights that will be coming to the market.

But the CFLs, right now use 75 percent less energy than the incandescent light bulbs. This results in a greenhouse gas emission reduction, reduction in energy used, and also it saves money. The estimates are about $43 over the lifetime of a bulb, for one bulb, and I have been told that there are about 3 million light bulbs in GSA buildings.

So I wanted to ask you mentioned a few things about what had been done by GSA in terms of lighting, although I wasn't exactly sure. You talked about light fixtures. I was wondering if there has been any effort to put in high efficiency bulbs in GSA buildings and what exactly has been done in this regard to lighting.

Ms. DOAN. GSA has actually employed several different strategies. One of the most basic, of course, is actually applying daylight harvesting strategies, such as interior and exterior lighting shelves that capture and redistribute the daylight throughout the build-

ings; working at limiting or eliminating incandescent lamps; reducing light wattages below the current standards.

For example, the old practice was 4 to 7 watts per square foot, and the new standard is 0.9 watts per square foot. Providing skylights in our buildings, wherever possible, so that we can bring in the natural light; limiting the window areas; providing exterior shading; installing blinds; locating closed office and conference space away from windows and placing open office areas by perimeter windows; using light-reflective colors.

In addition to that, we have daylight sensing automatic controls for lighting and daylight zones; technologies that split ambient lighting, task lighting for maximum efficiency; occupancy sensors in non-regulatory spaces; high-efficiency glazing.

This is actually a good news story for us. But most light bulbs, just to go back to that, are already high-efficiency light bulbs within our buildings. We work very closely with agencies to look at their desk lamps, for example, and starting back in 1990, GSA did a massive retrofit of all of our Federal buildings to address exactly the challenges that you just brought up, to try to increase that energy efficiency.

In addition, I would like to say we have some incredibly innovative new buildings. For example, the San Francisco Federal Building has a daylight harvesting technique that actually captures the daylight and it channels it back into the middle of the building. It is in a tower that is only 60 feet wide, and because of that it now is available to provide daylight to all the occupants. So by combining the efficiencies with having switched out and retrofitted light bulbs, as well as some inherent efficiencies in the new kinds of design and construction, I think we are doing quite a bit in this area; I actually have like 10 pages of lists that I could go through.

Mr. LIPINSKI. Well, it is great to hear that all this is being done. I would like you to get to me more specifics on, first of all—because I am hoping that—we have 65 cosponsors on this bill right now. I am hoping that we can do something on this, but I would like to have more specifics on how many bulbs out there have been replaced, how many have not been replaced, just so we have an idea about that, because I haven't been able to get information along those lines.

So if you could get that for us and also a little bit more specifics. It is great to hear all these things are doing done, but there are so many GSA buildings. It would be good to know more specifically how widespread this has been done. So if you can get those to me so that we on the Committee could see that, I would appreciate that.

Ms. DOAN. I would be happy to provide that information, and I will tell you I think you will be delighted when you read it because it truly is a good news story that GSA is putting forward. Thank you.

Mr. LIPINSKI. Thank you.

Mr. OBERSTAR. The gentleman from Texas, Mr. Lampson.

Mr. LAMPSON. Thank you, Mr. Chairman. Mr. Chairman, let me start by asking for unanimous consent to insert in the record words from our colleague, Congresswoman Eddie Bernice Johnson, who could not attend this hearing.

Mr. OBERSTAR. Without objection, the Subcommittee Chair's statement will be included in the record.

Mr. LAMPSON. Thank you. She states in here that under current law there are two highway programs which were started in the 1991 ISTEA law that she believes do support local efforts to combat greenhouse gases: Transportation Enhancements and the Congestion Mitigation and Air Quality Programs.

Those programs, dollar for dollar, as your own data show, do more to help the Nation curb harmful emissions by providing alternatives to solo driving, whether it is expanding transit or carpooling, improving traffic signalization, promoting innovative demand management strategies, or making non-motorized travel easier and safer; or the issue that I want to raise today, which is very contentious in Texas at the moment, and that is whether Texas elected officials can proceed to make policy decisions on the construction of highways without interference from the Federal Highway Administration.

I have a fairly lengthy statement to make and I have some questions within it, Madam Secretary, and I am going to ask that you respond to the questions that I have in the middle of my statement formally by writing, if you don't mind, but I have two questions at the end that I would like you to comment on.

I would like to refer and also ask, Mr. Chairman, that we put into the record a letter of April 25th, 2007, from the General Counsel of Federal Highway Administration in response to enquiries from the Texas Department of Transportation.

Mr. OBERSTAR. Without objection, so ordered.

Mr. LAMPSON. Thank you.

Within this letter, Mr. Rey, who sent the letter, says, "We urge you to support the spirit of a fair and open competitive process in whatever procurement procedures are adopted."

Mr. Rey was referring to legislation in the State of Texas. It is State House Bill 1892 that passed the Texas House and the Senate is now waiting for the governor's signature. The focus of Mr. Rey's concern is a highway project, State Highway 121, in the Dallas area.

Secretary Peters, I assume that you are in favor of a fair and open and competitive process in procurement. I certainly am. In fact, I would assume that the Federal Highway Administration, the U.S. Department of Transportation, and the Federal Government all are supportive of fair and open competitive procurement processes. I certainly am.

Mr. Rey may not be familiar with some of the relative events leading up to this decision in the North Texas Tollway Authority, NTTA, not to bid on State Highway 121 project, so indulge me and let me go through a few paragraphs and tell you all of this.

In January 2006, NTTA announced it was preparing to submit a proposal for the State Highway 121 project. Soon after the Texas Transportation Commission unexpectedly began a TxDOT comprehensive development agreement process for two significant projects that NTTA had spent years designing and shepherding through the environmental process.

These projects are the extension of the Bush Turnpike and the Southwest Parkway in Ft. Worth. By starting that process, NTTA

would be precluded by Texas law from carrying out the projects, and this sent an unmistakable message to NTTA concerning the consequences of its attempt to compete on that particular project. It occurred after private companies had complained that they could not and would not compete against NTTA. So Texas set about trying to fix that problem.

NTTA did not bid on State Highway 121 because almost an extortion by the Texas Department of Transportation, not out of its own free will. In February, TxDOT awarded a preliminary 50 year concession on this project to Sintra of Spain. Sintra's price was $2.8 billion. Sensing that Sintra's bid may not have been in the public interest, there began an effort by State Senator John Carona, Chairman of the Senate Transportation and Homeland Security Committee, to try to change that process. NTTA responded informally, saying that it could generate $6.3 billion for another region, and it is able to generate so much more because it has such a significantly lower cost than Sintra.

I don't think that you, Madam Secretary, would argue that the original procurement process was a fair and competitive and open process. Clearly, that was not the case. This House Bill 1892 in Texas is their attempt to correct significant mistakes and improper action by TxDOT. It provides an opportunity to NTTA to submit a formal bid on that project. We hope it will become the law and they will have that opportunity. We don't know what their bid will be, that will be forthcoming in the next week or so, but this process provides an excellent opportunity to test the hypothesis that has been stated so often that it takes on an aura of unquestioned truth, and that is that the private sector can deliver transportation projects faster, better, and cheaper, and can deliver at greater value to the public.

Now we can road-test that proposition to see if it is indeed true. If NTTA's initial estimate turns out to be anywhere close to the formal bid, hundreds of millions, if not billions, of dollars higher than the highest bid from the private firm, then we know that the public sector agencies can compete well against its private sector counterparts. The original hypothesis is more of an article of faith than a proven fact.

TxDOT received a letter from Ms. Janice Brown, the Texas Division Administrator of the Federal Highway Administration. In her letter, dated April 24th, she stated that, "In our view, any arrangement with NTTA would be a government-to-government agreement and we would treat the arrangement as a publicly owned and operated toll facility. Should TxDOT wish to re-compete the CDA after terminating the current CDA procurement process and seek a Federal highway grant loan, we would be forced to closely examine the circumstances of the new competition to ensure it met Federal requirements for fair and open competition."

Mr. Chairman, I also ask that this letter be put into the record.

Mr. OBERSTAR. Without objection, so ordered.

Mr. LAMPSON. Secretary Peters, is a government-to-government—and I don't want you to answer this right——

Mr. OBERSTAR. I want to encourage the gentleman to come to his question here.

Mr. LAMPSON. Okay, Mr. Chairman, I will do so and put the rest of this into not only a letter to Secretary Peters, but also into our record. This is a critically important problem for our State.

There were other letters that were written; there questions asked by Senator Kay Bailey Hutchison. There has been conflicting information presented back and forth through a course of several letters, and I wanted to put this into the record.

Mr. OBERSTAR. Is the gentleman asking for the Secretary to respond at this point?

Mr. LAMPSON. I will go straight to that right now, Mr. Chairman. I thank you for your indulgence.

I am confused by some of this. Statements in the letters that have been submitted by Mr. Rey in his May 10th letter seem to run counter, if not directly undercut the position that you have expressed and Senator Kay Bailey Hutchison's letter that you sent to her, so here are my two questions.

Where does this bill, H.B. 1892, supersede Federal highway laws, and can you give me your firm assurance that TxDOT can implement H.B. 1892 in such a way that would not affect Texas' ability to receive Federal aid highway funds?

Secretary PETERS. Congressman, I can answer your question, but I cannot give you an absolute. H.B. 1892 can be implemented without violating Federal law if the interpretation and the implementation that the State of Texas takes concerning the general assent clauses are consistent with Federal law. That is the very issue that I addressed in the letter to Senator Hutchison on the 10th of May.

The letter on the 10th of May from Mr. Rey to Texas DOT was in response to a different request from them, asking what they would have to do in order to ensure that H.B. 1892 did not violate provisions of law.

At the end of the day, same conclusion is there, but the letter that Mr. Rey wrote on May 10th, of course, is a much more lengthy legal interpretation based on specific questions that TxDOT asked.

But the bottom line of this issue is this is up to Texas to do this. We feel the discretion to pass this law, to implement this law is the State of Texas and the State of Texas alone. What we want to do through guidance that we have been asked to provide is to ensure that there is not a jeopardy in the use of Federal funds in that process.

And if I may speak specifically to the State Highway 121 procurement, as you indicated, once TxDOT started a procurement for a concession agreement on that particular project and then ultimately concluded that procurement process with an award, it is not possible to reopen that process at this time. The State of Texas may decide to cancel and to re-propose that project, but if they want NTTA to propose on that, it would have to be a government-to-government procurement, as opposed to getting private and public sectors bidding against one another in the process.

But, again, our only goal here is to ensure that Texas receives the full amount of Federal highway funds that is available to them.

Mr. OBERSTAR. I thank the Secretary for that response.

The gentleman has pursued an extensive line of inquiry that goes beyond the scope of the hearing on climate change, and the

gentleman will certainly want to pursue the matter further in another context.

Mr. LAMPSON. I thank you for your indulgence, Mr. Chairman.

Mr. OBERSTAR. The Chair recognizes the gentleman from New York, Mr. Arcuri.

Mr. ARCURI. Thank you, Mr. Chairman.

Thank you all very much for being here. I wish I had more time to chat with you and to draw on your expertise. You are all obviously very knowledgeable. Unfortunately, I just have a short time. I have a couple of questions that are more philosophical in nature.

Mr. Johnson, I would like to start with you. I want to qualify this first by saying you will be happy to know that it doesn't involve EPA. In our district we have a very large brownfield site that had a gasification plant on it. Our local DEC agency is proposing to deal with the PCBs by burning them, which by my understanding is one of the ways it was once dealt with. Our concern is that we are now going to be burning these and adding carbon to the atmosphere. Can you share some insight with us or your thoughts on that?

Mr. JOHNSON. Well, the first is we are major fans of brownfield sites being restored; I think it is one of the great success stories of the United States and the President's leadership and congressional support, and we are seeing that literally turning brownfields into greenfields across the United States. So that is excellent.

Mr. ARCURI. Well, that is one of our hopes, but our concern is, if you are burning it, are you actually turning it into a greenfield.

Mr. JOHNSON. Well, the second is that we do have a challenge with certain hazardous wastes, including PCBs, and incineration is one of the effective ways. Of course, we also ensure that that burning complies with all applicable air standards so that the air quality is not impacted. But as you note, the issue of climate change and whether it is waste or fuel are among the issues that we are trying to sort through as we speak, post-Supreme Court, focusing on motor vehicles.

Mr. ARCURI. Well, my concern is that they are dealing with the PCBs, but they are totally ignoring the fact that they are putting more carbon into the atmosphere, and the response tends to be, well, that is not really what our concern is, our concern is with the brownfield. And, again, this is not about EPA specifically, but it sort of goes to what we are talking about, the fact that we as a society and a government are not looking at this more in a global way, but in a very limited way.

Mr. JOHNSON. Well, again, the focus or the issues of global climate change, there are many sources, as was noted by one of the early slides, that approximately 30 percent of our greenhouse gas comes from transportation; about 40 percent from power generation; and then the remaining 30 percent from a variety of sources, from residential, from agriculture, from commercial buildings and others; and that as we look across the array of those sources, indeed, there are a number of tools that we have in our toolbox to address that, and we are working very expeditiously to sort through that.

But back on the brownfields, again, we are very delighted to see these brownfields across the Country turn into greenfields. It is good for the economy; it is good for the environment.

Mr. ARCURI. We are going to need your help on this one. So I think you will be hearing from me again.

Mr. JOHNSON. Okay. We would be happy to help. Thanks.

Mr. ARCURI. Ms. Doan, just a quick question for you, and it sort of piggy-backs on what Representative Holmes was saying. Just a question. We talk a lot about the market economy and what drives demand. Obviously, many things drive demand, but one of them obviously is, when you are dealing with an agency as large as yours, you can affect demand.

I would like to see every new home that is built fitted with solar panels, but we know that is not going to happen for a while because of the expense. Do you think your agency, if it were to require all Federal buildings to be fitted with solar panels, could help to enhance the demand and thereby help to perfect the technology for solar panels, making it more affordable?

Ms. DOAN. I think you are right, Congressman. GSA has an enormous ability to drive the industry. Because of the sheer volume that we purchase, we have an ability to influence. On the hand, I think you have to take into effect that legislation sometimes has an almost global effect on an activity, and we have to look at the solar panels as being useful in some areas of our Country, but perhaps not necessarily effective in others.

I think you will find that, at least within GSA, we are working enormously hard wherever possible to try to make use of solar power wherever it is possible in our design. For example, on the southern border on our Land Border Ports of Entry Program, we have enormous efforts afoot there because we have so much natural light, sunlight available for so many very hours of the day. As we mentioned, here in Maryland we have several projects, one of which is a huge, huge roof that benefits from the solar power. We have an effort up in Massachusetts where we are doing the same.

But I think what we try to do is we try to assess what is the best way to get the most energy efficiency for that particular location within the United States, and we have an enormous team of folks who are committed to the lead standard and who are trying very hard to make sure that we do that. We ourselves have committed, since 2002, to ensuring that each of our new building projects will configure to at least the silver standard with the LEED rating, and we have actually been pretty successful in that. But I think we do need the flexibility of choosing what is the very best possible solution, rather than having it legislated.

Mr. ARCURI. I thank the panel very much and I thank the Chair for this hearing. Thank you, sir.

Mr. OBERSTAR. I thank the gentleman for his questions.

Gentleman from Pennsylvania, Mr. Carney.

Mr. CARNEY. Thank you, Mr. Chairman.

I want to thank the panel. I was very encouraged by what I heard today.

Madam Secretary, I represent Northeast Pennsylvania, and a lot of my folks in the eastern part of the district actually commute into New York everyday, clogging the New Jersey roadways very badly.

In fact, it basically backs up from the Hudson River all the way to the Pennsylvania border on weekday mornings and in the evenings, of course. A couple hundred thousand, I think, spill out onto the roads every morning.

Is the Administration prepared to handle problems like this through expediting construction of new transit policies, rail in particular?

Secretary PETERS. Congressman, I think you make an excellent point, and that is the very basis of this congestion initiative that I spoke about earlier, is to look at a very broad range of solutions that can be brought to bear. Certainly, when that traffic is idling—and that happens around our Nation—we waste some 2.3 billion gallons of fuel every year just as a result of that congestion.

So we do want to work with communities, as I indicated earlier, to bring a menu of options and have the communities choose those that work best to address their specific needs. Certainly, public transportation is going to be a big part of that. In fact, part of what Mayor Bloomberg has proposed in this congestion pricing proposal that he has put out is he believes that it would generate some $400 million a year that he would like to put in to public transportation to expand public transportation and give people more of those options.

Mr. CARNEY. Things like intercity rail, etc.?

Secretary PETERS. Correct.

Mr. CARNEY. Okay, very good. Thank you very much.

Mr. Johnson, a pretty easy question, I think, but maybe not. When will EPA begin promulgating regulations based on the Massachusetts v. EPA decision?

Mr. JOHNSON. That is the million dollar question, sir. As I mentioned earlier, the Supreme Court decision leaves us with a very complex set of issues, and we are expeditiously reviewing those, but we will make an informed and a deliberative decision when we are ready. We understand and certainly have a sense of urgency, given the nature of global climate change, but we are actively talking about all options as the Administration and certainly under the authority of the Clean Air Act and what the Supreme Court said, so stay tuned, sir.

Mr. CARNEY. Do you anticipate this before January of 2009?

Mr. JOHNSON. Stay tuned, sir.

[Laughter.]

Mr. CARNEY. We will, certainly.

Ms. Doan, first of all, I want to thank you for what you have told us; it is very encouraging. The same information that you are going to provide my colleague, Mr. Lipinski, I would sure like it myself. Thanks very much.

In your opinion, do you think GSA has all the authorities it needs to pursue the highest, most efficient energy conservation initiatives?

Ms. DOAN. I thin GSA has a lot of resources, but there are some additional resources which, truthfully, we could use the help of Congress on. One of those would actually be to extend the renewable contracting authority. Right now it is only a 10 year window that we are allowed to contract for for energy. If we were allowed to extend that to about 20 years, that would allow the development

of additional energy sources to occur and we would be able to reap the benefit for our Federal Government clients of that reduced cost of energy. That would be an enormous help.

Another thing that would really help us is to have a little bit more flexibility in the prospectus process. As you know, that is a multi-year process to get buildings built, and it would be wonderful if we could be able to revisit the prospectus process and insert into it any sorts of energy efficiencies, newer developments and technologies that would help increase the energy efficiency.

And the very last thing would be able to extend the life cycle cost analysis. Right now it is about 25 years. If we could extend it to about 40 years or whatever would be appropriate for the kind of equipment involved. Obviously, if something's life cycle was 30 years, you wouldn't need 40 years, but use something appropriate; but up to 40 years, that would help enormously in both cost savings for the Federal Government, but also allow us to offer those energy efficiencies to our Government customers. So any help that you could give us in this area would be greatly appreciated.

Mr. CARNEY. I look forward to having conversations with you about that.

Ms. DOAN. Well, thank you.

Mr. CARNEY. Thank you very much. I yield back.

Oh, Mr. Johnson.

Mr. JOHNSON. May I just add one other note? That is, we at EPA have an Energy Star program that we are working with our other Federal colleagues on for buildings. That is, we are looking to have buildings be able to achieve an energy start rating, which is the top 25 percent of energy efficiency. There are a number of States, in fact, 30 States plus the District of Columbia, who have signed on and are interested. We have benchmarked 12,000 schools. That is 20 percent of the schools across the United States. Many communities. We have 165 existing Federal buildings that have actually earned the Energy Star label.

A number of things that are important about is that the first step is benchmarking what the building is actually doing so that you know what the energy consumption is and what those sources are so that you can then make informed decisions, whether it is changing a light bulb, buying a different computer, buying green power, those kinds of things. So there are a number of activities really across the Federal Government—this happens to be one that we administer at EPA—to help encourage not only from an environmental standpoint, not only from an energy security standpoint, but it also saves us money.

Ms. DOAN. Could I just jump in real quickly? I do want to let you know that we do have 120 Energy Star certified rated buildings, but one of the things you could also help us with is highlighting the Energy Star products that we have on our Federal Acquisition Services web site. So whenever you have an opportunity to direct folks attention to that area, that would help also.

Mr. CARNEY. Absolutely.

Ms. DOAN. Thank you.

Mr. CARNEY. I thank the panel.

I yield back, Mr. Chairman.

Mr. OBERSTAR. I thank the gentleman for his line of inquiry and Ms. Doan for your response on life cycle cost issue. I was not aware that you were limited to a certain number of years in life cycle cost. Is that by regulation or is that by act of Congress? What is the limitation under which you are operating?

Ms. DOAN. It is by regulation.

Mr. OBERSTAR. By regulation. You don't need legislative authority to go beyond 25 years.

Ms. DOAN. It is a little bit of both. Apparently, it is by regulation, but it is set by the national energy policy.

Mr. OBERSTAR. But that is not—I have tried for nearly all my service in the Congress to require GSA to move to a life cycle cost basis for construction of buildings not just for energy, but for all purposes, and we have encountered resistance, regardless of the administration. It has nothing to do with is in the White House, but more with who is at OMB. I swear when it comes to those guys at OMB with the green eye shades, if Castro came into power, they would all grow beards and still continue doing the same things they have been doing. They never change.

What we have to do is change that culture at OMB. First of all, we need a capital budgeting account for the Federal Government, which our former colleague on this Committee, Bill Klinger, Republican from Pennsylvania, and I worked on for years to establish. Now it is only an annex. The second was life cycle cost analysis on buildings, both for the Government-owned and for the Government-leased. That way you can build in energy efficiencies over 40 years and 50 years, instead of the short-term period that extends only to the lease or its extensions. That doesn't make any sense at all.

The Chair recognizes the gentleman from New York, Mr. Hill.

Mr. HALL. Is that Mr. Hall, Mr. Chairman?

Mr. OBERSTAR. I am sorry, Mr. Hall.

[Laughter.]

Mr. HALL. I don't know everybody here yet; there might actually be a Hill I haven't met.

Thank you, Mr. Chairman, and thank you all, our illustrious panel members. Just a couple of observations first, before the questions.

For the record, I would like to correct the Ranking Member's statement that nuclear power is emissions-free. It is not. It happens not to emit carbon dioxide.

I have a nuclear plant in my district, the Indian Point Nuclear Plant, which is currently emitting strontium-90 and tritium into the groundwater into the Hudson River, and I just read today that it has been found in the municipal sewer system of the Town of Buchanan. We also had a steam release of tritium a couple weeks ago, as well as many other problems, and it happens to be in the most densely populated part of the Country. Eight percent of the population of the entire United States lives within a 50 mile radius of that plant, and anybody who lives there knows that the evacuation plan is unworkable.

Moving on, however, I am very encouraged by all of your reports of the progress that you are making in the plans that you have. Administrator Johnson, I am glad you are for benchmarks. Seriously, I wanted to ask what progress is being made in terms of the effi-

ciency of the Federal vehicle fleet. How many vehicles that are supposed to be flex vehicles actually get, approximately, in your estimation, get to use flex-fuel, given the fact that, in our part of the Country, certainly, there aren't many pumps that are serving it?

Mr. JOHNSON. It is probably a response by both the Administrator and myself. It is true that flex-fuel, the availability, there are approximately 1,100 E85 flex-fuel stations in the United States. That is compared with about 170,000 fueling stations across the United States. So clearly there is still a greater need for having additional fueling stations that carry the E85 fuel.

With regard to the number of flex-fuel vehicles in the Federal fleet, I will turn it over to my colleague.

Ms. DOAN. I am not actually sure that there is any other agency in the Federal Government that has a greater commitment to alternative fuel vehicle than the General Services Administration. This year alone, GSA will buy 24,000 alternative fuel vehicles, and by the end of 2007 GSA will have almost 70,000 alternative fuel vehicles in its inventory, which will comprise a little under 51 percent of the inventory that we make available to our Federal customers.

But in addition to that, we take it one step further because then we recycle it into the private sector. When these vehicles have exceeded their useful life for the Federal Government, we then resell these to the private sector, and this year along we will probably sell about 11,600 of these vehicles, which will then put them into further use.

In addition to that, I actually, right after the President made his announcement in January, sent out a request to our fleet and asked them, as an entrepreneur, I love to get ideas, and I said I want every innovative idea you have, I don't care how wild it is, I don't care if no one else wanted to look at it; I wanted to see it, for what we can do to try to meet or exceed these requirements, and they came back to me a week or two ago with a proposal. But, truthfully, I am sending it back because it wasn't aggressive enough; it was not innovative enough. But we have an incredible record here.

I will give you the actual statistics for the breakup of the alternative fuel——

Mr. HALL. Maybe you could give them to me in writing, because I only have a minute left of my time.

Ms. DOAN. Oh, I am sorry.

Mr. HALL. No, it is okay. But I have a couple of questions that I would love to get the information.

Ms. DOAN. Okay. I would be happy to follow up in writing on that.

Mr. HALL. Thank you.

Secretary Peters, I wanted to ask you, given the concerns with energy dependence and the growing effects of climate change, why does the Administration propose to cut guarantee transit funding by more than $300 million fiscal year 2008 and eliminate the use of CMAQ funding for new start operations?

Secretary PETERS. Congressman, let me address the last question first. In terms of CMAQ funding for New Starts, there has been some discussion within the agency about the eligibility during the first three years for New Starts. That is an issue that we are ad-

dressing right now, so hopefully we will have that remedied in the near-term future.

In terms of transit funding, we funded every project that was ready to go with transit, both in the New Starts and in the Small Starts Program, that was ready to be funded at the time the President's budget was prepared and, in addition, reserved another $72 million for some projects that are still in the pipeline. We do understand that there is a desire to have more funding there, and we simply, as we all did in order to achieve reductions in the overall budget that was necessary to reduce the deficit, had to make some tough decisions, and this was one of those.

Mr. HALL. Thank you.

Just one last question for everybody. The Vice President, a couple years ago, made a famous statement, that conservation may be a personal virtue, but it is no way to build an energy policy, and you have all spoken very eloquently today about ways that we can use efficiency or conservation, which is the lowest impact way of our obtaining a usable barrel equivalent, or BTU or kilowatt hour, and if we save it, then it has less environmental impact than any way of generating it.

So combining that with the fact that the same steps that we would use to reduce global warming are the steps that we would need to reduce asthma and emphysema in our inner cities, especially, to reduce the increased storm frequency—in my district, all five counties I represent are currently under a disaster declaration by the State and the Federal Government because of the nor'easter that just went up the coast. There is now a named storm, Andrea, off the coast for the first time, I think, three weeks before the beginning of hurricane season. We just saw the mile and a half wide tornado that leveled Greensburg, Kansas.

These things, no one of them can constitute proof by itself about change in climate, but they are consistent with what these projections show happening if the worst case scenario were to develop in climate change; not to mention the fact that if we take these same steps to prevent global warming, we will also be cutting back on our balance of trade deficit, no longer shipping petro dollars to the Middle East, as Tom Friedman eloquently writes about, and paying for both sides on the war on terror because we are funding the madrasas through the oil dollars, and then having to pay for and give lives and time of our servicemen and women to go and fight against those people that we have been educating, and we will also cut back on the debt because we won't have to borrow the money to pay for that oil.

So, with those things together, would you—and this I guess is a simple question for all of you—consider that it is patriotic, it is not just good energy policy, but that, I mean, I would consider it and I would be curious if you would also consider it to be patriotic to save energy and to use the most energy-efficient vehicles, appliances, and practices that we as individuals all can?

Secretary PETERS. Congressman, I will start because I am at this end of the table. I think it certainly is in the best interest of Americans to do everything we can to conserve energy.

Mr. JOHNSON. Just to add to that, it is the near-term solution that we can make progress in improving energy efficiency. For the

intermediate and long-term, technology is the key, whether it be clean coal technology, more cost-effective solar, use of wind, hydroelectric, nuclear, other forms of power. Technology and investment in that technology will deliver us in the future.

Mr. WOODLEY. I would just briefly concur in that. We definitely need to place every emphasis we can on conservation.

Ms. DOAN. I agree. We lead by example at GSA and I, as the Administrator, also lead by example, using alternative fuel vehicles for my transportation. But I also think this conservation is good for America, and that can never be a bad thing.

Mr. HALL. Thank you all.

Thank you, Mr. Chairman.

Mr. OBERSTAR. I thank the gentleman for his thoughtful questions and for the panel for their responses.

I just want to pick up, Ms. Doan, on your response to Mr. Hall. You said that at a date in the future, which I didn't write down at the moment, you expect to have 70,000 alternative fuel vehicles. Does that mean that the total GSA—and you said that would be 51 percent—the total fleet is in excess of 140,000 vehicles?

Ms. DOAN. Yes, it is, it is about 170,000 vehicles.

Mr. OBERSTAR. A hundred seventy thousand. Okay, thank you.

The gentleman from Louisiana, Mr. Boustany, has been very patient, waiting for all of our Members on our side to go through their questions, and I appreciate his forbearance. The gentleman has a number of questions and may proceed.

Mr. BOUSTANY. Thank you, Mr. Chairman. I just have two final questions for Secretary Peters.

First of all, how much fuel is wasted each year as a result of highway congestion?

Secretary PETERS. Congressman, at a very conservative estimate, 2.3 billion gallons.

Mr. BOUSTANY. Thank you.

Mr. OBERSTAR. Let me put it another way, if I may intrude on the response. We consume three tanks of gasoline more a year per driver in America in the 68 major metropolitan areas that are the most congested in the Country, three tanks of gasoline more than we would if we could drive at posted highway speeds. That adds up to more than a week a year spent in your car than you would if you could drive at posted highway speeds. That is an enormous waste. That is a $68 billion congestion tax on America.

Mr. BOUSTANY. Exactly. I am glad you pointed those things out.

Thank you, Madam Secretary.

Secretary PETERS. Chairman Oberstar, if I may add, it not only wastes all that fuel, but vehicles burn fuel much less efficiently at that stop and go traffic and lower speeds, so it contributes disproportionately to emissions.

Mr. BOUSTANY. Thank you.

My final question is may State DOTs do not fully utilize their Congestion Mitigation and Air Quality funds because the requirements of the program supposedly are stringent. Do you think the States would find the program more attractive if they were able to use some of those funds for highway capacity expansion, particularly if the capacity expansion could be shown to improve air quality?

Secretary PETERS. Congressman, yes. I do believe in the greatest flexibility. You may know that before I had the opportunity and the pleasure to work with all of you, I was the director of the Arizona Department of Transportation. Flexibility is the key, giving State and local governments the ability to use the funds where they can make the biggest difference.

Mr. BOUSTANY. Thank you.

Mr. Chairman, that concludes my questions. I just want to thank the distinguished panel for spending this Friday morning with us.

Secretary PETERS. Thank you.

Mr. OBERSTAR. Ms. Doan, on page 11 of your testimony you describe the GSA Federal building in San Francisco using natural ventilation to cool the building, an example of avoiding energy use. Do you know how far back that goes?

Ms. DOAN. Excuse me?

Mr. OBERSTAR. Do you know how far back that goes in history?

Ms. DOAN. No, sir, I do not.

Mr. OBERSTAR. To the Romans. They diverted streams to run them through buildings and cool them. Napoleon located his sister on the Isle of La Tortue, off the north coast of Haiti, Colleen, and built a structure for her in the 1790s, 1800, roughly, and diverted a stream to run through the building to cool it for his precious sister, so she wouldn't have to sweat in the heat of the tropics. That is an old practice. I am glad you are rediscovering it.

In 1982, I, with several of our colleagues, traveled to Toronto, Ontario to observe Canada's energy conservation practices. A major public-private sector building occupied by eight agencies of the provincial government and private sector companies was entirely heated by solar power and entirely cooled by water running through and recirculating through the structure. So it is good that you are rediscovering these practices.

You, GSA, are the landlord of 367 million square feet of civilian office space and your testimony was excellent, it describes progress made. If we could fit—futurefit, not retrofit—all those Federal civilian office buildings with photovoltaics or other solar applications, do you have any idea how much of that $5,800,000,000 in annual energy cost we could save the taxpayers of this Country?

Ms. DOAN. We could save 30 percent.

Mr. OBERSTAR. It is more than that. It is a much greater number than that. And we intend to help you do that in this Committee. We have already moved to retrofit the Department of Energy with the south wall that was constructed with no windows, no doors for the purpose of a solar application, but it has never been done. Now we are going to do that. We passed a bill from this Committee through the House, pending over in the Senate. As soon as they can get through galactic discussions over there, broad public policy issues, come down to sole practical things, they will pass it, and we will take it out of the GSA Building Fund and make that a template for America. We can do that.

The cost of photovoltaics is now 25 cents a kilowatt hour. It was 1.75 in 1977, when I authored legislation, and got it enacted, President Carter signed into law to invest $175 million a year over three years to retrofit all Federal office buildings with photovoltaics and drive the cost down; use the private sector as the producer, the

Government as the consumer, the public as the beneficiary. The problem was Carter went out and lost the election in 1980, Ronald Reagan came in and abolished the whole alternative energy program. He just dissolved it with his 1981 budget. Well, we are going to turn that around. The cost of photovoltaics on its own has come down to 25 cents a kilowatt hour, and if we implement this program of converting Federal office space to photovoltaics, we can drive it down to below the 7 cents a kilowatt hour average from the investor-owned utilities. Isn't that a great benefit for the public?

Ms. DOAN. Chairman, I look forward to working with you on all the different ways that you and your Committee can help us save and conserve energy for the American people and for our Government clients. There is enormous opportunity out there and I think this could be a very exciting time for all of us. Thank you.

Mr. OBERSTAR. Thank you. I look forward to your cooperation.

[Applause.]

Mr. OBERSTAR. No outbursts from the audience. This is not a public demonstration.

Secretary Peters, we have a great opportunity in transit to make a substantial benefit. We started on this point earlier in my recitation of Mayor Bloomberg's statement about transit. If we had a 10 percent mode shift to transit, we could save the equivalent of all the oil we import from Saudi Arabia. That is 550 million barrels a year.

Now, what puzzles me is why the Administration's budget is $300 million short on the transit account for the coming fiscal year. Why is that?

Secretary PETERS. Mr. Chairman, as I mentioned earlier, we did fully fund every transit project that was ready to be funded, as well as reserved $72 million for additional projects. We simply had to make some tough decisions in our budget in order to keep the overall spending level down. But we did not sacrifice any projects that were either ready to go or in the pipeline ready to go.

Mr. OBERSTAR. Okay, I appreciate that you didn't sacrifice any projects that are ready to go, but you didn't advance the cause by that cutback, and I am badgering our colleagues on the House Appropriations Committee to increase the funding.

Secretary PETERS. Congressman, I understand that, Mr. Chairman. Also, there is over $1 billion each year that is flexed from highway spending to transit spending to help build transit projects throughout the United States.

Mr. OBERSTAR. Well, we have a great deal more that we can do, and if we made that mode shift, which Europe is doing and largely has accomplished, we can save enormous amounts of energy and impact on the environment. Furthermore, if we make an additional mode shift—and I want to compliment the Federal Highway Administration, it started under your direction there, with bicycling. I want to see us make a start on converting from the hydrocarbon economy to the carbohydrate economy and put people on the seat of a bicycle. Instead of burning 8 barrels of oil a year in your car, burn 86,000 calories a year on the seat of a bicycle. We can do that.

Munster, Germany, a little town on the western edge of Germany, on the Dutch border, was bombed to smithereens in World

War II. It has been rebuilt; 250,000 people. Mode share for bicycling, 48 percent. The mayor of Munster rides to work on his bicycle. They have parking for 4,000 bicycles in the center of the city, and they are adding more. They have a 20 foot head start for bicycles at intersections and a 20 second head start on traffic lights for bicycles. We can do that in America. Forty percent of all trips in Denmark are by bicycle; 35 percent of all trips in the Netherlands are by bicycle.

Tim Arnade, in the Federal Highway Administration, has led the way wonderfully with the Safe Routes to School Initiative, and I applaud you for your support of that initiative. We have got to change the habits of an entire generation of Americans. We have an opportunity to make a difference in childhood obesity and childhood type 2 diabetes. We can do that through the transportation account and have a beneficial effect on our environment.

Secretary PETERS. Mr. Chairman, in fact, many Americans agree with you. Since 1992——

Mr. OBERSTAR. I want to see a little enthusiasm.

[Laughter.]

Secretary PETERS. Mr. Chairman, in 1992, only $23 million was spent in bicycle and pedestrian activities. Today, because of flexibilities that you and your colleagues have included in laws, that amount has increased to $396 million in fiscal year 2006; and with the Safe Routes to School Program getting underway, it is expected to go even higher in the future.

Mr. OBERSTAR. Let me supplement that by saying since I crafted the language for bicycling in ISTEA in 1991, we have invested $3.5 billion in bicycle facilities, built nearly 40,000 lane miles of bicycling facilities across America. Last year, more bicycles were sold in America than automobiles, and that is a good thing for the Country.

One last observation. Secretary Woodley, one of the issues that we have dealt with extensively for the Corps of Engineers is watershed management of water resources on a watershed basis. The Corps has sporadically addressed the issue in this way. I want to see the Corps addressing our water resource issues in a systematic way in this climate change era, where we are seeing extraordinary variations; excess water in one area of the Country, deficit in another. The Upper Midwest, the Great Lakes watershed, for example, is going through, now, its fifth year of drought, and, yet, just to the west of us, in the Red River Valley that drains north to the Canadian watershed, they have an excess of water.

What direction have you given the Corps to address the issue of watershed management of our resources?

Mr. WOODLEY. Mr. Chairman, one of the most significant initiatives that we have taken in this Administration, is to craft and put in place a strategic plan for the Corps of Engineers that stresses the need for watershed based planning. We have embraced initiatives of the Congress to further that aim. It is one of our intents to continue our planning and to enhance our ability to look at watersheds as systems and to, rather than approach not only our planning and construction, but also our operation and maintenance over time, using the watershed as the fundamental basis. That is a different way of thinking. There is a little bit of resistance to it

in some quarters, but we believe we are making progress on managing our assets and also on having our planning basis using the watershed approach.

The real significance of this and the power of it, Mr. Chairman, is that we have a tendency in this Country and the political wisdom of our forefathers has been to use the waterway and the stream bed as a political boundary. If you go to Mr. Boustany's part of the world, you will see that the Sabine River is on one side and his district is right there. If he looks across that great river, he will see not only a different district, but a different State of the union, and that is quite common along the Mississippi as well. So our work——

Mr. OBERSTAR. But climate doesn't respect political boundaries.

Mr. WOODLEY. None of the things that we are talking about today respects those political boundaries. So what we need is a comprehensive and collaborative effort to cross those boundaries, to reach across them, and that is what I have charged the Corps of Engineers and what the President has charged the Corps of Engineers, in the area of water resource development, flood damage reduction, and storm damage reduction, and water resource development in general to be the catalyst for that collaborative effort.

Mr. OBERSTAR. Thank you. We made a start on that in the WRDA bill that the House passed. We are going to expand on it in the future, and there is probably no place in America more reflective of the need for comprehensive watershed management than the wetlands and the shoreline, the coastline along East Texas, all through Louisiana, Mississippi, and on to Alabama.

If the gentleman has any comment on that.

Mr. BOUSTANY. I would just appreciate Secretary Woodley's comments, because clearly, as we know down in Louisiana, that is the approach that needs to be taken; otherwise, we are going to continue to have problems as we separate parts of how we manage water, dealing with maybe just transportation issues versus some other aspect of it. Clearly, a comprehensive approach is necessary. Thank you.

Mr. OBERSTAR. The gentleman from New York, Mr. Hall, has another question.

Mr. HALL. Thank you, Mr. Chairman.

Thank you to all my absent colleagues so that I could get one more question in.

I was wondering, given the sort of medium and worst case scenario projections of the IPCC, among others, for sea level rise and the fact that we are sitting almost on the banks of the Potomac, which is part of the Chesapeake estuary, which is affected both by sea level and, of course, by tides, and then, in the case of storms, by wave action on top of the tides, Secretary Woodley, has the Corps done, or are you thinking of doing any projections—and I guess this would be for Administrator Doan as well—projections as to the effect on Government buildings and on the D.C. area in general of 15 to 20 to, worst case, 25 foot rise in sea level?

I am on the Select Committee on Climate Change, Energy and Dependence, and we heard testimony from insurance and reinsurance executives, and former CIA Director Woolsey and others that they consider, depending on how quickly we act and how effectively

we and other countries that we have no control over, act around the world, we may be looking at, at least the middle case scenario of sea level rise, we might get the best case if we act really fast. Thoughts on that?

Mr. WOODLEY. The answer to your question is somewhat complex, but the basic answer is yes, we have. The rest of the answer is a little more complex. The basic answer is that we are examining and seeking to understand the potential scenarios for climate change so that we can apply them in individual cases. The complexity arises because the Administration does have a plan for a project to improve the storm damage reduction capacity for the National Capital area, and I regret to say that we proposed that in our President's budget for two years running, and in each of those two years it was removed during the congressional process, and we have not proposed it again based on what we understood the guidance that it was not something that the Congress wanted to proceed with. So I would be willing, if anyone is interested, to continue that discussion.

So the answer to your question, like the answer to most questions in the civil works program, the answer to your question is yes and no.

Mr. JOHNSON. Just to add, there is a forthcoming report from the U.S. Climate Change Science Program this fall, late winter that is actually looking at the impacts and the vulnerability of our coastal wetlands and impacts of global climate change. So that is something. NOAA is leading the charge. Actually, there are going to be some public hearings I think beginning in the next couple months. So on the coastal wetland issue, that vulnerability assessment is well underway.

Ms. DOAN. And at GSA we have some firsthand experience with this because, after the flooding that we experienced last year in the Metro D.C. area, we realized that what we need to do is look more closely at our portfolio of properties that are in D.C. to see what do we need to do to ensure that what happened at the IRS building would not happen to those particular buildings where we had extensive flooding because of the extraordinary volume of rain that happened during that time frame. So we have begun taking a very close look at our portfolio on this very issue.

Mr. HALL. Thank you all.

Thank you, Mr. Chairman.

Mr. OBERSTAR. I thank the panel for their perseverance, for their thoughtful responses, and frank, candid responses to our questions. You have added substantially to our fund of knowledge on the subject, and this will be a continuing dialogue as we go forward. Thank you. The panel is excused.

Our second panel includes Acting Architect of the Capitol, Mr. Stephen Ayers, and the Chief Administrative Officer for the House of Representatives, Mr. Daniel Beard.

Gentlemen, thank you for being with us. Your statements will be included in the record, and you may proceed with your opening statement.

Mr. Beard?

TESTIMONY OF DANIEL P. BEARD, CHIEF ADMINISTRATIVE OFFICER, U.S. HOUSE OF REPRESENTATIVES; STEPHEN T. AYERS, AIA, ACTING ARCHITECT OF THE CAPITOL AND DEPUTY ARCHITECT/CHIEF OPERATING OFFICER, UNITED STATES CONGRESS

Mr. BEARD. Thank you, Mr. Chairman. I appreciate the opportunity to appear before the Committee to discuss Speaker Pelosi's green capital initiative.

On March 1st, the Speaker, the Majority Leader, and the former Chair of the Committee on House Administration directed me to develop a series of preliminary recommendations to reduce environmental impacts associated with the operation of the House office building complexes.

As they noted in the letter, the House sought to demonstrate leadership to the Nation by providing environmentally responsible and healthy working environments for our employees.

I undertook the review of House operating procedures and made recommendations on April 19th in six general areas. The Speaker has endorsed these recommendations and has written to the architect and myself, directing that we implement them.

Before discussing the changes, I would like to just talk briefly about the carbon footprint of the House of Representatives.

Using figures that were developed by the Government Accountability Office and reviewed by Lawrence Berkeley National Labs, we estimate the operation of the House complex is responsible for 91,000 tons of greenhouse gas emissions in fiscal year 2006.

Electricity use accounts for 63 percent of that. The Capitol Power Plant accounts for another 33 percent; and all other business-related uses for the remainder of the carbon dioxide emissions from the House.

The Speaker has directed the following changes in the operation of the House. First, she has made a decision to operate the House in a carbon-neutral manner until the earliest possible date, certainly no later than the end of the 110th Congress. By implementing this recommendation, we will be eliminating the 91,000 tons of greenhouse gases identified, which is equivalent of taking 17,200 cars off the road.

Second, the purchase of electricity is the largest source of our carbon dioxide emissions for the operation of the House, and to assist in achieving our carbon-neutral goal, we will purchase 100 percent of our electrical needs, our electricity needs, which is approximately 103,000 megawatt hours a year, from renewable sources at the earliest possible date. By implementing this recommendation, we will be reducing our carbon footprint by 57,000 tons, or the equivalent of 11,000 cars.

Third, the Speaker has directed a series of immediate actions to reduce energy use. These include converting all 12,000 desk lamps in the House office buildings to compact fluorescent bulbs, converting the overhead ceiling lights to high-efficiency lighting and controls at the earliest possible date, and making compact fluorescents available at the House office supply store at cost to House employees.

The House is a major purchaser of goods and services and products, and the Speaker has directed us to demonstrate leadership in

that area as well. We are directed to purchase only office equipment and appliances that are certified through Energy Star, Federal Energy Management, or the electronic product environmental assessment tool.

We are directed to give priority to the purchase of adhesives, sealants, paints, and carpets manufactured by companies that offset life cycle contributions of greenhouse gas emissions and we will be finishing the installation, the Architect's Office will, of an ethanol tank, pump, and related infrastructure for House vehicles.

To provide leadership on climate change and sustainability issues, we will hold a Green Expo for House offices, show employees how they can make a contribution to impacting climate change at home or at work, and establish a green building, a revolving to fund energy and water conservation initiatives here on the campus.

But even by implementing all of these measures, the House may not operate in a carbon neutral manner. As a result, the Speaker has directed me to recommend a strategy for offsetting our remaining greenhouse gas emissions by either purchasing offset credits or investing directly in mitigation or energy conservation projects. Since the domestic offset market is in its infancy and lacks uniform national standards, I think it is important for the House to approach this issue very carefully.

The recommendations in the Speaker's initiatives are only the first step in the process of creating a green Capitol and more sustainable House operations.

My final report is scheduled for release on June 30th, and it will contain additional recommendations and provide a framework for guiding our future activities. In the June 30th report, we will have benchmarks for energy use, goals for reducing energy and carbon and timetables for implementing various changes in our operating conditions as well as measures for reporting progress on a regular basis.

Again, I thank the Committee for the opportunity to appear and testify this morning.

Mr. OBERSTAR. Thank you very much, Mr. Beard, an excellent statement.

Mr. Ayers.

Mr. AYERS. Mr. Chairman, Members of the Committee, thank you for inviting me here today to discuss the initiatives and projects the Architect of the Capitol has undertaken over the past several years to conserve energy across the Capitol complex.

We appreciate the Congressional leadership's commitment to reduce energy consumption. As Mr. Beard noted, we recently received direction from the Speaker to complete a number of energy saving initiatives during the 110th Congress. She has our commitment to help achieve the goal of operating the House in a carbon neutral manner.

We will also continue to work with Mr. Beard's office as he finalizes the green Capitol report, and I believe that our individual actions can add up to a tremendous collective effort and can produce significant results in taxpayers' dollars and conserving our natural resources.

On behalf of the Congress, AOC is complying with the requirements and goals of the Energy Policy Act of 2005. Under the act,

the AOC was required to reduce energy consumption in 2006 by 2 percent. I am pleased to report today that we and the Congress have exceeded that goal of 2 percent by reducing our energy consumption by 6.5 percent in fiscal year 2006.

We exceeded this goal through a variety of projects and programs. Just to mention a few, we have initiated a pilot program in the House office buildings to install dimmable ballasts in stairwells, we are replacing conventional incandescent bulbs with compact fluorescent bulbs and are installing occupancy sensor switches in offices, conference rooms and Committee spaces upon request.

In addition, we are installing restroom fixture motion sensors and low flow devices to conserve water. We have upgraded elevators and escalators with energy efficient equipment, and we are installing modern heating and cooling systems, and replacing old inefficient windows with airtight insulated units.

We have implemented a policy requiring the purchase or leasing of alternative fuel vehicles and are using energy savings performance contracting to increase building energy efficiencies and upgrade infrastructure, and we have contracted for 3 percent renewable energy in 2007.

Active participation by Congressional and other offices in our recycling program has been significant to its success in recent years. Last year, we recycled nearly 2,300 tons of paper, and over the last five years the total tonnage of non-contaminated recyclable wastes has tripled, while revenue from the recycling program is now up over 60 percent.

The AOC has initiated two energy savings performance contracts, and we plan to utilize more to achieve a portion of the required energy reductions under the Act. Our goal is to utilize the performance contracting process in all of the major buildings across the Capitol campus. These contracts allow the AOC to initiate energy savings projects with little up-front appropriated funding.

To ensure that our efforts save energy and save taxpayer dollars, we are planning to conduct additional energy audits. To date, five have been conducted, and our goal is to conduct audits on all buildings on a five-year rotating schedule. Funds have been requested in our FY 2007 and 2008 budgets to continue this important process.

In addition to the energy audits, we have completed studies to identify projects, techniques, and policies which can be implemented to save energy. For example, we are currently evaluating the viability of adding cogeneration capability to the Capitol Power Plant which could provide steam, supplementary electricity, and backup power to the Capitol complex and reduce emissions by more efficiently capturing energy output.

As I mentioned earlier, the AOC and Congress were able to achieve a 6.5 percent decrease in energy consumption for FY 2006 despite the added energy load of additional facilities across the Capitol complex. It is important to note that the largest single contributor to our energy reduction efforts was the Capitol Power Plant. Between 2003 and 2006, the Plant cut its electrical consumption by 6 percent and fuel energy consumption by over 12 percent as a result of new and improved energy efficiency measures implemented there.

Looking ahead, there are a number of initiatives we plan to implement to ensure we meet or exceed the Energy Policy Act of 2005 of reducing our energy consumption by another 2 percent in fiscal year 2007. We will continue purchasing renewable energy and use energy savings performance contracts.

By practicing energy efficiency management, we save taxpayer dollars, reduce greenhouse gas emissions and protect the environment. Our actions and the actions of Congress are making a difference and have saved energy across the Capitol complex. We agree with the Congress that we need not only to comply with the Energy Act but we need to be leaders in the national effort to save energy. As stewards of the Capitol complex, we will continue to do our part to make this goal a reality.

Thank you, Mr. Chairman.

Mr. OBERSTAR. Thank you very much, both of you, for testimony and for the well documented information submitted to the Committee about the works in progress and the achievements to date of greening the Capitol. We need to pursue this matter with great vigor.

I recall, in 1977, debate in the Senate on portions of then President Carter's energy program. In the course of the debate, then Senator Jennings Randolph of West Virginia held up a thermometer in the Senate chamber—this was February—and said, we can do better. Look at this room. It is overheated. It is over 72 degrees in here. We can put on sweaters, and we can have a lower temperature and save all this energy.

The next day, the Senate began and Senator Randolph held his thermometer up and said, look at that. It is now 68 degrees. Think of all the energy we are saving.

A reporter asked the Architect of the Capitol, what did you do?

He said, well, we can't modulate the temperature here under the circumstances in which we operate, so we just opened up the outdoor air vents and let more outdoor air into the chamber and cooled it right down.

[Laughter.]

Mr. OBERSTAR. Senator Randolph was not amused by that answer.

I hope you have more ability to modulate. According to the testimony you have submitted, apparently you do.

What we have here is a district heating and cooling system, is it not, in the Capitol compound. It is cogeneration.

Mr. Ayers, I liked your comment about retrofitting. You can start with windows in this room right here. There is a window right back here. When the wind blows, it whistles in this room, howls, and you can see the curtains move. That is not very efficient.

Mr. AYERS. No, sir, it is not.

Mr. OBERSTAR. We have asked many times to fix that. People come with caulking guns, and nothing seems to work. So you could make a start on it right here.

On a more serious question, is the generation facility for the Capitol able to move? Are the boilers able to accept material other than coal? Can you fuel switch?

Mr. AYERS. Yes, sir.

Mr. OBERSTAR. Use wood chips, for example.

Mr. AYERS. We cannot currently use wood chips. We have seven boilers at the Capitol Power Plant which create steam to heat and humidify the 23 buildings and nearly 15 million square feet of space across the Capitol complex, and of those seven boilers, two of them burn coal. The remaining five burn oil or natural gas. So we are able to modulate between those.

Mr. OBERSTAR. There is some fuel switching between oil. You can use natural gas. You have a sufficient supply line to the boilers.

Mr. AYERS. We have a sufficient supply line for our current operation, yes, sir.

Mr. OBERSTAR. Could the entire system be switched to natural gas?

Mr. AYERS. Yes, certainly, we believe it can.

Mr. OBERSTAR. I am just asking technically whether that can be done.

The second question is there certainly is an environmental benefit. Is there a cost benefit or is it more costly to operate on natural gas?

That may depend on time of year and pricing and the marketplace.

Mr. AYERS. Certainly, the way we create steam now is based on a formula of a most economical scenario between coal, natural gas, and fuel oil. Over the course of the last six years, we average about 48 percent coal and another 40 percent or 45 percent natural gas and the reminder, fuel oil.

To the question of can we convert completely to natural gas, yes, certainly. Five of those boilers now are capable of fully running on natural gas, and the remaining two that primarily burn coal would take some significant retrofit on the order of a 7 to 10 million dollar retrofit of those two boilers to convert them to 100 percent natural gas, but it certainly could be done.

In terms of future costs, in today's market, natural gas is certainly much more expensive than coal and fuel oil, and we would estimate that an 8 to 10 million dollar-a-year increase in our annual utility bills would result by burning 100 percent natural gas.

Mr. BEARD. If I could add, Mr. Chairman.

Mr. OBERSTAR. Go ahead, Mr. Beard.

Mr. BEARD. I think it is important to add to this debate, though, that if we switch to 100 percent natural gas, we would certainly have a significantly reduced environmental footprint and carbon footprint. Right now, the Congress is the proud owner and operator of a facility that is the second largest point source pollution in the District of Columbia.

And so, I think there is a significant environmental benefit associated with moving to 100 percent gas. The Architect of the Capitol tried to do that in 1980 and was convinced to do otherwise in some very persuasive ways.

Mr. OBERSTAR. I don't think it was a matter of convincing. It was a matter of shutting down the Architect and saying it will be done this way. I remember that.

Mr. BEARD. Yes.

Mr. OBERSTAR. I remember that episode.

Mr. BEARD. But I also think that is an important debate to have, especially for this Committee and the leadership of the House of

Representatives, certainly, and this isn't a partisan issue at all. It is a very bipartisan issue. There has been very strong support in the House anyway for converting to 100 percent natural gas.

We also get some pushback from some of the coal State members as well.

Mr. OBERSTAR. I understand that.

Now supposing that the Capitol Power Plant operators had to go out and purchase credits in the marketplace. We were just working over the other agencies of the government and the Executive Branch and pushing them on initiatives they can and should be taking for life cycle energy costing and more energy efficient buildings and a more energy efficient fleet in GSA, a vehicle fleet in GSA. We need to be doing that ourselves here in the Capitol complex.

So if you had to go out and purchase credits for let us say a rain forest in Ecuador or Bolivia as has been done, reserve an area of forest from harvesting that would absorb the equivalent of the CO2 emissions of the Capitol Power Plant, what do you think that would cost?

Mr. AYERS. My understanding in our conversations with Pepco Energy Services is that is about $5 a metric ton.

Mr. BEARD. So I think in that case it is not as expensive as one would anticipate. I think the more important thing, and this is why the Speaker has directed that I develop a strategy on how to approach the offset problem between now and the end of June.

We are using taxpayer funds, and we have to be extremely careful that we are not investing in some fly by night scheme to offset credits. And so, we have to make sure that whatever offset choice we pick, at least for the House from the standpoint of the House of Representatives, we want to be absolutely certain that what we do withstands a public scrutiny test on behalf of all the Members.

And so, I think that is probably the biggest challenge we have because the offset market is a fledgling market. It is much more mature in Europe. In the E.U. and in Europe, it is a much more mature market. It is a safer market, but here we have got to be very careful.

Mr. OBERSTAR. I am going to yield to the gentleman from Louisiana.

I am not a great fan of emissions trading and of credit purchasing. I think it is a fine interim step. It is not a long term solution.

The case I just cited a moment ago is not theoretical. It was an actual case of a power plant in the State of Ohio that purchased credits in a rain forest in Ecuador that was slated for logging, and they purchased it or provided money to it for the government of Ecuador to take it off limits for logging and preserve substantially more carbon absorbing capacity in that rain forest than the power plant was emitting itself.

That is good for the interim. We need to have longer term solutions.

The gentleman from Louisiana.

Mr. BOUSTANY. Thank you, Mr. Chairman.

First of all, thank you for your testimony. It was very informative, and it highlights the magnitude of the challenge that you

face to meet these goals environmentally and yet dealing with the cost that is going to be incurred, especially with an aging infrastructure and so forth.

Mr. Ayers, I think in your testimony you mentioned that you are studying replacing the Rayburn roof with a photovoltaic roofing system. Is the existing roof system or roof near the end of its useful life or are we going to remove the existing roof while it is still functional? Can you give me an indication of where we are with that?

Mr. AYERS. Yes, sir. We are actually undertaking two feasibility studies now, one of the Hart Senate Office Building and one on the Rayburn House Office Building, and both of those buildings were selected because those roofs are coming up on the end of their useful lives.

We recently completed comprehensive condition assessment surveys of all of our buildings, using an independent vendor, and have mapped out the life cycle of all of our facilities. So that is why we picked those two because they are nearing the end of their useful lives.

Mr. BOUSTANY. You have accounted for the timing and all that.

Mr. AYERS. Yes, sir.

Mr. BOUSTANY. Good.

You mentioned that the Architect of the Capitol was able to achieve a 6.5 percent decrease in energy consumption in fiscal year 2006 despite adding new space and new construction with the Capitol Visitors Center, the National Audio-Visual Conservation Centers.

What steps were taken in the construction of these new facilities to make them more environmentally friendly?

Mr. AYERS. Certainly, primarily in the Capitol Visitors Center, for example, we have selected premium efficiency motors and equipment, installed compact fluorescent lighting throughout, motion sensors in all of the appropriate rooms, low flow plumbing equipment. In addition, of note on the Capitol Visitors Center, we are recycling 50 percent of our construction waste.

On the National Audio-Visual Conservation Center in Culpeper, Virginia, which is a partnership between us and the Packard Humanities Institute, that is our first green roof under our auspices, the first green roof we have designed and implemented. So that is our sort of foray into that technology.

Mr. BOUSTANY. I thank you.

Mr. Beard, how does our carbon footprint in the House of Representatives complex compare to the carbon footprint of all Federal agencies and private companies as well that employ a similar number of employees?

Mr. BEARD. I would have to double check for the record, but my guess would be it would be higher. We have aging infrastructure. I mean our portion of the Capitol is the year 1800, 1790. The Cannon Building is 1901, Longworth, 1930, and this building, 1964, I think, and the Ford Building, I don't know when the Ford Building was built.

But I think that in the private sector, what we are trying to do is something that every major corporation in America is doing and every major institution, university campus and system is doing as well. They are trying to reduce their energy and water costs and

promote energy and water conservation, reduce costs and reduce their carbon footprint at the same time.

We are not that big. I mean we are six million square feet on the House side and approximately 10,000 employees. There are universities in your district, I am sure, that are larger than that. So our problems are not that unique.

What makes us really unique and the challenge that the Architect's Office has is the historical nature of our buildings, the tremendous public use that we get of our buildings and then the fact that we have a board of directors that consist of 440 members which, on occasion, can make things challenging and interesting.

[Laughter.]

Mr. BOUSTANY. Thank you.

In your testimony, you outlined a significant number of proposed changes in the operation of the House. Could you give us an indication of the increased costs associated with these changes? Can you give us a little more information on that?

Mr. BEARD. I would be happy to do that for the record.

It is going to cost more, particularly purchasing. I think we have tentatively identified approximately $4 million of increased costs that will be included. We are negotiating with the Appropriations Subcommittee, probably somewhere around $4 million in additional costs.

But that has to be offset by the reduction in operating costs that we will receive. I mean it is easy to downplay compact fluorescent light bulbs. The payback time on something like that is three, four months. And so, we anticipate replacing just all the lamps with compact fluorescents will save up to $250,000 a year on our electricity costs, just from lamps, and that doesn't include all the overhead lighting and all the other things that we have suggested.

Mr. BOUSTANY. Is there a plan to shut down the Capitol Power Plant?

Mr. BEARD. Not that I am aware of. I would say, though, that the Capitol Power Plant is a major issue, given the problems with asbestos and coal and other kinds of things, and it is something that Ms. Norton and Mr. Hoyer and Mr. Moran and Mr. Davis and a lot of other people have mentioned quite frequently. But I think it is a major issue of how we approach that problem in the future.

Mr. BOUSTANY. Okay, thank you.

Mr. BEARD. Thank you.

Mr. BOUSTANY. I yield back.

Mr. OBERSTAR. I thank the gentleman for his questions.

I just want to follow up on that last point about light bulbs. The gentleman from Florida, our Ranking Member on the Full Committee, described the painful process he went through to change a light bulb or get a light bulb changed. You are going to do 10,000 of them, 12,000, I think you have in your statement, Mr. Beard. It is not going to be that painful, is it?

Mr. BEARD. My suggestion to him is the next time that happens, take the form, rip it up, pick up the phone and call me or call Stephen. We will have somebody there, and we will change it.

Mr. OBERSTAR. I would just go and change it myself.

Mr. BEARD. Yes or that.

Mr. BOUSTANY. They better be careful about what they ask.

Mr. BEARD. The Speaker has directed that we change out 12,000 bulbs over the next six months. We have the money to do it. We have the people. It is just the process of getting around to doing it.

We have already done. We did 2,000 in one day or a few days. It was done by the Architect's Office. So we have the ability, and we are going to do it.

Mr. OBERSTAR. I have converted my modest, little home in Chisholm, Minnesota, with those CFLs, and they work wonderfully. I don't have to worry about light bulbs burning out. At whatever, $6, $7 a light bulb, at first, I was taken aback by the cost. I said, well, you know, we have got to start somewhere. Let us start right here.

Mr. BEARD. I would encourage you to come down to the House Office Supply Store and you can get them at cost. We are selling them at cost.

Mr. OBERSTAR. Oh, my goodness, well, that is great.

Have you conducted a survey or an estimate of what the costs and benefits would be of converting the Capitol complex to photovoltaics or other solar applications?

Mr. AYERS. No, sir, we haven't done that, but we are doing a feasibility study for converting two buildings now, the Hart Building and the Rayburn Building, but we have not done a comprehensive analysis of all our inventory and what those costs and paybacks would be.

Mr. OBERSTAR. Do you remember? Well, you were still in college at the time, I am sure, a few years ago.

Mr. BEARD. I wasn't. I am almost as old as you are.

Mr. OBERSTAR. I didn't say that to you, Mr. Beard.

[Laughter.]

Mr. OBERSTAR. I was part of a group that caused a major experiment on the Ford Building to fit it with photovoltaics, and they were installed and operating and we thought very successful. Then after a few years, they just disappeared. Does the Architect of the Capitol have records on that period of time and what the results were?

Mr. AYERS. I believe we do, Mr. Chairman, and I will research that for the record.

Mr. OBERSTAR. Could you that dig that out for us, supply it to the Committee for the record, so we have it available?

Mr. AYERS. Yes, sir, certainly.

Mr. BEARD. If I could add, Mr. Chairman.

Mr. OBERSTAR. Yes.

Mr. BEARD. I think what is important is that I would certainly be hesitant that the Congress get in the power generation business itself, at least the House getting in the power generation business.

But I think we have worked, we have met with Pepco, and we have told Pepco that we want 100 percent renewable power. They have been very accommodating and said simply, we can meet your needs, and we can meet that with either solar, wind or other sources of renewable gases, municipal landfill gas and others. They have that available to them through their grid, the PMJ grid.

Mr. OBERSTAR. A concept that is both old and new is that of district heating and cooling where you have a central generating facility that also uses the steam cooled down to hot water or to dis-

tribute as steam throughout a defined geographic district. That was a fact that was very popular in the iron ore mining country of my district but also elsewhere around the Country, where each city had its own municipal power plant. That municipal power plant then fed the steam through a piping system to the community.

We had entire cities that had no chimneys. People would come from the metropolitan area of Minnesota up to the iron range to the City of Buhl and Virginia and Hibbing and stand in admiration of these homes that had no chimneys.

But then it became costly to maintain the piping system and to keep them insulated, keep the underground pipes insulated, especially in those cold winters that we experience in northern Minnesota. Eventually, the system deteriorated as communities didn't have enough money to use on the maintenance, but it was very successful.

At one power generation facility, there existed one emission that over time could be contained, controlled and cleaned up. Now you have all these individual homes that are sending emissions into the air.

The White House is a district heating and cooling system. It is a very efficient system, and it saves enormously on emissions into the environment.

So what we have here, what we need to do is not be, as you said, Mr. Beard, in the power generation business, but we have what we have and we have to make it more energy efficient and more environmentally friendly, and you are moving on track to accomplish that as the Speaker also has directed.

But I think it would be beneficial for us to have an assessment on the use of photovoltaics. We have acres of flat roofs that can accommodate photovoltaic cells if we are asking GSA to do that for the civilian office space of the Federal Government. As I said earlier, GSA spends $5,800,000,000 a year on the electric bill for nonmilitary, non-veterans, non-postal electricity cost, and we can cut that by 70 percent with photovoltaics.

That is in the public interest in addition to the environmental benefits that will result from such an initiative. Do you think that is too much to ask, Mr. Beard?

Mr. BEARD. Well, I think one of the things that we have done, we have always viewed these buildings as different and unique, and we aren't included, for example, in any of the requirements that you impose on GSA in the legislation that goes through. So while we don't have to meet those requirements, we also don't get to participate in the benefits of some of the financing and other approaches that are used for other government buildings.

We participate with GSA in the power purchase contracts, for example, and some other things, but we have always sort of viewed the Capitol complex as unique and different. It is part of the Legislative Branch, and it should be separate, but in many ways, we would benefit. At least my view is we would benefit by being able to participate in many of the activities that other government buildings or the private sector undertakes.

I am sure that if you went to build these buildings today, build new buildings, we probably put the heating and cooling on top of

the building. We wouldn't have the central system we have now, but, as you say, we have what we have.

Mr. AYERS. Certainly, those economies of scale of a district system are important to consider. We have seven boilers now that provide steam to 23 buildings and 15 million square feet. We would wind up with another. If we decommission that, we would have to install and retrofit 30 new boilers throughout the complex as well as maintenance staff to maintain those pieces of equipment as well as similarly we have 10 chillers on the chilled water side. We would have to install chilling equipment in every building as well.

So there are some economies of scale and efficiencies with the district system.

Mr. Chairman, staff has given me a quick update on the photovoltaics on the Ford Building that were installed in 1978, and that system had about a 20-year life cycle, and we did remove it in 2005. It was a glycol-based system. It was leaking, and we had some concerns with the environmental concerns with the glycol system, so we did remove it.

But we will try to get you the energy efficiency data for that over its 20-year life cycle.

Mr. OBERSTAR. Thank you very much. I appreciate having that information.

The Department of Energy has produced a number of documents on solar energy. Just for the record, I want to cite one intriguing fact that they have developed:

In a 100 mile square area of the Arizona desert, if photovoltaics were installed with the ability to concentrate that solar power on a grid and fire it to a satellite to be redirected elsewhere in the United States, it could produce all the electricity needs of the entire Country and by using microwave energy to fire through a satellite and redistribute it around the Country, you are not losing power as you would over copper wire or aluminum wire.

That is something we ought to be working on.

Do you think you will be able to achieve the objective set by the Speaker, that by the end of the 110th Congress, you will be able to operate the House in a carbon neutral manner?

Mr. BEARD. Yes, sir. Those are my instructions, and that is what we will do.

Mr. OBERSTAR. Have you set forth a strategy on getting that done?

Mr. BEARD. Yes, well, we have got a portion of the strategy is already place and, as I said in my testimony, we need to fill that out on June 30th.

Many of the actions we will undertake, we can't undertake immediately. It is going to take us several months to do that. Negotiating with Pepco, for example, for purchasing all renewable power, we have had one meeting with them. We will have additional meetings, and we will be able to get to that as soon as we can.

My directions from the Speaker have been very clear. This is what she wants to do, and my job is to get it done by working with the Architect's Office.

Mr. OBERSTAR. Thank you.

Mr. BEARD. Thank you.

Mr. OBERSTAR. Mr. Boustany, do you have any further questions?

Mr. BOUSTANY. Just to follow up on that, as you move to comply with the Speaker's directive and you are going to have to purchase additional power, have you calculated into this any security risk implications?

Mr. BEARD. Well, we purchase all of our power now from Pepco. So it would have the same risk.

I guess you are referring to security risk of renewables versus non-renewables?

Mr. BOUSTANY. Yes.

Mr. BEARD. To be perfectly honest, no, we have not. It is something that we should look at, I guess, to make sure.

Mr. BOUSTANY. Yes, perhaps you probably ought to look at that as well.

Mr. BEARD. Being a participant in a grid and the PJM interconnect that we are, assuming that we couldn't receive renewable power, there is a capability to supplement it with power from other resources, and they have more than ample supplies of that. It is one of the advantages of being in a grid.

Mr. BOUSTANY. I would just submit as you go forward with the planning process, that is something you might want to consider.

Mr. BEARD. Okay.

Mr. BOUSTANY. Thank you. That is all I have, Mr. Chairman.

Thank you, gentlemen.

Mr. OBERSTAR. I just want to point out that next Wednesday, May 16, our hearing continues on climate change and energy independence with an extensive witness list that includes surface transportation witnesses, public buildings witnesses including the American Institute of Architects, the Alliance to Save Energy, the Solar Energy Industries Association, the American Council for an Energy Efficient Economy and an aviation panel and a water resources panel.

I won't go through all those witnesses, but I expect to have a very lively and informative hearing next Wednesday.

Mr. Beard.

Mr. BEARD. Mr. Chairman, if I could just a second, I was remiss in not mentioning an item of importance to Mr. DeFazio. I have had conversations with him about his desire and interest in discussing some kind of alternative energy people moving system for an improved people moving system for staff on the Hill, and it is certainly is something that the Roads Committee staff and myself have discussed and I have discussed with Mr. DeFazio as well.

I think in the area of demonstrating leadership for the rest of the Nation, it makes sense to me that the Congress might want to consider, or at least the House if the Senate isn't interested, certainly the House could demonstrate leadership on alternative fuels by putting some kind of either fuel cell powered buses or some other kind of people moving systems.

So it is one of the things that we are discussing with the staff, and I wanted to put in a plug for it on Mr. DeFazio's behalf.

Mr. OBERSTAR. Thank you very much. I am very encouraged by your initiative and willingness to partner with us in moving that agenda forward. We certainly need to have something of that nature for the staff, those who are over at the Ford Building and

other scattered elsewhere, to move them more efficiently, including our subway to the Capitol from the Rayburn.

That system is now 42 years old, 43 years old. I remember when it was offloaded from a flatbed truck. I was on the staff at the time. I happened to be taking a little lunch break, walking around, and this flatbed truck pulls up and a huge crane over on the west front of the Capitol.

That subway tunnel was a cut and cover operation. They had one segment still open. The crane hovered over and lifted the first of those two passenger vehicles, put it down in the hole, picked the second one up, dropped it in the hole, and they poured the concrete over and sealed. It was entombed forever. The only way you are ever going to get it out of there is piecemeal.

Since then, the Senate has this very efficient system that moves automatically. Now, we waste an awful lot of time with those operators, waiting for one straggling Member to jump aboard as though this were the last car out of Dodge, to get on that train. There is another coming, and it is just sitting there empty, and it goes back with two people.

We have to do better with that. Do you have any plans for a renewable replacement?

Mr. AYERS. Certainly, those systems are clearly at the end of their useful lives, so we will be looking at replacement of those with new technology similar to the technology that we use in the Senate side which was done many years ago. I think nearly 20 years that system was put in.

Mr. OBERSTAR. It is a great thrill for visitors to the Capitol, kids who come here on close-up and Presidential Classroom and all the rest, love to ride. It is the biggest thing they talk about when they go home. Oh, we got to ride on the Capitol subway. But it is an antiquated system.

Mr. AYERS. It is. Yes, it is.

Mr. OBERSTAR. We have to do better.

Mr. BEARD. My granddaughter's biggest thrill in coming to visit her grandfather was to go on the little train.

Mr. OBERSTAR. Thank you very much for your testimony, for all the work that you are doing.

Mr. BEARD. Thank you.

Mr. OBERSTAR. We look forward to continuing our cooperation and participation with you.

I thank the gentleman from Louisiana for his participation and his perseverance throughout a long morning.

Mr. BOUSTANY. Thank you, Mr. Chairman.

Mr. AYERS. Thank you.

Mr. OBERSTAR. The Committee is adjourned.

[Whereupon, at 1:22 p.m., the Committee was adjourned.]

Committee on Transportation and Infrastructure

Hearing on "Administration Proposals on Climate Change and Energy Independence"
Friday, May 11, 2007

Statement – Congressman Jason Altmire (PA-04)

Thank you, Chairman Oberstar, for the opportunity today to hear from the Department of Transportation, the Environmental Protection Agency, the General Services Administration, the Army Corps of Engineers, the Architect of the Capitol, and the Chief Administrative Officer about what is being done to conserve energy within each agency and promote environmentally-friendly policies across the country.

The federal government – from each agency in the executive branch to both chambers of Congress – has an obligation to be good stewards of the taxpayer dollar. One way to save money is through energy conservation. My colleague from Illinois, Mr. Lipinski, has introduced legislation to install energy efficient lighting fixtures and bulbs in the construction and maintenance of publicly-owned buildings. With approximately 3 million light fixtures in GSA buildings, energy use could be reduced by 75 percent and lead to savings of up to $74 in energy costs over the bulb's lifetime. Millions of Americans already do this to save money on each month's electricity bill and I see no reason why the federal government should not do the same. I applaud my colleague's leadership on this issue.

Many of my colleagues may be surprised to learn that Pittsburgh has the second most certified green buildings in the country. Leadership in the non-profit and corporate sectors led to this achievement, driven by the financial savings that energy efficient buildings produce. Yes, it's possible to be environmentally-friendly and save money. Innovative ways to conserve energy must be incorporated into the public sector as well.

Finally, we must do a better job of investing in and promoting mass transit. Safe, convenient and efficient public transportation is essential for the economic development of western Pennsylvania and the country. Unfortunately, the President's FY08 budget proposed a cut of $308 million for mass transit – the majority of which comes at the expense of a grant program that assists states in building or extending major mass transit projects. I believe this is the wrong direction for us to head in, but I am confident that under the Chairman's leadership we will be successful in reversing this course.

Thank you again, Chairman Oberstar, for your attention to this issue. I yield back the balance of my time.

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U.S. Representative Michael A. Arcuri (NY-24)
Committee on Transportation and Infrastructure
Hearing on Administration Proposals on Climate Change and Energy Independence
Opening Remarks
May 11, 2007

Thank you, Mr. Chairman.

First of all, I would like to thank the Chair for holding this hearing today and pointing the spotlight on this Administration's failure to adequately address the global warming crisis. I am honored as a new Member of this Committee, to have the opportunity to work together with my colleagues to engage in a dialogue that is long overdue, and develop a plan of action for this problem that has been in need of serious attention for decades.

The time for lip service and broken promises from this Administration is over. We must now pay serious attention to global warming. To allow climate change to continue unchecked would jeopardize our economy, our national security, our environment, and every facet of our way of life.

The February report of the Intergovernmental Panel on Climate Change confirms that climate change is underway and greenhouse gases released by human activities are the main cause. If left unchecked, we can expect rising sea levels, more intense storms, increased drought in some areas and more floods in others, heat waves, spread of tropical diseases, and melting ice caps in the polar regions.

Despite acknowledging climate change in his State of the Union address earlier this year, the President's budget request for fiscal year 2008 would reduce funding for climate change research programs by more than 25% from the FY2004 funding levels – sending us backward, not forward. This is sadly near sighted and wholly unacceptable..

Addressing this national challenge should be viewed not as a burden, but as an opportunity for economic growth, technological development and innovation. Halting climate change will require new innovative strategies, but will increase U.S. competitiveness and decrease our reliance on foreign oil and technological imports.

This Congress must act promptly and make climate change a top priority.

There are currently very few federal programs that explicitly limit greenhouse gas emissions. Of the 50 or so that exist, only 6 are actual regulatory programs at the Federal level. The sad reality of the current climate crisis is that efforts made by this Administration to deal with global warming have been a slap on the wrist. The problem of global warming will not be dealt with by suggestions for voluntary measures to reduce emissions – this problem needs a committed and concerted effort by policymakers, the Administration, and the American people to bring this problem to a halt.

It is an important first step that this Congress has set forth a national initiative for alternative energy production and increased energy efficiency to make America energy independent and advance our economic, national, and environmental security. As a father of two teenage children, I believe it is our duty to provide for future generations.

I hope to hear today from these Administration officials what steps the Executive Branch is taking to join forces with the Legislative Branch to address this global crisis. The time for a coordinated national effort to address global warming has arrived.

Thank you and I yield back the balance of my time.

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Statement of Congressman Henry E. Brown, Jr.
T&I FC HEARING ON "CLIMATE CHANGE"
MAY 11, 2007

Chairman Oberstar and Ranking Member Mica, I know you join me in welcoming our witnesses here today, and I look forward to a very lively discussion. As ranking member of the Fisheries, Wildlife and Oceans panel on the Natural Resources Committee, this is not the first hearing I have attended this Congress focused on climate change, and given the fact that the mention of that phrase is the quickest way to get the attention of the media these days, I am confident that it won't be the last.

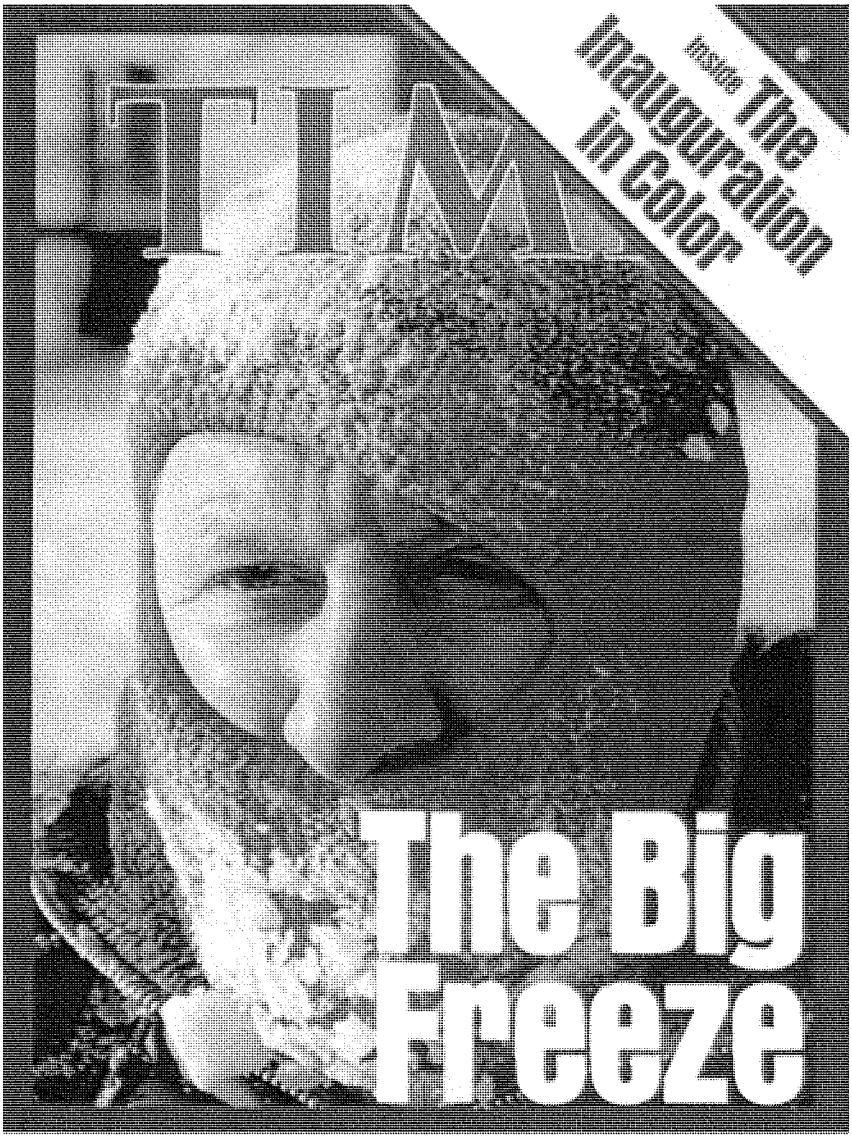
Mr. Chairman, one press report characterized this hearing as an attempt to examine how the Committee can "limit fuel consumption and promote mass transit." I believe that the best example of the impact this committee can have on these two areas can be found in bills like SAFETEA-LU. Every dollar that this committee authorizes for highway improvements, especially capacity additions, has the goal of moving traffic from place to place faster, while using less fuel. One just has to look down the Potomac from Washington to the Wilson Bridge project to see the impact federal highway dollars are and will continue to have on relieving congestion. And the Chairman may correct me on this, but I can't think of any major public transit agency that hasn't been funded with dollars authorized by this committee.

Climate change and global warming are the buzz words of the day. Politicians and scientists alike are fighting to get time in front of a camera to discuss the issue. From these magazine articles I have submitted for the record, it seems like global cooling and a coming ice age filled a similar role during the 1970s.

Mr. Chairman, this committee does have a crisis on its agenda that deserves its attention – the crisis of congestion plaguing our nation's highways, waterways, railroads and airports, and the crisis communities across the country face from aging infrastructure. Both threaten to cripple our economy. An alarmist response to climate change by Congress runs the same risk.

While I encourage efforts by this committee to find ways that we can encourage a cleaner environment, we must ensure that these efforts are complementary to our primary mission of meeting the transportation and infrastructure needs of our country, and do not go overboard. Unfortunately, we have seen one of our counterpart committees over in the other body become completely focused on climate change. We have an important agenda here in this committee, literally one of making sure the trains run on time. We cannot let desire for media attention or costly legislative mandates slow down our train, or the American economy.

Thank you Mr. Chairman, and I look forward to hearing from our witnesses.


TIME
The Big Freeze
inside The inauguration in color

TIME
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Monday, Jan. 31, 1977

The Big Freeze

Why had the rain turned white? Startled millionaires wintering in their baronial mansions in West Palm Beach, Fla., peered closer last week at the miracle that was falling from the skies and discovered—could it be?—yes, the substance was snow, the first ever reported there. Since mid-November, pedestrians in Dallas, unaccustomed to such hazards, have been slipping on sleet-slicked sidewalks. Meanwhile, a series of blizzards has smothered Buffalo this winter with an astonishing 126.6 in. of snow.

From the Dakotas and Minnesota, across the icy Great Lakes of the Middle West and down the Eastern seaboard to shivering Florida, the winter of 1976-77 is already one of the coldest since the U.S. began keeping weather statistics—and the worst may be yet to come. If February roars like January, this winter could be the coldest ever recorded for much of the U.S.—the great winter that millions of Americans will be telling their grandchildren about decades from now.

The dramatic changes in the weather patterns (see following box) that are sending temperatures plummeting across the nation are, ironically enough, warming the one state that is usually frozen stiff. In Anchorage, Alaska, where the thermometer was up to a comparatively balmy 45° last week, the ice was so soft that hockey players went home in disgust. Meanwhile, snowstorms avoided areas that are normally blanketed with white. Rocky Mountain ski operators complained bitterly about the clear skies. Sun Valley, Idaho, the haven of the wealthy and the sedate, had to use snowmaking machines, and even then managed to keep open only three of its 60 runs.

Still, it is the brutal and unrelenting cold—the Big Freeze—that has transformed the inevitable grousing about the weather into personal agony and national hardship. The furies of January have been unrelenting. Alltime low temperatures were recorded last week in Cincinnati (—25), Miami Beach (+ 32), Palm Beach (+ 27). Single-day records for the date were set in New York City (-1); Dayton (—21); and Lynchburg, Va. (— 8). At —19, Chicago experienced its coldest day in this century. Peoria, Ill. (— 25), had not been so cold since 1884. In Rice Lake, Wis., the temperature plunged to —60—and for two days dog owners had to push their reluctant pets outside to save their carpets.

It was like living in the Arctic—an ominous reminder of how modern man, so proud of his technological mastery of his environment, remains so vulnerable to its whims. Indeed, his very reliance on energy-consuming machines, vehicles and conveniences contributed

last week to widespread suffering. To meet soaring energy demands for heating, electrical utilities ordered temporary blackouts in some communities and reduced voltage in others.

A genuine crisis developed in the natural-gas industry. Suppliers put into effect emergency plans, cutting all deliveries to thousands of industrial users. Company officials pleaded for school closings, shortened business hours, and thermostats to be turned down to teeth-chattering levels in private homes.

As business leaders, local officials and countless citizens responded, some wholeheartedly, others grudgingly, life faltered and changed in many regions of the U.S. The Labor Department estimated that some 500,000 workers had been laid off in plants shut down by fuel shortages. Next summer's crops could be damaged by the effects of the deep-reaching cold on the soil, and the lack of moisture-bearing snow in the West.

Thousands of schools in at least a dozen states, including virtually all those in Georgia, were closed for varying lengths of time. The longest period was in Dayton, which planned a month-long shutdown. Energy emergencies were declared in Minnesota, New York, Pennsylvania, Ohio and the city of Milwaukee. Florida's Governor Reubin Askew proclaimed his state a disaster area because of damage to citrus crops. Maryland's Governor Marvin Mandel sought the same designation: 1,500 Chesapeake Bay watermen were frozen out of their oyster beds and fishing areas by layers of ice up to 3 ft. thick.

The natural-gas shortage was called "a nightmare" by Joseph Solters, the Federal Power Commission's gas expert.

"The weather," agreed a U.S. Senate energy specialist, "is going to be to the gas industry what the Arab embargo was to the oil industry." Indeed, if the current weather had coincided with the oil crisis in the winter of 1973-74, the double impact might well have been calamitous. Just how to increase natural-gas supplies remained in dispute (see ECONOMY & BUSINESS), but the time for national dawdling on a comprehensive energy policy has clearly run out. "Jimmy Carter's first confrontation as President will not be with the Russians," said a senior Washington weather scientist."It is with the weather."

The winter that is hurting the economy is also bringing suffering and tragedy to countless Americans. Two elderly men, Pinkney Carson, 66, and Herman Jackson, 62, were found frozen to death in unheated rooms in a New York City residential hotel. A furnace boiler had failed, and the men had huddled under thin blankets as water froze in glasses and ice formed on the cracked plaster of their tenement. In rural Georgia, three young brothers, Timmy Schuler, 11, Brian, 9, and Kirt, 7, romped on a pond covered with ice that had come South with the Northern winter. Timmy saw the younger boys break through and ran to their aid. All three drowned. In Atlanta, Mrs. Irma May Key, 51, died of exposure, after falling a short distance from her apartment. Veronica Hynson, 22, and her three children died in a fire in a Baltimore row house. The oil tank was empty, and the gas jets in a kitchen stove had been turned on for heating.

In North Yarmouth, Me., where winds had been gusting up to 80 m.p.h., heavy, frozen snow caved through a hockey rink's roof—minutes after 25 youngsters had left. The same heavy snow leveled a horse barn in Windham, Me., but four horses trapped under the snow and twisted metal were dug out alive. Sturdy North Dakotans of Scandinavian descent, long since inured to cold, broke out booster buttons proclaiming: MINUS 40 BELOW KEEPS THE RIFFRAFF OUT. When West Virginia's Governor Jay Rockefeller insisted on being inaugurated outdoors in Charleston's 0° weather, local wags quipped, "We always figured it would be a cold day in hell when a New Yorker would become Governor here." The situation was hardly funny, however, to the 25 inauguration watchers who had to be treated for frostbite.

On an icy hill in Jackson, Miss., Diana Berg flagged down a milk truck and warned the driver against going so fast. "Oh, don't you worry about me," he said. "I'm from Illinois. I can handle this stuff. Want a joyride?" Berg declined, then watched the truck slam downhill into a Volkswagen and another truck. Amazingly, no one was hurt. Says she: "My jaws were frozen into a laugh for about an hour."

As water pipes burst in Little Rock, Ark., one resident remarked, "My basement is flooded and my furnace doesn't work —but we're going to have an ice-skating party in my basement tonight." In Fort Walton Beach, Fla., Circuit Court Judge Clyde

Wells stopped a trial so that everyone could watch the snow fall. Opined the judge: "It's a real novelty."

The elements were simply a challenge to some outdoorsmen —and women. The combination of —23° temperatures and 46-m.p.h. winds on New Hampshire's Mount Washington created a —95° wind-chill factor—but did not stop some hikers from risking their lives on its lower slopes. The same was true in New York's gale-whipped Adirondacks, where Psychiatric Social Worker Bill Myers explained that people went out in such weather just because it was there. Said he: "It's an aggressive response, not a passive response like staying inside with a blanket."

For most who shivered in long Johns or waited up to six hours for tow trucks to pull their cars out of snowbanks, the challenge of the extraordinary winter was something they would prefer to pass up. The weather punished sections of the nation in varied ways, most of them harsh and costly. A tour of the icy American horizon, region by region:

THE FROZEN MIDWEST

As gales and subzero cold threatened to turn the Great Lakes into one vast skating rink, boat traffic virtually ceased. Only a few adventurous captains steered past the treacherous floes in Lake Michigan, where ice was a foot thick eight miles from shore. Worse, both the Ohio and Mississippi rivers were frozen solid in long stretches. Some 300 barges and more than 50 tugs were locked in the 181-mile leg of the Mississippi between Cairo, Ill., and St. Louis. A few steel barges, weighing some 750 tons each, were shoved atop the sturdy ice like so many giant hockey pucks. Others were crushed by converging packs of

ice. Even barges able to move were collecting ice barnacles up to 6 ft. thick on their bottoms. "That makes one hellacious load to push," said a U.S. Army Corps of Engineers official.

The freeze of the waterways aggravated the region's fuel crisis. For a time, Cincinnati Gas and Electric Co. had 3 million gal. of fuel oil stalled on the Mississippi, 400,000 gal. blocked on the Ohio near Aurora, Ind., and another 400,000 gal. stuck in the river near Paducah, Ky. Electric utilities sent out crews armed with hammers and iron bars to smash the frozen coal loose from rail cars. "It's absolutely miserable work," said Detroit Edison Co. Vice President Walter J. McCarthy Jr. Strapped for fuel, his firm at one point was turning out only 250,000 kilowatts, less than one-tenth of its normal production. At one Cincinnati plant, the slippery coal would not stick to conveyor belts. Ingenious employees devised a solution: spreading molasses on the belts.

The fuel shortage led the Northern Indiana Public Service Co. to order 1,500 industrial users of natural gas to cut their consumption by 20%. Both Columbia Gas of Ohio and East Ohio Gas Co. limited 1,675 heavy users to only enough fuel to keep their machinery from freezing. Ford, General Motors and Chrysler laid off some 58,000 workers in Michigan and Ohio. In Cleveland alone, about 10,000 laborers were idle. The cutbacks forced the closing of schools in 245 downstate Illinois communities. In Milwaukee, which has had a record 21 days of subzero weather, water mains burst or froze, creating extreme fire-fighting hazards. Amtrak canceled trains on eight major routes out of Chicago —and sent 25 cars down to New Orleans to thaw out. However, the cold did bring some blessings. Street crime was down, and three gunmen foolish enough to hold up the Cleveland Trust Co. were quickly caught when their getaway car spun its wheels futilely in the snow.

The "cold soak" also plagued the Midwest's farmers. Near Mount Vernon, Iowa, Gordon Neal discovered that the frost had penetrated an astonishing 6 ft. into the soil, freezing his water line for the first time since it was installed at the turn of the century. His silage pile was unusable, frozen rock-solid; he was forced to feed his cattle scarce hay. Following an extended drought, the freeze endangered the winter wheat crop throughout the Midwest.

In South Dakota, where two-thirds of the state's stock ponds were dry, there was not enough moisture to freeze the soil and, incredibly, it began to blow away in scenes chillingly reminiscent of the Dust Bowl of the '30s. Soil erosion in the coming windy months is also a threat throughout the farm belt. Grain farmers want more snow, not less, to blanket and insulate the ground —and provide moisture in the spring. Livestock herds are being sold off as feed costs rise. Things are so bad that Roald Lund, a North Dakota agriculture expert, suggested that farmers should simply take a holiday in 1977.

NEW ENGLAND ON GUARD

It was cold enough at home to freeze submarines into the ice in Groton, Conn., but New Englanders were somewhat smugly observing the discomfort elsewhere in the land. They had been especially hard-hit during the oil crisis of 1973-74. Since then, they have

managed to accumulate some reserves, and Yankee dealers have become adept at scrounging new supplies. Moreover, the area uses little of what is now so scarce: natural gas. Nonetheless, as the sun rose cheerless over hills of gray, snowbound New Englanders felt the cold—in their pocketbooks. Both inflation and the severe winter mean that an average homeowner in the area may well pay $230 more for heating this season than last, according to the Massachusetts energy policy office.

Although cold is a customary way of life during New England winters, many cities in Maine have already exhausted their snow-removal budgets. Highway crews in Connecticut have eaten through a 48,000-ton mountain of road salt near Hartford. "You might get a bucketful if you took a broom and swept the yard," said Edward Archibald, a highway department official. While blizzards battered Boston, the doughty breed of ice fishermen in the Berkshires of western Massachusetts pensively sipped Jack Daniel's, and kept right on angling in their snug lake shacks.

The major worry of some New Englanders seemed to be where to go for a warm vacation. Thomas K. Wiehl III, a flight instructor in Pittsfield, Mass., flew a Connecticut vacationer south in search of sun. They landed in Savannah, Ga., balked at the 50° chill, rejected Key West (65°), figured Bimini ought to do better than its 70°, and eventually wound up 300 miles southeast of Miami in the Exuma Islands' toasty 85°. Then Wiehl flew home into the miseries of ice, sleet and — 5°.

THE BESIEGED MIDDLE ATLANTIC

More industrialized and energy-dependent than other areas, the Middle Atlantic states from New York south worried about the potential impact of continued cold and dwindling fuel supplies. So far, so good—relatively speaking. Buried under record snowfalls, northern New York did close schools heated by gas. Residents of the Buffalo area were asked to set thermostats at a shivering 55°. Two General Motors plants near Buffalo and a Bethlehem Steel factory near Lackawanna closed their doors. But much-maligned Con Edison, which lights up most of the New York megalopolis, had its day in the cold. The giant utility, which has generated criticism for high prices and erratic service, was meeting its commitments and even urging New Yorkers to share electricity with other states that had helped them in past crises. Much of the city's suffering was caused by one perennial problem: highly taxed landlords who were unable—or too stingy—to keep antiquated furnaces repaired and fueled. More than 10,000 complaints a day overwhelmed a city hall office empowered to investigate claims of inadequate heat, make the necessary repairs and bill landlords later. Keeping up was so hopeless that five centers were opened in churches and community buildings to house anyone in danger of freezing. Some 200 refugees found shelter.

Out in New York harbor, the Coast Guard waged a bitter struggle to keep shipping lanes open to the nation's busiest port. Sandy Hook Channel, one of the two main passageways, finally was closed as the unusually heavy ice submerged or moved navigational buoys. No one wanted to risk yet another major oil-tanker disaster. Icebreakers rammed their curved prows against ice up to 18 in. thick to keep the Hudson open as far north as

Albany. Surprisingly, the faithful Staten Island ferry kept moving Manhattan workers in comfort to their jobs across the windswept harbor.

In New Jersey, Governor Brendan Byrne summoned the state's nearly forgotten civil defense workers to canvass commercial buildings and offer advice on how to reduce gas usage. School Superintendent Frank Mastoraki of Bridgeton, N.J., played out an exhausting daily ritual that was becoming commonplace for many school officials. He asked local police to telephone him at 4 a.m. with information on road and weather conditions so that he could decide by 6 a.m. whether to open his schools on schedule. Alternating conditions of snow, ice and fog made roads perilous for students who drove cars or rode buses.

After experiencing the coldest November in 66 years, Delaware endured a below-normal December and seemed headed for its most frigid January in history. The state's electricity consumption reached an alltime winter high. Home TV pictures shrank slightly in the Baltimore area when voltage was cut by 5% to conserve energy. Maryland woods were sprinkled with thousands of dead birds, which were unable to penetrate the icy snow to reach food. Stores were running out of rock salt to melt ice, but elderly women found a substitute to steady their steps on sidewalks: a scattering of kitty litter. In Aston Township, Pa., Ned Oppelt, 24, decided that it was too cold to risk a long walk home from a party, crawled into a Laundromat's king-sized clothes dryer—still cozy and warm from the day's tumbling —and slept the night through. Fortunately, no early arrival slammed the door or turned on the heat.

THE SNOWY SOUTH

President Jimmy Carter could not have left his home state at a better time. The Chattahoochee River in northeast Georgia was choked with invading ice. Studying the strange landscape, Mountaineer Lanier Chambers declared: "It is so cold, my imagination is frozen." The Georgia Power Co. instituted 30-to 60-minute blackouts throughout the state. In Atlanta, which dipped to 1°, patrons wore their overcoats while dining at the posh Peachtree Plaza Hotel.

"It's the roughest winter that anyone can remember since nineteen-and-eighteen," observed Newspaper Editor Mary Ann Oakley in Providence, Ky., a coal-mining town (pop. 4,270) numbed by temperatures down to —20°. As ice and snow made the winding roads impassable, the children have been able to attend school only three days this month. When the town's water supply was blocked by a frozen valve, the National Guard trucked in water to the fire station, where residents lined up with jugs for their 2-gal. rations. In their mutual need, the townspeople found a new spirit of closeness. "Everybody is working as one big family," said Municipal Inspector Randy McCully.

The chill extended across the Florida panhandle, where the biggest problem was the shortage of natural gas. Utilities Director Tom Smith in Tallahassee suggested that residents should take a bath only every other day. Frostproof (pop. 2,814) belied its name, recording 27°. But the real novelty was snow—snow as far south as Miami and Boca

Raton. "I feel sorry for these people working on a $100-a-day suntan," said Alex Ballora, pool manager at Key Biscayne's Sonesta Hotel. "What do you say when a guest comes up and asks you for an electric blanket?"

Worried citrus-fruit growers still could not tell whether firing up nighttime heaters had done much to save their groves. Some 55 million boxes of oranges (out of an estimated 211-million-box crop) were lost, forecasting a likely price rise. Temperatures as low as 30° at Fort Lauderdale and 23° in Homestead killed pole beans, watermelons and tomatoes. It was the worst frost in 37 years. The weather was causing even Floridians to pack up and head south. Puerto Rico reported an influx of tourists from Miami—but high winds made even San Juan's 78° seem too cool. Wise vacationers fleeing the cold headed west rather than south: Phoenix and Tucson offered their usual winter warmth, San Diego baked and beached in a delightful 86°—a high for the date.

Along the Gulf Coast, a 4-in. snow hit parts of Mississippi, which was undergoing its coldest winter in 17 years. Jackson had a record number of auto accidents as motorists unfamiliar with icy driving banged up their cars. The speaker of Mississippi's house of representatives dispatched a four-wheel-drive truck to round up stranded legislators.

Texas was having its worst January ever recorded. In Dallas the temperature hit 12° and the flow of natural gas in one of the nation's petroleum-richest states was curtailed to heavy industrial users. High winds aggravated the cold. Texans say they use logging chains fastened to stout posts as wind gauges—and this month the chains have been flying flat-out.

Those chains will surely rattle a great deal more before the winter is through. At week's end, temperatures were rising in some regions, but the scientists and computers at the National Atmospheric and Oceanic Administration were confidently predicting that the frigid weather would continue. The chilling pronouncement of Dr. J. Murray Mitchell Jr., NAOA'S senior climatologist: "The forecast is for no change." And spring may indeed be a little late this year—the year when a real old-fashioned winter gripped the U.S., and held on, and on, and on.

The Cooling World

There are ominous signs that the earth's weather patterns have begun to change dramatically and that these changes may portend a drastic decline in food production—with serious political implications for just about every nation on earth. The drop in food output could begin quite soon, perhaps only ten years from now. The regions destined to feel its impact are the great wheat-producing lands of Canada and the U.S.S.R. in the north, along with a number of marginally self-sufficient tropical areas—parts of India, Pakistan, Bangladesh, Indochina and Indonesia—where the growing season is dependent upon the rains brought by the monsoon.

The evidence in support of these predictions has now begun to accumulate so massively that meteorologists are hard-pressed to keep up with it. In England, farmers have seen their growing season decline by about two weeks since 1950, with a resultant over-all loss in grain production estimated at up to 100,000 tons annually. During the same time, the average temperature around the equator has risen by a fraction of a degree—a fraction that in some areas can mean drought and desolation. Last April, in the most devastating outbreak of tornadoes ever recorded, 148 twisters killed more than 300 people and caused half a billion dollars' worth of damage in thirteen U.S. states.

Trend: To scientists, these seemingly disparate incidents represent the advance signs of fundamental changes in the world's weather. The central fact is that after three quarters of a century of extraordinarily mild conditions, the earth's climate seems to be cooling down. Meteorologists disagree about the cause and extent of the cooling trend, as well as over its specific impact on local weather conditions. But they are almost unanimous in the view that the trend will reduce agricultural productivity for the rest of the century. If the climatic change is as profound as some of the pessimists fear, the resulting famines could be catastrophic. "A major climatic change would force economic and social adjustments on a worldwide scale," warns a recent report by the National Academy of Sciences, "because the global patterns of food production and population that have evolved are implicitly dependent on the climate of the present century."

A survey completed last year by Dr. Murray Mitchell of the National Oceanic and Atmospheric Administration reveals a drop of half a degree in average ground temperatures in the Northern Hemisphere between 1945 and 1968. According to George Kukla of Columbia University, satellite photos indicated a sudden, large increase in Northern Hemisphere snow cover in the winter of 1971-72. And a study released last month by two NOAA scientists notes that the amount of sunshine reaching the ground in the continental U.S. diminished by 1.3 per cent between 1964 and 1972.

To the layman, the relatively small changes in temperature and sunshine can be highly misleading. Reid Bryson of the University of Wisconsin points out that the earth's average temperature during the great Ice Ages was only about 7 degrees lower than during its warmest eras—and that the present decline has taken the planet about a sixth of the way toward the Ice Age average. Others regard the cooling as a reversion to the "little ice age" conditions that brought bitter winters to much of Europe and northern America between 1600 and 1900—years when the Thames used to freeze so solidly that Londoners roasted oxen on the ice and when iceboats sailed the Hudson River almost as far south as New York City.

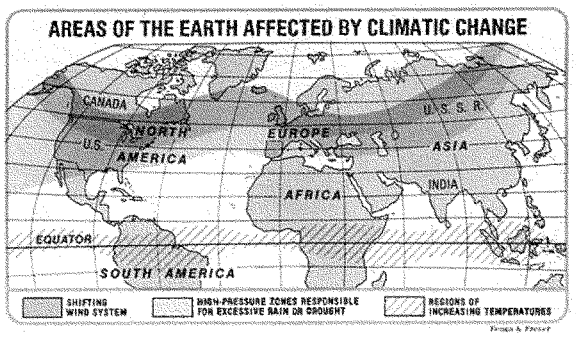
Just what causes the onset of major and minor ice ages remains a mystery. "Our knowledge of the mechanisms of climatic change is at least as fragmentary as our data," concedes the National Academy of Sciences report. "Not only are the basic scientific questions largely unanswered, but in many cases we do not yet know enough to pose the key questions."

Extremes: Meteorologists think that they can forecast the short-term results of the return to the norm of the last century. They begin by noting the slight drop in over-all temperature that produces large numbers of pressure centers in the upper atmosphere. These break up the smooth flow of westerly winds over temperate areas. The stagnant air produced in this way causes an increase in extremes of local weather such as droughts, floods, extended dry spells, long freezes, delayed monsoons and even local temperature increases—all of which have a direct impact on food supplies.

"The world's food-producing system," warns Dr. James D. McQuigg of NOAA's Center for Climatic and Environmental Assessment, "is much more sensitive to the weather variable than it was even five years ago." Furthermore, the growth of world population and creation of new national boundaries make it impossible for starving peoples to migrate from their devastated fields, as they did during past famines.

Climatologists are pessimistic that political leaders will take any positive action to compensate for the climatic change, or even to allay its effects. They concede that some of the more spectacular solutions proposed, such as melting the arctic ice cap by covering it with black soot or diverting arctic rivers, might create problems far greater than those they solve. But the scientists see few signs that government leaders anywhere are even prepared to take the simple measures of stockpiling food or of introducing the variables of climatic uncertainty into economic projections of future food supplies. The longer the planners delay, the more difficult will they find it to cope with climatic change once the results become grim reality.

—PETER GWYNNE with bureau reports



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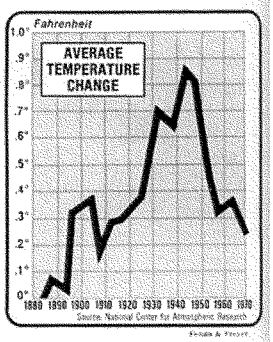

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Green groups dismayed as flights soar to record high

The Independent (UK)
By Michael McCarthy, Environment Editor
Published: 09 May 2007

Aviation growth is soaring to an all-time high, raising the prospect of a huge increase in the greenhouse gas emissions that cause global warming.

For the first time, more than 2.5 million commercial flights will be made around the world in a single month, with 2.51 million scheduled for May, says the flight information company OAG. This beats the previous record of 2.49 million flights last August.

The figure marks year-on-year global growth in flight numbers of 5 per cent, which translates as an extra 114,000 flights and 17.7 million extra passenger seats compared with May last year.

The growth rate, green campaigners said yesterday, would considerably outstrip any improvements the airlines could make in engine fuel efficiency or traffic management to bring down emissions. Aviation is the fastest-growing source of carbon dioxide, the principal greenhouse gas, and also the origin of other greenhouse gases including nitrous oxide and water vapour.

The new figures highlight not only the remorseless upward trend in global aviation, now greatly boosted by the cheap flights sector, but also astonishing increases in some individual countries. China's domestic flights as a whole are up by 18 per cent year on year, and international flights to and from the country have risen by 17 per cent.

Flights to and from Russia are up by 16 per cent since this time last year, while flight numbers to and from the two new EU member states, Romania and Bulgaria, are up by 14 per cent and 10 per cent respectively. Flights in and out of Britain are up by 7 per cent over the year - an extra 8,000 trips and an increase of 1.9 million, or 10 per cent, in seat numbers. The increases are even more remarkable in the low-cost sector. Cheap flights to and from Spain are up 68 per cent in a year, with seat numbers up by 77 per cent - an increase of 2.5 million.

OAG's managing director, Duncan Alexander, said: "We are witnessing a step change in the way airlines are differentiating their product. This is great news from a traveller's viewpoint, with much more competition and choice."But green groups took a different view. "The binge-flying culture is taking off worldwide, and the price will be paid by the victims of climate change," said John Sauven, executive director of Greenpeace. "If Gordon Brown becomes prime minister he should tax aviation fuel and call a halt to airport expansion."

According to aviation industry figures to be published next month, obtained by the Aviation Environment Federation (AEF), global CO2 emissions are likely to rise from between 500 to 600m tonnes in 2005 to between 1,200 and nearly 1,500m tonnes in 2025. Britain's total CO2 emissions are less than 600m tonnes.

"The point is, these growth rates just render air travel completely unsustainable," said the AEF's Jeff Gazzard, "And whatever you think about carbon offsetting or emissions trading, the only thing that will really bring them under control is flying less."

Good Morning Mr. Chairman. I want to thank you for holding this hearing today. For the past several years, scientists have been warning us of the real and ever increasing problem of global climate change, and urging governmental leaders to begin taking the issue seriously. But their pleas fell on deaf ears until recently.

It took some effort on their part, but leaders have taken a sober look at the data and determined that global climate change is happening and human activity is a contributing factor. More importantly, many of my colleagues have begun to search for solutions to the problem, and I count myself among them.

Frankly, the people of northeastern and central Pennsylvania realized early on that there is a problem.

One effect of global climate change is the increased frequency of severe flooding. Northeastern and central Pennsylvania has experienced numerous 100-year floods in the just the past few years! Recent flood events have occurred in January, 2006; June, 2006; November, 2006; April, 2005; and September, 2004 (Hurricane Ivan). On February 23, 2007, President Bush declared seven counties in my district a federal disaster area in the aftermath of the November storm. This declaration follows previous declarations from earlier storms I mentioned. Collectively these floods have caused millions of dollars in damage to public infrastructure and private property. Mr. Chairman, we can no longer afford to stick our heads in the sand with respect to this issue because the economic and human toll of doing nothing is too great.

I also am very interested in what the witnesses have to say about the administration's commitment to passenger rail service – or lack thereof. A New Start Rail Project that has been progressing through the Federal Transit Authority process in New Jersey and Pennsylvania would go, I believe, a long way to helping reduce greenhouse gas emissions. The rail project offers a realistic remedy to the congestion that plagues the I-80 corridor in eastern Pennsylvania and New Jersey.

Some 200,000 commuters travel daily from eastern Pennsylvania into New Jersey and New York for work and pleasure. Traffic actually backs up from the Lincoln Tunnel exit in New Jersey to the Pennsylvania border each morning. Re-opening the former Lackawanna Cutoff Rail Line will dramatically ease this congestion and I am excited for this project to be completed, but we need a greater

commitment from the federal government for this and other projects to move forward.

I look forward to the testimony of the witnesses you've assembled, Mr. Chairman, and I am eager to learn about their views and suggestions about what we need to do to adequately address the problem.

Statement by Congressman Jerry F. Costello
Committee on Transportation and Infrastructure
Administration Proposals on Climate Change and Energy Independence
Friday, May 11, 2007

Thank you, Mr. Chairman. I am pleased to be here today as we examine the Administration's proposals on climate change and energy independence. I would like to welcome today's witnesses.

Energy and its consumption are extremely important to our economy – we need it to drive a car; fly a plane; produce goods; and heat and light our homes and offices. We do, however, need to be responsible and aware of the environmental impacts of our energy use.

Within aviation, aircraft fuel efficiency has increased at roughly 1% per year, and research continues in engine efficiency, airframe aerodynamics, and the use of lighter materials, like composites currently used on the Boeing 787. Changes in a variety of other factors, such as operating procedures, aircraft routing, and load factors, can also have significant impacts on emissions. That is one of the reasons why I am supportive of moving forward on modernizing our air traffic control system and, as demonstrated in Wednesday's Aviation Subcommittee hearing,

urged the FAA to produce and meet a timeline and milestones for modernizing our system.

I am also interested in hearing more about coal to liquids technology and the benefits alternative fuels brings to this discussion.

Finally, I know Europe has taken bold steps to reduce greenhouse gas emissions by proposing a cap and trade system. I find this emissions trading scheme extremely problematic because it imposes a one size fits all approach, bypasses ICAO, and is contrary to international aviation law. I have spoken to European officials about this proposal and my concerns and continue to work with our colleagues here and overseas for a more reasonable approach to reducing emissions.

With that, I look forward to today's hearing as we discuss the Administration's proposals on climate change and energy independence.

Doris O. Matsui

Statement of Congresswoman Doris O. Matsui
Transportation and Infrastructure Committee Hearing on Global Warming
May 11, 2007

Thank you, Chairman Oberstar, for calling this hearing today. I appreciate your leadership in focusing the committee's attention on global warming. The Intergovernmental Panel on Climate Change has found that global warming will have significant economic impacts, especially on our coastal regions. It is critical that we prepare our infrastructure to handle these consequences.

Coming from California, I understand how much we have to lose from a rise in sea levels. Coming from Sacramento, however, I am even more concerned about the consequences for my hometown if we do not address global warming's impact on our infrastructure.

In Sacramento, our flood control infrastructure protects our homes, our businesses, and our lives. The levees and dams that ring Sacramento are as much a part of our communities as our roads and transit lines.

However, our flood protection infrastructure is unique in one important way. It is designed to be responsive to the weather.

Weather can be unpredictable to begin with. In Sacramento, this unpredictability can mean catastrophic flooding, loss of life, and billions of dollars in economic damage.

As a result, global warming will have a very real—and potentially very damaging—impact on my district.

People in Sacramento understand that flood protection is about maintenance. It is about ensuring that our infrastructure can withstand the next storm.

Global warming presents us with new challenges. As weather patterns change, shouldn't our flood protection approach adapt accordingly?

For example, earlier snowmelts will test the dams and levees that protect us from flooding. The Sacramento and American Rivers will be swollen with water at unpredictable times.

We have to be sure that our infrastructure can deal with these scenarios. If we fail to invest in our dams and levees, we are not merely being foolish—we are risking jobs, we are risking livelihoods, and we are risking lives.

As a result, our national water infrastructure policy must be focused on the challenges we face today, without neglecting the future.

I am encouraged by the Committee's work to get a WRDA bill passed this year. WRDA will help us address today's infrastructure problems by shoring up the dams and levees that protect our communities.

Today's hearing points our attention to the future. Global warming will make investment in our infrastructure even more critical to our lives than it already is.

I look forward to hearing how the Executive Branch agencies are planning for the changes that global warming will bring. If we do not upgrade our infrastructure to manage the effects of climate change, our children and our grandchildren are the ones who will suffer.

Thank you, Mr. Chairman.

Statement of Rep. Harry Mitchell
House Transportation and Infrastructure Committee
5/11/07

Thank you Mr. Chairman.

I want to extend a special welcome to Secretary Mary Peters.

Arizona is proud to have her as our nation's Secretary of Transportation, and I look forward to her testimony today about the Department of Transportation's efforts to address climate change.

In February the International Panel on Climate Change (IPCC) noted that many of the world's most renowned scientists unanimously agreed that human activity is 'very likely' causing global warming.

I think many of us were concerned about what they had to say, and troubled by the scientific data that demonstrates the threat of global warming and climate change isn't simply a threat – it's happening all across the world.

It's happening right before our eyes.

And the consequences are especially real in my home state of Arizona.

In Arizona, we are experiencing longer and more severe fire seasons. Changes in rain patterns and insect migration are destroying our forests. As the Rocky Mountain snow pack decreases, Arizona feels the heat – literally. We're experiencing lengthy droughts at the same time that our population is exploding.

For the people I represent, the time for debate about the existence of global warming is over. It's time for action…thoughtful, bipartisan action.

Congress can help us avert this looming crisis by moving America toward energy independence. We can promote clean technologies such as solar energy and biofuels, to limit our dependence on Middle Eastern oil, and reduce the harmful greenhouse gases we emit to our atmosphere.

I believe we can use American's ingenuity, and our unique innovative spirit to achieve energy independence. But it will take work on our part, and a real investment in the future of our country. We began that investment earlier this year with the CLEAN Energy Act, but we still need to do more.

And the Administration's efforts have been lackluster, to say the least. Their efforts to reduce greenhouse emission and promote energy efficiency rely on voluntary participation. This is not enough.

More action can be taken and there are many proposals out there. For example, promoting freight and passenger rail would get cars off the road and reduce vehicle exhaust fumes, a major cause of air pollution. A single freight train or passenger train would get 280 trucks off the road or 250-350 cars off of the road respectively.

Pipelines too, delivering fuel and other material directly from ports to their destination, would relieve our roads of hundreds of trucks. Clearing congestion reduces pollution and reduces the amount of fuel wasted by idling cars expended by Americans. In fact, in 2006, the Department of Transportation introduced a congestion initiative to clear the nation's roadways.

Federal buildings can also be made more energy efficient. Here in the Capitol, the Architect of the Capitol has made headway by installing low-flow water devices, lower energy lighting systems, and only Energy Star appliances and equipment. The rest of the government should take note. The federal government is the nation's single largest energy user and, as such, should lead by example.

I look forward to today's testimony and learning more about action we in Congress can take to become energy efficient and reduce our contribution to climate change.

I yield back the balance of my time.

STATEMENT OF
THE HONORABLE JAMES L. OBERSTAR
COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE
HEARING ON "ADMINISTRATION PROPOSALS ON CLIMATE CHANGE AND ENERGY INDEPENDENCE"

It is difficult to overstate the importance of the issues that we are addressing in today's hearing. We import more than one-half of our oil. Our economy is absolutely dependent on our ability to continue doing business with countries like Saudi Arabia and Venezuela. Energy independence is a national security issues as important as any this Body will address.

Meanwhile, the polar ice caps are melting. This is a fact, you can measure it and see it with your own eyes. Some studies estimate that there may be no ice on the North Pole during the summer months in just a few short decades. The age-old dream of the Northwest Passage may well come true soon – but at what cost?

Today's hearing on Administration proposals on climate change and energy independence will help us determine what steps this Committee should take with regard to climate change and energy independence policies. This is the first time the Full Committee has held hearings on this issue. Because transportation and infrastructure are so linked to climate change and energy independence, this Committee will lead the way in developing solutions to these critical issues.

There are signs of global climate change everywhere.

In my own congressional district, Bruce Kerfoot who runs a resort on the Gunflint trail tells me that he is seeing maple trees growing where they have never grown before. Polar bears may soon be listed as a threatened species because their ice-pack habitat isreceding. In the Arctic circle, the frozen tundra is melting – sending carbon dioxide back into the atmosphere, accelerating global warming.

Two very important dates stand out when it comes to climate change. The first is November 7, 2006. The second, April 2, 2007. These two dates signify the points when two of our three branches of government decided to tackle head-on the grave and pressing issue of climate change.

The first date, of course, was Election Day last year – when the people asked the Congress to, among other issues, finally deal with climate change and energy independence issues. The new majority in both chambers is committed to passing climate change legislation. I just met with the Speaker yesterday to discuss these critical issues.

On the second date – April 2, 2007 – the Supreme Court handed down *Massachusetts v. EPA*. In this first major global warming Supreme Court decision, the Court ruled that the most important greenhouse gas – carbon dioxide – is a pollutant, and that the EPA can avoid regulating carbon dioxide emission **only** if it determines that this greenhouse gas does not contribute to climate change.

Two branches of our government have spoken – they have stated loud and clear that it is time to take action on climate and energy. The effects of Hurricanes Katrina and Rita showed us what might happen if we continue to stay the course of inaction any longer.

The question, of course, begs - ***where is the President on climate change?*** Will this Administration see the light and realize that it's time to start taking serious steps toward reducing our emissions, declaring our energy independence, and preparing for climate impacts? Or will it simply be more of the same half-baked, minimalist effort that we've seen for the past six years?

We're hoping that today's hearing will help us find the answers to those questions. This morning we have invited the heads of some of the major departments and agencies under this Committee's jurisdiction to testify about what their agencies are doing about climate change and the need for energy independence.

I welcome Secretary of Transportation Peters, Environmental Protection Agency Administrator Stephen Johnson, General Services Administrator Doan, and Assistant Secretary Woodley of the U.S. Army Corps of Engineers.

I also welcome Acting Architect of the Capitol, Mr. Stephen Ayers, and Chief Administrative Officer of the U.S. House of Representatives, Mr. Daniel Beard, who will testify to us about the actions that are being taken here on the Hill.

Global is a result of the tremendous build-up of greenhouse gases - such as carbon dioxide and methane - in the atmosphere. These gases are currently present at far higher levels than they have been in over 10,000 years. These gases are very good at capturing heat energy. As a result, the more that carbon dioxide or methane is emitted into the atmosphere, the more heat energy that is trapped – and the warmer the planet will become. The world's top atmospheric scientists say that the evidence that the climate has warmed is "unequivocal."

As many of you know, the lion's share of the increase of these greenhouse gases is due to man-made causes: whether it's power-plants, vehicles, or other activities that consume fossil fuels. These same scientists tell us that they have "very high confidence" that the net result of human activities has been one of warming.

But why should we care?

The costs of climate change impacts will be huge: the environment, the economy, as well as people will all bear the burden. We can't say that Hurricane Katrina was a result of climate change. But we can say that its impacts are what we should expect if the globe continues to warm. That storm resulted in:

- 1,118 people confirmed dead;
- 135 still missing and presumed dead;
- $21 billion in property damage;
- Damage to public infrastructure is estimated at another $6.7 billion.
- Almost one-half of the region's population affected by the storm hasn't returned to their homes.
- And nearly 124,000 jobs were lost as a result of the hurricane

Katrina is a harbinger of what's to come if we do not take action now.

We may have other reasons to be concerned too. During the melting of the land ice at the end of the last ice age, fresh water surged into the North Atlantic Ocean. The upshot was that this less dense fresh water (instead of heavy salty water) could not sink and stopped the formation of the deep water section of the Gulf Stream

circulation. This caused the Gulf Stream to close down so that the North Atlantic became very cold. The cooling was so quick that Europe returned to ice age conditions for another couple of decades – even though the world was ostensibly warming!

Climate change is a very complicated topic. That's part of the reason there has been so much controversy. But the evidence continues to pile up; and there is now much we know about the science behind global warming, and the impacts that are likely to happen.

For example, if glaciers and ice sheets continue melting at the current rate, the sea could rise by 3 feet this century alone. In Bangladesh, 30 million people will be made homeless. Where would these "climate refugees" go? Who would accept them? Climate change, ladies and gentlemen, is not just an environmental issue – it's a national security issue, it's an economic issue, it's a humanitarian issue – it's an issue we cannot afford to ignore any longer.

The administration knows this. They have scientists that tell them that climate change is occurring. We have a president that has acknowledged that climate change is occurring, and that human activity plays a part.

And yet, administration approaches to climate change have been timid, at best.

States like Texas, Oregon, and New Jersey have taken bold, innovative steps to reduce emissions and become more energy efficient – but they can only do so much.

Since Hurricane Katrina, public opinion has also dramatically shifted. In January 2007, a Fox News poll reported that 64% of Americans believe climate change is a problem that requires action, and 82% believe that climate change exists. But the public relies on the government to move forward on these issues.

Once again, where is the President on these issues?

We have an administration that has continued to devote most of its energies into more and more research, and voluntary programs that have limited reach and effectiveness.

Research is good, and research is necessary – but when the evidence continues to add up – there comes a time to take action. And this evidence has been building for a number of years now.

In 2002 the President launched his much bally-hooed Global Climate Change Initiative. The center-piece of this program is 'emissions intensity reduction.' What does this mean? At the end of the day it means that we can put out more emissions than yesterday – as long as the rate of increase of emissions decreases.

Ladies and gentlemen, we cannot wait for another Katrina to decode this climate policy doublespeak.

We have an imperative to move forward on this issue and Congress is dedicated to taking action on climate and energy independence.

Some of my colleagues may say that this course of action will drag the economy down and put people out of work.

Let me ask this – how many people will be out of work – what shape will our economy be in – what will our country look like after another Katrina? After continued droughts in South Dakota? After sea level rise in Florida? After repeated heat waves in Chicago?

There are some simple fixes that we can make that will move us along to being energy independent, and more resilient to climate change. For example:

- Did you know that if we made a ten percent mode shift in surface transportation to transit, we would save the equivalent of all the oil we import from Saudi Arabia in a year. That's 550 million barrels of oil.
- That replacing traditional light bulbs throughout federal government buildings with fluorescent bulbs will save energy and costs to the taxpayer?
- That systematically including climate projections into the Army Corps of Engineers planning and analyses will make our levees better able to protect us against higher sea levels?
- And that encouraging the use of cleaner, efficient cars, trains, and airplanes will save consumers money as well as lower emissions.

Moves toward energy independence are win-win: they save consumers money and they reduce emissions.

Our witnesses this morning will tell us that they are moving in some of these directions. What we want to determine at today's hearing, is whether the administration – and these agencies in particular – understand the gravity of the current climate situation. And we need to learn whether their actions actually match their and the administration's rhetoric.

Thank-you for being here today. We look forward to your testimony.

TESTIMONY OF STEPHEN T. AYERS, AIA
ACTING ARCHITECT OF THE CAPITOL

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BEFORE THE
COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE
U.S. HOUSE OF REPRESENTATIVES

REGARDING THE ADMINISTRATION RESPONSES TO CLIMATE CHANGE AND ENERGY INDEPENDENCE

MAY 11, 2007

TESTIMONY OF STEPHEN T. AYERS, AIA
ACTING ARCHITECT OF THE CAPITOL

Before the Committee on Transportation and Infrastructure
U.S. House of Representatives

Administration Responses to Climate Change
and Energy Independence

May 11, 2007

Mister Chairman, Congressman Mica, members of the Committee, thank you for inviting me here today to discuss the initiatives and projects the Office of the Architect of the Capitol (AOC) has undertaken over the past several years to conserve energy across the Capitol complex.

We appreciate the Congressional leadership's commitment to reduce energy consumption and conserve natural resources, reduce costs, and protect the environment. Our individual actions can add up to a tremendous collective effort and can produce significant results in saving taxpayer dollars and conserving our natural resources.

Demonstrating our commitment to energy conservation, the AOC is complying with the requirements and goals of the Energy Policy Act of 2005. Under the Act, the AOC was required to reduce energy consumption in FY 2006 by two percent, as compared to the baseline set in FY 2003. The long-term requirement of the Energy Policy Act is to increasingly reduce, by percentage, energy consumption per gross square foot per year in fiscal years 2006 through 2015. I am pleased to report that the AOC exceeded the goal of two percent by reducing its energy consumption by 6.5 percent in FY 2006.

This decrease was achieved despite the addition of 1.3 million square feet of new space or new construction to the Capitol complex including the Capitol Visitor Center, the National Garden, and the National Audiovisual Conservation Center.

We exceeded our goal through a variety of projects and pilot programs.

The AOC:

- Installed modern, energy-efficient lighting and comfort-control systems that are saving taxpayers more than $2.2 million per year.

- Initiated a pilot program in the House Office Buildings to install dimmable lighting ballasts in the stairwells that dim when unoccupied and increase output to 100 percent when someone enters the stairwell.

- Implemented pilot program to install dimmable lighting ballast systems with daylight and occupancy sensors in overhead lighting to maintain consistent lighting levels in Senate offices. A similar pilot is ongoing in the Capitol Building.

- Is replacing conventional incandescent light bulbs with compact fluorescent lamps (CFLs).

- Is installing occupancy sensor light switches for offices, conference rooms, and Committee rooms upon request.

- Is installing restroom fixture motion sensors and low-flow devices for water conservation.

- Upgraded elevators and escalators with energy-efficient solid state equipment.

- Initiated a feasibility study to replace the Rayburn House Office Building roof with a building integrated photovoltaic roofing system or a vegetative roof for decreased storm water run-off and improved insulation.

- Is installing modern heating/cooling systems and is replacing old, inefficient windows with airtight, insulated ones in buildings across the Capitol complex, including the Supreme Court and the Ford House Office Building.

- Installed a storm water management rain garden at First and D Streets in 2004. Not only does the rain garden beautify the area near the parking lot, it helps protect and clean the environment by filtering pollutants from rain water and the air. Bioretention areas provide natural filtration to keep pollutants from running off parking lots into local streams and rivers.

- Is purchasing and leasing only Energy Star ™ appliances and equipment.

- Implemented pilot program to upgrade controls on heating, ventilating and air conditioning (HVAC) terminal units in Senate offices and Committee room to reduce energy usage while increasing comfort levels.

- Implemented policy requiring the purchase or leasing of alternate fuel vehicles.

- Is completing the West Refrigeration Plant Expansion project which includes the installation of more efficient chillers and other energy-saving systems.

- Is auditing the energy consumption of facilities to identify energy saving opportunities and planning to add new steam and chilled water meters to all buildings to monitor actual energy use.

- Incorporated standards from the Leadership in Energy and Environmental Design (LEED) Green Building Rating System into our design standards to start new construction from a "green" baseline.

- Is using Energy Savings Performance Contracting to increase building energy efficiencies and upgrade infrastructure.

- Contracted with GSA and Pepco for three percent renewable energy in FY 2007 and is currently in discussions with Pepco as we assess the budget implications to increase this percentage to the maximum percentage that is reasonable.

- Is planting 175 new trees on Capitol Grounds.

- Recycled nearly 2,300 tons of paper from the House and Senate Office Buildings in FY 2006.

In addition, the AOC has taken other measures to reduce the Capitol's impact on the environment. For example, we completed a strategy study with Carnegie Mellon's Center for Building Performance and Diagnostics to identify projects, techniques, and policies which can be implemented in the short-term.

The AOC also implemented a procurement policy that establishes our preference for the use of bio-based products. We require the use of USDA-approved bio-based products with certain exceptions with regard to products that are unreasonably expensive, do not meet specifications, or can not be delivered in a timely manner. As additional products are approved by the USDA, the AOC will evaluate them and approve them for use in accordance with our policy. The AOC is also taking the initiative to identify environmentally-friendly products in our daily operations by adding requirements for environmentally-friendly products to our contracts.

Reducing energy consumption is another important component of our overall energy-savings campaign. To encourage end-users to reduce energy use, the AOC has been conducting a public

education campaign by providing materials on how to save energy to Congressional, Committee, and AOC offices.

Active participation by Congressional and other offices in the recycling program has been significant to its success the past several years. In both the House and Senate Office Buildings, offices are outfitted with recycling bins under the AOC's recycling program. Over the past five years, the total tonnage of non-contaminated recyclable wastes has tripled, while revenue from AOC's recycling program is up over 60 percent. In addition, over the past two years, we have recycled 100 percent of all AOC computer and electronic waste which includes monitors, keyboards, computers, printers, laptops, and other types of computer hardware.

The AOC also has initiated two Energy Saving Performance Contracts (ESPCs) and we plan to utilize more to achieve a portion of the required energy reductions under the EPAct. Our goal is to utilize the ESPC process in all of the major buildings on the Capitol campus. ESPCs allow the AOC to initiate energy saving projects with little upfront government funding. An Energy Savings Contractor (ESCO) identifies improvements with short-term payback periods. The AOC and the ESCO then select projects to perform under terms of an ESPC. A negotiated portion of the savings generated by the project pays the ESCO in accordance with the terms of the ESPC. Once the negotiated term of the contract is over, the government retains the energy savings of the project.

To ensure that our efforts save energy and save taxpayer dollars, we are planning to conduct additional energy audits. The Government Accountability Office, in its report entitled, "Energy Audits are Key to Strategy for Reducing Greenhouse Gas Emissions" validates that energy audits are a key "because these audits identify cost-effective systemwide energy-efficiency and renewable-energy projects."

To date, five energy audits have been performed. The goal is to perform energy audits on all buildings on a five-year rotating schedule. Funding was requested in FY 2007 to continue these audits, but it was not awarded as a result of the continuing resolution. We have requested $1.1 million in our FY 2008 budget request to fund energy audits as part of our five-year plan.

In addition to the energy audits, we have completed studies to identify projects, techniques, and policies which can be implemented in the short term to save energy quickly. For example, we have been evaluating the viability of changing the Capitol Power Plant to cogeneration, which could provide steam, supplementary electricity, and backup power to the Capitol complex and reduce emissions by more efficiently capturing the energy output.

One of our more long-term strategies involves addressing many of the strategic policies and on-going planning and design opportunities that lie ahead for reducing the environmental footprint of the Capitol complex. As part of the development of our Capitol Complex Master Plan, we have been studying ways to introduce, enhance, and expand the sustainable design and operation of the Capitol complex. We are crafting a Sustainability Framework Plan which would provide a holistic approach to reducing the environmental footprint of the Capitol complex, reduce energy and water consumption, and improve air and water quality.

As I mentioned earlier, the AOC was able to achieve a 6.5 percent decrease in energy consumption in FY 2006 despite the added energy load of additional facilities to the Capitol complex. It is important to note that the largest, single contributor to our energy reduction efforts was the Capitol Power Plant. Between FY 2003 and FY 2006, the Capitol Power Plant (CPP) cut its electricity consumption by six percent and fuel energy consumption by 12.3 percent as a result of new and improved energy efficiency measures implemented there.

In addition to reducing facility energy intensity, the AOC achieved a reduction in energy-related carbon emissions since FY 2003. This is largely due to a shift in the fuel mix used at the CPP. However, switching fuels resulted in a substantial increase in energy costs due to the overall increase in fuel oil prices.

Mister Chairman, because the Capitol Power Plant (CPP) plays a critical role in our efforts, I would like to provide a brief history of the facility. The Capitol Power Plant operates 24 hours per day, 365 days per year to provide steam and chilled water service. Since the first initiation of steam service in 1910, the Capitol Power Plant has never been offline.

When it was first placed in operation, the CPP provided the Capitol complex with refrigeration and electricity. However, in 1952, the electrical generation plant was decommissioned and modern steam and refrigeration plants were built to provide buildings with steam and chilled water for heating and cooling purposes. Today, the CPP generates steam and chilled water used for heating and cooling of 23 buildings located on Capitol Hill. The electricity used today throughout the Capitol complex is purchased from Pepco. The steam plant contains seven boilers that utilize a combination of three fuels (low-sulfur coal, natural gas, and fuel oil) to generate steam. Fuel selection is made based on a combination of economics and equipment availability. The refrigeration plant contains 13 electric driven mechanical chillers that utilize refrigerant to produce chilled water used for cooling purposes.

The Capitol Power Plant operates under the Title V permitting program established under the 1990 Clean Air Act Amendments. The Title V program requires all new and existing major sources of air emissions to obtain a federally approved, state-administered operating permit. All Title V operating permits include applicable requirements from federal and state emission standards. We take great pride in abiding by the permit because the permit is designed to protect the public.

The Title V operating permit currently held by the Capitol Power Plant is administered through the District of Columbia Department of Health, Air Quality Division. In addition, the CPP is required to certify the emissions monitoring systems quarterly, with a certification performed by an independent third party testing firm annually. The Capitol Power Plant must submit quarterly reports to the District of Columbia and Semi-Annual reports to the Director of EPA Region III.

The AOC has spent and will continue to expend the funds needed to improve efficiencies and reduce emissions at the CPP. Several initiatives have been completed over the past several years to expand environmental controls at the Capitol Power Plant. A few of these projects include:

- Baghouses were added in the 1990's to reduce the amount of particulate matter emitted from boilers.
- New Continuous Emissions Monitoring System (CEMS) and Continuous Opacity Monitoring System (COMS) were installed to monitor emissions levels and maintain compliance as set forth in Federal and local regulations.

- New filter-bags in the baghouses to lower emissions of particulate matter from boilers were installed in 2005.

- Ongoing expansion of the West Refrigeration Plant involves upgrading refrigeration systems to increase overall efficiency, including the use of environmentally friendly 134-A Freon.

- In 2005, new coal under-throw stokers were installed to replace the original coal feeder systems. In addition, the CPP is replacing the stoker grate drive system in both coal boilers in 2007 and 2008. These modern systems should provide more efficient operation and coal combustion.

- The CPP is required to continuously monitor opacity, nitrogen oxides (NOx), and oxygen emissions. New monitors were installed in 2005 and provide constant monitoring of emissions from the coal boilers.

We are working to make the CPP more energy efficient and to reduce emissions. However, this is a long-term effort and one that will take considerable investment. The ability to burn three fuels at the CPP assures reliability, provides flexibility, and ensures some protection against rapidly rising fuel costs as we can switch to a lower cost fuel at any time. However, to cease using one fuel completely would require significant capital improvements to the CPP, necessitate disruptive infrastructure changes to the Capitol complex, and increase average annual fuel costs by millions of dollars.

In addition to improving efficiencies at the CPP, there are a number of initiatives that we have planned to ensure the Capitol complex's continued compliance with the Energy Policy Act. To meet or exceed the EPAct requirement of reducing energy use by another two percent in FY 2007, we plan to undertake the following projects, programs, and initiatives.

- Improve metering so that the impact of energy and water conservation projects can be measured rather than estimated.

- Continue purchasing Green Energy from Pepco Energy Services.

- Continue use of Energy Savings Performance Contracts (ESPCs) as a means to pursue projects that offer lifecycle cost-effectiveness but may require increased first-cost investment.

- Evaluate opportunities for onsite renewable energy generation such as use of photovoltaics and supplementing existing fuel with biodiesel.

- Evaluate opportunities for energy recovery both at the Capitol Power Plant and within individual buildings.

- Evaluate opportunities to conserve water throughout Congressionally administered facilities and grounds, and initiate projects such as vegetative roof surfaces to reduce storm water runoff to the public storm sewer system.

- Evaluate opportunities to reverse the rise in electricity consumption within individual buildings and the corresponding increase in the AOC's carbon footprint.

- Continue analysis of currently planned facility repairs and upgrades for energy and water savings opportunities.

- Increase communication with, and education of building occupants about current energy and water consumption within their facilities and the potential for reducing consumption through coordinated, complex-wide efforts.

- Continue development of the Capitol Complex Master Plan/Sustainability Framework Plan to ensure an overarching sustainable approach to facilities and grounds administered by Congress.

By practicing efficient energy management, we save taxpayer dollars, reduce greenhouse gas emissions, and protect the environment and natural resources. Our actions are making a difference and have saved energy across the Capitol complex. There is more we all can do to further conserve energy; however we need to ensure that the projects we chose to invest in are fiscally responsible, energy efficient, preserve the historic integrity of these landmark buildings, and have minimal adverse effects on the buildings' occupants, the local community, or on Congressional operations.

We agree with Congress that we need to not only comply with the Energy Policy Act of 2005 we should be leaders in the national effort to conserve energy. As stewards of the Capitol complex, we will continue to do our part to make this goal a reality.

Washington, DC 20515

August 3, 2007

The Honorable James L. Oberstar
Chairman
Committee on Transportation and Infrastructure
U.S. House of Representatives
2165 Rayburn House Office Building
Washington, D.C. 20515

Dear Chairman Oberstar:

Thank you for the opportunity to testify before the Committee on May 11, 2007, regarding the administration's response to climate change. During the hearing, you asked that we provide information on the use of photovoltaics at the Ford House Office Building.

During the 1970's, various alternatives were studied regarding the installation of solar systems on the Ford House Office Building and in the early 1980's, two solar panel water heating systems were installed on the roof of the building. System 1 heated domestic hot water and System 2 produced high temperature hot water for an absorption cooling system serving the main House computer center. System 1 effectively provided domestic hot water to the building and kitchen facilities for almost 20 years. System 2, while not as effective as System 1, provided a portion of the cooling requirements for the computer center for a number of years. In the late 1990's both systems were decommissioned due to failure of various components of the systems and a lack of availability of repair parts. In 2003, in preparation for the roof renovation project, the systems were removed.

As discussed at the hearing, the AOC strives to conserve energy on Capitol Grounds. An example of this effort is the Rayburn House Office Building roof replacement project. Currently, the AOC has $400,000 in design funding for the Rayburn House Office Building roof replacement project. As part of the roof design process, a feasibility assessment of vegetative and photovoltaic applications will be included. AOC's intent is to have a majority of the roof utilized for photovoltaics and a portion of the roof for vegetative applications, if possible. AOC plans to request construction funding for roof replacement in Fiscal Year 2010.

Should you have any additional questions, I am available to discuss this matter at your convenience. Thank you for your continued support.

Sincerely,

Stephen T. Ayers, AIA
Acting Architect of the Capitol

Doc. No. 070724-02-01

Testimony of
DANIEL P. BEARD
Chief Administrative Officer
U.S. House of Representatives

Before the Committee on Transportation and Infrastructure
"Administration Responses to Climate Change
and Energy Independence"
May 11, 2007

Mr. Chairman, I appreciate the opportunity to appear before the committee to discuss Speaker Pelosi's Green the Capitol Initiative.

On March 1, 2007 Speaker Pelosi, Majority Leader Hoyer, and the former Chair of the Committee on House Administration directed me to develop a series of preliminary recommendations to reduce the environmental impacts associated with operation of the House building complex.

As they noted in the letter, the House of Representatives should demonstrate leadership to the nation by providing an environmentally responsible and healthy working environment for our employees. In addition, the House complex should be a showcase for sustainability. "We cannot ask the American people to address global warming and climate change issues," their letter noted, "without first carefully examining ways to reduce our own energy consumption and develop sustainable workplace practices."

As a result of their letter, I undertook a review of the House operating procedures with respect to energy conservation, sustainability and related matters. The result was recommendations in six general areas which the Speaker has endorsed, and these recommendations form the basis for our operations in the near future.

Carbon Footprint of the House Complex

Before discussing the changes the Speaker has directed, it is important to point out the carbon footprint of the House.

Using figures developed by the Government Accountability Office, Lawrence Berkeley National Laboratory, we estimate the operation of the

House complex is responsible for approximately 91,000 tons of greenhouse gas emissions (expressed in carbon dioxide equivalents) in fiscal year 2006. This is equivalent to the annual carbon dioxide emissions of 17,200 cars.

Electricity use was the largest source of emissions, accounting for 63 percent of total carbon emissions. The electricity purchased by the House (and other Legislative Branch agencies) is generated from several sources: coal (53 percent), nuclear (37 percent), natural gas (7 percent), renewables (2 percent) and fuel oil (1 percent). The Capitol Power Plant accounts for another 33 percent of House greenhouse gas emissions, primarily from the combustion of fossil fuels at the boilers to generate steam to heat the buildings. The power plant's boilers are fired using coal (for 49 percent of the output), natural gas (47 percent) and other sources. All other business-related activities (travel in owned and leased vehicles, operation of heavy machinery, release of volatile organic compounds from paint, furniture refinishing, etc.) accounted for the remainder of the House's carbon dioxide emissions (4 percent).

Directives

Based on my report, the Speaker has decided make the following changes in the operation of the House.

Directive 1: Operate the House in a Carbon Neutral Manner. The Speaker has made a decision to operate the House in a carbon neutral manner at the earliest possible date, but no later than the end of the 110th Congress. By implementing this recommendation, we will be eliminating the impact of 91,000 tons of carbon dioxide emissions annually, which is the equivalent of taking 17,200 cars off the road each year.

Directive 2: Shift to 100 Percent Renewable Electric Power.

The purchase of electricity is the largest source of carbon dioxide emissions from the operations of the House. In order to achieve our goal of making our operations carbon neutral, my office, working with the Architect of the Capitol, will negotiate to purchase 100 percent of our electricity needs (approximately 103,000 megawatt-hours per year) from renewable sources at the earliest possible date. The cost of electric power generated from renewable sources could increase our electricity costs over power generated

from traditional sources. This increase in cost, however, will be offset over the long run by the energy conservation actions we will be implementing and recommending. By implementing this recommendation, we will eliminate 57,000 tons of the total greenhouse gas emissions annually, or the equivalent of removing 11,000 cars from the roads.

Directive 3: Aggressively Improve Energy Efficiency. The Speaker has directed implementing a series of immediate actions to reduce energy use; these include:

a. Immediately convert 2,000 desk lamps in the House office buildings to compact fluorescent lamps (CFL). In addition, within six months take the steps necessary to convert the remaining 10,000 desk lamps to CFLs. Replacing 12,000 CFLs is the equivalent to removing 255 cars from the road, and it will yield a $245,000 savings in electric power costs to the House per year.

b. Directing the CAO and Architect of the Capitol to no longer purchase standard incandescent replacement bulbs with funds made available by the House.

c. Instructing the Architect to convert the overhead House ceiling lights to high efficiency lighting and controls at the earliest possible date. Such action has the potential to reduce lighting energy from these sources by as much as 50 percent. This action will eliminate 7,130 tons of greenhouse gas emissions, which is equivalent to 1,340 cars.

d. In order to promote energy efficiency among the 7,000 staff of the House, CFLs will be made available at cost in the House office supply store. If all staff members installed just one CFL bulb for their own use, it would have a cumulative effect of removing 150 cars from the road.

Directive 4: Adopt Sustainable Business Practices. The House is a major purchaser of products and services, and the Speaker has directed us to demonstrate leadership by making purchases that promote sustainability; this includes:

a. Purchasing only Energy Star or Federal Energy Management Program-designated products where such designations are available. These products have been determined by the appropriate Federal agencies to be life-cycle cost effective in normal operations and will contribute significantly to reduced consumption of energy.

b. Purchasing office equipment that is certified using the Electronic Product Environmental Assessment Tool (EPEAT) system. This system helps evaluate, compare and select electronic equipment based on its environmental attributes. EPEAT certified electronic devices are low in heavy metals and high in recycled plastic content.

c. Giving priority to the purchase of climate neutral products that offset the life cycle contribution of greenhouse gas emissions. Specifically, purchase only adhesive, sealants, paints, coating, and carpets that emit very low quantities of volatile organic compounds. Volatile organic compounds are major components affecting indoor air quality and they contribute to climate change.

d. Purchasing only furnishings that contain recycled products or wood certified as sustainable by the Sustainable Forests Initiative, the Forest Stewardship Council or similar programs. Implementing this recommendation will make a small contribution toward insuring bio-diverse forests for future generations.

e. Directing the Architect to finalize the installation of an Ethanol-85 tank, pump, and related infrastructure for the use of official vehicles within the next six months.

Directive 5: Continued Leadership on Sustainability Issues. It is important for Members and staff to continue to provide leadership on climate change and sustainability issues. To assist in maintaining this continuing commitment, the Speaker has directed the following:

a. Holding a "Green Expo" for House offices to demonstrate the latest in green products or services available to offices from commercial vendors.

b. Establishing a sustainability education program for House employees providing guidance on how employees can make a

contribution to impacting climate change and sustainability at home and in the work place.

c. Establishing a "Green Revolving Fund" where revenues received from various sources will be placed in a revolving fund to be used to undertake energy and water conservation initiatives that offset greenhouse gas emissions.

Directive 6: Offset to Insure Carbon Neutral Operations. It is likely that even by implementing all the recommendations outlined above, the House will not be operating in a carbon neutral manner. As a result, the Speaker has requested that I recommend a strategy for offsetting as much as 34,000 tons of greenhouse gas emissions by either: (1) Purchasing offset credits in the domestic market, or (2) Contributing a per ton payment, based on the current domestic market, of carbon dioxide equivalents emitted by the Capitol Power Plant boilers and placing these funds in the Green Revolving Fund to be used to directly mitigate the emissions. Since the domestic offset market is in its infancy and lacks uniform standards, it is important the House carefully screen any offset purchases.

Between now and June 30, I will undertake a review of possible investments and determine their acceptability. If an acceptable offset cannot be secured, depositing the offset monies in the Green Revolving Fund would provide us with an acceptable alternative.

Conclusion

The recommendations in the Speaker's initiative are only the first step in the process of creating a Green Capitol and more sustainable House operations. The final report scheduled for release on June 30 will introduce additional recommendations and provide a framework for guiding future decisions. In particular, that framework will set benchmarks for existing energy use; establish meaningful and measurable goals for reducing energy and carbon; create timetables for implementing various changes in operating conditions; and define measures for reporting progress on a regular basis.

Thank you for this opportunity to appear before the committee to explain the Speakers initiative.

STATEMENT OF

LURITA A. DOAN
ADMINISTRATOR

U.S. GENERAL SERVICES ADMINISTRATION

BEFORE THE

COMMITTEE ON TRANSPORTATION
AND INFRASTRUCTURE

UNITED STATES HOUSE OF REPRESENTATIVES

MAY 11, 2007

Good morning, Chairman, Ranking Minority Member and Members of the Committee. I am Lurita Doan, Administrator of General Services (GSA), and I am pleased to have this opportunity to appear before you today to discuss GSA's Energy initiatives. Part of our mission is to help our client agencies meet their environmental obligations by providing responsible choices. Our offerings include the construction and leasing of energy efficient, sustainably-designed buildings, the procurement of renewable utility services, environmentally friendly telework and other alternative workplace arrangements, a selection of the latest Alternative Fuel Vehicles (AFV's), and a wide range of environmentally preferable office products. From the space and services provided by our Public Buildings Service (PBS), to the products and services provided by our Federal Acquisition Service (FAS), I am proud of the leadership we demonstrate and the assistance we provide to the Federal community to meet or exceed the targets set by Congress in the Energy Policy Act of 2005, and by President Bush in his new Environmental Executive Order 13423, Strengthening Federal Environmental, Energy and Transportation Management. I am also proud that our efforts to achieve energy efficiency through good practices, new technologies, and innovation have helped us not only reduce our energy consumption but our operating costs, as well.

Today I'd like to talk about 1) our leadership in energy efficient, green buildings; 2) our offerings of environmentally responsible products and services; and 3) our government wide telework initiative including our telework centers that relieve Federal employees from daily traffic snarls and also reduce greenhouse gas emissions.

Public Buildings Service

GSA's Public Buildings Service (PBS) is the steward and custodian of most civilian Federal buildings. We provide workplace solutions to more than 100 Federal agencies representing over a million Federal civilian workers in 2,000 American communities.

Buildings in this country consume about 40 percent of the total energy used in the United States and 70 percent of the electricity. GSA has an opportunity—and a responsibility —to lead the Federal Government by example and to demonstrate how we can reduce energy consumption by intelligently integrating energy efficiency into building designs while still creating places where people can work effectively.

We have made significant investments in energy saving solutions. In fact, between 1985 and 2005, GSA achieved the 30 percent reduction in energy consumption target set by the Energy Policy Act of 1992. We continue to reduce energy consumption in our buildings consistent with the President's new Executive Order 13423, which requires another 30% reduction from a 2003 baseline by the end of FY 2015.

We currently operate our buildings at costs that are five percent below comparable buildings in the private sector, and we pay 12 percent less for utilities. At the end of Fiscal Year 2006, GSA had reduced the overall energy consumption of its inventory by 4.7 percent compared to 2003 in line with the President's new Executive Order. Some of this reduction is directly attributable to the investments Congress authorized and GSA made in building modernizations and stand-alone energy conservation projects over the past 15 years, as well as the concerted efforts of GSA property managers working closely together with our tenants.

Lighting

Of the energy used in buildings today, nearly 30 percent is consumed for lighting and office equipment. GSA recognized this opportunity and during the early 1990's we extensively retrofitted existing buildings with new energy efficient lighting systems. In fact, we met our early goal of 20 percent energy reduction between 1985 and 2000 primarily through these retrofits. Since then, GSA has

moved towards using a new generation of integrated lighting products. While these new efficient lighting products are initially more costly and technologically challenging, they provide greater energy savings in the long run since they not only reduce the amount of energy used for lighting, they also reduce the amount of heat produced by the lights. This reduces the amount of air conditioning needed to cool the building, reducing the size of the mechanical system needed, resulting in even greater energy savings. Although a simple concept to understand, this approach demands an integrated, whole building approach.

As we move toward the future, GSA is incorporating numerous lighting initiatives in our workplaces that take advantage of sophisticated strategies, such as daylight harvesting, and commercial products that differentiate between task specific and ambient lighting requirements.

The Alfred A. Arraj U.S. Courthouse in Denver is an excellent example of how to use daylight harvesting and other sustainable design strategies to achieve energy and lighting efficiency. The public corridors of the building are oriented to the southeast to maximize solar exposure. Oversized windows provide visitors with a connection to the outdoors and magnificent views of downtown Denver. High efficiency triple-glazed windows minimize the need for heating and cooling. Internal light shelves bounce daylight onto light-colored surfaces so that it is then reflected deep into the interior of the building. Fluted glass panels bring diffused

daylight into the interior courtrooms and other spaces. Even the light-colored limestone floors contribute to the day lighting. Overall, natural light is available throughout 75 percent of the building.

Currently, our regional offices in Atlanta and San Francisco are piloting several types of advanced energy efficient lighting systems for offices such as:

(1) "Intelligent Lighting" using light ballasts that can be individually controlled by each person's computer, and are tied into advanced controls that monitor activity;

(2) Combination task-ambient lighting for low ceilings; and

(3) Fixture retrofits that provide individual light control that do not require re-wiring.

By demonstrating and testing these new technologies, GSA gathers the information necessary to select strategies appropriate for each building in our diverse inventory. For instance, intelligent lighting is initially more expensive and more complex, but offers an unprecedented energy savings, while task/ambient lighting for low ceilings provides an energy effective solution for a lower budget and is simpler to install and maintain.

A major challenge to future improvements in lighting efficiency is the old suspended ceiling system. Newer, high efficiency fixtures do not fit in old

suspended ceilings. GSA can incorporate them in new construction and building modernizations; however, the retrofit of existing systems will require capital expenditures that we will include in future prospectus submissions.

Renewable Energy

GSA is a national leader in the purchase and use of renewable power from utility companies, and we continue to explore opportunities for installing solar and other on-site generated renewable energy technologies as part of our building design and retrofit programs. The President's new Executive Order requires that half of the renewable power purchased by federal agencies be purchased directly from new renewable sources.

In 2006, 4.5 percent of our electricity was generated from renewable sources or bought through renewable energy certificates, compared with the national average of 2.3 percent. We are proud of the progress we have made in this area, but we can do more. We have found more opportunities to buy renewable power at competitive prices as the cost for electricity and natural gas has increased. However, recent State and local regulatory policies and increasing customer preferences are driving increased demand for renewable power. If this trend continues without a corresponding increase in renewable supply, price premiums for renewable power may reach or surpass previous historical highs.

Over the last four years, GSA has purchased almost 950,000 megawatt hours of energy from renewable sources through competitive power contracts and through the use of green power programs offered by local distribution companies. For example:

- The Binghamton Federal Building in New York State is the first Federal facility in the nation powered by 100 percent renewable energy. The power flows from a new wind turbine installed at the Fenner Wind Farm in the town of Fenner, New York. This project not only demonstrated GSA's commitment to energy independence and environmental stewardship, but also helped to spur the growth of a new wind power industry in a small community.

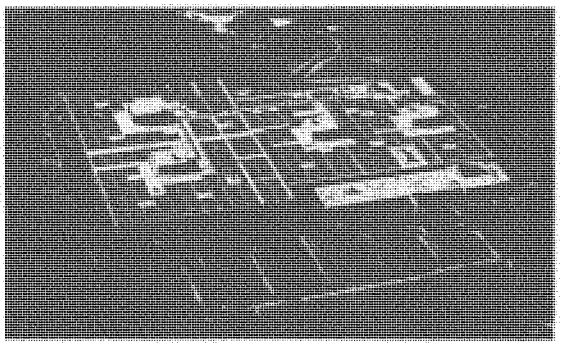
- GSA awarded a contract to supply the National Park Service's Statue of Liberty and Ellis Island with electricity generated from 100 percent wind resources. The three-year contract will supply approximately 28 million kilowatt hours of renewable energy to the two landmark sites. The Statue of Liberty is now not only a beacon of freedom to the rest of the world, but also a welcome sign of the future in renewable energy.

GSA is also incorporating solar and other on-site generated renewable energy technologies in our building design and retrofit programs consistent with Executive Order 13423's emphasis on the development of on-site renewable power. In

Fiscal Year 2006, GSA used an estimated 3.3 billion British Thermal Units (BTUs) in energy from self-generated renewable projects. We estimate that:

- 543.7 megawatt hours of the total came from GSA's 12 solar photovoltaic installations,
- 600 million BTUs came from GSA's two solar thermal projects, and
- 830 million BTUs came from the one completed geothermal project.

In Fiscal Year 2006, GSA also began construction of two new photovoltaic (PV) systems: The first is a 40 kilowatt array at the Trenton Courthouse Annex in Trenton, New Jersey. The second is a 377 kilowatt building-integrated photovoltaic system at the National Archives and Records Administration (NARA) facility in Waltham, Massachusetts. The NARA facility is covered by a completely integrated roof and solar system—the solar panels are the roof. The flexible, flat panel photovoltaic array is heat-welded into the roofing material and qualifies as a "Cool Roof" under the U.S. Environmental Protection Agency's Energy Star program.



NARA Facility in Waltham, MA

The project is estimated to save approximately $204,000 and 5.55 billion BTUs annually. One can view the operation of this project in real time at the following web hyperlink: http://gsanara.rem-systems.com/.

Just this year, at the Denver Federal Center, we funded a 1 megawatt pole-mounted solar photovoltaic array on 6.5 acres. This "solar park" will save $405,000 per year in charges on the electrical bill. The energy obtained from the solar park will both feed directly into the regional electrical grid and will be used at the DFC.

Alternative Financing

As identified in its 2007 Implementation Plan, GSA will maximize use of alternative financing contract mechanisms to reduce energy use and cost. GSA was an early adopter of the use of Energy Savings Performance Contracts (ESPC's) and developed a business case decision matrix that enables local facility managers to assess the local potential for the use of ESPC's. We continue to work closely with Department of Energy's Office of Energy Efficiency and Renewable Energy on this important financing vehicle.

Integrating Sustainable Design (Green Buildings)

Sustainable design, often referred to as green buildings, is a holistic, integrated approach to building, modernizing and operating buildings that seeks to balance cost, environmental, social, and human benefits with the mission and functional

needs of the customer agency. The President's new Executive Order requires that Federal agencies incorporate sustainable design practices into all new construction and renovations as well as into15% of the existing federal inventory by FY 2015.

To help us measure how well we are using this approach, GSA uses the U.S. Green Building Council's Leadership in Energy and Environmental Design, or LEED® rating system in the design of new construction and major alteration projects. As a leader in sustainable design, GSA has earned a LEED® rating for 19 buildings to date: nine of these are Government-owned buildings and 10 are build-to-suit leased buildings. Of these, six achieved the "Certified" level, five achieved "Silver," and eight achieved "Gold." GSA has registered another 70 buildings under the LEED® building rating system; upon project completion, these will be eligible for certification.

GSA integrates sustainable design principles as seamlessly as possible into the design and construction of our buildings and build-to-suit leases through our Design Excellence program. Through our Design Excellence program, we involve team members from a wide range of disciplines to dramatically reduce energy consumption. Our goals are to improve the quality of the work environment and

create more productive, healthier workplaces and drive down long-term energy and maintenance expenses. We view these goals as complementary. A few examples demonstrating leadership in sustainable design:

- GSA has incorporated green (planted) roofs in some of our projects. These roofs range from small tray systems to entire garden roofs. In Suitland, Maryland, we have built one of the largest green roofs in the country, covering 170,000 square feet—nearly four acres. Green roofs reduce energy costs by both insulating the building and reducing the "heat island" effect that is produced by large buildings in urban areas. Green roofs are also beneficial because they capture rainwater, which serves to reduce water run

- In San Francisco, GSA completed a remarkable new Federal building, the first of its kind in the U.S. to use natural ventilation to cool the building instead of mechanical systems to cool and circulate air. This is a great example of avoiding energy use by taking advantage of the favorable low humidity and moderate temperatures of the local climate. Simply put, its design is a good fit with its location. This new facility was cited in the April 9th edition of Time magazine for its sustainable design.

To the extent feasible, GSA uses biobased products in the construction of its buildings. We also direct lessors to use environmentally preferable products, including biobased products, when leasing space to the government. GSA looks forward to the development of the "USDA Certified Biobased Product" label and will continue to promote the use of biobased construction products as they are added to the designated products list.

Building Modernizations

While we continue to explore, test, and adopt new technologies in our construction program, some of our best opportunities for improving energy efficiency lie in building modernizations. We achieved tremendous efficiencies in the following modernizations:

- At the Charles E. Bennett Federal Building in Jacksonville, Florida, GSA used a holistic design approach and achieved a reduction of nearly 24 billion BTUs in energy consumption, a more than 60 percent drop. This is enough energy to power 208 homes for one year. The project received a U.S. Department of Energy Federal Energy and Water Management Award.

- The John J. Duncan Federal Building in Knoxville, Tennessee underwent a comprehensive building re-commissioning. Improvements included the installation of a new building control system, along with lighting upgrades and motion sensors, resulting in a savings of approximately 1.7 billion BTUs in FY 2005, exceeding the target goal of 33 percent. GSA also pursued a number of water management measures including the retrofit of restrooms with water-saving equipment, saving 400,000 gallons of water a year, and the installation of secondary water meters to reduce water sewage and runoff charges. The building successfully attained an Energy Star rating of 94 out of 100 and qualified for LEED certification.

On-Going Operations

GSA aggressively manages energy consumption in our buildings. As mentioned earlier, we currently operate our buildings at five percent below the costs of comparable buildings in the private sector, and for utilities, we pay 12 percent less. While some of this lower cost is directly attributable to the investments the Congress authorized, and GSA executed, in energy conservation projects over the past 15 years, we have also earned this achievement by strategically positioning ourselves in the energy market.

- Competitive Energy Procurements –GSA's energy experts develop procurement strategies for natural gas, electricity and green power to achieve the best competitive price, taking into account the facility and the customer's organizational goals—that may include budget stability, energy reliability and security. We provide this service to all Federal agencies, regardless of whether they occupy GSA buildings—it is part of our mission.

- Public Utilities – To provide government-wide efficiency in procurement and negotiate the best rates, GSA awards large public utility area wide contracts for electricity, natural gas, steam, chilled water, and water and sewage services thus ensuring Federal facilities receive service at the best tariff rates as regulated by public utility commissions, utility cooperatives or municipal utility companies. In many cases, these contracts include demand side management services and alternative financing for energy projects. In addition, GSA provides leadership in developing contracting vehicles, allowing end-users to meet multiple Federal energy requirements in both public law and executive orders.

- Energy Tracking – We track energy consumption monthly at every GSA facility. Our system provides data on energy trends as they relate to past or future building actions.

- Energy Audits – GSA continuously conducts energy audits and retro-commissioning studies of its inventory to identify life-cycle cost effective energy conservation measures. Approximately 10 percent of our space inventory is audited in any given year.

Pilot Projects

- GSA is piloting a new chiller efficiency monitoring and analysis tool in 14 buildings with 34 plant chillers of varying sizes. If successful, this tool will provide early identification of problems in chiller plant equipment and operations, improve the efficiency and extend the life of existing chillers and related equipment, identify optimal cost effective and efficient remedial actions to repair, replace, and enhance chiller plant operations, provide energy savings, lower carbon emissions, and reduce future capital expenses. Most importantly, this tool can help reduce equipment down time resulting in reliable service to customers.

- We are also working with one of our large customers to integrate power controls into their IT operations—establishing a monitoring system that will

reduce the electricity consumed by computers when people forget to power down as they leave—no work gets lost, but substantial amounts of electricity can be saved. And speaking of computers, our customers can help us dramatically reduce the energy they consume by replacing old TV-like monitors with flat screens. Flat screen (LCD) monitors use only one-third the amount of electricity as the old TV monitors, are better for the worker—less eye strain—and produce less heat that we have to dissipate with air conditioning.

Future Directions

Currently, GSA is increasing its participation in load curtailment and demand management programs sanctioned by utility companies and system grid operators to further refine its lighting use. As energy use generally peaks in the late afternoon for a short period of time, we try to quickly reduce the major consumer of electricity in our buildings: lights. We are looking at sophisticated lighting systems that reduce illumination levels significantly enough to reduce total building demand and still leave enough light for building occupants to perform their work. In addition, GSA is strategically issuing competitive electricity contracts in deregulated markets with contract language that optimizes our demand limiting capability, thus resulting in lower rates.

The Energy Policy Act directs us to install advanced metering. We will be doing that over the next few years, depending on funding. We started installing advanced meters in the Washington, D.C. and New York areas even before the law required us to do so. In the long run, advanced meters will save money by allowing us to manage power consumption more strategically. For example, GSA was able to contribute to the electrical management in the Washington area last summer by "shedding load" – sometimes allowing buildings to get a little warmer and more humid in the late afternoon – and thus, we helped avert major brown-outs in this area. Perhaps more importantly, advanced metering will help us buy power at better prices, because we will know our use patterns.

GSA is also exploring ways to reduce our dependence on the existing "energy grid." Combined heat and power (CHP) systems can be a source of both energy security and savings. The Food and Drug Administration Office in White Oak, Maryland is a great case study. Using an energy savings performance contract (ESPC) to install a 5.8 megawatt CHP facility as part of the first phase of the campus build-out, we saved more than 37 million kilowatt-hours, $1.4 million in energy costs and $2.1 million in annual operation and maintenance costs (FY 2003 data). The plant provides reliable, uninterrupted on-site electric generation capability for three facilities on campus—a laboratory, an office building and a

multi-use facility. Heat is recovered from the generating process to produce hot water for building use and in the absorption process to produce chilled water for air conditioning. The thermal efficiency of the plant is increased by 30 percent while significantly reducing pollution emissions. Furthermore, we plan to expand this system to support 100 percent power generation for the entire campus once the campus is complete. This will reduce the 25 megawatt load that the local utility would otherwise have to accommodate.

The General Services Administration is undertaking several initiatives to address facility 'survivability' and energy conservation. 'Survivability' addresses a building's ability to maintain critical life-support conditions in the event of extended loss of power, heating fuel, or water. Passive survivability should include such features as cooling-load avoidance, natural ventilation, a highly efficient building envelope, passive solar heating, natural day-lighting, and onsite water collection and storage.

In September 2006, GSA required additional energy analysis and evaluation of alternate energy sources for upcoming land port of entry feasibility studies. This initiative will be fully operational for the FY 2010 program. In partnership with our clients, Customs and Border Protection and the Federal Highway Administration we are looking at the survivability of land ports of entry, including alternate energy sources and the potential for taking remote ports of entry "off the grid". Under

discussion are such survivability technologies as: wind power, photovoltaics, day lighting, rain water collection/storage, micro turbines, passive solar walls, green roofs, and geothermal energy.

GSA has completed projects at land ports of entry using geothermal energy and heat pumps (Oroville, Washington) and a "green" roof (Sault Ste Marie, Minnesota). We will be using day lighting technologies in Champlain, New York. We will continue to explore these survivability technologies in future land port of entry projects.

GSA's Public Buildings Service continues to demonstrate great leadership in reducing energy consumption, purchasing power (including green power) at competitive prices, and integrating environmental and energy concerns in our buildings. As we realize greater reductions in energy consumption, conversely, the challenge in finding quick payback, simple design projects is also greater.

Federal Acquisition Service

The Federal Acquisition Service (FAS) offers Federal agencies a wide array of energy saving products and services to help them comply with the requirements of the Energy Policy Act of 2005 and the President's new Executive Order 13423, both of which direct agencies to save energy through the procurement and

responsible disposal of alternative fuel vehicles, hybrid electric vehicles, and energy efficient products as well as through reductions in energy consumption in Federal facilities.

Alternative Fuel Vehicles and Hybrid Electric Vehicles

FAS has purchased over 140,000 alternative fuel vehicles (AFVs) and hybrid electric vehicles (HEVs) for Federal agencies since 1991, of which 120,000 have been for GSA Fleet, which leases automobiles, passenger vans, light, medium, and heavy trucks, buses and ambulances to other Federal agencies. GSA Fleet's current AFV inventory consists of 62,424 AFVs and 351 HEVs—over [31 percent] of the total GSA Fleet.

FAS has ordered over 24,000 additional AFVs and HEVs for fiscal year 2007, of which over 20,000 are for GSA Fleet. By the end of fiscal year 2007, approximately 70,000 AFVs will be in GSA Fleet's inventory.

Moreover, GSA does not send its AFVs and HEV's to the junkyard after they have reached the end of their useful life for the fleet. During FY 2007, GSA Fleet will sell 11,600 used AFVs at public auction.

In addition to leasing AFVs and HEVs, GSA Fleet provides annual acquisition and fuel reports to each of its customer agencies. These reports help Federal agencies track petroleum reduction and plan for future acquisitions and compliance. The reports also assist agencies in preparing their annual vehicle report to Congress. These actions move us closer to the President's Executive Order 13423 goals for reduced petroleum consumption, increased use of alternative fuels, and increased percentages of alternate fuel vehicles in our fleets.

Energy Efficient Products and Services

Through its Multiple Award Schedules (MAS), FAS offers Federal purchasers many products and services that help reduce energy consumption. These include Energy Star and Federal Energy Management Program (FEMP) designated compact fluorescent lights; lamps; lighting controls; ballasts; transformers; copiers; computers; printer; fax machines; scanners; ceiling fans; and stoves, to name only a few. The Energy Management Support and Services section of the Facilities Maintenance and Management Schedule is dedicated to assisting Federal agencies increase their energy efficiency. With over 100 contractors on schedule, agencies can find a host of services that help them audit their current usage, properly meter their buildings, and evaluate alternative energy options.

Currently, FAS is developing an implementation plan to meet the requirements of Section 104 of the Energy Policy Act (EPACT) of 2005, which directs Federal agencies to procure an Energy Star product or a Federal Energy Management

Program-designated product when purchasing an energy-consuming product unless the agency finds that the product is not cost effective or not reasonably available. The plan will be completed within three months.

In addition, FAS will soon implement a plan to clearly identify and prominently display energy efficient products in its internet purchasing applications. These electronic tools will give prominence to the EPACT requirements using such methods as pop-ups, which will alert customers to the new requirement and advise them to complete determinations and waivers when buying non-compliant products. The electronic catalog software used by vendors has also been upgraded to ensure properly identification of these products.

Progress on emerging areas also includes:

EPEAT

GSA is developing its Electronic Product Environmental Assessment Tool (EPEAT) action plan. FAS introduced EPEAT requirements to the Alliant Governmentwide Acquisition Contract and FAS plans to introduce EPEAT requirements to Schedule 70. FAS is working with EPA to add a designation for EPEAT products in GSA Advantage, our online purchasing system, to make it easier for ordering activities to locate EPEAT products. EPEAT is an international standard labeling program that rates electronic products on a series of environmental and energy attributes.

Biobased Products

GSA has formed a team to work with the USDA to assist with the procurement of biobased products. The goal is to identify opportunities for GSA to increase the awareness of the USDA Biobased Product Preference Procurement Program. FAS recognizes that it can play an important role by increasing the availability of biobased products in the federal market.

Telework

GSA leads the development of alternative workplace arrangements for Federal community and, along with the Office of Personnel Management, is a co-lead agency for Federal telework. We actively promote and facilitate government wide environmental efforts through telework and alternative workplaces.

For example, the Patent and Trademark Office, working with GSA, established an alternative workplace program that encourages their employees to work at home. This reduced the agency's use and cost of space, as well as increased the quality of life for their employees. The program resulted in reducing three floors from their requirements, saving the cost of just under 50,000 square feet of space. Other similar examples include arrangements at the Treasury Inspector General for Tax Administration, the Equal Employment Opportunity Commission, and organizations within GSA.

GSA established a no cost trial use of the GSA Telework Centers in response to President Bush's request for agencies to find ways to decrease energy use including using telework (Memorandum to Agencies in September 2005). A total of **113** Federal employees from 35 agencies took advantage of this offer. Teleworkers who took advantage of this offer averaged at least **2** days of telework center use per week which yielded savings in gasoline use, fuel costs, exposure to traffic congestion, and contribution to air pollution. Based on data collected from the 14 telework centers, GSA estimates that teleworkers at these centers annually save nearly 2.8 million travel miles, which, in turn, saves almost 115 thousand gallons of fuel, and avoids 2.3 million pounds of emissions. Not only do our telework centers offer Federal employees relief from the daily stress of rush hour traffic, they also help reduce greenhouse gas emissions. Telework centers have been characterized as being "pro-productivity, pro-environment and pro-sanity."

A 1999 study found that telecommuting would have a positive impact on traffic delays. The study estimates that an approximate 3.0 percent reduction in daily total trips in the Washington, D.C. metropolitan area can be expected to reduce daily vehicle miles traveled by 2.4 percent, daily vehicle hours traveled by 6.4 percent, and daily delay by 10.0 percent in the region. If telecommuting is calculated at a level of 10.0 percent reduction in trips, the associated reductions are 8.0 percent, 20.8 percent and 30.0 percent respectively.

GSA will continue to work with its customers to promote the value of telework and alternative workplace programs to the Government and to its employees.

Governmentwide Policies and Guidance

GSA provides leadership in developing policies for personal property, motor vehicles, aircraft, travel and transportation, and encourages agencies to use the most cost-effective, energy-efficient, management practices as they conduct their business.

Personal Property

To help reduce the waste stream and to conserve money and Federal assets, our policies require agencies to first acquire excess property from other agencies rather than acquiring new property. Accordingly, items that cannot be utilized or donated should be disposed of using appropriate recyclers. GSA's guidance also encourages agencies to sell or exchange property when acquiring replacement items to increase the rehabilitation and remanufacture of personal property items.

Our policies and guidance encourage agencies to handle computers and other electronic equipment in an environmentally safe manner. GSA is also a participant in the Office of the Federal Environmental Executive's Federal Electronic Challenge that promotes acquiring, using and disposing of electronic equipment while considering environmental impacts.

Motor Vehicles

As a leader in motor vehicle fleet management, GSA issued the Federal Management Regulation (FMR), 41 CFR Part 102-34, instructing agencies to select motor vehicles that achieve maximum fuel efficiency. Last year, we issued guidance on developing and maintaining a structured method for vehicle allocation in motor vehicle fleets. The guidance will help agencies manage their vehicle fleets more efficiently with an optimal number of vehicles of the appropriate type for their agency mission.

GSA, through the interagency Motor Vehicle Executive Council, is developing a strategic plan to address motor vehicle energy mandates that will contribute to the President's National Goal to Reduce Emissions Intensity.

Travel

GSA is publishing policy encouraging agencies to adopt the Environmental Protection Agency's green meeting initiatives. With the goal of minimizing the environmental impact of Government meetings and conferences, this green meetings initiative encourages planners to adopt practices such as relying on technology to reduce the amount of paper consumed at their meetings; reduce the distances that attendees must travel; chose facilities that have recycling or reuse programs in place for metal, plastics, paper and glass items; and develop an

energy management plan with the meeting facilities to turn off the electricity and air conditioning for facilities not being used. In our upcoming FedFleet conference, which will attract over a thousand participants, we will hand out information on flash drives instead of on paper.

Opportunities for Change

As innovative technologies are brought to market, it may be helpful to GSA if there were some flexibility in capital projects (for those with prospectuses submitted) for GSA to incorporate new energy savings technologies that were not included in the design when the prospectus was initially submitted.

Given the requirements in the Energy Policy Act of 2005 and the requirements in the Executive Order 13423 to increase the purchase of renewable energy coupled with increasing private sector demand, we understand that the amount of new power production needed to meet the new demand will not be available. We understand that in the case of wind power, if the Government were able to purchase power for a longer period than the current statutory limit of ten (10) years, it might be possible to not only obtain very good prices for the Government, but also provide the financial security that would spur the development of new sources (and increased availability) of renewable power.

Conclusion

Mr. Chairman this concludes my formal statement. I look forward to continuing our discussion with you and members of the committee on GSA's initiatives to wisely manage our energy consumption, and the responsible choices we offer to our customers in the products and services they purchase.

STATEMENT OF
STEPHEN L. JOHNSON
ADMINISTRATOR
U.S. ENVIRONMENTAL PROTECTION AGENCY
BEFORE THE
COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE
UNITED STATES HOUSE OF REPRESENTATIVES

May 11, 2007

Good morning, Chairman Oberstar and members of the House Transportation and Infrastructure Committee. I appreciate the opportunity to appear before you today to discuss the Environmental Protection Agency's (EPA) efforts to address energy security and the challenges posed by climate change.

I. Introduction

The President has consistently acknowledged a human contribution to climate change. The President has requested, and Congress has provided, substantial funding for climate change science, technology, observations, international assistance, and incentive programs – approximately $37 billion since 2001. Across the federal government, programs are helping to further reduce scientific uncertainties associated with the causes and effects of climate change; promoting the advancement and deployment of cleaner, more energy efficient, lower carbon technologies; encouraging greater use of renewable and alternative fuels; accelerating turnover of older, less efficient technology through an array of tax incentives; and establishing numerous international climate partnerships with some of the world's largest greenhouse gas emitters. Through a comprehensive suite of mandates, incentives, and partnerships, the President's climate change policies are contributing to

meaningful progress in reducing the growth rate of U.S. greenhouse gas emissions, even as our population grows and our economy continues to expand.

II. Administration Climate Strategy: Progress Toward the President's Goal

In 2002, President Bush committed to cut U.S. greenhouse gas intensity (the ratio of greenhouse gas emissions to economic output) by 18 percent through the year 2012, a goal that we are on target to meet. This commitment was estimated to achieve about 100 million additional metric tons of reduced carbon-equivalent (MMTCE) emissions in 2012, with more than 500 MMTCE emissions in cumulative savings over the decade.

According to EPA data reported to the United Nations Framework Convention on Climate Change (UNFCCC), U.S. greenhouse gas intensity declined by 1.9 percent in 2003, by 2.4 percent in 2004, and by 2.4 percent in 2005. Put another way, from 2004 to 2005, the U.S. economy increased by 3.2 percent while greenhouse gas emissions increased by only 0.8 percent.

To build on the substantial progress in meeting the 18 percent intensity reduction, President Bush has announced major energy policies in the last two years. In his 2006 State of the Union address, President Bush proposed the Advanced Energy Initiative (AEI) - a 22 percent increase in funding for 2007 for clean energy technology research to change how we power our homes, business, and cars. The 2008 President's Budget includes $2.7 billion in the Department of Energy for the AEI, an increase of 26 percent above the 2007 Budget.

This year, in his State of the Union address, the President announced his "20-in-10" initiative, which sets an aggressive new goal for the United States to use 20 percent less gasoline in 2017 than

currently projected. As part of this effort, the Administration recently sent legislation to Congress to create an Alternative Fuel Standard (AFS) which would mandate the use of 35 billion gallons of alternative fuel in 2017. Should the AFS become law, it will complement and build upon the Renewable Fuel Standard (RFS), which EPA recently finalized. The AFS would rely on credit, banking, and trading mechanisms that EPA developed for the RFS, thereby achieving market efficiencies while ensuring the use of an increasing amount of renewable and alternative fuel by our nation.

When approaching the issue of greenhouse gas emissions estimate for the transportation sector, it should be recognized that 95 percent of such emissions consists of carbon dioxide, with the remaining 5 percent of emissions consisting of nitrous oxide and methane exhaust emissions and hydrofluorocarbons from air conditioners. In addressing greenhouse gas emissions from the transportation sector, the President's 20-in-10 plan recognizes that on-board technology to control carbon dioxide emissions from vehicles does not currently exist. Therefore, the 20-in-10 plan addresses two primary factors that can reduce carbon dioxide emissions from vehicles: greatly increasing the use of renewable and alternative fuels and increasing the fuel economy of vehicles.

Fuels such as cellulosic ethanol have the potential to offset lifecycle greenhouse gas emissions by over 90 percent when compared with gasoline derived from crude oil. Biodiesel can result in the displacement of nearly 68 percent of lifecycle greenhouse gas emissions relative to diesel made from petroleum. Increasing the use of such fuels in the transportation sector has the potential to make substantial reductions in greenhouse gas emissions. Increasing the fuel economy of a vehicle also will decrease greenhouse gas emissions. Under one possible scenario, the gasoline savings from reforming and increasing CAFE and from implementing AFS could result in as much as a 10

percent reduction in annual emissions (compared to the baseline scenario) of carbon dioxide from cars and light trucks – equal to half the number of cars in Germany.

As part of the 20-in-10 commitment, the President has also issued an Executive Order in January of this year that directs the federal government to reduce fleet petroleum consumption by 2 percent annually, increase the use of alternative fuels by at least 10 percent annually, increase the purchase of efficient and flexible fuel vehicles, make government buildings more efficient, and take other steps with regard to improving energy efficiency with respect to the government's purchase of power.

In addition to these initiatives, the President's 2007 Farm Bill proposal includes more than $1.6 billion of additional new funding over 10 years for energy innovation, including bio-energy research, energy efficiency grants, and guaranteed loans for cellulosic ethanol plants. Also, more than $50 billion in the Farm Bill is for proposed conservation program incentives, which include activities that provide natural capture and biological storage – "sequestration" – of carbon dioxide.

III. U.S. EPA Climate Initiatives

EPA climate programs include a wide array of partnerships, which rely on voluntary measures to reduce greenhouse gas intensity, spur new investments, and remove barriers to the introduction of cleaner technologies. Many of these partnership programs provide near-term solutions that focus on reducing emissions. These programs complement the work of other federal agencies investing in research and development programs, such as the Department of Energy's (DOE) FutureGen and fuel cell development programs. EPA is also one of many federal agencies participating in the multi-agency Climate Change Technology Program.

In addition, EPA also invests in a long-term global change research program. EPA's global change research focuses on understanding the effects of global change (particularly climate change and variability) on air and water quality, ecosystems, and human health in the United States. The goal of the program is to produce timely and useful information and tools that enable resource managers and policymakers to more effectively consider global change issues in decision-making. The program's activities are coordinated with other federal agencies' climate change research through the U.S. Climate Change Science Program.

EPA's climate initiatives address all key economic sectors. Today, I will focus on those efforts of particular interest to this Committee, including EPA's transportation programs, ENERGY STAR, and other domestic public-private partnerships, our work to promote carbon capture and sequestration, and the effects of global climate change on wetlands and water resources.

What follows is a brief look at a subset of EPA's climate initiatives, categorized by sector.

Transportation

While transportation is crucial to our economy and our personal lives, it is also a significant source of greenhouse gas emissions. Travel growth has outpaced improvements in vehicle energy efficiency making it one of the leading economic sectors in greenhouse gas emissions. Within the transportation sector, passenger vehicles contribute 60 percent of greenhouse gas emissions, and freight trucks contribute 20 percent. The next largest contributor is aircraft at roughly 9 percent. Through a combination of new technology development, voluntary partnerships, consumer information, and renewable fuels expansion, EPA is working to reduce greenhouse gas emissions

from the transportation sector. By focusing both on vehicles and fuels, these efforts follow the same successful approach the Agency has used to cut emissions from motor vehicles.

Reducing Vehicle Fuel Consumption. EPA's SmartWay Transport Partnership is a public-private partnership that aims to reduce greenhouse gas emissions, fuel consumption, and criteria pollutants from ground freight transportation operations. Nearly 550 companies, including some of the nation's largest shippers and carriers, have joined the SmartWay program.

The efforts of these companies, which include the use of fuel efficient technologies and anti-idling devices, improved aerodynamics, and the next generation single wide tires, will reduce greenhouse gas emissions and fuel consumption. Our SmartWay program is also working with truck stop owners to create "No Idling Zones" and install truck stop electrification systems, allowing tired drivers to take their required 10 hour rest period in comfort without having to operate their 450 horsepower engines. EPA estimates that by 2012, the companies that participate in the SmartWay Transport Partnership will cut carbon dioxide emissions by up to 66 million metric tons per year, and nitrogen oxide (NOx) emissions by up to 200,000 tons per year. It will save about $9 billion in fuel costs and as much as 150 million barrels of oil per year–enough oil to heat 17 million houses for one year.

EPA also is working to develop and commercialize new, state-of-the-art low greenhouse gas technologies at its National Vehicle and Fuel Emissions Laboratory in Ann Arbor, Michigan. EPA invented and patented the world's first full hydraulic hybrid vehicle system, which is capable of achieving a 40 percent reduction in greenhouse gas emissions and a 60-70 percent improvement in fuel economy. There is a high likelihood that hydraulic hybrids will be commercialized in certain

heavy-duty applications, such as urban delivery trucks and garbage trucks, within the next few years.

Promoting Today's Transportation Technologies. EPA also is working to maximize the potential of today's fuel-efficient technologies. For example, the recent phase-in of ultra low sulfur diesel fuel opens up new markets for clean diesel passenger cars and pickup trucks. These vehicles are up to 40 percent more efficient than conventional gasoline vehicles, reducing life-cycle carbon dioxide emissions by up to 20 percent.

In addition, EPA has ongoing efforts to keep the public informed about the fuel economy performance of the vehicles they drive. As evidenced by the million plus monthly "hits," the online Green Vehicle Guide has proven to be a popular consumer tool to help car shoppers identify the cleanest and most fuel efficient vehicles that meet their needs. EPA recently issued new test methods designed to improve the accuracy of window sticker fuel economy estimates to better reflect what consumers actually achieve on the road. We also redesigned the fuel economy label to make it easier for consumers to compare fuel economy when shopping for new vehicles.

Ensuring Access to Clean Renewable and Alternative Fuels. The Energy Policy Act of 2005 established the Renewable Fuel Standard (RFS)—a requirement for the use of 7.5 billion gallons of renewable fuels in the U.S. by 2012. EPA recently completed this rulemaking. The U.S. Department of Energy (DOE) now projects that ethanol use will greatly exceed the legal requirement. Under the regulatory impact analysis EPA conducted as part of the RFS rulemaking, EPA estimated that increased ethanol and biodiesel use in motor vehicles over the next five years will reduce carbon dioxide equivalent greenhouse gases by 8 to 13 million tons, about 0.4 to 0.6

percent of the anticipated greenhouse gas emissions from the transportation sector in the U.S. in 2012.

As I mentioned earlier, the Administration's proposed Alternative Fuel Standard would build on the RFS by setting an ambitious, but achievable, path forward for an expansion of the use of renewable and alternative fuels. The AFS specifies that 35 billion gallons of alternative fuel be used in the nation's transportation fuel by the year 2017. The AFS would include all fuels that are currently part of the RFS and would include fuels currently classified as "alternative fuels" under the Energy Policy Act. It would also allow other types of fuels to qualify as alternatives for compliance, adding competition in the alternative fuel marketplace. The AFS includes fuels or fuel components such as ethanol (derived from a variety of sources, including corn and cellulosic feedstock), biodiesel, butanol, as well as other alternatives to crude oil-based fuels such as natural gas, hydrogen, and coal-to-liquids. The AFS would also include the use of electricity to power advanced vehicles, including "plug-in" hybrid vehicles.

As proposed by the Administration, the AFS would replace the RFS in the year 2010, while retaining the flexible credit, banking, and trading mechanisms contained in the RFS. The legislation provides an accelerating schedule for AFS requirements in the years 2010 to 2017. After 2017, similar to the RFS, the level of the AFS would be set administratively based on several factors including the impact of alternative fuels on energy security and diversification, costs to consumers, job creation, and the environment.

The AFS also includes provisions to protect economic and environmental interests. For example, the Administration will be required to review the impact of the AFS annually and may adjust the

annual requirement if short- or long-term conditions exist that adversely affect the production or importation of alternative fuels. Under certain circumstances, the Administration could issue a temporary waiver of any or all the requirements of the AFS. The AFS also includes an automatic "safety valve" that serves as an economic backstop to ensure that mandating 35 billions of alternative fuel does not excessively increase the cost of gasoline and diesel to American consumers. By allowing the sale of credits at $1 per gallon of ethanol (or about $0.67 per gallon of gasoline equivalent), the "safety valve" guards against unforeseen increases in the prices of alternative fuels or their feedstocks, protecting other markets from being adversely impacted and minimizing costs to consumers. This feature provides some market certainty—businesses can calculate their maximum cost of compliance. They then can use their ingenuity to deliver value and minimize their compliance costs.

The AFS provides an opportunity to address two important national goals—improving our energy security and potentially reducing projected greenhouse gas emissions from the transportation sector. EPA has estimated that the current RFS would help achieve greenhouse gas emissions of up to 13 million metric tons in 2012. Although different AFS fuels will serve to offset greenhouse gas emissions by different amounts, increasing the use of fuels under an AFS program should result in greater greenhouse gas emission reductions than our current mix of fuels. For example, one advantage of the longer timeframe provided by the President's proposal, along with the market incentives it creates, is allowing for commercial development of cost-competitive cellulosic ethanol. Cellulosic ethanol may achieve very large greenhouse gas reductions—up to 90% compared to petroleum-based gasoline. Other fuels like electricity, compressed natural gas, and liquefied natural gas can achieve substantial greenhouse gas reductions. Ultimately, the level of greenhouse gas reductions achieved by the AFS will depend on the implementation of the program, market forces, the

incentives available for the development of various renewable and alternative fuels, and the mix of fuels used to meet the target.

Energy Efficiency

EPA has long recognized that energy efficiency offers a lower cost solution for reducing energy bills, improving national energy security, and reducing greenhouse gas emissions – all while helping to grow the economy through increased electric grid reliability and reduced energy costs in the natural gas and electricity markets.

ENERGY STAR. In 1992, EPA introduced ENERGY STAR as a voluntary labeling program designed to identify and promote energy-efficient products. Since the early 1990s, EPA has also promoted energy efficiency in commercial buildings. Through their ENERGY STAR partnerships, businesses and organizations of all sizes benefit from energy efficiency resources and guidance that help inform their decisions, enabling them to make cost-effective investments and reduce their energy use by as much as 30 percent. Central elements of EPA's efforts include promoting energy management as a strategic business objective and promoting performance benchmarking of building energy use to help energy users target their investments.

In 2005, EPA announced a new national ENERGY STAR campaign in coordination with key professional associations and states. The ENERGY STAR Challenge is a call to action for building owners and operators to implement energy efficiency measures and reduce energy use by 10 percent or more. EPA estimates that if each building owner met this challenge, by 2015 Americans would reduce greenhouse gas emissions by more than 20 MMTCE—equivalent to the emissions from 15 million vehicles—while saving about $10 billion.

More than 30 states —along with many other organizations—are participating in the Challenge. They are benchmarking the energy use of their buildings, setting an energy savings target of 10 percent or more, and making the investments necessary to achieve this goal.

EPA's ENERGY STAR building efforts are engaging many states, local governments, and schools to improve the efficiency of their buildings, including:

- Several states (California, Ohio, Michigan) are using ENERGY STAR to help meet state policies and goals for building energy efficiency improvements.
- Minnesota has set a goal to increase the number of ENERGY STAR labeled buildings from the current 87 to 1,000 by 2010, as a key part of their effort to reduce energy consumption 15 percent by 2015.
- The District of Columbia requires that new public buildings be designed to meet ENERGY STAR levels.
- Virginia recommends designing new public buildings to meet ENERGY STAR levels as one of two methods to comply with a new energy efficiency Executive Order.
- School districts have benchmarked the energy performance of more than 12,000 schools, approximately 20 percent of school space across the country and they have earned the ENERGY STAR label on more than 700 schools across more than 30 states; these schools are using about 35 percent less energy than typical schools
- National Association of Counties (NACo) has partnered with EPA under the ENERGY STAR Challenge on the NACo Courthouse Campaign. Over 100 counties have joined the campaign and are working to improve the energy efficiency of their courthouses.

- In addition, many cities have used Portfolio Manager to rate the performance of their office buildings and some have earned the ENERGY STAR label.

All of these efforts are contributing to the growing results of the ENERGY STAR program. In 2006, Americans, with the help of ENERGY STAR, implemented energy efficiency measures that saved $14 billion on their energy bills and prevented greenhouse gas emissions equivalent to those of 25 million vehicles – the number of cars in California and Illinois combined.

Geologic Sequestration. Coal is an important fuel to achieve energy security and increase economic prosperity in the United States. Currently, about 50 percent of electricity in the United States is generated from coal, and according to DOE, at current rates of consumption, coal could meet U.S. needs for more than 250 years. To achieve our goal of energy security, coal must continue to play a major role in the generation of electricity in this country. Carbon dioxide capture and storage can potentially make a significant contribution to reducing greenhouse gas emissions from coal-fired electricity generation, while allowing continued use of our ample coal reserves. EPA's role is to ensure that carbon capture and storage is developed and deployed in a manner that safeguards the environment. We are focusing our efforts on two fronts: (1) partnering with public and private stakeholders to develop an understanding of the environmental aspects of carbon capture and storage that must be addressed for the necessary technologies to become a viable strategy for reducing greenhouse gases; and (2) ensuring carbon dioxide storage is conducted in a manner that protects underground sources of drinking water, as required by the Safe Drinking Water Act.

At the recommendation of the Clean Air Act Advisory Committee, EPA established the Advanced Coal Technology Work Group in January 2007 to discuss and identify the potential barriers and opportunities to create incentives under the Clean Air Act for the development and deployment of

advanced coal technologies, including carbon capture and sequestration. The Work Group includes participants from electric utilities, coal companies, equipment manufacturers and pollution control providers, states and tribes, public utility commissions, environmental and public health organizations, academia, and federal agencies such as DOE and the Department of Defense.

The Work Group is developing a set of shared recommendations that could be undertaken by various stakeholders (e.g., EPA, DOE, DOD, states, tribes, utilities, public utility commissions, equipment providers, and environmental and health organizations) to accelerate the development and use of advanced coal technologies. In its work to date, the Work Group has discussed a wide range of issues associated with the commercial use of advanced coal technologies. We believe that an approach involving a shared set of actions to address some of these issues will provide the greatest opportunity to advance the technology most quickly.

Some of the areas the Work Group is focusing its discussions on include: 1) incentives to encourage advanced coal technology; 2) education and outreach to inform the public and other affected stakeholders about the importance and need for advanced coal technology; 3) liability and public perception concerns related to carbon capture and sequestration; 4) opportunities to streamline and accelerate permitting for advanced coal technology projects; and 5) the creation of mechanisms to accelerate advanced coal technology research and development. The Work Group plans to issue an interim report in June 2007, with the final report planned for January 2008.

Another focus of the Agency is the development of risk management strategies to ensure that carbon dioxide injection and long-term geologic storage are conducted in an environmentally responsible manner. Working together, EPA's Offices of Air & Radiation and Water have determined that the underground injection of carbon dioxide is subject to the Underground Injection

Control (UIC) Program of the Safe Drinking Water Act (SDWA), which regulates injection activities to protect current and future sources of drinking water. In carrying out our responsibilities under the SDWA, EPA's goal is to ensure protective, effective storage of carbon dioxide injection in suitable geologic formations.

EPA has more than 30 years of experience working closely with states to authorize underground injection of billions of gallons of fluids annually. Approximately 35 million tons of carbon dioxide are injected annually and, in the Southwest United States, there is an extensive infrastructure to transport and inject carbon dioxide for enhanced oil and gas recovery. Although the knowledge gained from these activities is extremely useful, we do not yet have experience in integrated carbon dioxide capture and storage technologies on a commercial scale for coal-fired power plants. Developing this expertise is essential to ensuring the potential utility of carbon dioxide capture and storage technology. The Department of Energy's research efforts to integrate and demonstrate carbon dioxide capture and storage will go a long way toward reducing costs and providing the data needed for EPA and states to develop appropriate risk management strategies.

To support these policies, EPA has developed UIC permitting guidance that recommends treatment of injection wells associated with research and development projects as "experimental technology" wells, which are covered under our existing regulations. Our goal is to provide guidance that facilitates permits while encouraging environmentally responsible injection activities. Another goal of the guidance is to promote information exchange between project proponents and regulators, which will eventually support the development of a long-term management strategy for future geologic carbon dioxide storage projects and answer public questions about the emerging technology. The guidance recommends a workable UIC permitting approach for the next several

years while more data are gathered to determine the most appropriate management framework for large-scale commercial deployment of geologic carbon dioxide storage.

Combined Heat & Power Partnership. Combined Heat and Power (CHP) is an efficient, clean, and reliable approach to generating power and thermal energy from a single fuel source. By installing a CHP system designed to meet the thermal and electrical base loads of a facility, CHP can increase operational efficiency and decrease energy costs, while reducing emissions of greenhouse gases that contribute to climate change. EPA's CHP Partnership is a voluntary program that seeks to reduce the environmental impact of power generation. The Partnership works closely with energy users, the CHP industry, state and local governments, and other stakeholders to support the development of new projects and promote their energy, environmental, and economic benefits.

Other Industrial Sectors

A number of EPA's climate initiatives cut across multiple industrial sectors:

Climate Leaders. Climate Leaders is an EPA partnership that encourages individual companies and other organizations to develop long-term, comprehensive climate change strategies. Partners develop corporation-wide greenhouse gas inventories, including all emission sources of the six major greenhouse gases (CO2, CH4, N2O, HFCs, PFCs, SF6), set an aggressive corporate-wide greenhouse gas emissions reduction goal to be achieved over 5 to 10 years, report inventory data annually, and document progress toward their emissions reduction goals. Since its inception in 2002, Climate Leaders has grown to include nearly 100 corporations whose revenues add up to almost 10 percent of the United States' gross domestic product and whose emissions represent 8 percent of total U.S. greenhouse gas emissions. Five organizations have achieved their greenhouse

gas reduction goals – Baxter International, General Motors Corporation, IBM Corporation, National Renewable Energy Laboratory, and SC Johnson.

High GWP Gas Voluntary Programs. EPA has a set of voluntary industry partnerships that are substantially reducing U.S. emissions of high global warming potential (high GWP) gases. These synthetic gases - including perfluorocarbons (PFCs), hydrofluorocarbons (HFCs), and sulfur hexafluoride (SF6) - are manufactured for commercial use or generated as waste byproducts of industrial operations. Some of these gases have valuable uses as substitutes for ozone depleting substances. However, some species of these gases, while released in small quantities, are extremely potent greenhouse gases with very long atmospheric lifetimes. The high GWP partnership programs involve several industries, including HCFC-22 producers, primary aluminum smelters, semiconductor manufacturers, electric power companies, and magnesium smelters and die-casters. These industries are reducing greenhouse gas emissions by developing and implementing cost-effective improvements to their industrial processes. To date, industry partners have achieved significant emission reductions and industry partners are expected to maintain emissions below 1990 levels beyond the year 2010.

International Efforts

EPA's global leadership on climate change extends not only to our suite of domestic programs, but also to our pioneering and effective international partnerships.

Methane to Markets Partnership. The United States launched the Methane to Markets Partnership in November 2004 with active participation from EPA, DOE, USDA, the U.S. Agency for International Development, and the State Department. The Methane to Markets Partnership is a

multilateral initiative that promotes energy security, improves environmental quality, and reduces greenhouse gas emissions throughout the world. The Partnership consists of 20 Partner countries, and involves over 500 private sector and other government and non-governmental organizations that participate through a Project Network.

Under the Partnership, member countries work closely with private sector development banks, and other governmental and non-governmental organizations to promote and implement methane recovery and use opportunities in four sectors: oil and gas systems, underground coal mines, and landfills and animal waste management systems. Capturing and using "waste" methane not only provides an additional energy source that stimulates economic growth but also reduces global emissions of this powerful greenhouse gas. The United States has committed up to $53 million for the first five years of the Partnership. EPA estimates that this Partnership could recover up to 500 billion cubic feet of natural gas (50 million metric tons carbon equivalent) annually by 2015.

Asia-Pacific Partnership on Clean Development and Climate (APP). EPA is an active participant in this Presidential initiative, which engages the governments and private sectors in six key nations - - Australia, China, India, Japan, the Republic of Korea and the United States - that account for about half of the world's economy, energy use, and greenhouse gas emissions. Partners are enhancing deployment of clean energy technologies to address their energy, clean development, and climate goals. An example of APP success is the leveraging of a $500,000 U.S. government grant to build the largest coal mine methane power facility in the world in China, which, when completed, will avoid the annual equivalent emissions of one million cars. Another success story is the provision of technical support to China to develop a voluntary energy efficiency label similar to ENERGY STAR.

This Administration is meeting unparalleled financial, international, and domestic commitments to the reduction of greenhouse gas emissions, and as outlined today, EPA plays a significant role in fulfilling those commitments. The initiatives discussed above represent only a sample of EPA's climate change activities. We will continue to move forward to address climate change in ways that produce meaningful environment benefits and maintain our nation's economic competitiveness.

Wetlands and Water

Global climate change could cause sea levels to rise, which could in turn affect coastal wetlands and infrastructure (building, roads, energy lines, treatment facilities, and the like). Wetlands serve important buffering functions for coastal infrastructure. It will be important to restore, improve, and protect coastal wetlands to maintain as much of their buffering capacity as possible. Healthy wetlands are also best able to adjust to gradual sea level rise, and thereby maintain their ability to protect the developed areas along our coasts.

Understanding the location, functions, and condition of coastal wetlands resources on a national scale requires accurate geo-spatial information. Having ready access to this information in the wetlands layer of the National Map managed by the U.S. Geological Survey, along with real-time updates will help decision-makers at all levels determine what wetlands sites are the most important to restore and protect and which areas should be avoided for development. For some coastal infrastructure that may need to be re-located inland, we should protect the wetland areas that can provide natural buffers to protect it. In light of the importance of wetland resources to adapting to anticipated sea level rise, EPA has begun active coordination with eight other federal agencies

engaged in wetlands protection and management to explore ways to accelerate the geo-spatial mapping of our wetland resources.

The focus on wetlands is related to a broader effort by EPA's National Water Program to gather information and develop a strategy on water related aspects of climate change. In March, the Office of Water established an internal climate change workgroup in coordination with other EPA offices and Regions.

A key first task of the workgroup is to better define water-related consequences of climate change and build understanding of how the clean water, drinking water, and ocean programs may need to be tailored in light of climate changes. By this summer, the workgroup will draft a strategy addressing three key questions:

- Mitigation: Can water programs and water pollution control facilities contribute to greenhouse gas mitigation efforts?
- Adaptation: How can EPA, states, and tribes adjust implementation of water programs to better account for anticipated climate changes?
- Research: How can research activities complement and inform water program efforts to address climate change?

The EPA workgroup is also developing basic educational materials to inform water program professionals about the water related impacts of climate change. We are holding initial listening sessions with stakeholders this month and will seek public input on the draft strategy later this year.

IV. The Supreme Court Decision

The recent Supreme Court decision in Massachusetts v. EPA comes against the backdrop of this Administration's comprehensive climate policy.

In Massachusetts v. EPA, the Supreme Court made several findings regarding EPA's denial of a petition to regulate greenhouse gas emissions from new motor vehicles under Section 202(a)(1) of the Clean Air Act. First, the Court found that greenhouse gas emissions are indeed pollutants under the Clean Air Act. Second, the Court ordered EPA to reconsider its denial of a petition from the State of Massachusetts and several other groups seeking regulation of greenhouse gas emissions from new motor vehicles and engines. One of the most significant things the Court instructed EPA to determine is whether greenhouse gas emissions endanger public health or welfare based on the requirements of the Clean Air Act. Third, the Court's decision explicitly left open the issue of whether EPA can consider policy considerations when writing regulations in the event EPA were to make an endangerment finding.

Currently, EPA is moving forward to meet the Supreme Court's decision in a thoughtful, deliberative manner, considering every appropriate option and every appropriate tool at our disposal. It is incumbent upon us to act expeditiously and prudently, making decisions informed by the best available science. Along with addressing the decision's substantive ramifications, the Agency is considering the appropriate procedural steps to take once the court remands the petition. Whatever we decide on that and many other issues, I can assure you that we are committed to receiving broad public input prior to making sound decisions.

V. Conclusion

The Administration remains committed to addressing climate change in a manner that promotes a healthy environment and a healthy economy. Today, I have outlined the myriad of programs, partnerships, and investments the Administration is deploying to meet this challenge.

Thank you.

STATEMENT OF
THE HONORABLE MARY E. PETERS
SECRETARY OF TRANSPORTATION

BEFORE THE
COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE
U.S. HOUSE OF REPRESENTATIVES
MAY 11, 2007

Chairman Oberstar, Ranking Member Mica, and Members of the Committee, I am grateful for the opportunity to come before you today to testify on Climate Change and Energy Independence. These are topics of great importance to the President and to the American people. I would like to discuss the President's agenda briefly, and then turn to a discussion of how our Department and this Committee can work together to help achieve these objectives.

In 2002, the President said "addressing global climate change will require a sustained effort over many generations." We are making that effort today, and the President's climate change strategy has three key elements:

- Collect the facts we need to make informed decisions;
- Invest in long-term technologies; and
- Take practical, cost-effective, near-term steps to reduce petroleum use and carbon dioxide emissions without damaging the U.S. economy.

In order to meet these goals, the President has requested, and Congress appropriated, some $35 billion in funding since 2001 for climate-related science, technology, observations, international assistance, and incentive programs.

Addressing the need for long-term technology investment, the President launched the Hydrogen Fuel Initiative and, subsequently, the Advanced Energy Initiative. The President's FY 2008 budget includes a request for $2.7 billion for the Advanced Energy Initiative, a 26 percent increase over the FY 2007 budget. The Advanced Energy Initiative includes funding for hydrogen research, and key nearer term enabling technologies that will help us solve our energy

and environmental dilemmas. Specific research and development (R&D) targets include: Better batteries to make plug-in hybrids a reality, and cellulosic ethanol production that offers the promise of a renewable, home-grown transportation fuel.

In this year's State of the Union Address, the President addressed two Department of Transportation-led initiatives that can significantly reduce our Nation's dependence on foreign oil and help to curb greenhouse gas emissions. In his remarks, the President urged reform of the Corporate Average Fuel Economy (CAFE) program for passenger cars and directed the Department "to work with States and cities to explore ways to reduce traffic congestion, help save fuel, and reduce commute times."

I urge you to support these initiatives.

The Administration has a long-standing commitment to strengthening CAFE. In 2002, Congress granted Secretary Mineta's request to remove appropriations riders that blocked rulemakings for many years. Subsequently, the National Highway Traffic Safety Administration issued rulemakings raising fuel economy standards for light trucks in 2003 and 2006, saving 14 billion gallons of gasoline. That savings means that there will be 107 million fewer metric tons of carbon dioxide emitted by those vehicles.

The 2006 light truck rulemaking introduced an innovative new size-based approach to setting CAFE standards that more equitably distributes compliance responsibilities among the full-line and other vehicle manufacturers. For the first time, virtually all manufacturers will be required to install more fuel saving technologies. This will produce greater fuel savings, and at a reduced cost. Further, the size-based approach will improve safety by reducing the incentive that existed under the old CAFE standards to downsize vehicles.

We have requested the legal authority to pursue similar reforms for passenger cars. Increasing CAFE standards for passenger cars in the absence of reform would increase costs, while reducing fuel savings, environmental benefits, and safety. I ask Congress to support CAFE

reform for passenger cars, and want to work with you in fashioning legislation that will ensure that future fuel economy standards will be based on sound science and economics.

The Department has also embarked on an environmentally-friendly congestion initiative, designed to curb fuel consumption while combating the gridlock plaguing our cities today. I would like to explore with you how this Committee and the Department of Transportation can work together on shaping transportation infrastructure to enhance energy security and reduce greenhouse gas emissions. The key contributions that we can make to reducing petroleum consumption and greenhouse gas emissions are:

- Optimizing the use and fixing the bottlenecks in our transportation systems;
- Helping shape our transportation infrastructure to accommodate new fuels and new technologies as they are introduced; and
- Establishing sustainable funding for transportation infrastructure based on pricing scarcity.

We need to find ways to increase the efficiency of our existing road system and direct limited investment capital to where it is most needed. This is the fundamental rationale for the Congestion Initiative and Next Generation Finance Reform Initiative. Both endeavors can be powerful tools for reducing petroleum consumption and greenhouse gas emissions as well as saving time and money for travelers.

While the Congestion Initiative involves a number of different elements, today I would like to particularly focus on those elements most relevant to saving fuel, and therefore reducing greenhouse gas emissions. The first element I would like to discuss is the **Urban Partnership Agreement (UPA)**. In December, with the help of this Committee, the Department issued a request for proposals from metropolitan areas that wished to become "Urban Partners" with the Department. As an Urban Partner, a metropolitan area will commit to implementing a comprehensive policy response to urban congestion, including a congestion pricing demonstration, enhanced transit services, increased use of telecommuting, and advanced technology deployments. In exchange for this commitment, the Department will support its

Partners with available financial resources (using current approved budget authority), regulatory flexibility, and Departmental expertise. We have received some thirty UPA applications, which we are in the process of reviewing. We plan to "short-list" a set of preliminary urban partners in early June, then announce our final partners by early August.

The Department has requested an additional $175 million in the President's FY 2008 budget to extend and expand this program.

The heart of the UPA is congestion pricing. When applied appropriately, pricing can reduce congestion and save drivers substantial amounts of time and fuel. Pricing can incentivize mass transit use and enable the provision of high-speed, reliable bus rapid transit service. It can improve in-service fuel economy and reduce criteria pollutant and greenhouse gas emissions from individual vehicles by cutting out stop-and-go movement and allowing vehicles to operate at closer-to-optimal speeds. By charging drivers a price closer to the costs that they impose on the system, pricing can have beneficial land use impacts – reducing distortions in housing markets.

Congestion pricing has been in the news lately – most recently with the proposal by New York Mayor Michael Bloomberg to consider implementing a "cordon pricing" program in which drivers would pay a fee to enter downtown Manhattan during the workday. Notably, he called for pricing not simply as a stand-alone effort, but rather as part of a broader sustainability plan to create "the first environmentally sustainable 21st century city," saying,

> "we can't talk about reducing air pollution without talking about congestion … the question is not whether we want to pay but how do we want to pay. With an increased asthma rate? With more greenhouse gases? Wasted time? Lost business? And higher prices? Or, do we charge a modest fee to encourage more people to take mass transit?"

Mayor Bloomberg's proposal is the kind of bold thinking leaders across the country need to embrace if we hope to win the battle against traffic congestion and climate change. I am not necessarily suggesting that cordon pricing will work for all U.S. cities – though it may for some.

I commend Mayor Bloomberg, however, for recognizing that tackling traffic congestion is not just good transportation policy – it is also good environmental policy.

We are also working to reduce aviation congestion. The Federal Aviation Administration has saved millions of gallons of jet fuel and over 6 million tons of carbon dioxide emissions over the past two years 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 Procedures (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. continue to optimize our air traffic control system. We need a reauthorization bill passed by the Congress that provides for the next generation air transportation system—NextGen for short.

At the core of NextGen are infrastructure and operational capabilities to optimize air traffic management—which, in turn, reduce congestion and delays in the system, save travel time for the public, and improve energy conservation and emissions. NextGen includes the development of environmentally-beneficial engine and airframe technologies. Historically, the bulk of environmental improvements in aviation have come from new technologies, and NextGen is essential to continuing that progress.

Several elements of the Congestion Initiative deal with freight traffic, including the Department's **Corridors for the Future** and **Southern California freight congestion** efforts. Programs that permit freight to travel via the most cost-effective mode will generally produce emissions and fuel savings benefits. In addition, significant increases in the use of ethanol or other alternative fuels will inevitably have impacts on our freight infrastructure. We need to understand these impacts better, ensure that the freight infrastructure needed to support new fuels works effectively, find ways of applying new technologies, and incorporate this knowledge into the implementation of our freight-related congestion mitigation efforts.

In addition, advanced vehicles, including plug-in electric hybrids, dedicated ethanol vehicles, and hydrogen vehicles may require specialized infrastructure in order to be successful. We need to explore ways of integrating specialized infrastructure into our current systems.

In addition to these two major fuel savings programs, the Department has multiple ongoing programs that address climate change and energy security concerns. Let me list several of them now.

As part of the Administration's Climate Change Science Program, we are undertaking a special study of the impacts of climate change on transportation infrastructure in the Gulf Coast. The Department invests billions of dollars every year in long-lived vital infrastructure, and we need to understand how the changing climate will affect this infrastructure, and how we need to adapt.

DOT has a Center for Climate Change made up of representatives from each of the modal administrations. Through strategic research, policy analysis, partnerships and outreach, the Center creates comprehensive and multi-modal approaches to reduce transportation-related greenhouse gases and to mitigate the effects of global climate change on the transportation network.

Through the Federal Highway Administration's Congestion Mitigation and Air Quality Improvement (CMAQ) and innovative finance programs, DOT is working with States and local governments on a range of programs to improve urban air quality within the transportation sector. One of our most interesting and successful programs has been undertaken in conjunction with the Environmental Protection Agency's SmartWay Program: a program of grants and innovative loan programs 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 been successful in reducing fuel consumption, criteria pollutant emissions, and greenhouse gas emissions. This initiative 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.

Through the Federal Aviation Administration, we have two important programs:

- The Voluntary Aviation Low Emissions (VALE) program assists in the deployment of low emissions ground vehicles and aviation support equipment at airports in air quality nonattainment areas.
- Last year, the FAA launched the Commercial Aviation Alternative Fuel Initiative (CAAFI) in coordination with the Departments of Defense and Energy, and with U.S. airlines, airports, and manufacturers. This initiative is focused on the near-term development and deployment of "drop-in" alternative aviation fuels; that is fuels that can directly supplement or replace petroleum-derived jet fuels. It is also exploring the long-term potential of other fuel options.

Through the National Highway Traffic Safety Administration, the Research and Innovative Technology Administration, and the Pipeline and Hazardous Materials Safety Administration, we have modest programs to undertake safety research required for the development of safety standards for future hydrogen vehicles and infrastructure.

The Maritime Administration is focused on new technologies to reduce the harmful emissions from marine diesel engines through research on alternative fuels like biodiesel and reduced ship stack emissions.

I commend the Committee for holding today's hearing. We all share the enormous responsibility of ensuring that future generations can experience the freedom of an efficient and vital American transportation system. I look forward to answering your questions.

DEPARTMENT OF THE ARMY

COMPLETE STATEMENT

OF

THE HONORABLE JOHN PAUL WOODLEY, JR.
ASSISTANT SECRETARY OF THE ARMY (CIVIL WORKS)

BEFORE THE

COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE
UNITED STATES HOUSE OF REPRESENTATIVES

ON

THE ARMY CIVIL WORKS PROGRAM'S RESPONSE TO CLIMATE CHANGE AND ENERGY INDEPENDENCE

MAY 11, 2007

Mr. Chairman, and distinguished members of the Committee:

Thank you for the opportunity to testify before the Committee and to present my views on the U.S Army Civil Works Program's response to global warming and energy independence.

OVERVIEW

For thousands of years human civilizations have risen, prospered, and declined depending on their ability to adapt to changes in weather patterns especially floods and droughts. Over the last century, the U.S. Army Corps of Engineers (USACE), the Bureau of Reclamation, and other Federal agencies have helped develop this Nation's water resources. We are taking steps to improve our ability to manage those resources and are now addressing the water-related issues that might arise in the next few decades from changing weather patterns.

USACE plans, constructs, and operates many projects that could be affected by climate change and conducts related studies. Some examples of our responsibilities include:

- Coping with droughts and floods due to changing precipitation patterns;
- Evaluating the implications of changes in hurricane frequency or intensity along our coasts;
- Addressing changing needs and values by balancing water allocation among competing users;
- Designing and managing USACE projects in ways that anticipate and can adapt to changing conditions.

USACE is working with other Federal agencies – the National Oceanic and Atmospheric Administration (NOAA), the U.S Environmental Protection Agency (USEPA), the U.S Geological Survey (USGS), the Natural Resources Conservation Service (NRCS) and Bureau of Reclamation – to share information on the complex and technically difficult aspects of our respective responses to climate change in the many areas where our programs overlap.

USACE's flood and storm damage reduction mission directly involves understanding and responding to the extremes of climate variability. A significant change in climate could also affect our ability to supply water from our multipurpose reservoirs to 55 million municipal and industrial consumers; facilitate safe and secure waterborne transport on some inland waterways and produce nearly 25% of the nation's hydroelectric power. It could also affect our

ability to restore and sustain aquatic ecosystems and endangered and threatened species.

The USACE has the capacity and necessary authorities to comprehensively examine the uncertainties, threats and vulnerabilities on water infrastructure and to implement the necessary adjustments as part of a proactive adaptive management program. For example, in PL 99-662 (WRDA '86), the Congress authorized a study of the impacts of a possible rise in ocean levels (Section 731); a study on national capital investment needs for water resources infrastructure (Section 707); and a comprehensive assessment of water resources needs of river basins and regions (Section 729). We are also assessing the vulnerabilities of existing Corps water infrastructure and providing recommended courses of action for Federal, state and local partners on a variety of matters, as I will lay out in the remainder of my testimony.

CONTEXT OF THE USACE RESPONSE TO CLIMATE CHANGE

The Civil Works program is working to deal with the practical ramifications of changing weather patterns, and to develop sensible strategies in our areas of responsibility that anticipate various scenarios where these trends may intensify.

Generally, it is the large uncertainties that create substantial challenges for planning new pubic works, and even more so in operating our existing water resources systems. There are difficult decisions surrounding basic questions whose complexity would be compounded by climate change. At any given location, for example, we may need to determine:

- What is the appropriate level of flood and storm damage reduction, and what is the residual risk to those living and working once we build a levee, floodwall, dam, or other structure or implement a non-structural solution;
- How to characterize and identify a 100-year floodplain in coordination with FEMA's specifications;
- How to adaptively manage a reservoir to accommodate an increasingly uncertain spring runoff;
- How should reservoir storage be allocated among the competing needs, now and in the future;
- What criteria should be used to "recertify" flood mitigation structures where the flow frequencies have changed or are in the process of changing; and,
- How should our contemporary ideas on life-cycle infrastructure management and performance accommodate our evolving scientific understanding of climate change?

The uncertainties associated with climate change are additional factors that will compound the complexity of these issues. The USACE is addressing these issues, with no easy answers or solutions. However, we are committed to

devising a sensible way forward, in cooperation with the many others, including Federal and state agencies and private interests, who also deal with these matters.

LIFE-CYCLE MANAGEMENT OF AN AGING WATER RESOURCES INFRASTRUCTURE

The Civil Works program has oversight, regulatory or inspection responsibilities for a portfolio of 1600 water resources projects, programs and systems. We view our responsibilities from a life-cycle standpoint, which starts with our planning processes and engineering and ecosystem management designs, and continues with the development and implementation of project and system operating plans that will enable us to better adapt to any changing conditions.

The USACE does not collect or interpret most of the basic scientific and physical information related to climatology – precipitation, evaporation, snow pack, wind speed, soil moisture or sea level rise, etc. – that explain climate change trends. This is accomplished primarily through others, including NOAA, USGS and the National Aeronautics and Space Administration (NASA) and publicly funded research efforts.

PROACTIVE ADAPTIVE MANAGEMENT

In many respects, "adaptive management" represents a prudent component of a sensible approach to infrastructure life-cycle management. For the next decade or so, the nation's existing water resources infrastructure can, in most cases, be adapted to address subtle changes and trends in the hydrology and climatology with a proactive use of existing policies, programs and water management practices.

An integrated approach to evaluation of the impacts and response to Hurricanes Katrina and Rita exposed and highlighted the monumental challenge in responding to large-scale disasters, and has motivated the USACE to take serious stock of its planning and engineering methods and standards for evaluating, managing and responding to extreme events, and how they might be dealt with as part of climate scenarios that reflect different degrees of change from our historical expectations.

In many cases the climate changes we are experiencing are still within the "norms" of weather and climate variability, which our existing water resources infrastructure was designed to accommodate. Nevertheless, the USACE has engaged its researchers, planners and reservoir operators, as have other Federal agencies, to try to better understand the nature of these changes and to begin to develop methods that could help our planners and operators begin to deal with shifting trends.

The USACE is exploring ways to improve how to plan water resources public works, so that they are robust and resilient enough for an extreme storm event where justified, with due consideration for the uncertainty in the frequency and magnitude of such storms. USACE is working on ways to design projects with allowances for performance monitoring, adaptation and life-cycle management. The Administration has requested more funding for operation and maintenance and has proposed to transfer the funding and responsibility for rehabilitations to the operation and maintenance program. This will help ensure that the key components of the existing USACE inventory are properly maintained and provide the necessary safety, resiliency and reliability.

As part of our past project design, we've known that hurricanes of the magnitude of Katrina (and greater) were possible, even within what we consider "normal" climate variability, but it is difficult to predict the frequency of such events and we are still developing our understanding of how the intensity and frequency of such storms would alter under different climate change scenarios. Generally, however, we have formulated our projects to address storms that are more likely to occur. Similarly, our cities typically design their urban drainage systems for smaller but more frequent events. On the other hand, in cases of dam safety, we design spillways for very infrequent floods, roughly of a 10,000 year return period.

RISK-BASED PLANNING

The USACE is pursuing the expanded use of risk-based planning. The risk-based planning process considers uncertainties such as the effects of climate change, evaluated through multiple possible scenarios of the future. The ongoing work on the Louisiana Coastal Protection and Restoration study is an example of the application of this process.

The recently completed comprehensive International Joint Commission (IJC) study of the Lake Ontario-St. Lawrence River operating rules, relied explicitly on the ability of alternative regulation plans to function under four different climate scenarios. A similar study just initiated of the International Upper Great Lakes will also consider conditions resulting from climate change.

There are numerous other venues and opportunities for the USACE to promote these types of analyses and discuss a broader view on climate variability. For example, the USACE serves as principal advisor on numerous interagency Water Control (regulation) Boards, such as those for the International Joint Commission. There are twelve Boards for the watersheds and river basins that straddle the U.S.-Canadian border, and most are now beginning to consider climate change in their operations.

The USACE has been very active in supporting many of the U.S. Government's initiatives in working with a broad array of United Nations institutions to

implement the "Millennium Development Goals" (MDG), focusing on those that address water resources management and providing drinking water and food security to developing nations. As part of this effort, the USACE has aligned itself with a number of global water partnerships, such as the World Water Council and the Global Water Partnership, whose focus is on developing policies and mechanisms for implementing the MDGs.

The USACE was also instrumental in revitalizing the new U.S. National Committee for contributing to UNESCO's International Hydrologic Program (IHP). The IHP program is geared towards developing new approaches to integrated water resources management, with an emphasis on how climate change may be factored into the analysis and design of water management projects. Associated with the U.S. National IHP efforts, in which the USACE is partnering with many Federal agencies, universities and Non Governmental Organizations (NGOs), the USACE has entered into a series of Memoranda of Understanding with international centers of expertise that are part of the UNESCO devoted to water issues, including climate change. One of the key programs in which the USACE will be centrally involved is the International Flood Initiative (IFI), working with Japan's International Center for Water Hazards Flood Risk and Risk Hazard Management (ICHARM).

THE USACE ENVIRONMENTAL OPERATING PRINCIPLES

The USACE has reaffirmed its commitment to the environment by formalizing a set of "Environmental Operating Principles" applicable to all its decision-making and programs. These principles foster unity of purpose on environmental issues, reflect a new tone and direction for dialogue on environmental matters, including climate change, and ensure that USACE considers environmental issues in all USACE activities. The Administration's wetlands goal, proposed in 2004, is designed to not only limit wetland losses, but to expand the quality and acreage of wetlands across the nation. By reducing hydrologic variability in river systems (i.e., serving as storage for water) and providing a buffer to coastal storm surges, wetlands perform an important function that would become more valuable under a changing climate scenario.

HIGHLIGHTS OF CIVIL WORKS ACITIVITIES RELATED TO CLIMATE CHANGE AND VARIABILITY

Soon after Hurricane Katrina, the USACE initiated a series of actions that built on its previous work in risk analysis, and incorporated contemporary life-cycle infrastructure management principles, which include dealing with uncertainties through a "proactive adaptive management" approach. Similar risks and uncertainties would come into play under climate change. The planning and analytical evaluation processes of the USACE have been updated and upgraded

to explicitly encompass the risk and uncertainty components of the decision-making processes. The USACE has developed a 'scenario-based' planning and evaluation framework that is coupled with a better system for conveying risk and uncertainty information in a participatory public information framework.

NATIONAL FLOOD RISK MANAGEMENT PROGRAM

The reliability of the nation's aging flood and storm damage reduction infrastructure is affected by a number of factors. A changing climate could lead the nation to rethink how flood risk is assessed, communicated, managed and mitigated, and affect how and where we develop our communities in the future. Under the USACE's National Flood Risk Management Program, we are conducting an inventory of the nation's levees and will then assess their condition to determine if they will function at their design level. This effort is being coordinated with the Federal Emergency Management Agency (FEMA). FEMA has embarked on a billion dollar, 5-year program to update the nation's flood maps, known as the Map Modernization (MapMod) Program. The USACE has been actively supporting FEMA with reimbursable work on MapMod products, development of technical and funding guidance for levee certification, and the establishment of the Interagency Flood Risk Management Committee to allow senior executives to meet on a regular basis. The USACE and FEMA have also started the "Silver Jackets" collaborative planning program to better coordinate the Federal and state programs that can address a community's flooding problems. Collectively, these efforts are aimed at improving the nation's resiliency to the impacts of floods and storms both under present conditions and future climate scenarios.

12 ACTIONS FOR CHANGE

The principal "centerpiece" for the USACE's approach resides in what the Chief of Engineers introduced, as the "12 Actions for Change." The 12 Actions for Change were developed in response to the aftermath of Hurricane Katrina, and are focused on a systematic approach to better quantifying and communicating risk, uncertainty and safety considerations in our various endeavors; engaging the public; investing in research; and continuously reassessing and updating the Civil Works policies, planning guidance and design standards as part of an overall 'proactive adaptive management' approach.

USACE'S CLIMATE CHANGE WORKING GROUP

Under the direction of the Headquarters Directorate of Civil Works, the USACE is launching an effort to assess and develop a proposed comprehensive strategy for responding to the effects of climate change across the full range of its water

resources missions. This effort will aim to develop strategic policy and programmatic guidance for activities over the next decade including ongoing studies, as well as reviewing and upgrading existing programs and guidelines to increase planning and operational flexibility as part of a proactive adaptive management strategy.

WATERSHED STUDIES AND INTERAGENCY COLLABORATION

At the field and interagency levels, the USACE has been developing and advocating new approaches related to adapting to uncertainties such as those presented by climate change. In some cases, alternative solutions developed by the USACE have explicitly considered climate change as a potential risk factor. For example, communities along the Upper Mississippi River questioned whether their flood risk changed following the 1993 flood. In addressing this concern, the USACE conducted the Upper Mississippi River Basin Flow Frequency Study to update flood profiles for the Mississippi River from St. Paul, MN to the confluence with the Ohio River, the Missouri River from Gavins Point to the mouth, and the Illinois River. In addition to traditional flood frequency analysis, the analysis examined long-term climate trends and the potential uncertainty due to climate change.

The USACE is participating in the National Shoreline Management Study, an interagency effort to examine the status of the nation's shorelines and coordinate the various Federal, state and local perspectives on many issues, including the possible effects of climate change.

In addition, the USACE has initiated or participated in a number of workshops with its Federal and state agency partners that are designed to evaluate the development of technical and scientific methods for incorporating climate change information into forecasts, flood and drought frequency analysis and planning evaluation approaches for new projects, as well as for existing ones.

One such national effort is the upcoming USGS/NOAA/USACE/Bureau of Reclamation Headquarters Climate Roundtable. This effort, which is complemented by regional partnerships, such as an ongoing series of technical Interagency Climate Workshops, collaboration among the Bureau of Reclamation, California and the USACE, was initiated to develop more dynamic adaptive management strategies for California's reservoirs and flood protection systems, as well as its water supply and irrigation needs.

OPERATION AND MAINTENANCE

USACE can also address climate change as part of its effort to increase the resiliency and reliability of key existing infrastructure by instituting monitoring

programs and updating the hydrologic data base and the operating rules and criteria that are used to operate reservoirs, along with flood and drought management contingency plans, and Section 216 studies and associated efforts under P.L. 85-500 for the reallocation of reservoir storage.

USACE reservoirs can provide a buffering capacity for coping with the vagaries of climate variability and change. With the exception of a few large systems, most reservoirs have not had their operating plans updated for decades. This systematic updating could include new flood and drought frequency information, along with testing the resiliency and robustness of the systems under different climate change scenarios.

EMERGENCY PREPAREDNESS

The USACE is familiar with the hazards that natural disasters, such as tsunamis, extreme hurricanes, tornados, landslides, earthquakes or prolonged droughts can pose, as occurred in Hurricane Katrina and the Loma Prieta earthquake. Scientists are still in the early stages of being able to understand the connections between ocean temperature increases (El Niño) and mechanisms of weather patterns that lead to hurricanes and droughts. For example, the year 2006 was projected to be an active one for Atlantic hurricanes – yet none made a U.S. landfall. The USACE's "Advanced Measures Initiative" program allows it to determine areas where there is an imminent threat to public safety, for example from rapid snowmelt and flooding, or increased erosion and flood damage during high lake levels in the Great Lakes, and undertake preventive measures to reduce the risk to populations. Waterways transport is an important part of the nation's transportation system. It can be affected by hurricanes or floods, and by droughts like those of the 1930's and more recently in the late 1980's. Similarly, hydropower production is important, particularly in the Northwestern States, and its curtailment during droughts would add to the cost of power in those regions.

REGULATORY PROGRAM

Concerns about climate change are also affecting the USACE Regulatory Program. Under the Rivers and Harbors and Clean Water Acts, the USACE evaluates Federal, non-Federal government, and private proposals for actions affecting waters of the United States, including wetlands and the territorial seas.

When the Regulatory Program reviews a permit application for an action that would have significant environmental impacts (including but not limited to the impacts on waters of the United States), it generally considers the full environmental impacts of the action. Corps regulators have been asked to take positions on, or make judgments regarding, climate change for proposed actions subject to our jurisdiction in several States where we have joint permitting

procedures, regional general permits, and State Programmatic General Permits, or in States that have passed legislation with specific regulatory requirements pertaining to potential changes in climate. For example, in some cases, regulators in the District offices are already being asked to consider the impact that the added emissions resulting from a proposed action could have on future climatic patterns.

In general, climate change concerns tend to arise for larger, more complex projects, particularly those with long use lives such as energy and transportation projects. Hence, together with other regulatory agencies, we have begun to discuss how, or if, climate change should be addressed in the regulatory process. We may need to develop science-based evaluation tools to aid decision making. Also, while climate change concerns generally are not raised for smaller projects such as those authorized under general permits, private dock owners in some cases have asked the Corps to authorize a larger project – possibly with greater adverse environmental effects on waters of the United States, before mitigation – as a cushion or protection against the risk that floods, coastal storms floods, or a sea level rise may become more common in the future.

RESEARCH & DEVELOPMENT

The USACE has been involved in climate change impact studies since 1979, and has also sponsored, organized, and conducted numerous interagency conferences and technical workshops related to global warming. Past research investigated the potential impact of climate change on eight water resources systems that varied in size from a municipal water supply to the Missouri River Basin. Current research efforts are examining how changes in snow pack and the timing of snowmelt can be incorporated into modifications of reservoir operating rules for USACE projects in the Western United States.

The USACE Cold Regions Research and Engineering Laboratory (CRREL) research on ice cores from glaciers and polar ice sheets, cores from tree rings, and ocean-floor sediments provides a timeline of changes from the Ice Ages to the present day. These and other efforts by scientists to understand and predict the impact of potential climate change will help the USACE to develop a long-term strategic planning perspective and adapt its environmental stewardship, mitigation, and aquatic ecosystem restoration efforts to climate change.

The USACE's Research and Development Program may also be able to help bridge the gap between the scientific products flowing from basic climate change research performed by others across multiple U.S. and international agencies and institutions, and the need for applied research to develop methods, models and systems that will support a more dynamic and adaptive approach to reduce the risk from floods and storms.

The USACE will be able to include new information into its water management and control operations, because it has already implemented a nationally consistent, integrated system to operate all of its lakes and reservoirs across the U.S. This system, known as the Corps Water Management System (CWMS), has integrated a suite of software models of rainfall-runoff, snowmelt, and reservoir operation processes directly into operational decision making, allowing the adoption of new operation strategies quickly and efficiently. CWMS allows water control operators in USACE district offices to predict the consequences of operations under revised rules before the gates on the dams are moved.

A comprehensive systems type analysis would be required to apply the new analytic tools to evaluate and address the impacts of global climate change in any specific location. The USACE's' Hydrologic Engineering Center (HEC) has been developing such an interface called the Watershed Analysis Tool (HEC-WAT or the WAT). The primary purpose of the WAT is to streamline and integrate a water resources study such as a reservoir re-operation study using software commonly applied by multi-disciplinary teams. The WAT is the planning version of the CWMS software. The WAT will include the ability to perform risk analysis through the traditional approaches and will also facilitate the use of scenario-based analysis.

USACE ADVISORY BOARDS

Any significant sea level rise would have an impact on coastal flooding and erosion. The USACE developed technical guidance in 1987 on factoring in sea level rise scenarios as part of project planning and design. The Coastal Engineering Research Board (CERB) provides advice to the Chief of Engineers on research priorities and new initiatives, as does the Environmental Advisory Board (EAB). Both have suggested ways in which the USACE can deal with climate change and variability.

CIVIL WORKS ACTIVITIES CONTRIBUTING TO ENERGY INDEPENDENCE

The USACE is the single largest producer of hydroelectric power and energy in the United States. The USACE operates and maintains 75 multiple purpose hydropower projects with a total hydroelectric power capacity of nearly 21 thousand megawatts (MW) generating about 78 billion kilowatt-hours (kWh) of electricity per year. The USACE accounts for about 24% of hydroelectric power capacity and about 3% of total electric power capacity in the United States. This output makes the USACE the fourth largest electric utility in the United States behind the Tennessee Valley Authority, Commonwealth Edison and Georgia Power.

The Administration continues to invest in improving the efficiency and reliability of the inland navigation system. Over a comparable distance, barge traffic is more energy efficient than rail or truck for equivalent cargo volume. For example, according to data compiled by the U.S. Department of Transportation Maritime Administration, when comparing the relative energy efficiencies of different modes of transportation, for one gallon of fuel, trucks can carry one ton of cargo 59 miles, rail can carry one ton of cargo 202 miles and an inland barge can carry one ton of cargo 514 miles.

CONCLUSIONS

There are many avenues through which the U.S. Army Corps of Engineers Civil Works program can help address the difficult scientific, technical and operational issues raised by the uncertainty associated with climate change and its potential impacts on water resources management. The USACE has the necessary authorities to conduct a broad program of necessary first steps that are part of a longer-term proactive adaptive management strategy. The USACE is a leader in innovative, yet practical, cost-effective approaches, and is working to incorporate potential climate change impacts in the planning and management of our key water-based infrastructure. We are well positioned to respond to the nation's needs now and in the future.

Written Statement
Tennessee Valley Authority
Tom D. Kilgore, President and CEO
U.S. House of Representatives
Committee on Transportation and Infrastructure
Friday, May 11, 2007

Thank you for the opportunity to add a statement to today's hearing on behalf of the Tennessee Valley Authority. As its President and Chief Executive Officer, I take very seriously the mission entrusted to us by the United States Congress in 1933 – to improve navigation on the Tennessee River and reduce flood damage, provide agricultural and industrial development, and provide electric power to the Tennessee Valley region. In other words, our responsibilities boil down to three things – energy production, environmental stewardship and economic development – the core of our mission to improve the quality of life in the Valley for the last seven decades.

As the nation's largest public power system, TVA supplies power in seven states – Tennessee, northern Alabama, northeastern Mississippi, and southwestern Kentucky along with portions of northern Georgia, western North Carolina and southwestern Virginia. We serve a population of roughly 8.7 million, and are financially self-supporting, using our power revenues to pay our own way.

TVA is fortunate to have a diverse mix of generation from which to supply power to our customers, including coal-fired power plants, nuclear plants, natural gas plants, hydroelectric units, a pump-storage facility, and renewable technologies. In 2006, our generation was 64% coal, 29% nuclear, 6% hydro, and 1% natural gas, diesel and renewable technologies, such as solar and wind.

Within that mix of power generation, we obviously use coal extensively, and consequently, are among the larger emitters of CO2. However, it is important to note that with our diverse generating mix, our CO2 emission rate, relative to the amount of energy generated, is lower than many other companies.

TVA has worked diligently to address the challenge of greenhouse gas emissions. In 1995, we were the first utility to sign a Memorandum of Understanding with the Department of Energy to participate in its newly created program, Climate Challenge. As a result of this program, TVA has reduced, sequestered or avoided more than 305 million tons of CO2 as reported under Section 1605b of the 1992 Energy Policy Act. These results were achieved primarily through the restart and continued operation of Units 2 and 3 at Browns Ferry Nuclear Plant, and the commercial operation of Watts Bar Nuclear Plant Unit 1.

The Administration's Global Climate Change Initiative sets a goal of an 18% reduction in the greenhouse gas intensity (defined as the ratio of greenhouse gas emissions to economic output) of the nation's economy by 2012. In addition, the electric sector, through the Administration's Climate VISION program, has committed to reduce

the sector's greenhouse gas intensity by 3 to 5% in the years between 2010 and 2012, measured from a baseline of 2000 to 2002.

In both of these voluntary programs, I am pleased to report that TVA is a participant. We are signatories on a Memorandum of Understanding and work plan between the electric sector and the Department of Energy in the implementation of Climate VISION.

Our projected reduction in TVA's CO2 intensity align well with the overall industry target both in terms of the Administration's goal to reduce greenhouse gas intensity and with Climate VISION. TVA's projected greenhouse gas (GHG) intensity will decline over the term of the MOU with DOE, primarily due to increases in non-GHG generation on the TVA system.

We also have several partnerships to further reduce CO2. We are a member of the Southeast Regional Carbon Sequestration Partnership, one of seven teams participating in this Department of Energy-sponsored program.

We participate in the Coal Combustion Products Partnership program. A cooperative effort between the Environmental Protection Agency, Department of Energy, and the Federal Highway Administration along with the American Coal Ash Association and the Utility Solid Waste Activities Group, the program promotes the beneficial use of coal combustion products to reduce greenhouse gases and the amount of material sent to disposal.

Most importantly, we are taking voluntary actions in two pivotal areas to reduce carbon emissions: notably expanding the diversity in our electric generation mix with safe, clean, zero-emission power; and reducing emissions through increased energy efficiency. I would like to spend a few moments on each.

Within the next month, TVA will restart and up-rate Unit 1 at Browns Ferry Nuclear Plant in northern Alabama, the first U.S. nuclear unit to be brought on-line in the 21st century. Browns Ferry Unit 1 is expected to initially provide additional generating capacity of approximately 1,150 megawatts and eventually will produce 1,280 megawatts. We are also working with the Nuclear Regulatory Commission to up-rate Units 2 and 3 at Browns Ferry to 120% of their Original Licensed Power.

In addition, we are currently conducting a feasibility study on resuming construction at Unit 2 of our Watts Bar Nuclear Plant, located in east Tennessee. The results of that study are expected in the late summer or early fall. The operation of Watts Bar Unit 2 would add another 1,170 megawatts of non-CO2 emitting generation to the TVA system.

TVA is also a member of the NuStart consortium, which is composed of two nuclear reactor vendors (General Electric and Westinghouse) and nine electric utilities. The consortium is working together to determine the effectiveness of a new licensing

process, a combined construction permit and operating license, developed by the Nuclear Regulatory Commission.

NuStart has selected TVA's Bellefonte site, also in northern Alabama, as one of the nation's two best locations for an advanced technology nuclear power plant. The estimated cost of the detailed engineering needed for a combined construction permit and operating license at Bellefonte is roughly $400 million. The Department of Energy has committed to sharing in the cost along with the consortium's members.

I am also pleased to report that TVA has expanded our Green Power Switch program with 27MW of wind generation. Our site at Buffalo Mountain in east Tennessee makes our wind generation the most in the Southeast, and gives more customers the opportunity to purchase blocks of power generated by renewable energy sources.

TVA worked cooperatively with the environmental community and local public power companies in the development of Green Power Switch in order to bring electricity, generated by renewable sources, to Valley consumers. Residential customers may purchase Green Power Switch in 150-kilowatt-hour blocks, roughly 12% of a typical household's monthly energy use. Consumers may purchase as many blocks as they like, with each block adding $4 to their monthly power bill. We have also marketed Green Power Switch to commercial and industrial consumers, and Tennessee's university system has demonstrated considerable interest in the program. These customers purchase blocks based on their energy consumption. In three months, from December, 2006 to February, 2007, the program generated 27,977,065 kilowatt hours of electricity.

With our location on the Tennessee River, TVA is increasing generation at our hydroelectric units with critical equipment upgrades through our Hydro Modernization Program. When this program is completed, we will have more than 700 megawatts of additional capacity of this renewable energy source.

As we increase capacity, we are also mindful of the need to increase energy efficiency and conservation. TVA has begun this effort at home, so to speak, in TVA buildings with the use of energy efficient lighting, temperature set-backs, high efficiency motors, occupancy sensors, heat pumps, passive solar heating and automatically turning of lights in office spaces.

We employ sustainable building designs, including non-toxic recycled-content building materials, geothermal heat pumps and day lighting. We purchase hybrid and alternative fueled vehicles, using the most efficient vehicle available for a given task, and reducing the number of vehicles that consume large quantities of gasoline.

At our power facilities, we are improving plant heat rate efficiency through turbine and system upgrades, the use of high efficiency transformers, and premium efficient motors.

For over twenty years now, TVA has had a demand-side management residential energy efficiency program. Our current program, established in 1995, is known as *Energy Right*, and is a joint program with our distributor customers. The program provides incentives to builders and homeowners to encourage higher efficiency HVAC systems and tighter building envelopes.

We have also promoted geothermal HVAC systems throughout the service territory with over 275 systems, many in public schools, installed since 1997.

At the present time and at the TVA Board's request, we are in the process of completing the development of a new strategic plan. With significant input from our Valley stakeholders, the plan will help us continue to explore the cleanest, most cost-effective and efficient energy options for the future.

Next year, TVA will celebrate its 75th anniversary, a significant milestone. We will continue to add clean energy sources to our generation portfolio and to encourage energy efficiency, all the while preparing for the continued demands on our system of two percent growth in the Valley each year for the foreseeable future. The men and women of TVA are proud of our original and historic three-fold mission, providing energy, protecting the environment, and providing economic development opportunities, all to improve the quality of life in the Tennessee Valley. Once again, I appreciate the opportunity to add this statement to the record, and look forward to our continued work with the committee.

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* Names in bold denote Founder level Associates

As of May 11, 2007

National Association of State Energy Officials
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Texas State Energy Conservation Office
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The Trust Fund for Electric Energy Savings (FIDE)
University of Illinois - Energy Resources Center
U.S. Green Building Council
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Washington Gas
Whirlpool Corporation
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CLIMATE CHANGE AND ENERGY INDEPENDENCE: TRANSPORTATION AND INFRASTRUCTURE ISSUES

Wednesday, May 16, 2007

HOUSE OF REPRESENTATIVES,
COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE,
Washington, DC.

The Committee met, pursuant to call, at 11:06 a.m., in Room 2167, Rayburn House Office Building, Hon. James Oberstar [Chairman of the Committee] Presiding.

Mr. OBERSTAR. The Committee on Transportation and Infrastructure will come to order. This is the second in our series of hearings on climate change and energy independence and the role of transportation and infrastructure initiatives in the global climate issue.

We had a hearing a week ago with a rather lengthy list of witnesses and an abundance of testimony. And it was fascinating. We have another robust day of hearings and very knowledgeable, learned panel—panels—witnesses with great storehouses of information. And I anticipate that the Committee's hearings will be a compendium for the future of the factual information-based presentations on the subject of our time.

A fascinating book that I have read and reread over time entitled, ″The Whale and the Supercomputer: On The Northern Front of Climate Change,″ by Charles Wohlforth and others.

The book starts out: "I love the winter. It's when I fly through the birch forest like a hawk. If the snow is good in Anchorage and at Kincaid Park, the cross country ski trails swoop among trees and over steep round hills, unwrapping silent white glades and black thickets edged with hoary frost in quick smoothly evolving succession."

Lovely start to a book.

He continues, "but some recent winters were still born in this part of Alaska. Fall came late and Halloween, when it should be deep snow, we took children trick-or-treating without coats. The winter's first snowfall was later than ever. And then we had rain and thaw. Ski trails were ruined. Running instead, plodding and earth bound was no substitute. In late winter, normally the best season, the sled dog races were cancelled for lack of snow. That almost never happened when I was a child. But now it happens every couple of years." Science tells us, he continues, that no single winter can be blamed on global climate change. "Weather naturally varies from year to year while climate represents a broad span of time and space beyond our immediate perception. But science, too, has taken notice.

"Average winter temperatures in interior Alaska have risen 7 degrees Fahrenheit since the 1950s. Annual precipitation increased by 30 percent. Alaska glaciers are shrinking, permanently frozen ground was melting. Spring is earlier. Arctic sea ice was thinner and less extensive." Winter, he writes, "was going to hell."

"The Inupiat elders of the Arctic noticed first. Sustained for a thousand years by hunting whales from the floating ice, they developed fine perceptions of the natural systems around them. The Inupiat adapted to the new world, knowing that the rest of the world would eventually follow. What is happening here is beyond debate: Burning fossil fuel elevated the carbon dioxide content in the atmosphere. We have a crime scene, victim, suspect, motive, opportunity and smoking gun; plenty of evidence to convict."

It goes on to say that, for 420,000 years, the carbon cycle was in a rough range of balance. Carbon in the atmosphere ranged from 180 parts per million to 280 parts per million. Within the last 100 years, that has dramatically changed. There is more carbon in the atmosphere now than at any time in 420,000 years.

On that sobering note, we will begin the second of our hearings on this issue of climate change. Energy consumption is expected to grow some 23 percent. The Energy Information Administration predicts that, by 2025, worldwide energy use will grow 57 percent.

Eleven of the past 12 years have been the hottest since 1850; 2006, the warmest on record. Sea level is rising, as ″The Whale and the Supercomputer″ report. We are hit by the dual crunch of rising energy prices and rising carbon in the atmosphere. Legislation that produces increased energy efficiency and results in a degree of independence, hopefully total independence, is important for us to consider in the transportation sector. That alone accounts for over 27 percent of total greenhouse gas emissions in the United States, second only to electric power generation.

And there are things we can do in this Committee with our legislation and with what is already in place, a good deal of which we have already enacted. A mode shift of only 10 percent to transit will save the equivalent of 550 million barrels of oil, the amount we import from Saudi Arabia every year. The President has joined the effort with his statement just a day or so ago establishing higher fuel efficiency standards for cars and concluded by saying the steps he announced today were "not a substitute for effective legislation."

Well, we are going to take the President at his word and, in effect, at his invitation and move toward legislation—not far-out stuff—but what is available, in a sense, off-the-shelf. One provision of which we have already enacted—or not—I am sorry, that we have passed through Committee and through the House. It is pending in the Senate. That legislation would convert the Department of Energy building to photovoltaic cells. Not far-out technology, but that which is already available and has been developing for over 30 years.

If we don't do these things, we are on a crash course with history. The Woods Hole Oceanographic Institute announced results of continuing studies predicting that summers that now average in the low to mid 80s by 70 years from now will average between 100 and 110 degrees in Chicago, Atlanta and elsewhere.

Dr. Sam Epstein, of the Center For Health and Global Environment, who has spoken with our Committee Members several years ago, points to the rise in malaria, dengue fever, West Nile Virus and other vectors that transmit disease in a wider range and a

wider latitude in the earth because temperatures are warmer and more favorable to the lifecycle of those vectors.

There are many other considerations that I will enter into the record at this point with the complete statement, but I think that frames the subject matter. We are looking forward to the testimony of this first panel and the subsequent panels, and then we will jointly fashion a legislative response at the invitation, in effect, of the President, and do things that are realistic that are within the ambit of this Committee. These will hopefully contribute in the short term, as well as also in the long range, to reducing carbon emissions in the atmosphere.

I thank the gentleman from Florida for his participation on this hearing. And I recognize and I yield to the gentleman from Florida.

Mr. MICA. Thank you and thank you for convening the second session on the important topic of climate change and energy independence and our transportation infrastructure issues relating to how we can do a better job.

I started off my comments last week again citing some simple facts, and I think you reminded us today that about 32 percent of the greenhouse gas emissions come from power generation and cited the problem of even the U.S. Capitol building not being efficient, actually the second biggest polluter I guess, in Washington, D.C., I read afterwards. I didn't know it fell into the second category. I am sure automobiles and transportation, which account for 28 percent of those emissions, also pollute our Nation's capital's air.

I didn't count sheep last night, but I did have a chance to read some of the testimony, and since I won't be able to stay through this, I am going to turn over to Mr. Duncan in a few minutes here. But particularly, I want to thank Mr. Millar. And I read some of his recommendations at the conclusion and concur with them that we have to have incentives.

The other thing, too, that, with public transportation, and I consider myself a strong advocate of mass and public transportation, which we have done some in the United States, but not enough to promote but to, just looking at my own district, the lack of intermodal connectivity and convenience for passengers. And I represent six counties from Jacksonville all the way down to Orlando and found either lack of public transit systems or existing public transit systems that didn't move people through—throughout say even my district from Orlando to Jacksonville. No one thinks about it, but our long distance carrier is—today our long distance transit carrier is Greyhound, a company that actually makes a profit and moves people. But we don't accommodate Greyhound, which is our national carrier intermodal service in most of those bus systems. In fact, one of the—I went to Deland, Florida, the county seat of Volusia County, about a week ago, and the bus station is on the north side of town at a little stop. And we are building a new intermodal on the south side of town where our bus service will eventually feed through the county and into a regional system. But we have made no accommodation for that carrier.

So we need to have considerations of convenience for people in truly intermodal functions in our policy. So I thank him.

And then Ed Hamberger is here. Last week I cited, and I repeat again, in 2006, 1 gallon of diesel fuel moved 1 ton of Freight an average of 414 miles. And I saw on his testimony the potential that we have for moving—well, trucks do a very good job at moving much more freight in a very efficient manner and dealing with capacity issues for the future in an energy efficient manner, and I appreciated his testimony which I also read last night.

Finally, we have got, Mr. Rader is here. Mr. Rader represents Colorado Railcar, and I am one of their strongest champions. They produce the most efficient transit rail vehicle probably in the world, right in the United States, developed it without Federal funds, at their own initiative. Colorado Railcar, which is now, we will hear in his testimony, where that is going to be used, but fuel efficient and emissions-efficient and very proud of what he has done, American workers with an American product.

And finally, on another panel, we have Jim May. I won't get to ask him the question, but I did check on the issue, and he does speak to it some, the issue of the European Union moving forward with plans to tax commercial passenger aircraft that do pollute the European skies. And I know that they are waiting on a ICAO, the International Civil Aviation Organization, to come up with some standards, but eventually, if measures aren't taken in the United States to deal with the aviation aircraft emissions, we will be held to task either by international organizations or by organizations of states like the European Union. And that is something that we also have to deal with.

So with a couple of those comments, again, I am pleased to be here and thank you for carrying on this important responsibility.

Mr. OBERSTAR. Again, I thank the gentleman from Florida, and I greatly appreciate your comments. And we will proceed in that spirit.

Mr. HAMBERGER. Mr. Chairman, point of parliamentary inquiry.

Mr. OBERSTAR. It is rare for a witness to make a point of parliamentary inquiry. Does the witness wish to be recognized?

Mr. HAMBERGER. If the Chair would be so kind.

Mr. OBERSTAR. Yes.

Mr. HAMBERGER. I wonder if it would be appropriate to let Mr. Mica know, since he is leaving, that the number that he was using, 414 miles per gallon was accurate in 2005, but the number for 2006 is 423.

And so I did not want to let that——

Mr. OBERSTAR. It is so noted in the testimony that you will be delivering which I also read.

Mr. MICA. I thank the gentleman for correcting the record. And we will put on suspension the sole minority staffer that we have until he gets those figures correct.

TESTIMONY OF JONATHAN LASH, PRESIDENT, WORLD RESOURCES INSTITUTE; WILLIAM W. MILLAR, PRESIDENT, AMERICAN PUBLIC TRANSPORTATION ASSOCIATION; EDWARD HAMBERGER, PRESIDENT, ASSOCIATION OF AMERICAN RAILROADS; ANDY D. CLARKE, EXECUTIVE DIRECTOR, LEAGUE OF AMERICAN BICYCLISTS; EDWARD HALL, GENERAL MANAGER OF ENGINE TECHNOLOGY, GENERAL ELECTRIC; TOM RADER, PRESIDENT, COLORADO RAILCAR; AND GREG COHEN, PRESIDENT & CEO, AMERICAN HIGHWAY USERS ALLIANCE.

Mr. OBERSTAR. With those trenchant observations and the quivering in the background, we will begin with our first panel: Jonathan Lash, President of World Resources Institute. I have been a fan of Mr. Lash's writings over many years, and he has piqued our conscience and stimulated the public debate and forced the issue to the forefront with factually based and substantiated writings for which we are most appreciative.

Mr. Lash.

Mr. LASH. Thanks very much, Mr. Chairman. It is an honor to be here with you this morning. We congratulate you on pursuing this issue in the Committee. The World Resources Institute is an environmental think tank. We work on global issues and have worked on issues of climate change for two decades now. It is great that we finally have the chance to begin to discuss the solutions with the Congress. I am going to very quickly run through a few slides, Mr. Chairman, confirming some of the things you said in your opening statement. If I could go to the next slide?

The earth is warming. There is no doubt of this fact. It is warming rapidly. It has warmed a little less than 1 degree centigrade, most of that in the lifetime of those of us in the room. The pace of warming is outside anything in human history.

Next slide.

The warming is caused, as the Chairman pointed out, almost entirely by the build-up of greenhouse gasses in the atmosphere, most importantly carbon dioxide. As the Chair said, carbon dioxide levels are the highest in human history. In fact, they are now the highest in 650,000 years, we are quite certain. The Intergovernmental Panel on Climate Change, the official process that the United States is a party to, said it is more than 90 percent likely that the warming is largely caused by human activities.

Next slide.

The warming has gone far enough that we all have begun to see the effects of the warming. As oceans have warmed, both the Atlantic and the Pacific, the number of hurricanes that turn into Category 4 or 5 hurricanes, the most serious, has almost doubled. So, in the period from 1975 to 1989, there were half as many that became Category 4 and 5 hurricanes as there were in the period from 1990 until 1994. We saw the first South Atlantic hurricane in history 2 years ago. We saw a 3-year Amazon drought. That impacts the rain forest. A recent scientific study confirmed that we are apt to see such droughts in the Amazon about every decade now because of the changed ocean conditions.

If we could go on to the next slide. The Chairman mentioned the changed conditions in the far north. The rapid melting of the

Greenland ice sheet has shocked even scientists who predicted it because it is going so much faster than predicted. Glaciers around the world are retreating. That becomes a significant issue because many, many cities around the world depend on snow pack to supply them with water in arid areas. A group of 11 admirals and generals who looked at the security implications of warming issued a report a few weeks ago in which they said climate change can act as a threat multiplier for instability in some of the most volatile regions of the world and present significant national security challenges for the United States.

They went on to call for action. Now, to mitigate those threats.

Next slide please.

That is also the call of the 22 major companies and six environmental organizations that joined together in the United States Climate Action Partnership and issued a call to action last January, urging the Congress to adopt mandatory legislation that slows, stops and reverses the build-up of emissions of greenhouse gasses from the United States that called for the United States to take unilateral action.

They made that call because they saw that they needed certainty for investment that created an opportunity for technological change in the future. Also, because they believed that action sooner is cheaper than action later, and because of energy security issues, all of the steps we take for climate change would help.

If we could go, skip the next slide. Skip this one. For the United States, the problem is essentially one of cars, coal and buildings. The buildings drive 70 percent of the emissions from the electric power sector. Cars are responsible for most of the 27 percent from the transport sector. And coal is the major cause of emissions from the electric power sector.

In each case, there is an opportunity to change technologies, technologies that are 50 to 100 years old, that will give us an opportunity to compete in tomorrow's markets, which will demand low carbon alternatives and which our industries can produce better than anyone else's if they are given a platform to do it from, one that gives them the opportunity to be assured of profit from low carbon technologies.

Last slide.

There are a number of measures that we can pursue that produce both benefits for energy security and benefits for climate. Efficient transportation, public transit, building efficiency are all very positive. But there are some we could do that might improve energy security but would be highly damaging to climate. For instance, the adoption of coal liquefaction technology. It is important to distinguish those that are in the upper right hand quadrant here that would benefit both national goals.

Thank you very much, Mr. Chairman.

Mr. OBERSTAR. Your complete statement will be included in the record and has a compendium of information, very thorough well researched presentation on the issues before us. Thank you. Excellent presentation.

Bill Millar, President of American Public Transit—I am sorry—Public Transportation Association.

Mr. MILLAR. Thank you, Mr. Chairman, and it is a pleasure to be with you, Mr. Duncan, the other Members of the Committee. And I appreciate your opening remarks and those of Mr. Mica. You have done a good job of outlining the urgency of the issue here. As has been said, the transportation sector accounts for about two-thirds of the petroleum used in this country, 28 percent of the greenhouse gas emissions. If we are going to beat America's addiction to oil, we simply have to reduce transportation related petroleum consumption.

I am pleased to report that the American public transportation industry is already leading the way in reducing petroleum use and greenhouse gas emissions. A recent study by ICF International concluded that the direct savings from public transit that is used already today in America is about 1.4 billion gallons per year. APTA currently has a study under way that is going to look at the next order of savings because we know, if people use public transit, they live differently. They save additional oil beyond the obvious of, "I took the bus; I didn't take my car today." The amount of savings that that amounts to, that savings amounts to, in that first order, is equal to all of the fuel consumed by cars in smaller States such as New Mexico or Utah. It is also five times the amount that would be saved by converting the Federal light duty vehicle fleet to alternative fuels. That may be a good idea, but I am just trying to give you a sense of the order of magnitude.

Now these savings result from several important characteristics of public transit, certainly that transit carries multiple passengers in each vehicle, that traffic congestion is reduced because transit takes cars off the highways, and transit systems do not rely exclusively on petroleum to power their fleets. They can be flexibly, and many are, flexibly powered today.

Now, the energy and emission reductions could be multiplied if we could have a greater use of public transit. Cities around the world that have more public transit use less energy. A study done a couple of years ago showed that European cities are on average two and a half times more energy efficient than American, and comparable Asian cities are five times more energy efficient. These are all cities that use an extensive amount of public transportation.

Unfortunately, public transportation isn't available to all Americans who wish to use it. Only about one in four Americans actually has what they consider to be adequate—whatever that term means—public transportation. Nonetheless, Americans are using public transit in record numbers, Mr. Chairman, as you have noted over the years, more than 10 billion rides a year now being taken on public transportation. Public transportation use, over the last 11 years, is growing faster than the use of the automobile and much, much faster than the growth of our population.

Now, as the Congress considers these important issues, and as it puts together its policy ideas on energy savings and greenhouse gas emissions, APTA wishes to offer five principles that we think are important to be included.

First, transit use significantly reduces energy consumption and greenhouse gas, therefore encouraging public transportation must be a part of the overall strategy.

Second, energy savings from emission reductions from increased transit use are long-term savings. These are investments we are making that will still benefit us 100 years from now. For example, Boston opened the first subway in 1901; New York City in 1904. More than 100 years later, those cities and indeed our nation is still benefitting by those investments made at that time.

Principle three, public entities like public transit agencies that directly produce energy savings and reduce emissions should be eligible to receive revenues generated from any carbon tax or cap-and-trade style program.

Four, energy conservation and greenhouse gas emission reduction should be factors in transportation and land-use planning. The Federal Government should encourage State and local governments to coordinate land-use planning, and Federal facilities should be cited to be accessible to public transit so employees and Federal employees as well as visitors to Federal facilities can easily use public transit to get there.

Fifth, new investments in energy efficient public transit vehicles and facilities that will increase substantially the energy efficiency should receive encouragement from the Federal Government. And if there is to be a program of incentives, we certainly want to include that.

My written testimony includes a series of more specific recommendations in the area of tax policy and promotion of green technology and related items. We certainly look forward to working with you and the Committee as you develop your ideas further. We would be happy to make any additional information available you might prefer. Thank you, Mr. Chairman.

Mr. OBERSTAR. Thank you very much, Mr. Millar, APTA's members have done a spectacular job of providing increased mobility with lower emissions and reaching more areas of our metropolitan areas than ever before. And the remarkable fact for me is that, just 15 years ago, New York City accounted for 60 percent of all transit trips in the Nation. That is down below 40 percent now. Not because New York isn't using transit—their numbers have grown—but because the rest of the Nation has grown faster and has much further to go, but we are there.

We have a recorded vote on the floor right now. I will recess for this vote, come back, and we will continue with testimony. There will be another series of votes later, but there is debate intervening.

And so, Mr. Hamberger, we are anxious to hear about new high horsepower locomotives, information technology systems, reduced idling, and new locomotive crew training programs that are all a feature of the freight rail landscape.

Mr. HAMBERGER. Look forward to it. Thank you, sir.

Mr. OBERSTAR. And the rest of our panel as well. Thank you. Committee will stand in recess for roughly 10 or 15 minutes.

[Recess.]

Mr. DUNCAN. [presiding.] Chairman Oberstar told me to go ahead and proceed with the next witness. I am not attempting an Alexander Hague moment here.

The next witness is our friend, Edward Hamberger, who is president of the Association of American Railroads.

Mr. Hamberger.

Mr. HAMBERGER. Thank you, Mr. Duncan. The AAR appreciates the opportunity to address the issue of climate change and transportation. Freight railroads are committed to being part of the solution to the challenge of climate change. Greater use of freight rail offers a simple, inexpensive and immediate way to meaningfully reduce greenhouse gas emissions without hurting the economy.

Freight railroads are clearly the mode of choice for fuel efficiency. Greenhouse gas emissions are directly related to fuel consumption because railroads are on average three or four times more fuel efficient than trucks. Every ton mile of freight that moves by rail instead of truck reduces these emissions by two-thirds or more.

I want to emphasize up front that the testimony we have submitted and my testimony today is not meant to be an anti truck diatribe. Our largest customer segment is intermodal. And that is achieved because of cooperation and partnership with the trucking industry. But having said that, the facts paint a very compelling picture that moving freight by rail is the most environmentally friendly way to move freight. For example, according to the American Association of State Highway and Transportation Officials, transferring just 1 percent of the long haul freight currently being moved by trucking to rail would reduce fuel consumption by 110 million gallons per year and decrease emissions by 1.62 million tons. The demand for freight transportation is projected to increase substantially in the coming years. And if the 10 percent of that traffic that is predicted to move over the highways could move by rail instead, the cumulative reductions in greenhouse gas emissions could reach as high as 212 million tons by 2020.

Working with our suppliers, whom you will hear from a little later, railroads work constantly to improve fuel efficiency, with stunning results. In 1980, one gallon of diesel fuel moved 1 ton of freight an average of 235 miles. In 2006, as I already mentioned, the same amount of fuel would move 1 ton of freight by rail an average of 423 miles, roughly equivalent to the distance from Boston to Baltimore and an 80 percent increase over 1980.

All seven U.S. Class I railroads have joined EPA's SmartWay Transport, a voluntary partnership between freight transporters and the EPA that establishes incentives for fuel efficiency improvements. To accomplish these goals, railroads make extensive use of technology, training and changes in operating practices to curb fuel consumption. New long haul locomotives are more powerful, more fuel efficient and emit fewer greenhouse gasses. New genset and hybrid-switching locomotives and idling-reduction technologies also reduce fuel consumption and emissions. On-board locomotive monitoring systems help engineers determine the optimum speed for moving the freight in the most fuel-efficient way.

Information technology is used along with in-trip planning systems to smooth traffic flow, better utilize assets and reduce fuel consumption.

It is important to note that freight railroads account for a very small share of U.S. greenhouse gas emissions, just .6 percent in 2005, according to EPA. And we are quite proud of the fact that even though freight rail moved 42 percent of intercity freight on a ton-mile basis in 2005—we moved 42 percent—our greenhouse gas

emissions amounted to only 2.2 percent of the total transportation sector greenhouse gas footprint. In addition to reducing fuel consumption and emissions, moving more freight by rail would also help reduce highway congestion and save fuel that otherwise would be consumed by motor vehicles caught in traffic. As you are aware, a single intermodal train can take up to 280 trucks off the road directly, and other trains could move the equivalent of 500 trucks of pay load.

Policy makers can and should take steps to attract more freight to railroads and expand the greenhouse gas emission benefits of rail transportation. Two ways of doing this are through tax incentives to expand rail capacity and through public-private partnerships for freight rail infrastructure projects. Both of these concepts are endorsed and supported by AASHTO and its freight rail bottom line report. And of course, this Committee gave great support to many freight public-private partnerships in the SAFETEA-LU bill in 2005, including, in Chicago, the CREATE program.

I would draw the Members' attention to H.R. 2116, a bill introduced recently with the lead cosponsorship of Congressmen Kendrick Meek and Eric Cantor, which is entitled, The Freight Rail Infrastructure Capacity Act, which provides a tax incentive for expansion capital—expansion capital only—also for an increase in horsepower for new locomotives. And I draw the Members' attention to that to consider whether that would be an appropriate way to encourage even more investment to expand capacity to move more freight by rail.

We look forward to working with you, Mr. Chairman, and the Committee and others to address the challenges of climate change. Thank you.

Mr. OBERSTAR. [Presiding.] Thank you for your very compact testimony and for the extensive documentation you have submitted to the Committee which will be included in the record.

Our next witness, Andy Clarke for the League of American Bicyclists, is going to show us how we can convert from the hydrocarbon economy to the carbohydrate economy.

Mr. CLARKE. Mr. Chairman and Members of the Committee, thank you. On behalf of our members and the tens of millions of adults who will get on a bike and ride this year, thank you for giving us the chance to share what we think are some of the considerable roles that cycling and walking can play in combating climate change and promoting energy independence. This Friday, tens of thousands of people in communities across the country will bicycle to work in celebration of National Bike to Work day. In the D.C. Area alone, more than 7,000 riders will participate. Now, if those 7,000 riders chose to drive to work instead of bicycling, they would generate 32 tons of carbon dioxide, one and a half tons of carbon monoxide, and they would burn half a tanker truck of gasoline, and they would do exactly the same thing on the way home. That is just 1 day in one community.

The potential to increase the numbers of people bicycling and walking to work in the United States in the short term is even more impressive. San Francisco and other cities have more than doubled bicycle commuting between 1990 and 2000 through invest-

ment in bike lanes, trails, bike parking, maps, education programs, encouragement activities and a focused bicycle plan.

Bicycling to work is just part of the picture however. More than three-quarters of trips a day are not for commuting at all. They are social, recreational, for shopping trips. And amazingly, more than 40 percent of all those trips are 2 miles or less, a very manageable bike ride. And more than 1 quarter are just 1 mile or less.

These short trips are the most polluting and the most feasible to switch to bicycling and walking. The City of Chicago, for example, recently adopted a 2015 goal of getting 5 percent of all trips 5 miles or less made by bicycle. And we would encourage Congress and the Federal Government to encourage more urbanized areas to establish such goals.

When barriers to bicycling are removed, people start riding. A great example is Portland, Oregon, where bicycle use has more than quadrupled since 1994 as their bike network has grown from 60 miles to 260 miles. They, too, have invested in cyclist and in motorist education, encouragement programs and very simple measures, such as providing bicycle parking. They have fully integrated transit and walking and bicycling.

Many of the short car trips in our metro areas are school related, parents driving their children to and from school over really very short distances. The Federal Safe Routes to School program created by SAFETEA-LU is a welcome opportunity to change the habits of a generation of school children by enabling them to walk and bicycle to school. And we know from the initial Federal pilot program in Marin County that real mode shift is possible.

So what can Congress do today to encourage more people to walk and bicycle instead of automatically reaching for the car keys for all of their trips?

First, we would encourage you to consider establishing automobile vehicle miles traveled reduction targets that States and localities can meet by shifting from short polluting trips by automobiles to walking, bicycling and to transit.

Second, Congress can appropriate funding for the Conserve By Bicycle program, which was authorized in the Energy Act in 2005. This program directs the U.S. DOT to develop and disseminate best practices on how to replace car trips with bicycle trips for those short distances.

Third, Congress could pass the Commuter Tax Benefit Act, H.R. 1498, which would extend the transportation fringe benefit currently offered to transit, van pool and qualified parking plans to bicyclists.

Fourth, Congress can ensure that any future rescissions of Federal transportation funds do not disproportionately hit bicycle and pedestrian funding programs. In 2006, for example, $600 million were taken back from the transportation enhancement program, a key funding source for bicycling and walking.

Fifth, Congress could direct the General Services Administration to make the Federal Government a model employer for promoting bicycling and walking to work.

And finally, in the next transportation bill, perhaps sooner, Congress could codify the U.S. Department of Transportation's design guidance on accommodating bicyclists and pedestrians so that

every new and every improved highway project is a complete street that truly serves all users.

Mr. Chairman and Members of the Committee, many new technologies and solutions will be presented as strategies for reducing greenhouse gas emissions and oil consumption. We support a full range of those strategies from congestion fighting to carbon taxes, from increased inner city and freight travel by train to road pricing. All of these have the potential to help shift travel to bicycling and walking, provided our two modes are considered from the outset.

I urge you not to overlook the simple tried and tested existing technologies of bicycling and walking. Unlike any of the other options presented to you as we move forward, these two options will not only tackle climate change and energy independence but will simultaneously address critical issues of obesity, physical inactivity, congestion and air quality. Thank you again for allowing me to be part of the hearing, and I hope you will consider some of our considerations.

Mr. OBERSTAR. Thank you very much. We certainly are going to consider and include those, especially the design guidance issue in the next iteration of the Surface Transportation Act. And we are also going to have a provision in the aviation bill to make parking for bicycles at airports an eligible item—not require it—but make it an eligible item so airport by airport can decide to build bicycling facilities. We have many instances of persons who want to commute to the airport, take their plane, but they have no place to leave their bike. And I think that everything we can do to encourage commuting by bicycle is a positive way forward for the country. I will not unfortunately be able to participate in the bike-to-work program on Friday. I did it last Saturday. I biked from Potomac down to the tidal basin, but the last 2 miles are way too dangerous to do it alone.

You need guidance to bike that last 2 miles up to Capitol Hill from down there. But unfortunately, I have to be on a trip to Canada.

Our next witness, Mr. Hall, general manager of engine technology from G E. And I greatly appreciate the work that GE has done. One of the first trips that our Ranking Member, Mr. Mica, took with me when I chaired the aviation Subcommittee was to Cincinnati to see the GE 90, which was then nearing its completion of development. It was the most advanced aircraft engine in the world at the time. Others have caught up since then.

But it was interesting to note that, 50 years earlier, GE had developed the first jet engine with a thousand pounds of thrust, and that day, we saw 90,000 pounds of thrust. Mr. Hall.

Mr. HALL. Thank you, Mr. Chairman, for inviting me to address the Committee. As executive leader of engine engineering for GE Transportation, I am responsible for, among other things, all phases of diesel engine development. GE Transportation is the world's leading manufacturer of diesel electric locomotives with more than 15,000 locomotives operating around the globe.

My testimony this morning will focus on two technologies that are being introduced right now for locomotives, hybrid technology and what we call trip optimizer, both of which will be beneficial for

reducing greenhouse gas emissions and increasing our energy independence. The first technology I would like to discuss, the hybrid locomotive, will be demonstrated for the first time later this month at a planned GE eco-imagination event in California.

We are all familiar with hybrids in the automotive context, but let me explain how it works for locomotives. All hybrid vehicles use some form of energy storage to recover energy that would otherwise be wasted. The difference between a car and a train however is that while a hybrid car can recover and store energy from a single vehicle, a hybrid locomotive has the potential to capture and store the energy from the hundreds of rail cars and thousands of tons of freight being pulled. Locomotives, like non-hybrid cars, use brakes to dissipate the energy of the moving vehicle by converting this emergency to heat and venting that heat to the atmosphere. GE's evolution hybrid is a modified version of our evolution locomotive that has the ability to store some of the energy generated during braking in a series of specially designed lead-free batteries. The evolution hybrid utilizes existing drive motors to convert this braking energy into electrical energy that is stored in the battery system. When needed, the batteries supply the locomotive with extra power that can then be used to reduce fuel consumption and reduce emissions.

So now, when the locomotive is traveling downhill, making sharp turns or slowing down for speed limits, the energy generated by braking will be stored in the battery and that power won't go to waste. This reduces the total power that needs to be generated by the diesel electric engine, saving on total fuel burn and emissions. The evolution hybrid can even use the batteries as the primary source of power to reduce emissions in restrictive zones.

In terms of carbon reduction, the evolution hybrid has the ability to reduce fuel consumption by 10 percent when compared to today's evolution locomotive. Using 10 percent less fuel directly reduces the emissions of carbon dioxide, NOX and particulate by 10 percent. If hybrid technology replaced 100 Tier 1 locomotives now in service over the next 10 years, it would save over 510,000 tons of carbon dioxide from being produced, equivalent to removing 8,900 cars annually or 89,000 cars over 10 years from our roads.

In terms of potential energy savings, if the evolution hybrid replaced 100 Tier 1 locomotives in service, it would save more than 45 millions gallons of fuel over next 10 years.

The second technology I would like to discuss is called trip optimizer. Trip optimizer is a locomotive control system enhancement that manages the speed and throttle settings to minimize fuel consumption taking into account the composition of the train, the terrain, track conditions, train dynamics and weather without negatively impacting the train's arrival time. Put simply, trip optimizer uses global positioning systems, or GPS, and forward-looking terrain mapping to plan a locomotive's trip, and it develops a recipe to minimize fuel usage and meet speed limits along the way. The recipe is constantly updated and gives the on-board crew a tool to manage the journey in a completely novel way, by allowing explicit trades between journey completion time and the fuel used as opposed to operating at or near the speed limit all the time.

In principle, trip optimizer could be applied to any engine and achieve a 10 percent fuel savings and a 10 percent reduction in carbon dioxide, NOX and particulate emissions. To give you a sense of the large potential benefits of this technology, applying trip optimizer to a single GE evolution locomotive would save 360 tons per year of carbon dioxide emissions and 32 gallons of fuel annually.

If this technology is installed on a thousand Tier 2 GE evolution locomotives in a given year, we have the possibility of 360,000 fewer tons of carbon dioxide emitted. These two technologies show that there are innovative solutions for our transportation systems that can achieve both the reduction in all emissions and the net savings in fuel. As this Committee considers climate change and energy independence, GE believes it is critical that government policies encourage innovations that save fuel and reduce emissions overall, taking into account traditional pollutants and carbon dioxide and, at a minimum, provide incentives to railroads that adopt such technologies and ensure that existing and future policies do not present obstacles to their introductions; on the contrary, policies should promote their development.

Mr. Chairman, again, thank you and the Members of the Committee for the opportunity to testify this morning.

Mr. OBERSTAR. Thank you, very much, Mr. Hall. We will come back to you in a little bit.

Mr. Rader, thank you also for being with us. We—I had the privilege of riding your rail car a few years ago in Colorado, and I was very impressed with the domestically developed technology and the smooth ride. It wasn't a very long ride, but it was a nice smooth ride. Thank you for being with us today.

Mr. RADER. Thank you, Mr. Chairman, and thank you for this invitation to discuss with your Committee the effects of global warning and the rail transit industry. I, like you, am old enough to remember magazine covers and numerous headlines proclaiming eternal winter and the coming ice age. Yet I think it is important to note that we don't necessarily have to accept all of the theories of global warming to realize that the time has come to redouble our efforts to reduce fossil fuel consumption and its consequent emissions. Furthermore, it is time to utilize all of the tools at hand to accomplish this goal.

The Congress of the United States and specifically your Committee can take several key steps towards significantly reducing the consumption of fossil fuel in our country by understanding and encouraging the utilization of technology that has been developed and tested during the last 4 years.

The ever-increasing cost of fossil fuels means that the cost of travel, and specifically commuting, is pushing more Americans to utilize more efficient forms of travel, including rail transit. This growth means that rail system capacities must rise and that rail systems, new rail systems, will be created.

You can ensure that these expanding and new systems contribute to the reduction in fossil fuel consumption and emissions by encouraging the use of newly demonstrated and efficient technologies like the modern clean diesel multiple unit train. When we study the benefits of that train, it becomes obvious why they are

so popular in Europe and elsewhere. When we compare the operation of DMUs to traditional locomotive haul trains using data from U.S. transit agencies, we get some astounding results that are quite relevant to the subject of today's hearings.

Mr. RADER. A clean diesel multiple unit train will produce a 50 percent reduction in fuel consumption, a 68 percent reduction in emissions, a 75 percent reduction in noise. It will reduce the operating costs of the train set by an amount equal to twice the capital cost of the train over its 30-year life.

These will all come at no increase in total capital cost to achieve the benefits. Therefore, the development of this technology and the manufacturer of DMUs in the U.S. to U.S. standards addresses many issues of importance to this Committee and to the U.S. citizenry as a whole.

First, it will contribute to energy security by reducing fuel consumption per passenger mile in rail transit by 50 percent or more. This is a conservation measure whose capital cost is self-liquidating over the life of the rail car.

Second, it will contribute to improved air quality by reducing engine exhaust emissions by 68 percent or more per passenger mile. The DMU could save thousands of pounds of emissions from entering our atmosphere.

Third, it will develop the U.S. technological know-how to produce more efficient products in the future.

Two years ago I testified that the principal reason that we had not enjoyed the benefits of DMUs in the United States was that there was no U.S.-owned manufacturer with the incentive to develop advanced cars for the nascent U.S. market; that in fact foreign manufacturers had brought their structurally noncompliant cars to the United States, demonstrated them, and then explained to us that we just needed to change our standards of strength and safety so that they could use their noncompliant cars. This campaign continues to this day.

Today I am pleased to report that due to the joint funding of the Federal Railroad Administration at the direction of Congress and the Florida Department of Transportation, clean diesel multiple unit technology trains are in use in south Florida and they are producing a savings of more than 50 percent in fuel per seat-mile and at least a 70 percent reduction in emissions per seat-mile compared to the locomotive haul technology that is also in service there.

How can this Committee ensure that expanding in new rail transit systems will use the best available technology to reduce fossil fuel consumption and emissions?

First, I think you can encourage the FTA to reward systems that reduce fossil fuel consumption and emissions by increasing the percentage match for those who meet such goals.

Second, you can work with other Committees of Congress to ensure that research and development tax credits continue to incentivize U.S. companies to develop advanced technologies that achieve your goals.

Third, continue to encourage and fund demonstration programs at the FRA and other agencies which get these new technologies into the field where they can be proven and subsequently adopted by agencies.

Thank you very much for this opportunity.

Mr. OBERSTAR. Again, thank you for your innovative work.

Now, Mr. Cohen, the Highway Users Alliance. I welcome your presentation. Thank you very much for being with us this morning.

Mr. COHEN. Thank you, Mr. Chairman, Mr. Duncan. I am honored to have the opportunity to present testimony on behalf of highway users on the subject of climate change and energy independence.

The Highway Users Alliance is an umbrella association that brings together the interests of various users of the highway modes that contribute to the highway trust fund, including AAA clubs, truckers, bus companies, RVers, motorcyclists, and a wide variety of businesses.

For 75 years we have worked closely with this Committee to advocate for highway bills and to promote a strong and trustworthy highway trust fund.

My written testimony contains more information on what individual highway users can do to reduce their greenhouse gas emissions and fuel usage. It also discusses legislation under consideration in other Committees and how this Committee might weigh in, particularly on how to protect the trust fund under legislation to increase alternate fuels or to tax or cap carbon.

The good news is the Transportation and Infrastructure Committee is capable of taking the lead to reduce mobile greenhouse gases, minimize wasted fuel, and grow the economy and increase America's global competitiveness. The key to this success is what I call a ″war on congestion.″ congestion is not inevitable; it can be reversed. As our current honorary chairman and former Secretary of Transportation Norm Mineta says, it is not a scientific mystery, it is not a fact of life, nor is it an uncontrollable force.

Congestion results from poor public policy choices and a failure to separate solutions that work and that are effective from those that are not. Fighting congestion also happens to be the most realistic and effective way to decrease pollution, greenhouse gas emissions, and wasted fuel. That is because Americans overwhelmingly choose to travel by highway, shippers overwhelmingly choose to move freight by truck, and both will continue to do so, barring some economic collapse or massive contraction.

To this end, this Committee should authorize a comprehensive data-driven national congestion relief program. Frankly, it is surprising that a data-driven program of this type doesn't currently exist. We believe a core congestion relief plan would greatly reduce lagging support for the Federal Aid Highway Program and may even increase support for raising user fees to keep the program solvent and growing.

Like the new data-driven Highway Safety Improvement Program authorized under SAFETEA-LU, a core performance-based congestion relief program would be a revolutionary advancement in the Federal program.

Removing the Nation's worse bottlenecks. Bottlenecks are locations where highway demand exceeds capacity, and they represent about half of total congestion in this country. Improving the worst 203 bottlenecks, those with more than 700,000 hours of delay, would reduce carbon dioxide emissions by an astounding 390 mil-

lion tons over 20 years, even after accounting for the increased emissions during construction.

On average, carbon dioxide emissions and fuel usage at the worst bottlenecks would drop by a remarkable 77.2 percent, and over 20 years the amount of fuel saved would be more than 40 billion gallons; 48 billion vehicle hours of wasted time would be saved as well, along with over 220,000 injuries that would be avoided, and $470 billion in economic benefits that could be realized.

The other 50 percent of congestion is really due to nonrecurring delays. These are delays caused by incidents on the road, or weather, and they can be addressed through increased support for operations planning, particularly intelligent transportation systems investments, the next generation of vehicle infrastructure integration, which will allow cars and roads to communicate to divert traffic around congested sites. And I hope the Transportation and Infrastructure Committee will continue to significantly support these programs.

I would like to briefly talk about the pitfalls I hope the Committee will avoid. Unfortunately, it is a popular notion that reducing highway use is realistic and an advisable approach to reducing greenhouse gas emissions and saving fuel. Some advocates of this approach even promote punitive measures that create financial and time burdens, punishing highway users so that driving becomes more costly or congestion more severe. The goal is to force drivers to give up their cars and reduce their driving, but these approaches include diversion of dwindling supplies of highway user fees to off-highway purposes, congestion pricing, tolling, and opposition to new highway projects that add capacity.

We contend that these so-called solutions are not only unlikely to succeed, but actually will damage the environment as well as the economy, despite the goal of protecting the environment, and that these programs are particularly damaging to working-class and disadvantaged populations because, as the DLC study on welfare to work has shown, in most cases the shortest distance between a poor person and a job is along a line driven in a car.

America's highway users are ready to help. We want to reduce greenhouse gas emissions, prevent wasted fuel, we want to be part of the solution and we stand particularly ready to support congressional action to comprehensively fight traffic congestion. We believe this is the most realistic way to solve the problem. This approach is also one of the few direct actions Congress can take to reduce energy use and provide enormous benefits to drivers, consumers and the economy. Other approaches need to be considered carefully, but we ask that you really reject the punitive measures that highway users should be punished for driving or that highway user fees should be diverted from desperately needed projects.

As every Member of this Committee knows, those road needs are overwhelming. Thank you for the opportunity to be here.

Mr. OBERSTAR. Thank you, Mr. Cohen. I will take your concerns into very serious consideration, as we are doing, and of course the hearings that Mr. DeFazio chaired in the hearings he is conducting as we prepare for the next authorization.

I have a number of questions for each of the witnesses. We have a vote and there are minutes remaining. That is not so important

as there are 165 Members who haven't voted yet. My rule of thumb is when it gets down to 100, then I leave my office for the House floor and I can make it in time for that vote.

Mr. Lash, I want you to mull some of the thoughts that I began my statement with. The obvious things that are happening in the environment around us, the Arctic snow reflects sun, that it has a huge effect on heating of the sea. If you have snow-covered ice, it reflects 80 percent of the sun's energy. Bare ice reflects 65 percent of the sun's energy. Melt ponds, only 35 percent. Open water reflects less than 7 percent of the sun. And then you begin to absorb, and the water begins to absorb the sun's energy; 93 percent absorption, that means the water is warming, the Arctic is warming, ice is melting, sea levels are rising. Dramatic, maybe irreversible, changes happening in that environment that affect the entire world.

I want you to think about that. I am going to come back right after this.

[Recess.]

Mr. OBERSTAR. The Subcommittee will resume its sitting, and when we left for the votes I propounded some thoughts for Jonathan Lash. Would you like to respond?

Mr. LASH. Thank you, Mr. Chairman.

The short answer to what you were saying is ″yes.″ the Chair was describing what the scientists call the albedo affect. If you lose the reflective power of snow and ice, the warming goes more quickly; particularly when you are talking about sea ice, it is a profound change, and that is going very rapidly.

It is one of a number of mechanisms where the effect of warming creates a feedback that accelerates the warming. It is like the melting of the tundra releasing methane. Methane is a greenhouse gas, so that in turn accelerates the warming. There is a whole set of physical mechanisms like that which scientists are concerned become much more serious at about 2 centigrade warming, so there is a consensus building that we ought to stop at 2 degrees centigrade. If we want to do that, that means we have to start thinking about reducing U.S. emissions by 60 to 80 percent in the next 30 to 40 years. It is a big task. We need to start.

Mr. OBERSTAR. Now, the scientific environment in which we discussed this question of global climate change has with several international groups created a body of knowledge or developed a body of knowledge based on evidence from Greenland ice cores, not just a little scoop, but cores 2 miles deep. These go back hundreds of thousands of years.

Last week at the opening of our hearing, I cited the work of Dr. Wallace Broker at Columbia University on the great ocean circulating current commonly known as the conveyor belt, which starts with a cold—I don't need to lecture Mr. Lash about this but I will just regroup the issue—and that starts in the Arctic with dense cold water with high salinity content, and as it travels down past the coast of North and South America, travels into the Southern Pacific and through the Philippines and moves back, it loses its salinity, loses some of the cold water, tempers the Pacific Ocean, a vast river of water equal to the flow of all the rivers of the world

or all the rainfall of the entire globe on any given day measured in drip units.

Then it brings that warmer water back, and, with a much more powerful effect on climate than the gulf stream, warms the British Isles and the European continent. Every 100,000 years or so, something has happened to the great ocean circulating current.

Milutin Milankovich, the Serbian mathematician of the late 19th century, postulated that there is a tilt of the Earth's inclination of less than one-half of 1 degree that occurs in that period of time, and possibly linked Scottish scientists to the bulging of the ocean at the Equator due to warming. The ocean expands, tilts, globe tilts, and then something happens, conveyor belt shuts down, and we have an Ice Age. Just the opposite of what people think about climate change, but over long periods of time.

What are your thoughts about the direction in which climate change is taking us?

Mr. LASH. Just to build on what the Chair said, the concern is that the natural process that has led to the great ocean conveyor shutting down could be replicated by the human-driven process of warming. And if you create melting of the Greenland ice sheet, you have fresh water coming down and diluting the very saline water. You have most warm air crossing the Greenland ice sheet and changing conditions above that northern ocean, and you stop this huge flow of water dropping down from the surface to 10,000 feet deep and that the conveyor might stop, and in historic terms it hasn't stopped over a period of 500 years, it stopped over a couple of years. So it is quite sudden.

There was just a major study released earlier this week in which scientists concluded that the pace of warming is warming northern Europe so fast that that is likely to largely offset the loss of warmth if the great ocean conveyor stops. So that rather than Europe going into an ironic deep freeze when the rest of the world is getting hot, you will have somewhat of a more balanced process.

But that doesn't mean it is not important. What we are talking about is one of the three or four major drivers of weather systems on Earth, and of biologic systems, and we have no idea what the consequences are of stopping that.

Mr. OBERSTAR. The question, then, I pose is these great long-lasting forces in Earth processes, climate rather than weather, are difficult to slow down and to turn around. Unless there is some way of extracting carbon from the atmosphere, it is going to be there for a very long period of time, and the urgency of action is for us to deal with it now to moderate over a long period of time the presence of carbon. Is that right?

Mr. LASH. That is absolutely right. The weather conditions that we are experiencing today are the result of decisions that were made a generation or two ago. The decisions we are making today won't affect us, they will affect our children and their children. The weather system has so much momentum that if we stabilized the concentrations of greenhouse gases in the atmosphere tomorrow morning, the temperature would go on rising for 30, 40, 50 years, and ocean temperatures and the expansion of the ocean would go on for longer than that.

This is a very big system and it is going to turn around very slowly, but we are accelerating in the wrong direction.

Mr. OBERSTAR. Thank you. Sobering thoughts for all of us why actions we take now will either benefit the next two generations or adversely affect them.

Mr. Millar, that comes to you. I had, how shall I say, a positive experience, pleasure of riding a hydrogen bus in Santa Barbara a few years ago as a result of legislation that I included in ISTEA in 1991 to stimulate the production of fuel cell buses. It took a decade to develop, put on the road, but it actually was operating. They pulled it out of service now.

What is the future of hydrogen buses, electric buses, which I also rode in Santa Barbara? I saw that they could climb hills just as smooth with a development of power as conventional bus service. You have testified to, and I have cited those numbers many times, that transit use is growing faster than population, much faster than population, two or three times faster than the population growth. So what is the future for alternative fuel bus services?

Mr. MILLAR. Certainly bright. Let me give you a baseline as I understand it now. Almost 20 percent of the urban transit buses that are in service at the moment are alternately fueled or hybrid buses. 35 to 40 percent of the buses that are on order are also in those categories as well. So we are clearly heading to a situation that, in very short order, more than 50 percent of the transit buses will be alternately fueled or powered.

When you look at a specific technology, for example, the fuel cell, for the last 15 years or so it has always been that we have been 7 years away from that becoming common. I sit here today to tell you we are at least 7 years away, still. It hasn't gelled yet. But there are a number of cities—at the moment, the Coachella Valley, Palm Springs area of California is probably the lead in that area. But AC transit on the east bay of the San Francisco Bay area is experimenting with that. Others in the California area are as well.

So I think it is still going to take a while. It does appear that the hybrid technology is a good interim step. We are getting significant savings in pollutants, greenhouse gas emissions. We are getting remarkable increases in energy efficiency out of it, doubling and tripling.

So I would say we are making steady progress and improvement in those areas.

Mr. OBERSTAR. Thank you very much. I will have other questions. The gentleman from Tennessee, Mr. Duncan.

Mr. DUNCAN. Thank you, Mr. Chairman.

First let me compliment you for putting together a series of very important hearings about this very important problem. I told you earlier that I was pleased at how balanced the panels have been, first having in the hearing last Friday the top government officials, and now having witnesses from business, from industry associations, from environmental groups.

I want to compliment the witnesses not only for very informative and helpful testimony, but also because the common theme here of this panel—and I assume the panels to follow—is that all of these people seem to be doing everything they reasonably can to help out in this situation or help combat this problem.

I do think that our best hope in combating global warming is to rely primarily on the free enterprise, free market system, because the worst polluters in the world have been the socialist and communist countries. And only in a free-enterprise, free-market system do you generate the excess funds to do the good things for the environment that everybody wants done. And one danger that we need to recognize is we don't want to overregulate our economy in an overreaction to global warming so that we end up causing more harm to the environment than good that we do. I have noticed that some people who believe so strongly that global warming is the top problem, they become very angry, in fact hateful at times, about people who even dare to question them.

So I want to express, I want to try to explain, the Chairman very wisely did not have opening statements except by him and the Ranking Member because he wanted to get to the witnesses, so I am going to use my time to express a few thoughts and concerns, as I have already done.

I am going to read some quotes here that I think might help explain why some of us on our side are a little bit skeptical at times on some of this global warming/climate change issue.

Richard Lindzen, who is a professor of atmospheric science at MIT, a few months ago wrote in the Wall Street Journal about what he called the alarmism and feeding frenzy surrounding the climate change/global warming debate. And he said this, quote: But there is a more sinister side to this feeding frenzy. Scientists who dissent from the alarmism have seen their grant funds disappear, their work derided and themselves libeled as industry stooges, scientific hacks, or worse. Consequently, lies about climate change gain credence even when they fly in the face of the science that supposedly is their basis.

Professor David Deming, a geophysist, said, quote: The media hysteria on global warming has been generated by journalists who don't understand the provisional and uncertain nature of scientific knowledge. Science changes.

Robert Bradley, president of the Institute for Energy Research wrote in the Washington Times, quote: The emotional politicized debate over global warming has produced a ″fire, ready, aim″ mentality, despite great and still growing scientific uncertainty about the problem.

And he went on to say, quote: Still, climate alarmists demand a multitude of do-somethings to address the problem they are sure exists and is solvable. They pronounce the debate over in their favor and call their critics names such as deniers, as in Holocaust deniers. This has created a bad climate for scientific research and for policymaking. In fact, the debate is more than unsettled.

So I use those quotes just to show why there is still some uncertainty and some concern about this,, and I do appreciate—I will say once again—I think the balance that the Chairman is attempting to approach this issue. I think we probably need to do as much as we can on this. On the other hand, we don't need extremism on this issue, we need balance and common sense.

Some places global warming is apparently a really bad, maybe even terrible thing. Some places it may even be a good thing. Georgianne Geyer, a nationally syndicated columnist, wrote a few

days ago—she said at one point in this column: In short, what they are talking about, still privately for the most part, is the idea that as the world continues to warm and the melting ice here bares secrets long held, underneath Greenland's huge mass could house gold, diamonds, even oil. The long dreamed-of Arctic route from Europe and Russia to the American continent and beyond could become a reality.

She gave many other examples that I won't go into at this time.

I think that we have had a very reasonable and fair hearing so far, and I appreciate the testimony of the witnesses. And I guess I will come to questions, get to questions on my second opportunity. Thank you, Mr. Chairman.

Mr. OBERSTAR. Thank you very much for your always judicious and thoughtful remarks.

I emphasize once again what we are seeking as we move to craft our part of what will be an energy package, we are looking at practical things that are within reach, that are doable now, using technology that has been demonstrated that in each piece can make a reasonable contribution to slowing down the emission of carbon into the atmosphere.

I appreciate the gentleman's observations on that, that we have balance and common sense. I am seeking that.

Mr. DUNCAN. Will the gentleman yield for a moment?

Mr. OBERSTAR. I certainly do.

Mr. DUNCAN. I think that this Committee has done more than almost any other Committee in the Congress in helping to improve the environment by attempting to relieve congestion and also to encourage energy efficiency in this very big and growing and important segment of our economy. So I appreciate the work that you have done and this Committee has done on this issue in the past, far more than of most other Committees in the Congress.

Mr. OBERSTAR. I agree with that. In the last 12 years, in a very bipartisan way, we have moved very good legislation.

The gentleman from New York, Mr. Bishop.

Mr. BISHOP. Thank you, Mr. Chairman. I apologize for coming in late.

The President's budget request for fiscal 2008, if I remember correctly, cut funding for transit programs by $200 million from what would have been authorized and what hopefully will still be authorized under SAFETEA- LU.

I guess, Mr. Millar, this question is for you: What does that tell you about the administration's commitment to seeing transit as a means of dealing with the issue of dependence on foreign oil and on global climate change?

Mr. MILLAR. The President's budget would underfund SAFETEA-LU guarantees by $309 million; 300 million of that would come out of the so-called new starts and small starts programs. Those are the parts of the Federal program that lead to the expansion and extension of public transit systems.

We have argued consistently that now is not the time to cut back on Federal investment. I mentioned in my testimony that private investment that was made in Boston and in New York more than 100 years ago in the subway system is still giving benefit.

So to perhaps achieve some short-term budgetary goals, we are sacrificing the long-term needs of the country if we take that approach.

Mr. BISHOP. Thank you for that. I am pleased to observe that the budget resolution that the House passed, and hopefully will prevail in the conference report, carries forward SAFETEA-LU funding at the authorized level for fiscal 2008. Hopefully we will be moving in the right direction there.

Mr. Hamberger, if I may, the percentage improvement in fuel efficiency that the railroad industry has realized is very impressive, 80 percent over the last 20 some years. What lessons are there for other industries—I mean for the airline industry, for the automobile industry? Are there any lessons, any best practices that can be derived from your success that could be applied to other industries?

Mr. HAMBERGER. I appreciate that question. I wish I had a better answer. I think it not so much of a silver bullet as really working across all aspects of the industry and in conjunction and cooperation with the manufacturers who produce the locomotives and also with the freight car manufacturers who are helping to design better cars so that they are more aerodynamic, have less drag as they go along the rail. We have top-of-rail lubrication to cut down on friction, operating practices for the engineers to get the optimum use.

So it is really a combination of factors and it is clearly something that we focus on. It is the second to the largest variable cost next to labor for the industry. So it is, I guess, a commitment to try and improve the fuel efficiency that would be, I guess, the overarching lesson.

Mr. BISHOP. Thank you very much. One more question for Mr. Hall. The evolution hybrid locomotive which seems to hold great promise for the future, your projection is that approximately 10 percent—it will become approximately 10 percent of the annual locomotive market. Why not more? Just seems like such great technology. Is that just a very conservative estimate?

Mr. HALL. Yes, Congressman. We really input that as a conservative estimate at this point. Feedback from customers, there is a lot of interest, but we don't know exactly what the total sales projection would be.

Mr. BISHOP. But you are prepared to meet whatever the market might demand?

Mr. HALL. Absolutely.

Mr. BISHOP. Thank you. Mr. Chairman, thank you. I yield back.

Mr. OBERSTAR. Thank the gentleman. The gentleman from Maryland, Mr. Gilchrest.

Mr. GILCHREST. Thank you very much, Mr. Chairman.

Mr. OBERSTAR. Resident biologist.

Mr. GILCHREST. Resident wannabe biologist. Don't have a degree. Had a couple classes in college but just enjoy nature's design.

Mr. Lash, can you describe the difference between the ability of a carbon tax and a cap-and-trade to address our need to reduce greenhouse gases and what the costs and benefits of each are, in your view?

Mr. LASH. Thank you, Congressman. I will take a crack at it. I will also supply you with a study that we did with Brookings, looking at some of those questions.

The economists love the idea of a carbon tax because of its simplicity. It applies throughout the economy. It sends the economic signal of the importance of being more efficient in our use of energy throughout the economy with complete even-handedness. Very simple to administer and it generates a source of revenues which you can either use to lower other taxes or to invest in technologies. The difficulty with a carbon tax is you set a particular level of tax and then you get only as much reduction in CO2 emissions as the economy gives you back.

A cap-and-trade system, you set a particular level of emissions and you know you will get that level of reduction.

That is what you did with sulfur dioxide. You said we are going to make a 50 percent reduction; you knew you would get a 50 percent reduction. You allowed trading between sources of sulfur dioxide in order to reduce the costs.

The difficulty with a cap-and-trade system is it is very difficult to apply it throughout the economy. You can't apply it to every source. You have to choose larger sources for simplicity of administration, and you don't have a guarantee about what the costs will be before you start.

The group of companies that we worked with, the United States Climate Action Partnership, ended up recommending a cap-and-trade system because they feel that it is important to send the economy a big signal about changing technologies immediately. They want to know that they have to achieve certain levels of reduction because they are making billion-dollar investments in new technology.

Mr. GILCHREST. So a CAP agrees that if the government sets the target, sets the goal, which is to set the cap, then the market—if the program was structured appropriately, then the market would set the price for the greenhouse gases.

Mr. LASH. That is correct. You have the model of the sulfur dioxide program that you enacted in 1990. Very successful. The cost of a ton of sulfur dioxide, the cost of a ton of reduction for that program was predicted to be $1,600. Very expensive.

Mr. GILCHREST. Given the fact—I guess we will come back, but we are running out of time for probably this silly vote, Mr. Chairman—but given this is going to be economy-wide, going to deal with every single sector to one extent or another about the reduction of emissions, and given sulfur dioxide I think dealt with about 1,000 power plants, is there any way to predict in advance what the cost of a ton of CO2 is going to be?

Mr. LASH. There are many models that are making predictions of the cost but I wouldn't want to rely on any of them. I think there are programs you could enact that would enable you to test the price.

Mr. GILCHREST. Do you think it is an essential part of the process we go through here to develop a cap-and-trade program to have some idea of the cost of a ton of CO2?

Mr. LASH. Yes, I think you need to talk to a range of economists, they will give you a range of prices. You need to recognize that

none of us can be certain about it. I personally would not support some of the measures that are proposed; to have a safety valve, to say if the cost of a ton of CO2 goes above $10, that you add extra credits in, because I think that undermines the environmental effect of the cap.

Mr. GILCHREST. I see. Mr. Chairman, I guess when we come back we can pursue other questions.

Mr. OBERSTAR. We have a quorum call in progress now, with 6 minutes remaining. It is a most unusual occurrence. We haven't had a quorum call in years on the House floor. It is like taking attendance in grade school.

We will stand in recess and Ms. Napolitano will be next.

[Recess.]

Mr. OBERSTAR. With apologies to the present and future witnesses, Subcommittee will resume its hearing. It will be rather unpredictable this afternoon. Challenges on the floor. But we will do our best to persevere. The gentlewoman from Texas, Ms. Johnson.

Ms. JOHNSON OF TEXAS. Thank you very much, Mr. Chairman, and thank you very much for your leadership in holding these hearings.

This is a very important topic today, and as a representative from the State of Texas, I know a lot about energy, and I know a lot about extreme weather. And I know that the way we use energy and the types of energy that we use is going to have to change or else the weather is going to get worse for a whole lot of people.

In 2005, a series of powerful hurricanes hit the United States. One of the most powerful of these was hurricane Rita. It crossed into southeastern Texas on September the 24th and wiped out a number of coastal communities, took the lives of many and caused over $11 billion in damages. Over 1 million people were forced to evacuate in the path of the storm. Costly and dangerous storms like Rita are what we might expect more frequently in the warming world.

In other parts of Texas, we will face increased water shortages and droughts. Flash floods will be more frequent and tropical disease, such as malaria, may become more frequent as a warmer climate moves north.

Contrary to what many might think, the State of Texas has actually been a leader when it comes to addressing climate change. The State government realizes the close connection between energy use and greenhouse gas emissions. As a result, Texas has among the more forward-thinking energy policies in the country.

In 1999, the Texas Public Utilities Regulatory Act was passed, and this law required Texas to increase its use of renewable energy sources that do not generate greenhouse gases. As a result, Texas has been on a rush to generate wind power; 3 to 4 percent of Texas's energy needs are expected to come from wind in 2010, up from less than 1 percent in 1999.

The irony of this Texas policy is that it was signed into law by then Governor Bush. Unfortunately, the President has not been quite as forward thinking over the past 6.5 years in Washington. As a result, it is now time for us, the Congress, to step in and take action on the very important issues of climate and energy. I look

forward to working with the Chairman, to moving forward on this point and with this Committee.

Today's hearing will be valuable as the witnesses will provide us with numerous suggestions of proposals to increase our energy independence while at the same time decreasing the Nation's greenhouse gas emissions. I look forward to hearing the testimony. Thank you.

I am sorry, Mr. Chairman I guess I was supposed to ask a question following my statement.

This is to Mr. Lash. Given the abundance of coal in the United States, what are the negative ramifications of liquid coal as a fuel source?

Mr. LASH. The use of coal to make liquid fuels is not new. Germany did it in World War II. Switzerland did it in World War II. South Africa did it when they were isolated. It takes significant energy to turn coal into liquid fuel. The use of that energy creates additional CO2 emissions. So if you dig coal, make it into liquid fuel, you create CO2 emissions when you are converting it and then again when it is burned in an engine to drive a car or a truck.

It is possible to capture the CO2 from the conversion of coal to liquids and store it underground, a technology which has been demonstrated but not in commercial scale, but at considerable cost. Then what you would end up with is the equivalent of very, very expensive gasoline.

Ms. JOHNSON OF TEXAS. More expensive than we have now?

Mr. LASH. Oh, yes, ma'am.

Ms. JOHNSON OF TEXAS. Thank you.

Thank you, Mr. Chairman.

Mr. OBERSTAR. The gentleman from Illinois, Mr. Lipinski.

Mr. LIPINSKI. Thank you, Mr. Chairman. The witnesses have been here for a long time. I thank you for your testimony. I will make this relatively short. I know that there certainly are benefits that rail does show in terms of reducing energy usage, but I think public transportation is probably the most useful place that we can make real changes to conserve energy and reduce greenhouse gases.

I want to focus, especially during the bike-to-work week, Mr. Clarke, I am also a, I am a member of the LAB, and you know, I want to thank the Chairman for all the work that he has done on trying to move us forward in allowing people to use their bikes to get around, to get to work. You know it can make a big difference. So many of the trips that we make are such short distances, and they certainly can be done on a bike.

Unfortunately, go over to Europe and also in Asia and you see the tremendous usage of bikes for transportation is very, very common.

I have real questions about how much—how far we can actually get in doing this. Certainly, we can do a lot more than we have, and what Chairman Oberstar has been able to get into transportation bills, including SAFETEA-LU, if we can get more money appropriated, certainly that will be very helpful.

But one thing I just want to pick out from your testimony here, you are saying that Congress should direct GSA to make Federal Government a model employer in promoting bicycling and walking

to work. How exactly do you see that being done? Because I think that, in a lot of ways, the government needs to be a leader when we are talking about changes that we can make to impact energy usage. But I want to—I wanted to hear what you specifically think can be done by the GSA.

Mr. CLARKE. Thank you for the question. There are numerous examples of corporations across the country that have tried a variety of different techniques to encourage people to ride their bikes to and from work. They range from simply providing decent bicycle parking, showers, locking, changing facilities, to going much further and providing mentoring programs, credit for someone to buy a bike, route mapping and assistance in finding routes to help people take routes to and from work, to improving the physical infrastructure around the workplace, to improve acces by putting in bike lanes and trails and working with the local community to do that, to providing fleets of bicycles on larger campuses and work sites so people can better travel in and between buildings in a campus setting.

So there is a range of different incentives, different infrastructure, different promotional programs and even tax incentives that are available to encourage people to at least occasionally ride to work.

Mr. LIPINSKI. Do you have any studies that you have commissioned or that you know what the cost would be, that you think would be associated with GSA doing some of these things?

Mr. CLARKE. It would very much depend on the scale, and I think you would have to begin by finding that out, as has been done through a program called the Travel Smart Program, which is an individualized marketing program that first asks people realistically what percentage of the workforce lives and works within a reasonable cycling distance, what needs they have for carrying things to and from work that might preclude them from riding. But once you have found a population that can feasibly switch to a bike, you have a better sense of what kind of investment will be necessary.

The cost of a bike parking rack is $75. Simply putting in a few of those in most work places would be an enormous step forward. If every post office in the country had good bike parking and a good bike access to and from, it would go a long way towards enabling people to make those kinds of errands and trips by bike. So it does not have to be a very expensive endeavor. There are communities that require new buildings as they are developed to accommodate cyclists and also runners and other people taking exercise with showers and lockers and changing facilities. That is something which can be done up front in the cost of a new building in the development code that would be very forward thinking.

Mr. LIPINSKI. Thank you. I know there was an issue in Minneapolis airport about someone who rode their bike there and didn't have a place to put it and winded up getting it taken away. Simple things can make a difference. Thank you.

Mr. CLARKE. I think the Chairman knows that story very well.

Mr. OBERSTAR. Not only that, the traveler came back to find his bike cut in pieces. So I mobilized the bicycling community in Minneapolis to repair the bike, restore it to its original condition. He

got a new bicycle seat and other new parts for the bike and that is where the idea for bicycle parking facilities authorized in the next FAA authorization has come from. Here is this guy trying to do the right thing. He rides to the airport at 3 o'clock in the morning when there is no transit. Come on. Let's do the right thing.

Ms. Napolitano, we do have a vote on the floor, but we have plenty of time—not a vote. It is a quorum call. A nuisance action. Ms. Napolitano.

Ms. NAPOLITANO. Thank you, Mr. Chairman, and I am glad to see the diversity in the panels. And I have about 100 questions, and I am only going to be able to ask 1 or 2. As I have said before and during comments in this Committee, I have one of the most used quarters in my area. Pollution to me is an every day life. I have the City of Pico Rivera who not too long ago was the number one polluted city in the whole State of California, so I understand the pollution. And I have been trying to figure out how do we incentivize more trucks to change into diesel or the mechanism to allow for less production of pollutants.

One of the things, the statement that I want to make is that during the Olympics in Los Angeles, the Ford Motor Company I was employed by went to nighttime delivery. Works well. They are still using it. Why are we not incentivizing some of the companies to look at other alternative methods besides, as we well know, daytime, the sunlight causes for pollutants? Why not incentivize telecommuting? People have computers. Why aren't we looking at all of the other solutions besides the normal ones we can think of?

I would love to see all the three big manufacturers of automobiles in California go to hybrid. They haven't. We should be able to incentivize those companies to produce hybrids so that we can cut that pollution. And then California had a program not too long ago, about 10 years ago, where we paid for old cars so that they wouldn't pollute. I forget what the amount was, $1,000, I can't remember, old vehicles.

All of the other things that we know can help, what is it that collectively you can suggest besides what we have been discussing, all the different things, railroad, going to newer diesel burning engines, more effective? All those things that we talk about, what else can we do to be able to ask the Federal Government to participate, whether it is GSA or anybody else, Federal agencies that have a part in this, what can we do collectively? Anybody.

Mr. MILLAR. Certainly, in my testimony, I talked about many things. We can certainly use the Tax Code to incentivize. We can take the unfairness out where free parking gets a larger tax break than if someone uses transit, and if they use bicycles, they don't get any break at all. So there is certainly a matter of leveling the field. We need to expand options for people. People can't use what they don't have, so we need to make sure that we fully fund the transit program, go beyond fully funding if we can and make sure that communities are able to expand their systems.

We need to do things like the President has proposed to encourage buying of hybrid buses, the waiving of certain local match requirements. Well, that is fine as far as it goes, but with a limited amount of money, it actually decreases the amount of total money State, Federal, local that gets invested. So setting up a new pro-

gram that encourages people to buy new hybrids, companies to buy new hybrid buses for example and pay for it, doesn't require a local match. Those kind of things.

Ms. NAPOLITANO. Anybody else? Mr. Rader.

Mr. RADER. Yes, I think the local match problem is a very serious problem and one that needs to be addressed. I think, most importantly, FTA issues funding today without any consideration about whether or not the vehicle being purchased is fuel efficient, whether or not—they measure in great detail the return on the investment, the numbers of riders, and nowhere in the formula is how much fuel is this going to burn over the next 30 years? What is the payback? I think that is something we need to get in, and we will have an immediate effect.

In the City of Los Angeles, something like 50 percent of the commuter trains are 3 bilevel cars and a 275,000 pound locomotive. Appropriate technology would cut the fuel burned by 60 percent and would cut the emissions by nearly 70 percent, by just going to appropriate technology that is available today, for those half of the trains that are just three cars and locomotive. So there are a lot of things we can do in I think the very short term, and it doesn't take 20 years to fix that. Those locomotives are going to come up for a rebuild. Put appropriate technology in.

Ms. NAPOLITANO. And incentivze to be able to purchase them.

Mr. RADER. Absolutely, absolutely and another thing, when we are looking at new starts, we are forever being inquired of by people who want to do new starts. Could we lease equipment? Well, in today's environment, there is no incentive to lease. There is no incentive for a private company to come out and lease, and when they are competing with FTA funding for expansion, the answer is, no, you can't afford to lease. If we could come up with a proper tax program that puts some incentive for private people to supply equipment into this market and help supplement the new starts market, I think we could go a long way with lease equipment and Tax Code and FTA problem.

Ms. NAPOLITANO. Are you suggesting that maybe we have a specific bill to address incentives to be able to achieve what we are all looking for?

Mr. RADER. I think that would certainly be one way to do it, yes, ma'am. I think the other might be to simply incorporate it into some of the new authorizing legislation as we are moving forward. Either one. My concern about the latter is that it gets so big, we don't get anywhere; whereas if we can do it a little piece at a time, we can get there quicker because we can get general agreement across the board on it.

Ms. NAPOLITANO. Thank you, Mr. Chairman, and I would like to submit some questions for the record.

Mr. OBERSTAR. Without objection, questions will be submitted for the record and let me ask the witness to respond. We have 4-plus minutes remaining.

Mr. Gilchrest, do you have some questions you would like to ask at this point? There are 324 Members who have not, quote, voted.

Mr. GILCHREST. I like your calculations, Mr. Chairman. Yes, sir, I have a couple of questions if I could get them through.

Mr. Millar, I was talking to Mr. Lash about a cap-and-trade versus a carbon tax on reducing greenhouse gas overall in a pretty wide-ranging economy-wide program. And I think I am beginning to hear that a cap-and-trade program, as opposed to the carbon tax, is something that, if the Federal Government sets the goal, the market could adjust to a mechanism that was appropriate.

Can you give me some idea of how you think a cap-and-trade program would affect the transportation industry and how could we best—or you best—or all of us best position a cap-and-trade program to benefit the transportation system?

Mr. MILLAR. First, let me state, I am not expert on cap-and-trade, but I am rapidly learning about it. And we do believe that cap-and-trade has a very significant place in reducing greenhouse gas emissions. We think public transit services, which already are energy and greenhouse gas efficient compared to private automobiles, should participate in that. We think that the cap-and-trade could be a source of money, private sector money, that would be put into investing in public transportation, into encouraging people to use public transportation, thus by saving even additional energy and greenhouse gas emissions. We are working right now a report I hope I can make available to the Committee by midsummer that is going to examine some of those issues that relate specifically to public transit. But we think there is a lot of good there, and we are strong supporters of it.

Mr. GILCHREST. That same investment in public transportation—could that be an investment to the automobile industry to create better gas mileage, hybrid cars, those kinds of things?

Mr. MILLAR. Again, I am certainly not an expert on all the extent of it, but it would certainly seem reasonable, what you said.

Mr. GILCHREST. Thank you, very much.

Mr. OBERSTAR. The Committee—are there any witnesses at the table who need to leave for some urgent purpose, like eating or—I know Mr. Duncan has some questions that he wants to pose. And I have just a few sort of bullet points to establish for the record. And I do want to say, these are important because we are going to fashion, in the end of this month and month of June, our portion of the energy package that the House leadership is bringing together across Committee lines, and so all of your comments and those of last week are very important for us as we move forward. The Committee will stand in recess.

[Recess.]

Mr. OBERSTAR. Subcommittee will resume sitting, and Mr. Duncan is next.

Mr. DUNCAN. Well, thank you, Mr. Chairman, and I know you want to get on with the other panel, so I will just be very brief, but the staff has asked that I ask unanimous consent that they be permitted to submit their questions to all the witnesses following this hearing.

Mr. OBERSTAR. Without objection, so ordered.

Mr. DUNCAN. All right, Hamberger, I have heard at times in the past that most of your, or some of, your members use a billion dollars or more fuel or oil in a year. And I just wondered, how much oil or how much fuel are they using now typically on average, and how does that compare say to 10 years ago?

Mr. HAMBERGER. Thank you, Mr. Duncan, the best information I have is that, in 2005, we burned 4.2 billion gallons of fuel. I believe that is more than the United States Navy. It is the second, as I said, the second largest variable cost for the industry. And as my testimony pointed out, if we had not made the progress that we have since 1980, we would have been burning an additional 3.3 billion gallons of fuel in 2005—I am sorry, that is 2006—I correct myself, not 2005; that is 2006 we would have burned an additional 3.3 billion gallons of fuel.

Mr. DUNCAN. An additional 3.3 billion, and I assume that you are carrying much more tonnage now than you were in 1980 or——

Mr. HAMBERGER. Absolutely correct, 2006 was the record year for freight.

Mr. DUNCAN. So you are carrying much more tonnage or much more in goods for really quite a reduction in energy costs.

Mr. Cohen, what difference do you think it would make if the Congress was able to change some of the CMAQ eligibility rules so they could apply to highway capacity projects? Many of the traditional highway projects are not eligible for CMAQ funding.

Mr. COHEN. That is right. Currently, the CMAQ program does not allow highway capacity outside of HOV lanes to be eligible. I believe HOV lanes are eligible under CMAQ. The congestion relief program that I would envision would allow full eligibility for anything, whether it be a highway investment, a transit investment, road building or an ITS, but that would be a performance-based program in which in order to use these funds or—it really has to be worked out because I don't want to create a whole bunch of new layers of planning process for this. So I would like to work it out with you. But what I envision is that an improved CMAQ program or a completely new congestion relief program be created that allows full application of any solution available provided that it give you the most bang for the buck. And in my view, bottle-neck relief, which is not currently eligible under CMAQ, would be a very big bang for the buck type set of projects to look at and should be eligible.

Mr. DUNCAN. Mr. Lash, in one of our morning publications that we receive here, I don't remember whether it was Congress Daily or the CQ Today, but one of those just a few days ago, I think last week, maybe a week before last, said that farmland had its biggest increase ever over the past year, had gone up 22.5 percent, not every place of course, but they said part of it was due to inflation. Part of it was due to farmland close into the cities becoming more valuable, but that most of it was due to the ethanol craze or whatever you might want to call it. Yet I saw an energy expert on television Friday night that said that ethanol costs about as much in energy use as it does in energy that it saves. And I notice that you have mentioned something about that in your testimony, yet, of course, ethanol—we can produce a lot of ethanol domestically where we can't supply all of our oil needs.

Is ethanol the answer and the solution that a lot of people seem to think it is?

Mr. LASH. Congressman, I don't think it is, at least not corn-based ethanol as it is produced now. The problem that you raise is exactly right. For the most part, corn-based ethanol is made now

using natural gas and because of that, the benefits in terms of reduced CO2 emissions are quite small, depending on the technology. There are huge benefits to farmers. I have a house on Chesapeake Bay, and there are fields being planted with corn that I have never seen planted before. And it is a great thing for farmers.

There certainly are opportunities to make ethanol that would be of much more a benefit from a climate point of view, using cellulosic ethanol technologies that are still a few years off before it is commercial. And we are getting some energy independence benefit from the current production of corn-based ethanol. There is an energy benefit since it is a domestic source.

Mr. DUNCAN. Thank you, very much.

Mr. Hall, you have heard, you may have heard my statement earlier in which I said that I think that if we allow the free enterprise, free market system to work, that we will solve many of these problems, that we can really do more that way than through the government. And I was very impressed by the energy that you are producing from dynamic braking, and I did not know about that. I was told that is also being done in cars and buses and so forth. And you know, I said, well, somebody a lot smarter than me came up with that, but, boy, I think that is an amazing sign of progress. And I think that if we allow the free enterprise system to work, that the genius of that system will do more than almost anything to help us with the problems we are talking about here today.

But we need to get on to the next panel, and you all have been here far too long, but I just want to say I appreciate your patience. I appreciate your testimony. You have been very, very helpful to us.

Thank you.

Mr. OBERSTAR. I concur with the gentleman's remarks about the helpfulness and patience of this panel. We are likely to have a batch of additional votes.

I would just pick up on Mr. Duncan's comments about ethanol. The first ethanol plant in the State of Minnesota was built in my district. Yet it now has moved to complete recycling of material using recyclables to fuel the plant so it is no longer dependent on fossil fuel to operate an ethanol facility. And the by-product of producing ethanol is a filter cake that is high protein feed for cattle and now has achieved a 1.6-to-1 benefit-to-cost ratio. And other plants are moving.

But, as Mr. Lash pointed out, there is a finite limit to corn production, even using marginal lands which will require more nutrients and more limestone to apply to acid soils to make them productive. Switch grass, my colleague from Minnesota, Chairman of the Agriculture Committee, Collin Peterson, points out is a native grass, has three cycles, it has a three-crop production capacity, is perennial, does not need to be reseeded and produces 900 gallons of ethanol per acre compared to 600 gallons per acre for corn-based ethanol. And as this farm bill moves through, there will be an incentive to moving to switch grass. And all of these, these are all pieces, each piece that we add reduces our dependence on foreign-sourced oil.

Mr. Hamberger, your testimony cited great efficiencies, huge progress. You do mention switching locomotives. How many of the

member railroads of your association are using Green Goats, as they are affectionately called in the switch yards, using biofuels? And what has been the effect of moving to the Green Goat technology?

Mr. HAMBERGER. I don't really have that data on the top of my head. I would like to respond for the record, but it is the Green Goats, but it is also the Genset, where they have as many as three different engines in the locomotive so that when you are moving, doing switching and moving a car or two, you are not using all 4,000 or 2,500 horsepower; you are using just that amount of motive power that is necessary.

In addition, we have the alternative power units which we sit on the side of the locomotive, and in cold Minnesota, for example, in February, if you turn the engine off, the viscosity would get such that you could freeze up so you have to keep it running while these alternative power units do that in a much more fuel efficient way, and so that kind of technology is moving throughout all of the members. I don't have the specifics on the Green Goat.

Mr. OBERSTAR. I have seen from one or two of your members, their promotion pieces on Green Goat technology and using technology soybean-based fuel that has relatively small or negligible particulate discharge, NO, SO2 or NOX, and is more friendly to neighbors of switch yards.

Mr. HAMBERGER. We have been doing a lot of research on that down on the Texas transportation center, and I think part of that is with the suppliers as well. And a couple of issues have popped up, one of which is, how does that work again in cold climates? It is not always as effective, and there are also some issues with the warranties with the manufacturers.

[Information follows:]

Add #1

Railroads currently have possession of approximately 40 Green Goats, but these are all currently parked and subject to recall by the manufacturer due to operating problems. There are more than 100 Gensets in use, with many more on order by the railroads. The use of Gensets is clearly on the rise. The outlook is not as promising with Green Goats.

Add #2

In fact, no railroad is currently using biofuels, possibly other than for test purposes.

Mr. OBERSTAR. You have spoken in the past of, and your various principals have spoken, about needs for tax credits to make further investments. Would you submit for the Committee record to be shared on both sides their recommendations for legislative initiatives as we—whether they are within the jurisdiction of this Committee or not—we can recommend those to be done by others, for a legislative initiative that we are going to put together?

Mr. HAMBERGER. Very pleased to do so, and as I did mention in my opening statement; that is, H.R. 2116, introduced by Congressman Meek and Congressman Cantor, that is pending. The bill has been referred to the Ways and Means Committee.

[Information follows:]

(EXCERPT — COVER PAGE ONLY)

I

110TH CONGRESS
1ST SESSION

H. R. 2116

To amend the Internal Revenue Code of 1986 to provide incentives to encourage investment in the expansion of freight rail infrastructure capacity and to enhance modal tax equity.

IN THE HOUSE OF REPRESENTATIVES

MAY 2, 2007

Mr. MEEK of Florida (for himself and Mr. CANTOR) introduced the following bill; which was referred to the Committee on Ways and Means

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A BILL

To amend the Internal Revenue Code of 1986 to provide incentives to encourage investment in the expansion of freight rail infrastructure capacity and to enhance modal tax equity.

1 *Be it enacted by the Senate and House of Representa-*
2 *tives of the United States of America in Congress assembled,*

3 **SECTION 1. SHORT TITLE.**

4 This Act may be cited as the "Freight Rail Infra-
5 structure Capacity Expansion Act of 2007".

Mr. OBERSTAR. I would like sort of an order of priority suggestion to the Committee.

Mr. Clarke, I have known Andy Clarke since he first emigrated here from England. He has pretty much lost his British accent, which I don't know what effect it has on his working relationship with Americans; they would always bow to a British accent. But he has certainly been a very effective advocate.

My goal for bicycling is to establish it as a mode of transportation, not just a fun thing to do or, as I mostly do, for fitness. But also in my capacity, I ride to promote bicycling as a mode of transportation, and to encourage others to do it. And I do these promotional rides both in my district and elsewhere around the country. My 2,800 miles a year a couple of years ago is declining as I have more responsibilities and fewer morning hours and fewer weekends to devote to it.

But about bicycling, what do you recommend that—I have sent a letter to Secretary Peters asking her to include that in the departmental initiative. What else do you suggest we do in that regard?

Mr. CLARKE. The Energy Policy Act of 2005 authorized funding for a study and a series of demonstration projects, as you know, to determine what the most effective ways are of achieving this switch from cycling—from car trips to bicycling trips. The funding needs to be appropriated. And if there were some way that, either through the appropriations process or by the encouragement being given to the Department of Transportation to find the relatively small amount of money, just $6.2 million, in their existing budget, it would go a long way towards providing some terrific examples and to disseminate the best practices that exist and can be created; to show how, through encouragement and education programs, people can be encouraged to switch modes and to find the appropriate technology for certain trips.

Mr. OBERSTAR. Well, switching modes is eminently doable. In Munster, Germany, a city of 250,000 people, which was leveled by the Allies in World War II in retaliation for Coventry—the city has been rebuilt. It is on the German-Dutch border, northwest of the Netherlands; has bicycle mode share 48 percent, nearly half of all trips for all purposes, parking for 4,000 bicycles in the city center. The mayor rides to work every day, rain, snow, shine, on bicycle. They have a 20-foot head start at intersections for bicycles over automobiles. They have a 20-second head start at signaled intersections in addition to the 20-foot headstart for bicycles. Makes a big difference. We can do that in cities in the United States. That is why we have the nonmotorized transportation pilot project in four cities that have been designated in SAFETEA-LU.

We are moving in that right direction, but your numbers right on the Netherlands is roughly 30 percent; Denmark is 20 percent mode share for bicycling. And for those relatively short trips, we can make it safe, and we can make it efficient. And we just need to continue every—we have to use squeeze every practical realistic opportunity to cut the carbon out of the atmosphere so that projections that Mr. Lash and others and serious scientists have made aren't proven true; that we cut them off, delay them off into the future.

Mr. Cohen, what do you mean by data-driven congestion relief programs?

Mr. COHEN. What I mean is basically for you to authorize programs with incentives for cost-per-ton of carbon dioxide or other greenhouse gas emissions as a factor in project selection. I think if you do that, and you look at the actual cost per ton of pollution removed, whether it be a pollutant that is a criteria pollutant or carbon dioxide, you will find that, on the basis of just biggest bang for the buck, you will have a very significant amount of that funding going to congestion relief projects. And I think, as the CMAQ program was intended to do, it would both solve congestion problems and air quality problems. But you can't just say, well, all these things are eligible except for highways and not have a performance basis to it. If you add the performance requirement and make anything eligible and reward those who do the best job, then I think that is the kind of data-driven performance-based program that I would like to see.

Mr. OBERSTAR. Thank you. There are—that opens some opportunities for to us work on as we move to a legislative package.

Mr. Rader, you say that electric vehicles are not zero pollution; they use electricity generated principally by fossil fuels, but the diesel multiple-unit train does produce electricity and does produce fewer or lower total emissions.

Mr. RADER. It is a very interesting finding there was just a paper published, peer-reviewed paper published by the National Academy of Sciences Transportation Research Board, the double-deck clean diesel DMU in an environment like Denver where we generate our power in the same basin that we run the train, actually has fewer emissions than an electric vehicle because of course we have the emissions right there, right next door. And an electric vehicle frequently is a pollution transfer device. If I am in Southern California, I get to move my pollution to Arizona. But it is a very interesting study. The cost emissions per seat mile from the new clean diesel are actually lower than those of the electricity generated to drive a heavy electric rail system.

Mr. OBERSTAR. So what do we need to move that technology forward?

Mr. RADER. We are doing it today. I think the key is now that through the direction of Congress, the FRA-funded demonstration project, people are now seeing it run. We are in an industry that does not adopt new things easily. Now, that it is out running, we see another year or two approving, I think you are going to see pretty universal adoption. We have 17 agencies that we are working with today who would like to see clean diesel DMU technology in the next 10 years.

Mr. OBERSTAR. Thank you.

Mr. Hall, once we achieve the—when science and engineering achieves breakthroughs, people sort of plateau and think, well, that is the limit, just as with the GE 90, now GE has produced much more powerful aircraft engines.

What is the next step in technology and how widespread will be the use of the breakthroughs that you cited in your testimony, Mr. Hamberger cited in his testimony?

Mr. HALL. I think what we have in our plans to run forward is a combination of technologies that we can apply to improve the engine by itself and then more of these overall sort of control system strategies that we can use to reduce emissions and fuel consumption for the total locomotive system. So hybrid is just one example of that. The trip optimizer is another example.

There is an enormous amount of braking energy that can be recovered from these large trains. These two technologies only tap into a portion of it. There is still a lot more to be had, and we will continue to work on that.

Mr. OBERSTAR. The weight of the vehicles is also—weight of locomotives and weight of the passenger cars are a detriment to efficiency because they are pulling so much weight. When the French achieved their world speed record, 358 miles per hour steel-on-steel passenger rail in April, just the day before our Committee Members traveled on the TGB from Brussels to Paris, 185 miles per hour, also in lighter rail cars, 3 minutes apart, all day long, 1,100 passengers, 94 percent load factors, extraordinary accomplishment, all requirements for heavier rail cars are safety based.

Is it possible for to us change those standards, still protect safety, reduce the weight of locomotives and passenger cars and achieve these efficiencies? Mr. Hall? Mr. Hamberger? Mr. Millar?

Mr. RADER. I can certainly speak to that because we spend a lot of time in Maglev study, and the answer is, yes and no. The yes part of the answer is, if we provide a dedicated right-of-way for passenger service, such as is provided for the TGA and for the Shinkansen, then the answer is absolutely yes. But as long as we are going to use the existing rail systems that are interconnected and we are running heavier trains on them, then the answer is no. We can't make a safe car substantially lighter. With one exception, we are currently studying crash energy management technologies that are used in Europe and in part of the trains in Japan. And that may lead us to some lightening, but not terribly significant.

Mr. OBERSTAR. Much depends on the system in which the rails are operating.

Mr. RADER. Absolutely. If we were to spend per passenger mile in the United States for rail what is spent on the road bed in either Japan or France, given distances that we have, there is not enough money in the Federal budget. I think that is the big challenge we face. We have to face the realities that we have much longer distances, many more miles, many more grade crossings to protect, et cetera. It could be done, but the cost is enormous.

Mr. OBERSTAR. In that spirit, Mr. Hamberger, let me ask you the hard question.

Commuter rail access to freight rail track, what I hear from local governments repeatedly, is the impediment to improved commuter rail service. Gaining access to freight rail tracks may entail double tracking where there is only single track or sidings.

Now, without mentioning individual railroads, there have been some that have been very cooperative and very responsive to commuter rail interests. And others have dragged their feet. In most cases, it has been very difficult to work it out. What do you think we should do to ease the burden of access?

Mr. HAMBERGER. You won't be surprised to me hear me say that I find that all of my members are forthcoming in this regard and that, in fact, I believe the number Mr. Millar used at a hearing on this issue a couple of years ago was 400 million trips a year. And I like to characterize that as 400 million opportunities where we have cooperated around the country, and it really is on all the Class I railroads that have entered into bilateral arm's length agreements with the local authorities.

And I think the discussion you were just having with Mr. Rader about what was happening in Europe and what is happening in Japan, if you take a look at Europe, because you have been there, you know that they move less than 10 percent of their freight by rail. They have a pretty good passenger system, but they have not a very good freight rail system.

Mr. OBERSTAR. In fact, freight rail is operating on the passenger rails.

Mr. HAMBERGER. You cannot have, in my opinion, a high-speed passenger rail system operating on a freight rail system. And so when it comes to commuter rail, I think the answer is, there has to be enough capacity for both. You do not achieve your clean air goals, congestion mitigation goals, fuel saving goals, by getting people out of their cars onto commuter rails while at the same time you are getting those UPS trucks back on the highway instead of riding double stack on the back of the rail car.

Mr. OBERSTAR. The answer has to be intermodal.

Mr. HAMBERGER. The answer has to be intermodal, and the answer has to be enough capacity for both.

Mr. OBERSTAR. And in building more capacity. Finally——

Mr. HAMBERGER. Which I might add would be accomplished by H.R. 2116, which we encourage.

Mr. OBERSTAR. We are going to work on that.

Mr. Lash, the emissions trading, preserving a rain forest in Ecuador in order for a power plant in Ohio to continue its energy production, as cited as an example of success and advancing the cause of freezing carbon emissions, but it is not advancing the cause in my—as I see it. What are your thoughts about emissions trading regimes, such as that the European community wants to do in aviation, for example?

Mr. LASH. There are many forms of very legitimate emissions trading. You created an SO2 trading system in 1990 that has worked very well. The Europeans are now trading carbon on the European carbon exchange, and that is reducing the cost for them of meeting their obligations.

The idea that you can include in that system offsets from avoided deforestation seems to me not legitimate at this time. We don't have agreed-upon rules even of what you would count for avoided deforestation. It is a great way to avoid deforestation. It is not a great way to avoid global warming.

Mr. OBERSTAR. Thank you, each of you for your very thoughtful and sobering comments and for your extraordinary patience in being with us throughout this day. If you have any further suggestions or recommendations for our Committee to consider in formulating legislative initiatives, we would welcome those. Thank you very much.

Our next panel on public buildings includes the American Institute of Architects, Mr. R. K. Stewart; American Council For an Energy Efficient Economy, Mr. William Prindle; Alliance to Save Energy, Jeff Harris; Solar Energy Industries Association, Mr. Christopher O'Brien. And we will be in recess for about 15 minutes pending this vote and a subsequent vote on the House floor.

[Recess 3:00 p.m.]

Ms. NORTON. [presiding] As you can see, a madhouse has gone mad. So I am going to have to ask that we proceed as expeditiously as possible with brief opening statements so that we can move through this very important panel.

If you have been here previously, you will understand that our Committee—each of its Subcommittees is, of course, involved in the effort of the Full Committee to design energy policy that affects our Committee, and our Committee is centrally affected in many ways.

I am Chair of the Subcommittee on Public Buildings and therefore have a special interest in Panel II. We will be submitting a number of proposals; I already have a number of proposals. I will be especially interested in your ideas to enhance and add to my own.

I am pleased to welcome all of you. I apologize for the delay, of which I must assure you we had no notice. It doesn't come from our side, I might add. I intend to proceed as quickly as possible. Please summarize your statements. And I am going to ask you to proceed, I suppose beginning with Mr. Stewart.

TESTIMONY OF R.K. STEWART, FAIA, PRESIDENT, THE AMERICAN INSTITUTE OF ARCHITECTS; WILLIAM PRINDLE, EXECUTIVE DIRECTOR, AMERICAN COUNCIL FOR AN ENERGY EFFICIENT ECONOMY; JEFF HARRIS, VICE PRESIDENT FOR PROGRAMS, ALLIANCE TO SAVE ENERGY; AND CHRIS O'BRIEN, CHAIRMAN, SOLAR ENERGY INDUSTRIES ASSOCIATION

Mr. STEWART. Thank you, Madam Chair. I am R.K. Stewart, President of the American Institute of Architects, and on behalf of our 81,000 members and the 281,000 Americans who work for architecture firms nationwide, I would like to thank you for the opportunity to appear today. I would like to share the thoughts of our Nation's architects on energy consumption and how it relates to the most overlooked sector in the greenhouse gas debate, buildings: the buildings in which our people live, work, and play.

I have submitted written testimony to the Committee but would like to stress those points the AIA feels are most important. The AIA believes strongly that now is the time to react to address climate change by tackling energy use in buildings. Our Nation needs to begin making significant reductions in the amount of fossil fuel-generated energy our buildings consume. As your Committee has jurisdiction over the Public Building Service of the General Services Administration, this Committee is in a unique position to make policy decisions that could result in new and renovated Federal buildings using far less energy than current buildings.

According to the Department of Energy, buildings and their construction are responsible for nearly half of all greenhouse gas emissions in the U.S. every year. The building sector alone accounts for

39 percent of total U.S. energy consumption, more than either the transportation or industry sectors. Building operations consume 71 percent of U.S. electrical production and buildings in the United States account for 9.8 percent of carbon dioxide emissions worldwide. Put another way, U.S. buildings account for nearly the same amount of carbon emissions as the economies of Japan, France, and the United Kingdom combined.

If we want to be serious about energy use reductions, buildings must become a significant part of the discussion. The AIA believes that architects must advocate for the sustainable use of our Earth's resources. We have adopted an official position establishing energy reduction targets in buildings. Architects across the country have embraced this position and are expanding the use of design practices that enhance design quality as they increase the environmental performance of buildings.

To truly revolutionize the way our Nation designs and uses buildings, a combination of regulations and incentives must be used to greatly reduce fossil fuel-generated energy use, and improved energy efficiency nationwide. The AIA strongly urges Congress to take the lead in fighting against climate change by establishing new energy consumption standards for Federal buildings. The AIA recommends that Federal agencies be required to immediately ensure that new buildings and buildings undergoing major renovations consume no more than half the fossil fuel energy that a similar Federal building constructed in 2003 would consume. Beginning in 2010, agencies should be required to meet a declining cap on energy consumption such that they meet minimum energy reductions compared to the 2003 baseline.

We propose that by 2010, new and significantly renovated Federal buildings be required to reduce fossil fuel-generated energy by 60 percent. By 2015 the cap should be lowered to 70 percent reduction, continuing until 2030 when we should achieve 100 percent reduction in fossil fuel-generated energy for all new Federal buildings.

Setting declining caps on energy use is not a new idea. In the past Congress has passed similar legislation, and recently Governor Bill Richardson of New Mexico established energy reduction targets in his State.

Energy reduction requirements have shown a record of success, as referenced in my written testimony. That record demonstrates that the AIA-recommended energy reduction targets are readily achievable.

There is increasing evidence confirming that the public is concerned about how we are able to reduce the use of fossil fuels in our buildings. They increasingly believe it is in the best interest of our Nation and the planet to reduce our reliance on fossil fuel-generated energy and move towards a sustainable future. Reducing energy use in Federal buildings would be a major step in redesigning the future and point the way for the private sector.

We encourage Congress to consider our proposal and I welcome your questions and thank you very much for the opportunity to present to you today.

Ms. NORTON. Thank you very much, Mr. Stewart.

Mr. Prindle.

Mr. PRINDLE. Thank you, Madam Chair.

Good afternoon. My name is Bill Prindle. I am the Acting Executive Director of the American Counsel for an Energy Efficient Economy. We are a national nonprofit organization based here in the District that advances energy efficiency for energy security, economic prosperity, and environmental protection. I am pleased for the chance to share our thoughts with you.

The theme of my testimony today is that energy efficiency should be used as the first fuel in America's race for a clean and secure energy future. We face unprecedented energy challenges as we enter this new century. Conventional energy markets, especially for oil, have shifted such that the era of cheap fossil fuel energy is over. The global warming challenge is going to further force us to change our energy use patterns.

Now, energy efficiency is one of the very few resources that addresses both energy security and global warming while also boosting economic prosperity. We can develop domestic energy supplies with low carbon content, but that is going to take time. So we can and we must start now to accelerate efficiency investment. Every clean energy strategy that you can imagine, whether it is based on renewable energy or advanced coal or safe nuclear, depends on energy efficiency to succeed. As we study the markets today we find that energy demand is growing too fast for any realistic supply plan to catch up. So our first job is to make policy that accelerates efficiency investment.

Energy efficiency is actually an infrastructure issue. We happen to be blessed in this country with a massive energy service infrastructure. When I say that, I am not talking about the supply infrastructure; I am not talking about refineries and pipelines and power plants. That is the supply infrastructure. I am talking about the millions of energy using systems in our vehicles, our buildings, in our factories.

People tend to think of energy efficiency as little things, light bulbs, thermostats, things we can see and touch. But our research estimates that we spend as a Nation about $200 billion annually on energy efficient technologies. And as close as we can account, we only spend about 100 billion on all the energy supply infrastructure in this country in a given year.

So we spend more money on energy efficiency on all those lighting systems, motors, windows, all the components of our buildings and factories and vehicles that use energy, we spend more on that than we do on the whole supply side. So it is big business. It is a big part of our economy. It is surprising to a lot of people.

But, in fact, energy efficiency is one of the prime engines of economic growth in the United States. We use half as much energy per unit of economic output than we did when I came into this field 30 years ago. If we had not made those gains, our economy would not have been able to sustain the prosperity that we have seen in these recent decades. And even though we have made a lot of progress, we still have enormous potential to accelerate efficiency investment. We estimate in the range of another $200 billion every year. That is a big infrastructure investment that we can make and we need to make.

There are numerous studies about this. We do some, there are others, and consistently what we find in the research is that we can meet most if not all of the growth in our energy needs over the next several decades through energy efficiency. That is what will allow us to win the energy security battle and to win the climate battle.

But it takes public policy commitment to make this happen. Even though market forces are working, and we do believe in market solutions, there are significant market barriers and there are other economic forces at work that are limiting the rate of investment that we need to achieve in efficiency.

We have recently completed a study for the International Energy Agency that shows that simple market barriers—that every serious economist will acknowledge affects half or more of the energy used in our residential and commercial buildings—with those kind of market barriers in place, we can't expect the market to deliver the results. We have to have some serious policy help to move markets forward.

I want to touch also on energy efficiency and the way it plays in climate policy. We have been studying this issue for several years. We were stakeholders in the Regional Greenhouse Gas Initiative that stretches from Maryland to Maine now. I know the District is talking about joining RGGI, as it is called. The detailed studies that we have participated in show that any way you look at it, energy efficiency makes climate policy affordable. It reduces carbon prices, reduces energy bills, it improves economic growth while reducing carbon. And that is great, but here is the paradox. The climate policy designs that we are talking about today, whether they are cap-and-trade or carbon taxes will not be sufficient to obtain the energy efficiency investment that would make carbon policy affordable.

Let me say a little bit more about that. Cap-and-trade systems set caps up at the power plant level, and when you reduce energy use down at the customer level, that doesn't change the cap on emissions at the smokestack level. Emission traders tell us we will not accept credits for people who say they saved energy in a building. That is a fundamental structural problem in cap-and-trade design and we need to fix that.

Secondly, a lot of the effects that are expected from climate policy come from price effects. Carbon taxes or carbon allowance prices raise the price of energy. What we find by looking at how markets are actually working today, those effects are very weak and we are not going to see energy prices that will motivate energy efficiency at the rate we need to see it.

I want to compress some of my other remarks and get to a few of our policy recommendations. Certainly we have to have carbon policy designs that encourage energy efficiency. If there is a cap-and-trade program, there has to be an allowance allocation policy that sets aside a large chunk of allowances to get after energy efficiency and the other low-carbon technologies that won't happen automatically under the cap-and-trade system. We need complementary policies that come in at the appropriate level of the market to get efficiency where it exists in vehicles and buildings.

In the transportation sector in this Committee's jurisdiction under SAFETEA-LU and those kinds of legislation, we would recommend that the Committee look at State allocation formulas for Federal transportation funding to encourage State and local governments to consider greenhouse gas emissions improvements as part of that process.

We would like the Committee to order a study of the climate benefits of a Federal policy that was more active in supporting transportation and land use planning at the State and local level. My colleagues have already talked a lot about building codes and building standards. I won't go into that. Appliance standards are also part of that picture. Research and development is part of that picture. We need to rebuild the research and development infrastructure in this country. And our research also shows that significant carbon savings can be realized at very low cost to energy efficiency. So we urge you to use efficiency as the first fuel in the race for clean and secure energy.

Thank you for your time and I will be happy to answer any questions.

Ms. NORTON. Thank you, Mr. Prindle.

Mr. Harris.

Mr. HARRIS. Thank you, Madam Chair. It is a pleasure to be here to talk with you on this important topic and to join my colleagues from our fellow organizations. My name is Jeffrey Harris. I am the Vice President for Programs at the Alliance to Save Energy. The Alliance is a bipartisan, nonprofit coalition of more than 120 business, governmental, environmental. And consumer leaders. Our mission is to promote energy efficiency worldwide to achieve a healthier economy, a clean environment, and greater energy security.

The Alliance was founded in 1977 by Senators Charles Percy and Hubert Humphrey. This year we are enjoying our 30th anniversary. We currently enjoy the leadership of Senator Mark Pryor as our chair, with congressional vice chairs Congressman Ed Markey, Zack Wamp, Ralph Hall, and Senators Jeff Bingaman, Susan Collins, Larry Craig, and Byron Dorgan.

In addressing the topic of today, I would like to focus on the importance of improving energy efficiency and reducing energy waste within the Federal Government in both fixed facilities and mobile operations. This is a topic we have already heard several of the earlier witnesses in Panel I address. I would like to go into a little more detail and point out that although I am emphasizing Federal Government opportunities, virtually all of these opportunities also apply at the State and municipal level, and as we have seen from the important examples of policy leadership recently on energy efficiency, in the District government here.

The U.S. Federal Government is the world's single largest user of energy and also its largest waster of energy. In 2005 Federal agencies accounted for about 2 percent of total energy use in the country and cost U.S. taxpayers $14-1/2 billion. Of this total, about $5 million goes to heat, cool, and power about a half million Federal buildings around the country, but the majority of this Federal energy use goes for mobility purposes. This includes the light and heavy duty fleet vehicles, military aircraft and ships, and a huge

variety of mobile systems that must be deployed and fueled wherever they are needed, both for defense purposes but also for disaster relief and recovery, for scientific research and for a host of other Federal purposes, and it is this mobility energy that now needs most of the new attention, in our view.

Thanks to concerted efforts by Congress and leaders in Federal agencies, government as a whole has reduced primary energy use by 13 percent in the past 20 years and this has also led to a 25 percent decrease in real dollars in the government's energy bill. These savings have been dramatic, but there is a strong potential for additional energy savings, especially in the case, as I mentioned, of this Federal mobility energy use, which was actually higher in 2005 than it was 10 years previously.

We already have on the books a number of ambitious targets, standards, requirements and programs aimed at reducing Federal agency energy use. Most of these focus on conventional Federal buildings. These requirements, some of them at least, were put in place within the last 2 years and as a result are not yet fully implemented. So we still have a challenge in accomplishing them fully, and this requires the active involvement of Congress in three ways: periodic oversight, assurance of adequate funding, and in several cases supplementing or strengthening the existing statutes in on the books.

The most important step to reduce Federal energy use is to fully implement the policies already in place, and these include a wide range of efforts for energy efficiency standards in new Federal construction, energy metering and energy savings targets for existing buildings, performance contracts for third-party financing of energy saving improvements, energy efficient government purchasing, and use of life-cycle costing for government investment decisions.

We believe that Congress' first role here is to conduct thorough and sustained oversight to help focus the attention of government officials on meeting their agency's energy savings and cost-effectiveness targets.

Second, though, Congress has to assure adequate funding for Federal energy efficiency improvements that generate and sustain long-term savings. This will require billions of dollars of investments but it will save even more. In recent years, though, the annual appropriations that we have seen for energy efficiency in Federal buildings have been only on the order of $100- to $300 million a year. This funding needs to be increased, but Congress also needs to emphasize the importance of Federal agencies using the innovative financing mechanisms available to them, the energy savings performance contracts and utility energy service contracts that allow agencies to upgrade energy efficiency at no initial cost to the government.

These ESPCs and UESCs, as they are called now, provide—at one time provided more than $500 million a year for energy savings investments, but after the authorization by Congress lapsed temporarily in 2003, we still haven't arrived at the same level of investment from these innovative funding sources.

We have several recommendations in our detailed testimony—let me just summarize them here—for additional policies that, first,

would require comprehensive energy and water saving evaluations for each Federal agency to be updated periodically.

Second, require that Federal agencies actually implement all of the water-saving and energy-saving measures identified in these evaluations, all the measures that have a payback of 15 years or less; and, in doing so, allow agencies to combine, in any way that is suitable, appropriated funds and this third-party financing that I mentioned.

Third, make sure that agencies provide for start-up commissioning of energy-using systems and for periodic review of performance and diagnostics to make sure that these systems work as they are planned, and keep on working.

Fourth, extend the energy efficiency requirements for new Federal buildings that were put in place by the Energy Policy Act of 2005 so that they also apply to leased Federal buildings, and that we add to these requirements provisions for smart growth, principles applied to the location and siting of Federal facilities to make sure that they are accessible for employees and for the public by means other than single occupancy automobiles.

Finally, we need to look beyond the Federal building sector alone and establish new savings goals and policies for the mobility sector, which accounts for the largest component of Federal energy use.

Let me conclude my comments and I would be happy to answer your questions.

Ms. NORTON. Finally, Mr. O'Brien.

Mr. O'BRIEN. Thank you, Madam Chair. Very much appreciate the opportunity to testify today.

My name is Christopher O'Brien, I am Vice President for Strategy and Government Relations for Sharp Electronics Corporation Solar Energy Solutions Group. Sharp is a producer, leading producer of solar photovoltaic panels. These are panels that produce electricity without pollution directly from sunlight. I have a miniature example of the types of panels we produce at our factory in Memphis and on the sign board an example of one of the more common applications where these solar panels are installed directly on Federal buildings or on buildings to reduce the energy use in those buildings.

I would like to focus today on the main point which is that solar technologies can play a significant role in reducing energy use in Federal buildings. There is ample roof space available, and wide deployment of this solar technology will have associated benefits, including the reduction in peak energy demand and significant economic development or jobs growth.

Let me first emphasize that the single most important action that the Federal Government can take to encourage the increased use of solar energy across the country would be to enact the provisions of H.R. 550, the ″Securing America's Energy Independence Act.″ this includes an 8-year extension of the solar investment tax credit for homeowners and businesses who install solar energy systems. Note that this investment tax credit would be applicable to both public sector and private sector entities because, in most cases, projects on Federal facilities would be developed by third parties who could use the tax credit, and it would be a significant catalyst to increased solar usage.

Let me now outline—I am here before the Committee today in my role as chairman of the board of the Solar Energy Industries Association. There are over 400 companies that are members of SEIA, including Sharp, and it is in that role that I appear before you today.

I would like to, first, outline SEIA's recommendations for specific policies to encourage the increased deployment of solar energy on Federal facilities. SEIA recommends the creation of a new strategic initiative, the solar technology utilization and deployment program. This program would create a framework for Federal, State and local governments that would facilitate the installation of solar energy systems, including solar thermal, and would expedite the purchase of solar-generated electricity by third-party financing. The target would be to achieve 3 gigawatts of mandated solar capacity at Federal facilities by 2012 and would be complemented by a voluntary commitment from State and local governments.

Federal commitments would be established in 2007 and 2008. Agency requirements to deploy solar would be calibrated to their energy consumption so the more the agency spends annually on energy, the higher their target for solar deployment would be. There are several reasons why the Federal Government should take the lead in launching this solar program. The Federal Government is the largest single user of energy. The program would have a significant stimulus to jobs growth. I can speak directly to this from our experience at Sharp where we have over 200 jobs created in the last 3 years and many hundred more jobs among the businesses that we serve as customers.

Third, the Federal Government is uniquely stable financially in its ability to back long-term commitments to help support the financing for these projects. Finally, this program would displace roughly 3 million metric tons of CO2 emissions as a result of full implementation.

In order to launch and implement the program the following legislative changes would be required. First, the program would require legislation to provide GSA with an exemption from the current 10-year restriction. This would be applicable for any utility service contract that supplied energy from new renewable resources. This is necessary because most private sector solar installations will pay out over a period of 10 to 30 years, so the utility service contract must cover that duration.

Second, the legislation should authorize Federal agencies to offer leases of underutilized real property, both rooftops and underutilized land areas, to solar developers.

Third would be to enact legislative language setting required targets for increased use of solar power in Federal facilities. This kind of top-down guidance would provide much—by agency heads to the facility staff would greatly increase the pace of solar deployment.

Finally, Congress should demonstrate its leadership and commitment by launching an initiative to require the Architect of the Capitol to issue an RFP for deployment to 5 megawatts on congressionally controlled properties and structures. This would be an immediate and a highly visible deployment and would demonstrate the congressional leadership is sincere in its commitment to a carbon-smart future.

Thank you for the opportunity to comment today. I look forward to addressing any questions that you may have.

Thank you very much.

Ms. NORTON. I must say that this testimony is just chock full of ideas, I think many of them are very practical. I don't know where to begin, especially since we intend to—my own concern in a list of priorities would be to look at what is least costly and most immediate. Got to begin.

The Chairman, as virtually the first piece of legislation out of here, has already got a photovoltaic proposal approved for the Department of Energy. That will, I think, send a message and also prove something about the use of energy. We all know the Federal Government. It would bring down the cost, since we are the biggest user of energy in the country.

Let me begin by asking just a few questions, given my interest in submitting proposals to the Chairman for legislation that could be immediately produced, recognizing that we have a huge deficit that everybody is going to be controlled by.

Mr. Stewart, you say that the goal of the AIA is that all new buildings, I guess that means public and private, should meet an immediate reduction of 50 percent in fossil fuels—fossil fuel-generated energy compared to the 2003 baseline. Immediate, by when? And all new buildings, how? That is design or some kind of performance or building system standards. When you say immediately, compared to 2003, that would seem to be now. Can they do it? Can they do that kind of huge reduction?

Mr. STEWART. Yes, ma'am. We believe it is possible to make those kinds of cuts immediately. If you begin to look at an integrated——

Ms. NORTON. You mean buildings already up, or new?

Mr. STEWART. New and major renovations. So that we are talking about projects that we will be looking at in the entire assemblage. So you start to talk about window assemblies and their insulating value, the insulation placed in the walls and roofs, the equipment that goes in to heat, cool, ventilate the building; lighting systems, utilizing day lighting more extensively in control systems so that you don't need to light spaces that have good daylight. And then you start to deal with just those kinds of systems before you get into more advanced technologies.

We believe it is possible to achieve these kinds of 50 percent cuts today. But a lot of this has to do with looking at the separation that exists today between capital costs and operations and maintenance budgets. Oftentimes what we see is decision makers chasing first cost, to lower the first cost, and ignoring the implications of a building's 75-year life.

Ms. NORTON. That is the great problem in this country, from Wall Street to building design. Everybody looks at what the returns are. Wall Street looks at returns every virtual month, sometimes we think every minute, and we end up making hugely erroneous and costly decisions that way. The first thing we are going to hear is it costs too much money, which is related to something else you say on page 11 of your testimony, that you yourself, the AIA, is apparently going to analyze a study of the benefits. I take it you mean economic benefits of energy efficient billing.

I would like to know, first, when that study will be concluded. And one of the things we have had the hardest time finding an authoritative study of, but what we think would be most convincing is not the 75-year life of a building. Too many people will say I won't be here for 75 years, and I have got to show that I am building efficiently and with low cost now.

Is your study designed to show what the benefits, the cost benefits are by years, let's say 5 years, 10 years, 50 years, 100 years?

Mr. STEWART. The study is designed to both address energy savings as well as cost savings. It is underway right now. We expect to have it done in the next couple of months and we will be more than happy to share it with you. One of the things that has been interesting in the data that has emerged over the last year is that a lot of the first cost assumptions are proving to be erroneous as the market tends to mature.

Turner Construction issued a report at the end of 2006 that indicated their experience has been that the additional costs for more sustainable design is roughly .8 percent of the initial construction budget. Davis Langdon, which is an international cost estimating firm, has told us that it is statistically insignificant, trying to find those additional costs. So I think the market is changing rapidly over time and what people perceive as first cost impediments are really starting to go away.

Ms. NORTON. Somebody has to do an economic model that shows us how these shifting costs should play into how they figure out whether savings will be, again, because of the short-term vision of not only people that build buildings but, frankly, people who do everything in this country.

Mr. Harris, much of what you suggest, what I am really intrigued by is the page where you indicate the first thing to do is essentially to meet the standards that already are in existence. You suggest there is not a lot of enforcement going on, and that if there were, that very substantial reductions—I don't use enforcement in the policing sense—but nobody is watching, nobody is monitoring, or at least not enough, and some of them are just very intriguing because you cite already existing executive orders.

For example, one that intrigues me I have to ask you about, I guess it is page 3, you say each agency is to reduce energy use intensity by 3 percent per annum, or 30 percent by 2015. That really sounds good. You want them to meet earlier target, culminating in 30 percent between agencies—mostly met—I'm sorry—earlier targets between 1985 and 2005. But you say that total energy use reductions have been smaller as energy intensive facilities are excluded from these targets and as the targets are interpreted as applying to site energy. Are you talking about Federal policy now? Who was excluded?

Mr. HARRIS. There are some detailed guidelines that the Federal energy management program at the Department of Energy has issued, and there are now some requirements to look at cost-effective measures in an energy intensive facility, industrial-type facilities, defense maintenance facilities, a whole range of laboratories and other things that are not what we think of as a classic office building or a residence, for example, for a military family.

So the difference is that there are no quantitative targets of the same sort that we have seen for the so-called standard Federal buildings. There has been substantial progress made, but the trail is getting steeper. The rules that we are facing ahead are 3 percent per year, and that will pose a bigger challenge to Federal agencies. That is why we argue that it is important for Congress to maintain its oversight function and to make sure that there is adequate funding of these programs and adequate training and support and technical assistance that comes from the Federal energy management program.

Ms. NORTON. Mr. Chairman, are you going to have to go vote again? I don't have to vote in Committee. I guess I should watch out about seeking a larger vote from the Committee of the Whole.

I should ask you, Mr. Chairman, if you have any questions before you run again.

Mr. OBERSTAR. Thank you very much. You are doing very well with the questions. Many of those are ones I wanted to propound myself but I will have to leave in a few minutes to make this. These are protest votes that we are having to do on the House floor, and I understand that, having been in the minority, we did some of the same things.

Mr. Stewart, the Institute of Architects, for whom I have great admiration, has, throughout the testimony you have presented, set goals for reduction of fossil fuel consumption through building design and through life-cycle design and construction facilities. Which raises the issue that the continued objection that we hear to conservation, to reduction of greenhouse gases through changes in technology is that these are not obtainable, except at great economic cost and loss to the economy. And wherever there is resistance, these are the objections that are raised. We can't meet these goals.

You say IAI approved an official position stating all new buildings and major renovation of existing buildings be designed to meet an immediate 50 percent reduction in fossil fuel-generated energy. If you had to retire that, amortize that cost to the first year, that would be a huge—a steep hill to climb. But if you amortize it over 20 years or 30 years or longer, the life-cycle of that building, then it becomes imminently achievable, does it not. Or am I mistaken? Did I miss the beat somewhere?

Mr. STEWART. No, sir, you are spot on. We have been working with the Congress. In the 2005 energy bill, as you recall, there was a tax credit provision up to $1.80 a square foot for energy reductions, and Congresswoman Schwartz has authored a bill to extend that credit to 2012 and enhance it to $2.25 a square foot. We are also in a number of conversations with the financial markets to recognize the value of increased energy efficiency and more sustainably designed projects in an effort to get discounted financial rates. The insurance markets are recognizing the increased value of sustainably designed buildings and are offering discounts in their insurance rates for buildings that have been designed in this manner.

So I think the economy, in one sense, is starting to catch up with recognition of the value that these kinds of projects bring to the table.

Mr. OBERSTAR. That is a very significant point; that insurance rates are lower for—at least adjusted for energy efficiency. That is the market response, is it not?

Mr. STEWART. That is correct.

Mr. OBERSTAR. Mr. O'Brien, you may have heard me say on one or more occasion that in my second term in Congress I had the good fortune to preside over a hearing of the Subcommittee on Public Buildings and Grounds, as it was simply called then. Now we have added other responsibilities to it. Which Ms. Norton chairs.

The Sheet Metal Workers Union presented testimony during the course of our hearings on public building energy efficiency, presented results of a 2-volume study that they commissioned on conversion of Federal civilian office space to photovoltaic cells, the result of which was it would create 135,000 jobs in the Sheet Metal Workers Union-- which is equivalent to, I think, their total membership at the time—and it would save the government enormous amounts of money and also contribute less to atmospheric carbon emissions.

While I thought this was a splendid idea, they suggested $175 million a year for the government to buy and install, the private sector to build facilities. At the time, the cost of energy from photovoltaic cells was $1.75 a kilowatt hour. The same kilowatt hour for the private sector was $0.07 a kilowatt hour.

So I introduced the bill. Senator Humphrey called me up, saw the news release, said, "You send me that bill, we will introduce it over here." and he moved it to the Senate, we moved it through the House, President Carter signed it into law. He provided the $75 million for the first of a 3-year program designed to drop the cost down of energy from photovoltaics from $1.75 to the range of 15 to 20 cents over a period of 20 years.

President Carter put the money in his last budget. Then he lost the next election, and President Reagan just dissolved the entire alternative energy budget of $960 million.

So time passes. I have become the Chairman of the Committee. I say this is still a great idea to do. We have jurisdiction over 367 million square feet of Federal civilian office space in this Committee. The energy cost for those buildings is 5 billion 800 million dollars. Why wouldn't you do something just to save money, if for no other reason, to save money to taxpayers that would use alternative forms of energy?

So we moved the bill through Ms. Norton's Subcommittee to—I call it—"future fitting" the Department of Energy building, which was built with the south wall blank, no window or doors to accommodate a solar application. We moved this through the Subcommittee, Full Committee, through the House. Virtually unanimous vote. It is pending in, as we affectionately call them, the other body, and we hope that they will do something soon. I know there is a willingness to do it on the part of the chair, Ms. Boxer.

Well, use that as a template, show that it can be done, but at the same time move ahead with legislation to equip all Federal buildings under jurisdiction of this Committee with solar power. Just makes imminent good sense. That is a statement you can respond to.

Mr. O'BRIEN. I fully agree with you. I think that the types of signature projects such as the one that you outline in your legislation are to be commended and I think do set a great example and a highly visible example of what can be done. I think the resource that you talked about is absolutely spot on; there is an enormous resource of rooftop space, of Federal lands that could be used and, in many cases, at a considerable cost advantage for the deployment of solar.

So some of the changes that we have outlined in our recommendations are really just unlocking those resources. And that is really focused on two areas. One is making some of that space available for developers to come and develop projects. We are finding an increasing model in the private sector of what we call a PPA model, where a developer will come and build and develop a solar project on someone else's rooftop, will give them a long-term energy contract and say we will provide you with energy at a 10 percent discount, 5 percent discount, and over a period of 15 or 20 years, and so to make—and that could work in the Federal buildings as well.

It requires a couple of things. One, it requires access to the rooftops and, second, it requires the ability of the building host, in this case the Federal facility owner, to enter into a long-term contract like that to buy the energy into that long-term contract.

Mr. OBERSTAR. How long a period of time is, in your judgment, the current payback for investment in solar energy? By the way, the cost has gone down from $1.75 to roughly 25 cents a kilowatt hour just without significant stimulus.

Mr. O'BRIEN. A lot of that is because of developments, and you mentioned the curtailment of support here in the U.S. That did not stop some other countries from moving ahead. So where the solar industry grew very quickly and solar PB industry grew very quickly was in Japan and Germany most recently. The irony is Germany has the amount of sunshine the equivalent of Alaska, but they are now the largest market of solar PD in the world, largely because of a strong political commitment that has been taken to ensure that renewables in general and solar in particular are a significant part of the energy mix by 2020.

I think in terms of the payback, it ranges. It may be up to in the area of 10 years or more for residential application. Many commercial applications would demand a paypack considerably shorter that. That is usually possible with some of the State-level incentives that are in place. It will be greatly facilitated by a Federal tax credit such as is included in H.R. 550. But at the same time, what is happening is there is a development of this PPA model where in many cases commercial customers are able to sign up today and pay less than their peak cost of energy right from the get-go.

Mr. OBERSTAR. I have to stop you there, but Ms. Norton will have other questions. I will vote and return. I want you all to be thinking about specific initiatives that we can craft into legislative language as we fashion our part of the energy and conservation package that House leadership is planning to bring to the floor in July.

Ms. NORTON. Thank you, Mr. Chairman.

Just completing the Chairman's round of questions on solar, I am informed a Federal Archives building with solar panels inlaid into the building was just opened within the last few weeks in Waltham, Massachusetts. This is a Federal building. In fact, the GSA has been pressing ahead where the funds are available.

Would you explain to me the difference in the panels—and you can see the way the temperature is recorded, that it was working; of course, some of us uneducated on solar energy would wonder what the difference was in sun intensity and the efficiency of solar energy. Waltham, Massachusetts would not come to mind if that is what one was thinking about. This was an archives building. I don't know if it is a building with lots of people in it or what, but I am wondering about the universality or not of solar energy in public buildings.

Mr. O'BRIEN. It is a good question. I think the quick answer is that there is—obviously among the broad portfolio of Federal facilities, there are going to be some places where the economics work well in the short term and others that are going to work better as the cost of solar technology comes down.

I think that what is important to recognize is that the economics depend not just on the amount of sunshine available but also on the value of the energy that you are displacing. So in many cases Waltham would be a good example where the electric rates are comparatively higher than they might be in New Mexico, for example. So even though it has comparatively less sunshine, it has comparatively more valuable electricity being displaced. And the solar industry has grown very sophisticated in terms of modeling what the economics would be for any particular site so it requires—a site survey would be pretty straightforward to determine what the payback would be and what the economics would be for the different Federal facilities.

The overall message, though, is that the technology is quite universal in application. As I mentioned, Germany is the largest market today, which is probably an outlyer in terms of insulation.

Ms. NORTON. Mr. Prindle, in your testimony you don't give a lot of currency to one of the new kind of progressive ideas, not necessarily widely embraced yet, but the notion of a carbon tax. And you indicated it would not stimulate efficiency. I would like to have you elaborate on that. In other words, you don't think that causing the price to go up matters much.

Mr. PRINDLE. As we have observed the actual behavior of energy markets in recent decades, what we find is that price elasticity effects, as economists refer to them, are much weaker than they were once thought.

Ms. NORTON. Where, Mr. Prindle?

Mr. PRINDLE. They are weaker in motor fuel markets.

Ms. NORTON. Are we talking about the United States? If you are talking about the United States, I don't think anybody has ever done anything in the United States, or done very much, to make energy more expensive. In fact, all of the policy, all of the rhetoric is designed to make the American people believe they deserve cheap energy and, yes, so it is at $3 a gallon now, and even more if you happen to live in my district. You ask a comparable European resident what she or he would think of a comparable $3 a gal-

lon gas. I wonder if we have experimented with it. I am not advocating it, but I can't believe that we would take our own policy, what comparable countries have felt they must do while we scream and shout about the Middle East and about the cost of energy, and even in the 1970s when we had the long gas lines, went right back, because in fact the experience is quite the opposite, not that we have seen high prices, but on the contrary, that the prices tend to go down and therefore reassuring the American public, see, you deserve this. Everybody else in the world doesn't. Let them raise the cost of energy but we deserve, and we can prove that it doesn't work because, see, you pay high prices. When—over what sustained period have the American people paid high prices for energy?

Mr. PRINDLE. Well, we have seen increases, particularly in gasoline prices, in the last 3 to 4 years. And what we have also seen, this has been measured by researchers at the University of California Davis. I recite it in my testimony. What they found is that the price elasticity effect, the response of customer behavior to changes in prices is about six times weaker than it was measured in the 1970s. And so we have a fundamental problem if we expect high prices alone to motivate enough change in investment, enough change in behavior. I am not saying prices don't work, I am not saying we should ignore energy prices. But if we want to meet the energy security challenge we have in this country, and especially the climate challenge, prices alone will not be sufficient.

Ms. NORTON. If you are saying prices alone, I am sure you are right. I am sure you are right. I don't even know if prices will do it. I just don't believe that this is a fair—that we have had a fair test of that. And what worries me most is that Americans think it is unfair, it is unfair for them to be tested in this way. We have reinforced the notion that they deserve high energy and thus that we are having to turn around a whole culture and mentality on greening.

Fortunately, as we begin and the facts get out there, people are beginning therefore to wonder. I mean, one of the reasons I think why Detroit hasn't had any real reason to change is the Congress hasn't wanted to push beyond where the American people are. Nobody has had the guts to do that. And Detroit says well, shucks, why should we change? We are here where energy doesn't matter, the cost of energy doesn't matter. And now they are saying that we're behind the 8 ball, with not even a decent number of hybrids to put on the market. It just goes to show you what the Europeans did initially, frankly only with price. And then, when price was up, that encouraged the industry to go to different, more efficient automobiles and things began to show results there that we have not had.

I am not disputing the initial notion and I think it is a very important notion to put forward because I do think we are a magic bullet society. And that has come forward as the latest magic bullet. I must say I am very intrigued, Mr. Harris, on your notion of incentives. Boy, am I intrigued about that. I believe in win-wins. I am intrigued by the whole set of things that people can do because I believe the way to break Americans into the energy conservation business is with old-fashioned conservation, old-fashioned

things, for example, yeah, turning the lights off and finding a way so that it happens. I think it happens without giving much responsibility to somebody. When nobody has the responsibility, the building superintendent, for example, and doesn't get rewarded for it, why should he do it?

Now we give bonuses here in the Federal Government to people for doing good work. I have never heard of a bonus given to a working stiff who is a building superintendent for making sure that all the things you say the executive orders already say to do. The notion of incentives, I would like you to consider the Federal workforce, 2 million people, to elaborate on—and if not bonuses, and I am not suggesting money and bonuses are the only way—but to elaborate on incentives.

Mr. HARRIS. I certainly agree with a lot of what you are saying. And from my experience over quite a few years working with Federal employees and a number of agencies, it is true that not everybody focuses on energy efficiency as much as I might like them to do. But there are a lot of dedicated people out there for whom energy efficiency is something they care about and is something they try to do. They are not always at a level of the agency where they can make the decisions that matter and so——

Ms. NORTON. Where are they?

Mr. HARRIS. Down at the working level, managing a facility. They may be the staff person responsible.

Ms. NORTON. Managing the facility. Isn't that just the kind of person who is at the level where he can have an effect?

Mr. HARRIS. There is a chain of command above that person, above him or her, and often you have capital investments that must be made at the top levels of an agency, you have budget constraints. We need Federal personnel from top to bottom recognizing the importance of these goals and encouraged to make decisions that are based on, as we were talking earlier, life-cycle costing, looking at the long term, and looking at what the savings will be, not just what the initial cost will be.

I think, as you said, there is no single silver bullet to resolve this, but I think a variety of mechanisms can help. One, as I mentioned before, is congressional oversight, not just once but continually to pay attention to what you the agencies are doing.

Let me tell you a small anecdote, if I might, because you mentioned European experience. There is a European requirement now that is just rolling out, being implemented, that calls for a certification of the performance of large buildings every year. This also requires that when a building is sold, when it changes hands through a lease when it is first built, that there has to be a disclosure of how much energy that building uses.

There is a special requirement for public buildings and that is that all public buildings must post their energy performance for the public to see. In Denmark they have gone even further. In Denmark every building, I believe, over 100,000 kilowatt hours, has a special recording meter that takes the energy, electricity use from that building and puts it on the Web so that anybody can see it in real time. I don't speak very good Danish but I have gone to that Web site. An I heard a wonderful story about a minister who one Friday evening went to the Web site for his building and saw that

the building systems had not been shut down for the weekend as they should have been. He got on the phone, talked to the energy manager, and he read him the riot act. He said, Do you know that this information is out there for anybody in the public to see; and by the time I get up tomorrow morning I better see something different on our agency's Web site.

Now, I don't know whether that story is true or not, but the point is it is being circulated as it if is something that could happen. So transparency, openness, and feedback on what buildings are actually doing can be a very powerful force at motivating people for being recognized for the good work they are doing; and if they slack off, to recognize they have got to fix it. So there is a different incentive that is important.

Ms. NORTON. I recognize that we are further along in capital investment in some of these devices than in others. You say some will require capital investment. For the immediate term, I am not looking at those that require capital investment. GSA does a lot of automatic turn-off of lights, those things that turn off and turn on when you come into the ladies room and so forth, or the kitchen part.

I believe that if you begin people where they are, you can take people where they want to go. And when people hear us talking about energy now, they say, for God's sake, they just know they are so far from either being able to do what they think is affordable or afford the tax that would be necessary to do it. That basically the only way we have gotten their attention is through what Al Gore and others have done with warming and the fear that has now emerged.

Mr. Prindle and Mr. Harris suggest an interesting issue. I certainly would love to get ahold of that and wonder how they do it: where essentially both of you in one way or another want the Federal Government to get tougher on codes, or stricter codes. But, of course, in our system, that is usually considered a local issue. How do you see the Federal Government able to make the demand and make it stick?

Mr. PRINDLE. Madam Chair, it is ultimately a local issue and, as you know, the District government has recently instituted some very strong new building codes for private buildings.

Ms. NORTON. So you would expect a local jurisdiction. Are you saying the local jurisdiction, or are you saying the Federal Government can have an effect?

Mr. PRINDLE. The Federal Government can have a very strong effect by working at the national level, with the national organizations that develop what we call model codes. Because the standards that the District implemented weren't invented overnight, they were developed by national organizations.

Ms. NORTON. Or by the District.

Mr. PRINDLE. The District deserves credit for taking the leadership to implement it, but these are very technical documents and so there are national processes and national organizations that develop the models, and the Federal Government could be a lot more aggressive in pushing for those 50 percent better performance levels in the national model codes and then at least the State and local governments have a model that they can draw on. They can

feel more confident in adopting one of those models if it has been developed and endorsed by a national organization.

Mr. HARRIS. Madam Chair, if I could add to that, I certainly agree with everything that Mr. Prindle has said. The Alliance to Save Energy, working with a number of other organizations, many of which you see here at the table, has actually proposed some legislation to do exactly that, to establish clear benchmarks for these national model codes to progress over time towards the kinds of goals that Mr. Stewart was talking about earlier.

There is a second role that I think is very important and we have been talking about it in the last few minutes, and that is that the Federal Government and, for that matter, State government agencies, local agencies, school districts can be the leaders, can say that their buildings are going to not only meet these new codes but go beyond them.

We have right now in Federal law a requirement that Federal buildings should be 50 percent more energy efficient than the current code. And as Mr. Stewart said earlier, AIA is proposing that these standards should be even higher for Federal buildings in the future, and our organization strongly endorses that.

I also point out—and Mr. Stewart may want to comment on this—that the vision 2030 goals that the AIA has outlined had been endorsed by the U.S. Conference of Mayors, by hundreds of mayors around the country. It is those same mayors whose building officials and building departments have responsibility for code adoption and for code endorsement in many cases, and they are also the building officials who go to the organizations that Mr. Prindle referred to and establish the model codes.

I am sorry to say that many times we see a very conservative approach from these building officials, and we would like to see the opposite; we would like to see them stepping out and providing leadership. And I think the mayors can be encouraged to talk to their building officials and say, when you go to this next code conference we want you to speak up for making building energy codes stronger than they have been. I think there is a lot to do at all levels of government.

Ms. NORTON. I would like to ask all four of you for some friendly advice. You saw me ask in the beginning about—or bemoan the absence of some universally accepted model for payback, life-cycle costing, or costing even in the nearer term. And I am wondering who might the Federal Government commission to do something like that. When we have had comparable things, although I must say this may be different, we have gone to somebody like the National Academy of Sciences or somebody like that.

To go to any of you is to go to people who will be seen with a vested interest, and I hope you do have a vested interest. The point is to give everybody else a vested interest as well. The fact that we can't put our hands on something definitive has not helped us. Obviously, if you sit down with experts, you can kind of figure out these models and what they mean; I mean, yes, from a technical and expert point of view that says this is what it means, America. Who in the world do you think could definitively do that and have it accepted as an objective source by the professions, by science, by the government and by the public?

Mr. PRINDLE. I will take a quick stab at that and my colleagues, I am sure, can add to that. There are some established available for life-cycle costing. The Department of Energy, for example, has life-cycle costing methods that it uses for setting appliance standards, in setting Federal building standards. The broader challenge, I think, is to translate those—you know, those are sort of economic analysis methods. Those have to be translated into the marketplace. For example, in the residential mortgage market, a mortgage should be underwritten based on the total of principal, interest, taxes, insurance and energy costs. If mortgage underwriters took energy costs into account when they underwrote a 30-year mortgage, that would change behavior in the mortgage market.

And so that the economic analysis tools are there. It is creating policies that gets them used in the market in real ways. Because even though the tools are there, what we see is market barriers and other forces continue to make those short-term driven decisions; you know, lowest first cost, and I am sure my colleagues would have additional thoughts on that.

Mr. STEWART. As you noted earlier in some of your comments, that kind of short quarterly, annual time frame where people are looking for payback is really very, very shortsighted when we know building lives are so extended. Some of the comments Mr. Harris made about exposing the real costs to tenants and the people who occupy buildings is important.

My firm, Gensler, did a survey of building owners and managers and tenants from our London office, and what we found there was that tenants were becoming increasingly disturbed at the fact that they were paying for inefficiently designed buildings. And so as the marketplace begins to recognize that they are assuming real-time costs now for decisions that were made long ago, I think we will begin to see that change.

Places where the studies can be done are like, NIBS, National Institute of Building Sciences, in places like that. We are working with Mr. Harris in the large Berkeley lab on some proposals to look at ways where we can enhance sustainability as well as examine the payback. So I know you have been working a lot with that, Jeffrey; you may want to comment on that.

Mr. HARRIS. Sure, thank you. I will. I think there is a whole lot to do in this field and I think that is probably a topic for a separate hearing which we would be delighted to attend. Suffice to say, I think going back to what Mr. Prindle said, there are lots of methods out there for doing the economic calculations. I think it is a question of how to deliver the message as both of you have, I think quite rightly, said.

Let me give you one example. If you buy a refrigerator now, go into a Circuit City or wherever you want to shop for appliances, you will see a yellow label that is the FTC energy guide label. And if you squint carefully and take out your glasses you can find a dollar amount. The problem is most people can't see it. And research has shown—research from Mr. Prindle's organization—that a significant number of people who see that number, $75, think that it is the savings number and not the annual energy cost, which in fact it is.

Ms. NORTON. So government, of course, can require that it be seeable and knowable from reading it.

Mr. HARRIS. That is exactly right. And right now the FTC is in the middle of a proceeding to try to redo that label to make it much clearer and easier to understand, so that is a great example of how delivering information is really key.

Let me suggest another way in which delivering information is going to matter. When Congress approves the budget for constructing a new Federal building, I believe, if you look at one thing and that is the price tag for that building, you are not looking at the price tag for the building, you are looking at part of the price tag for the building, as Mr. Prindle, Mr. Stewart and Mr. O'Brien of said.

What we should find is ways to get Congress to look at the total price, the true cost of building and owning and operating that building, including its energy costs, because that building is going to be there for half a century, maybe longer.

Ms. NORTON. You think we can do that even for leased buildings? Because we are the ones—they lease them, but they need us in order to have a building in the first place.

Mr. HARRIS. And I think leases, because they have already spread out the costs in the lease payments, are one of the better ways to get at the question of not only the cost of occupying the building but of paying for the energy bill for the building.

Ms. NORTON. One of the reasons that strikes me is because we lease many buildings for long periods of time, that we do not then own at the end. When you lease—energy savings for having leased a building all that period.

Mr. HARRIS. I agree with you, Madam Chair. One of the recommendations we make in our written testimony is that the requirements for energy efficiency in a building that the Federal Government builds and pays for up front should also apply to any building that is built by a private developer for the purpose of leasing to the Federal Government.

Ms. NORTON. What about buildings we already lease and we for the most part—let's say in the District and the region—we will be leasing buildings that are already up, sometimes we have been leasing for some time. Do you think that we could have same or similar effect on those buildings?

Mr. HARRIS. I honestly do. And I think the way to do that is over time as these leases are up for renewal, every 5 years or whatever it is, there should be a requirement that the lease renewal include a renovation cycle, a retrofitting of the building for all measures that are cost-effective over some period of time, perhaps the term of the next lease.

Now once you have a building in place, as Mr. Stewart said, you are limited in what you can do with it. But there are still major renovation cycles that occur in buildings, and that is the opportunity certainly to renew the lighting system, sometimes to replace windows, and oftentimes to renew or redo the heating and cooling system and controls. So there are opportunities even in leased space. And we need to use the market power, especially in the Federal Government, especially here in the District to make energy efficiency happen.

Ms. NORTON. So much power so unused makes me cry. In your own testimony you say we could drive the cost of energy down throughout the United States.

I want to thank you very much for testimony that has been enormously enlightening, and for suggesting ways that we can immediately approach these very important issues. And I am going to turn the meeting over to the next round. The next round is aviation and——

Oh, please be seated, Mr. Costello. And here the Chairman is coming back. We will have some questions on remaining questions for you.

Mr. COSTELLO. [presiding.] Gentlemen, we have a number of questions left, and we will submit them in writing to you and ask you to reply.

Mr. OBERSTAR. Will the Chair yield for just a moment? I will announce that an agreement has been reached on the House floor that resolves the matter that has been the subject of repeated quorum calls, motions to rise, and attempts to disrupt the proceedings on the floor. The issue has been resolved. We will be able to proceed in an orderly fashion and hear testimony from this panel and the succeeding witnesses without disruption.

Mr. Costello will be in the chair, and I will return, but not necessarily for this panel, because I have another meeting I have to attend to.

Mr. COSTELLO. The Chair thanks the distinguished Chairman of the Full Committee. And I have two questions that I would like to pose to the panel, and then the rest of the questions will be submitted and we will ask you to submit your answers in writing.

All of us recognize that the Federal Government has come a long way in the past two decades regarding energy consumption, and the question is, where would you put your efforts in the next decade; research and development, alternative sources of of energy, consumption restrictions, adhering to stricter standards or efficiency investments?

Mr. Stewart, if you would like to go first.

Mr. STEWART. I think I would look at splitting my efforts between research and development. There is a lot of technology out there on the edge that could and should be brought to market that I think we will see great benefit from.

I would think the other opportunity would be to advance the regulations and incentives because the opportunities to use the carrots and the sticks of the marketplace and the regulations to get people to actually implement and adhere to the standards, I think is one of the bigger challenges we face.

As we have talked about this afternoon, there is a lot that can be done, but yet the market fails to respond. So if we can find ways to bring them around in their understanding of the benefits, not just in terms of the environmental benefits but the cost benefits, I think we would see a huge shift in the marketplace.

Mr. COSTELLO. Chair thanks the gentleman.

Mr. Prindle.

Mr. PRINDLE. Thank you.

I would say that we need a balanced portfolio of energy efficiency policies. The beginning of the pipeline, if you will, for energy effi-

ciency infrastructure is research and development. Energy efficiency research and development has been reduced by more than 25 percent during the current administration's tenure. After inflation, it is even worse. And that is not just cutting a few dollars; that is actually beginning to shut down whole sections of research institutions. That is infrastructure. That is infrastructure that we need to build the clean energy future. Congress needs to start by rebuilding the R&D and deployment programs at the Department of Energy and the other agencies, just to get us back on track.

We also need to expand the labeling and voluntary programs we have through Energy Star. Those are working very well. They are underfunded. But we are also going to need regulations. Our markets will be where the problem gets solved, but markets work best when they have targets to hit. And so we need to set standards for individual appliances. We have been doing a lot of that in the last few years, 15 products in the Energy Policy Act of 2005. We need standards for buildings, as we have been discussing, building codes. And we are also seeing at the State level, the States are setting energy efficiency targets on the macrolevel for entire utilities, for example. And for renewable energy.

And when you set targets for energy efficiency and you set targets for renewable energy, we are seeing some States that can actually see their carbon emissions beginning to go down in the next 15 years because they are beginning to do that. And so that is going to take some judicious regulation as well. It is really a spectrum. It starts with R&D and goes through regulation.

Mr. COSTELLO. The Chair thanks the gentleman. The agreement that Chairman Oberstar just announced lasted about 2 minutes and we now have another vote on the floor.

I have 12 minutes to get over, but let me—I am going to ask a final question, Mr. Harris and Mr. O'Brien, and then we are going to dismiss this panel and ask the third panel to come forward. We will go over and vote—there are two votes—and then come immediately right back. And if the third panel can be at the witness table, we will proceed immediately.

Mr. Harris, what are the biggest obstacles you view to a national energy policy?

Mr. HARRIS. I don't know that I can do that justice in a minute or so, but let me take a stab at it.

I certainly think that we have a lot of education to do to help people understand better how energy is used and where the opportunities are in their daily lives and the way they run their businesses and, in the case of policymakers and elected officials, in the areas under their jurisdiction for saving energy.

So I think education has got to be a centerpiece of what we do, and overcoming what I don't think is really reluctance—I think people are all busy, we have day jobs. I am fortunate that my day job is energy efficiency. But I think that we can nonetheless start with our elementary schools, and the Alliance to Save Energy is working with a number of school districts to do that and carrying it on throughout the school system and beyond. If there were a single thing that I would like to see happening that is not getting enough attention—and I agree with the list that my distinguished colleagues have just given you—it has to do with educating the

general public to be literate in energy and understand where energy-saving opportunities lie.

I think there is a flip side of that, and that is helping the people whose job is not only building buildings and operating them, but designing and installing industrial systems, running our utility companies to understand the opportunities for energy efficiency. We have, Mr. Chairman, in this business, in the energy efficiency business, a serious and growing workforce issue to deal with. We have people who—I will take the responsibility and let my colleagues jump in on this—are, frankly, getting a little long in the tooth. We have been in this business maybe 20, 30 years or longer, and finding the people who will replace us and come behind us, let alone let this field grow, is not going to be easy. So I think there is a huge education and workforce development challenge, and I hope that we can address it together.

Mr. COSTELLO. Mr. O'Brien.

Mr. O'BRIEN. You know, we have talked just a few minutes ago about the challenges of overcoming the mentality that focuses on the first cost, and I think that has a lot—I think we can take a look at the national—the lack of ability to move forward with a clear national energy strategy—in the same way that there is a limited political accountability for some of the consequences of maintaining the status quo, which, in the short run may be lowest first cost.

If you took a national energy strategy that was more akin to a life-cycle cost, the long-term consequences, you would end up with a portfolio that would include a much heavier dosage of energy efficiency and onsite renewable energy.

Mr. COSTELLO. Mr. Stewart or Mr. Prindle, would you like to respond quickly? Mr. Prindle, apparently, had the answer to the question so——

Mr. PRINDLE. The biggest obstacles to a national energy policy—I was going to say ignorance and apathy, but Mr. Harris spoke about education. I think he is really right, there. I think what we really have to grapple with in this new era of expensive energy and serious climate threat is we need to get past the argument about regulation versus markets. You know, there is this kind of split; you either have a free market energy policy or you have a regulated.

And we don't see it that way. We think that smart regulation actually helps markets work better. And let's get past this idea of the free market is going to do it or you need to regulate every facet of a marketplace. We have seen States in particular come up with very smart regulatory policies that have helped their economies and helped their energy industries. And we can find that sweet spot where regulation actually drives markets forward. I think that is a message we need to get across.

Mr. STEWART. I would simply add to the education discussion, is that a better understanding that the decisions we make today have a ripple effect on out through the decades for 50, 60, 70 years, and shortsightedness with which we tend to make these decisions really will be the problem that future generations will come back to us and ask, What were we thinking?

Mr. COSTELLO. The Chair thanks all of our witnesses here in this panel today, and this concludes the testimony and the questions from the second panel.

We would ask those who are on the third panel testifying—I would expect that we would be back here in the Chair in about 15 minutes and would ask you to be prepared to give your testimony. I will give an opening statement—a brief, very brief opening statement, and go directly to the third panel.

But, again, gentlemen we thank you for being here and presenting your thoughtful testimony and answering the questions of the Members. Thank you.

[Recess.]

Mr. OBERSTAR. [Presiding.] The Committee will resume. And Mr. Costello, Chair of the Subcommittee on Aviation will return to continue chairing the proceedings.

I regret that the announcement I made at the last vote was that this was the last vote that we were going to have of this kind. But there is still a disruption proceeding on the House floor that may go on for some time yet, a matter that we thought had been resolved at the leadership level, but there is still a Member proceeding on his own agenda, and we have no idea what is going to happen. So I would propose that we bring the Water Resources panel to the table. It will make for a long table. But make sure that we can get everybody together. And we will hear all testimony and then proceed with any questions that Members may have.

So are all—is Mr. Brandt, Mr. Fitzgerald—I think there were some who had time constraints. We did not anticipate this to be a marathon 7- or 8-hour hearing today. But those are matters beyond our control.

So we will begin in the order in which the witnesses are listed. And perhaps—no, we will just go through the Aviation panel and then the Water Resources panel. I think that is the best way to proceed.

TESTIMONY OF JIM MAY, PRESIDENT AND CEO, AIR TRANSPORT ASSOCIATION; GREG PRINCIPATO, PRESIDENT, AIRPORT COUNCIL INTERNATIONAL—NORTH AMERICA; MICHAEL McQUADE, SENIOR VICE PRESIDENT FOR SCIENCE AND TECHNOLOGY, UNITED TECHNOLOGIES CORPORATION; AND RICHARD L. ALTMAN, EXECUTIVE DIRECTOR, COMMERCIAL AIRCRAFT ALTERNATE FUELS INITIATIVE

Mr. OBERSTAR. So, Mr. May, welcome to the Committee. Thank you for your patience throughout this long day. And welcome to the legislative process.

Mr. MAY. Thank you, Mr. Chairman. This evening I would like to emphasize three key points. First, commercial airlines are extremely carbon efficient. Second, we are committed to driving our carbon efficiency even further. Third, as commercial aviation is a global industry, the United States should continue to support efforts by the International Civil Aviation Organization to further address aviation's contributions to climate change. Recent media reports from Europe have raised alarm bells about commercial aviation's contributions. Some rhetoric is extreme. Air transportation has been categorized as sinful.

Let me try and set the record straight. Commercial aviation contributes about 2 percent of domestic U.S. greenhouse gas emissions. At the same time, commercial aviation is critically important to our economy, driving about 1.2 trillion in economic activity, 6 percent of the country's economic output, over 11 million jobs, nearly 9 percent of employment. We have been able to deliver more value to the economy and reduce our carbon footprint because we are constantly improving fuel efficiency.

Since 2001, commercial aviation has achieved a 35 percent improvement. That is both in fuel efficiency and in our carbon footprint. U.S. airlines are highly motivated to continue the trend. Fuel is our largest cost, over $38 billion in 2006. But even in these highly constrained financial times, we have invested heavily in fuel-efficient capital and technology.

In the next 3 years we are going to receive over 500 new highly fuel-efficient aircraft from companies, the likes of which are Boeing and Airbus, who have been doing a terrific job in improving their own technology. We have relentlessly pursued operational opportunities to reduce fuel burn, including cutting-edge software to permit more direct routes, aircraft weight reduction programs, and improve ground operations.

There is a need for congressional leadership in three areas. First, you should ensure that this country's inefficient air traffic control system is modernized to permit more direct routing, saving fuel and emissions. Modernization can improve fuel efficiency——

Mr. OBERSTAR. Excuse me, Mr. May, could you bring your microphone just a little closer to you?

Mr. MAY. Yes, sir, Mr. Chairman.

Mr. OBERSTAR. Thank you.

Mr. MAY. Modernization will improve fuel efficiency and reduce greenhouse gas emissions an average of 10 to 15 percent on every single flight.

Second, we urge Congress to reinvigorate NASA and FAA environmental aeronautics research and development.

Third, we urge congressional action to spur further commercial development of alternative fuels. We urge Congress to move forward with legislation on all of these points.

A significant part of ATA carriers' operations are international, and U.S. airlines compete vigorously in that format. In light of our global nature, ICAO has endorsed the use of voluntary measures, and adopted formal guidance on voluntary agreements and operational measures to reduce fuel burn and emissions, which ATA and its member carriers helped develop.

Given these efforts, countries such as Japan, Canada, both of whom are parties to the Kyoto Protocol, and whose economies are closely aligned to the United States, have also chosen to address aviation greenhouse gas emissions through voluntary agreements.

So I close by asking you to note the achievements of the industry in reducing fuel burn and emissions. And while we are asking for congressional leadership, we are not asking you to work for us; we are asking you to work with us in addressing the environmental concerns. Thank you.

Mr. COSTELLO. [Presiding.] Thank you, Mr. May.

Mr. Principato.

Mr. PRINCIPATO. Thank you, Mr. Chairman, for allowing Airports Council International-North America to present the views of the Nation's airports on these important environmental issues. As has already been stated, the aviation sector contributes a very small amount to greenhouse gas emissions, yet ACI-North America members are doing their part to minimize impacts on climate change, just as they do in other areas such as water quality, noise, and local air quality.

Greenhouse gas emission reduction strategies employed by airports have included investing in and promoting the use of alternative fuel and low-emission vehicles and energy saving equipment, recycling building and construction materials, waste and water, improving the operational efficiency of the airfield and landside systems, acquiring green power, and providing emissions-reducing services for aircraft at the gate.

For example, Dallas-Fort Worth International Airport has converted nearly all of its fleet of vehicles to low-emission or alternative fuel. Portland and Denver have conducted inventories to determine their contribution to greenhouse gas emissions. Los Angeles has an onsite hydrogen fuel generating system. Numerous airports have installed 400-hertz power and preconditioned air units at gates to minimize emissions from aircraft auxiliary and ground power units. Sacramento installed a jet fuel pipeline to eliminate emissions from fuel truck traffic.

Airports have also reduced greenhouse gas emissions by implementing initiatives to reduce waste disposal and energy use. Last year, Terminal A at Boston became the first airport terminal in the world to be certified by the U.S. Green Building Council as meeting the requirements for LEED, Leadership in Energy and Environmental Design. Several other airports are currently working toward LEED certification for new or renovated terminal projects, including Indianapolis and Oakland.

Sustainability programs and environmental management systems, EMS's, are also becoming increasingly widespread at airports across the U.S. as mechanisms to minimize their environmental footprint. Chicago O'Hare has developed this Sustainable Design Manual to guide its entire modernization program. Miami-Dade, Westchester County, and Denver have also implemented EMS's.

On the industry level, the Airport Cooperative Research Program has provided a valuable resource for airports in helping to better understand and address many of the environmental issues facing the industry. Now, to further support these efforts, ACI has advocated a number of very specific ideas. We are working very closely with the staff on a number of them.

Rather than take the time to go through each of them, because we have spent a good deal of time working with the staff on AIP pilot programs and so forth to promote energy efficiency, low-emission vehicles and that sort of thing at airports, I just want to assure you that we are working very closely with the staff on these matters.

I want to close by making two specific specific points: Number one, asking you to consider making ACRP permanent at the administration's requested level of $15 million, and also supporting the designation of $5 million for much-needed environmental research;

and also, airports do support Next-Gen initiatives that will make the air traffic control system more efficient, both en route and on the ground, and reduce emissions and noise.

So with that let me close, and offer to answer any questions you might have. Thank you.

Mr. COSTELLO. We thank you.

And the Chair now recognizes Mr. McQuade.

Mr. MCQUADE. Thank you, Mr. Chairman, for the opportunity to testify. I am Michael McQuade. I am the senior vice president for science and technology at United Technologies Corporation. I am very pleased to testify today.

The approach Congress and businesses together adopt to tackle the climate change issues present both challenges and opportunities for the Nation.

Let me tell you a little bit about UTC. We are a $50 billion global company, a diversified company, headquartered in Hartford, Connecticut. Our chairman and CEO likes to say that our entire business is about combating gravity and the weather. We make things go up and down, we make things go hotter and colder. The common denominator in everything we do is the conversion of energy into useful work, whether it is in elevators or air conditioners or in the aerospace industry. So we are highly alert to the energy and conservation agenda for transportation and stationary applications.

Through a series of technology process and policy initiatives in the company during the period from 1997 to 2006, UTC reduced our absolute energy use by 19 percent, even as we doubled the size of our company. So we believe we bring a credible voice to the policy debate, as we have been a leader in addressing climate change by reducing energy use in our global operations and incorporating energy efficient innovations in our products.

Aviation is a global industry. On any given day, an airplane can literally be in multiple countries and on multiple continents. You have heard already from other witnesses about the importance of ICAO. We want to echo those remarks. ICAO, with its 190 contracting member states, is the place to establish guidance and policy to address global environment issues. We are an active participant with ICAO, and we support global solutions to global problems. We remain firmly committed in our support to alternate fuel initiatives, and participate fully in the work my colleague, Rich Altman from CAAFI, will describe next. At the same time, UTC believes the more immediate path to lower CO2 emissions for aviation is through energy efficient engine gains.

Our Pratt & Whitney business makes military and commercial aircraft engines, and we are taking a leadership role in developing new technologies, such as our unique geared turbofan, that will offer significant improvements in fuel efficiency and thereby directly reduce carbon dioxide emissions. Pratt & Whitney will have in place production- ready engine technology for the next generation of single-aisle aircraft. Key elements of our technology include the geared turbofan, low-emission combustor technology known as TALON, an advanced high-pressure compressor, and a suite of new high-pressure turbine technologies.

This unique engine configuration offered by the geared turbofan will deliver 12 percent reduction in fuel burn over best current sin-

gle-aisle engines, a 55 percent reduction in NOX emissions over the ICAO 2008 standard, a 20 percent reduction in noise over ICAO chapter 4 standards, and a 40 percent reduction in engine maintenance costs. And just to note, a 12 percent reduction in the aviation industry fuel usage would save over $14 billion a year, a figure which would exceed the current profitability of the industry and lead to increased energy security by reducing our dependence on foreign oil.

We are working in other areas to improve engine efficiency and reduce aircraft emissions. During the course of normal operations, airborne material is ingested into an aircraft engine and deposited on the internal parts. As you can imagine, over time this material builds up and leads to a drop in fuel efficiency. This performance deterioration can be restored by regular engine washing, which historically has been a very long process, using toxic chemicals. Pratt & Whitney has made this once labor- and time-intensive process operationally efficient with our environmentally friendly EcoPower Engine Wash System. Washing every engine airline system twice a year with EcoPower could save over half a billion gallons of fuel, the equivalent of 10 million pounds, or 5 million tons of carbon dioxide.

Major sources of air pollution at our airports are not limited to aircraft operations. Ground vehicles, automobile shuttles and public transportation for people and goods, baggage handling, maintenance repair, all contribute to the energy and emission footprint. We see fuel cells as a solution for this component of airport emissions. With more than 40 years of experience, UTC Power is the world leader and only company that develops and produces fuel cells for stationary transportation and space applications. Fuel cells combine hydrogen and oxygen to produce electricity with only two byproducts, heat that can be used for downstream heating, cooling and clean water. Fuel cells and other clean power technologies can be used to reduce air emissions for buses and ground support equipment, terminals, and adjacent hotel operations, backup power.

Let me summarize. Energy conservation presents the greatest near-term opportunity to reduce both consumption and emissions and should be a high priority for our Nation. UTC is investing heavily, and working in partnership with various government agencies to bring climate-friendly technologies to the aviation industry. The Federal Government should increase its focus and investment in existing and emerging alternate energy efficiency technologies, should support the VALE portion of the FAA reauthorization proposal, and invest in those technologies that have a high potential to be affordable and cost-effective to lead to market acceptance. This is why we focus on fleet applications for fuel cells rather than the distributive automotive industry.

We look forward to working with Members of this Committee and other stakeholders to ensure the commercialization of these advanced energy efficient technologies. Thank you for the opportunity to testify.

The Chair thanks the gentleman.

Mr. COSTELLO. The Chair recognizes Mr. Altman.

Mr. ALTMAN. Thank you, Mr. Chairman, for providing the Commercial Aviation Alternative Fuel Initiative with the opportunity to testify on the compelling issues of climate change and energy independence as relates to aviation. It is particularly satisfying to me to be represented on the panel with three of our sponsors, the Airport Council International, ATA and United Technologies, as part of the Aerospace Industries Association. CAAFI is a data-gathering and communications process that seeks to increase both the quantity and the quality of dialogue among its airline, airport, manufacturer and FAA sponsors. It also seeks to engage multiple government, industry and university stakeholders.

The fundamental belief of the sponsors in forming the CAAFI process is that aviation is data-driven and relatively small in size, allowing it to benefit from such a process. CAAFI sponsors and stakeholders recognize the data they develop and collect, in the hands of key analysts and decision-makers in such matters as safety, security, and the environment, will be a catalyst for informed and expedited solutions which serve all components of the supply chain well. Such clarity of solutions and messages, we believe, will spur suppliers to invest in solutions suitable for commercial aviation. The goal is to make our relatively small sector of the transportation market a customer of choice for alternative fuels.

My role as executive director is simply to be the facilitator of that process. While I am an independent contractor to our FAA sponsor in this role, my task is to balance the interests of all four supply chain sectors. So getting to the aviation fuel option specifically, we are evaluating three fundamental categories. One, largely non-renewable from coal and gas, could be available in the zero to 5-year time frame, in some quantity; I want to make clear, not for all the total supply.

As can be expected, there is far more data available on these sources, and consequently more information that will be discussed regarding both the technical and business perspectives.

In near- to mid-term, 5 to 15 years, biodiesel renewables and some more difficult to extract non-renewable sources, such as shale oil, are possible, according to the United States Air Force Science Advisory Board. Blends of renewable and non-renewable sources can be brought into play in this time period. Some analysis of how deployment can be effective in this area have been brought to CAAFI's attention, and I will address those very briefly.

Long term, 15 years and beyond, biofuel renewable candidates from a variety of alternative processes could be targets for aviation. Let me give you a very brief summary of those three categories, both from the R & D certification and qualification status, the environmental status, and also what the business scenario looks like for each.

In the case of the certification qualification of Fischer-Tropsch coal-to-liquid or gas-to-liquid fuels, two specific types; one, Syntroleum, that flew last year on a B-52, and Sasol, a coal-to-liquid derivative, have been tested. The testing is complete to industry standards now, and could be qualified by midyear. There will be created a generic specification for coal-to-liquid or gas-to-liquid. Any Fischer-Tropsch process will be completed by the end of the

year. And then lastly, within the next year, about 100 percent will follow.

In fact, the CO2 output of this particular item without coal capture or without carbon capture and sequestration is, in fact, worse. However, most of the plants that are being contemplated do have provision for sequestration. And in addition to that, they have the ability to use the carbon in some cases. Local air quality is extremely important in these cases, and the Fischer-Tropsch fuels we are talking about have significantly better attributes in terms of particle matter, and also in terms of sulfur, which is particularly significant in that it allows the same fuel to be used in ground equipment, could conceivably be used in jet aircraft.

There have been significant studies done by the Department of Energy, and it shows affordable cost in this particular area. There is a limit in current production, and therefore incentives would be required to move forward. There are also, in the case of Fischer-Tropsch fuel, there is an opportunity to add biomass to that fuel. And those particular provisions, if they are at the 20 percent level, will create a significant opportunity.

It is very significant, I think, to Mr. Costello that one of the studies that was done has been done by Princeton University in southern Illinois, Fayette County, showing the economics of combined Fischer-Tropsch and agricultural capability and how that could work.

Lastly, the last option that we are looking at here are oils, vegetable oils, fuel from algae. That particular type of technology is further out in time, and the economic case for those types of renewables has yet to be made. I think it is important that it be looked at in similar depth to what's been looked at in the case of the Fischer-Tropsch coal-to-liquid fuels.

So with that, I will leave with one final statement. And that is that the FAA authorization requests—and this was mentioned by Greg—in terms of the ACRP program, is extremely important in terms of the Clean Research Program that they have indicated they will spend on alternative fuels. Those two things the people who I work with consider to be right-sized and totally appropriate and should go forward in the reauthorization. Thank you.

Mr. COSTELLO. If the Chair would yield?

Ms. JOHNSON OF TEXAS. [Presiding.] Yes.

Mr. COSTELLO. Let me thank all four of you for your testimony. We will have questions for you concerning your testimony.

At this time the gentlelady from Texas, who chairs the Water Resources Committee, will recognize the panel here to testify for water resources,

Ms. JOHNSON OF TEXAS. Thank you very much. And let me thank both panels for being so patient today to stay here all day. And I am going to call out of order, because Mr. Fitzgerald has to leave to get a plane. And he goes to Houston, Texas. And being from Texas, I am taking that liberty.

I gave my opening statement about 1:30 today because that is the time that I was supposed to be up. And I came in here from another Committee and didn't learn until after that that was just a question period for the first panel. So thank you for being here. And Mr. Fitzgerald, you can make what statement you would like.

And then we will get them to submit any questions they might have so you can get out on time.

TESTIMONY OF STEVE FITZGERALD, CHIEF ENGINEER, HARRIS COUNTY FLOOD CONTROL DISTRICT, HOUSTON, TEXAS, ON BEHALF OF THE NATIONAL ASSOCIATION OF FLOOD AND STORMWATER MANAGEMENT AGENCIES; BRIAN RICHTER, DIRECTOR, GLOBAL FRESHWATER INITIATIVE, THE NATURE CONSERVANCY; ALF W. BRANDT, PRINCIPAL CONSULTANT, COMMITTEE ON WATER, PARKS AND WILDLIFE, STATE OF CALIFORNIA ASSEMBLY; AND LINDA STROUT, DEPUTY CEO, PORT OF SEATTLE, ON BEHALF OF THE AMERICAN ASSOCIATION OF PORT AUTHORITIES

Mr. FITZGERALD. Thank you very much. And on behalf of the National Association of Flood and Stormwater Management Agencies, or NAFSMA, I would like to thank you for this opportunity to present this testimony today. NAFSMA represents more than 100 local and State flood and stormwater management agencies. Our members are on the front line, protecting their communities from loss of life, and reducing flood damages to homes and businesses. Scientific analysis and interpretation of climate, weather and stormwater runoff data is of fundamental importance for the planning, design and operation of stormwater and flood protection facilities.

Historical data and events are used by scientists and engineers to estimate risks and levels of protection for existing and future flood protection systems. Other factors clearly influence the decision of how to provide protection, such as lives at risk, damages avoided, environmental impacts, costs and ability to pay.

So how does climate change affect local stormwater management agencies? It comes down to deciding whether to include climate change as a factor in estimating risk and levels of protection to size future flood protection facilities or modify existing ones. How much of the calculation should be based on historical data and how much on future climate projections? Presently, very few of our members are considering future climate change because of the many unknowns.

NAFSMA has five recommendations for the Committee.

Number one. At the Federal level, continue the targeted climate change research to establish public policy based on sound scientific research. NAFSMA supports the ongoing Research and Application Initiatives Assistant Secretary Woodley presented to this Committee last Friday. We also support inclusion of State and local officials in federally led research and policy development. All of the impact and much of the cost of any decision to incorporate or not to incorporate climate change as a design factor will be borne by State and local entities.

Number two. Provide adequate funding for research and existing programs that address responses to our climate. Specific examples are the USGS stream-gauging programs. These gauges serve as the backbone of our stormwater and flood protection systems, the NOAA, NAFSMA and National Weather Service research efforts, FEMA's map modernization programs, that better defines risk for our local communities, and FEMA mitigation grant programs. And

finally, the Corps of Engineers research efforts, water resources studies and projects, and operation and maintenance of existing facilities.

Third recommendation. Allow projects to proceed under existing policies and design parameters. We need to provide definitive protection today instead of waiting for future climate conditions yet to be determined. This is in the public health and safety interest of local communities.

Four. Once climate change-related policy is adopted, incorporate changes within current policies for planning, approval, funding, implementation, and operation so that the projects will be in place and work as intended when they are needed. Specific suggestions that update the current project evaluation process to give public safety equal standing with the national economic development standard, reduce the time to identify projects by eliminating redundancies and unnecessary steps, such as the Lean Six Sigma Process recently initiated by the Corps of Engineers, and streamline permitting for operations and maintenance of activities of flood protection facilities.

And the final recommendation. Encourage strong and deliberate interagency coordination among Federal agencies. A good example of this has been the recent efforts by the Corps of Engineers and FEMA to address levee safety and flood risk reduction. Together they have initiated the national levee inventory program and a national flood risk management strategy, with active local, regional and State involvement.

As climate change issues and impacts are addressed, cooperation and collaboration will be imperative to making sound and informed decisions. And thank you for letting me make this presentation today.

Ms. JOHNSON OF TEXAS. Thank you very much. And my staff person here will help you get out of this building if you don't know it real well.

Mr. FITZGERALD. Okay. Thank you. I appreciate it.

Ms. JOHNSON OF TEXAS. We will go back to our regular order, unless someone else is in a real big hurry. Mr. Brian Richter is next. Oh, I am sorry, Dr. Gerald Galloway.

Mr. GALLOWAY. Thank you, Madam Chairman. Can you hear me? Can you put on the slides there, if you would?

Thank you very much for giving me the opportunity to be here today. I am Jerry Galloway, President of the American Water Resources Association, which is a multidisciplinary group of professionals chartered to deal with water resources, education, research and management. And we are waiting for a slide. Let me continue.

My message today is very straightforward. The United States faces significant water resource challenges, and we are not properly addressing these challenges. Climate change is only going to exacerbate the very challenges we have faced in the past and make it more difficult in the future.

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Water resources are a critical component of both our national security and our national economy. And we recognize that. I know the Members of the Committee are very familiar with the challenges illustrated on this slide, ranging from water shortages,

water quality backsliding that is going on, the problems we have with ports and harbors in need of rehabilitation, losses in wetlands and habitat, problems with getting adequate funding for restoration in many areas where ecosystems are in great danger. Water conflicts still abound.

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We also face significant challenges in the flood damage reduction area. The annual flood losses in this country are continuing to grow. Climate change will just make that worse.

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The American Society of Civil Engineers biennial report on the status of our infrastructure clearly indicates that we are giving a very poor job, a grade of D, to the work that is going on. The backlog in annual shortfall of funds necessary for this infrastructure are in the tens of billions of dollars. And, again, climate change will just make this more difficult.

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At the international level, something of importance for our national security, and mentioned earlier today, the U.N. Reports that 5 million people, mostly children, each year will end up having significant problems as a result of the lack of access to water.

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What is interesting and illustrated in this slide is the fact that credible organizations report significant challenges with what water resources will look like in the future. We can see from this slide that we are dealing with increases in water at high altitudes, high latitudes, and in the mid-latitude areas an increase in the shortage of water, further exacerbating the drought that I mentioned earlier. We see that there are problems with the resilience of ecosystems and the challenges that we will face in dealing with sea level rise and the surges that will come as a result of hurricanes and other acts of nature in these coastal and riverine areas near the coasts.

Next slide. Next slide.

I think the major challenges in this area can be seen in coastal Louisiana, where the impacts of climate change increased the surge heights and increased elevations as a result of climate change make the challenges they already face even more difficult.

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The work that is going on on examining the protection of Louisiana will become increasingly more important as we get more information and understand better what climate change is actually going to mean.

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The AWRA conducted three water policy dialogues over the past 4 years at the request of 10 Federal agencies and 49 governmental organizations. These dialogues brought together experts from around the country to discuss our Nation's water challenges. And it is important to note that as they developed the consensus, they represented all parts of the country as we moved forward to discuss the issues. The general conclusions are——

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-- the Nation is operating without a sound understanding of the water challenges we face. We have not had a national water assess-

ment since 1976. And given the impacts of climate change, it is critical that such a national assessment be undertaken.

Second, the efforts to deal with water lack focus and immediate attention. Our Nation's approach to dealing with water has been ad hoc on a project basis versus a systems and a watershed basis and needs to be reformed.

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The participants in the National Water Policy Dialogues concluded that the administration and Congress should work with Governors and leaders of the country to develop broad principles for water management. We don't have a vision. We don't have a national vision. We don't need a Federal vision. And there was a strong sense that the center of gravity for water issues should rest at the State level, as the Federal Government should provide support, with the States leading the way.

They also determined that there should be better coordination of water resource activities among Federal agencies and within the Congress, and that the administration must encourage policies that promote watershed planning, and that ensure that our Nation's scientific talent is put to good use.

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With specific respect to climate change, the Dialogue believes that Congress and the administration should provide adequate funding to Federal agencies to carry out climate change impact analyses for the planning of new projects, and most importantly, for the operations of those that are currently in existence. They have the authorization, but not the funding.

And lastly, that Congress should closely examine the allocation of funds for water resources infrastructure. Our current situation points to the failure of current funding levels to adequately deal with the problems we now have. And climate change is just going to make that situation worse.

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In sum, let me say that the stewardship of the Nation's water resources is being neglected. And the manner in which we deal with water issues and climate change in specific terms is dysfunctional. We urge you to initiate substantive efforts to develop a coordinated, collaborative national, not Federal, approach to preserving and protecting our water resources, our infrastructure, and the ecosystems they support.

Thank you very much for the opportunity to testify today.

Ms. JOHNSON OF TEXAS. Thank you very much. We appreciate you being here.

Mr. Brian Richter?

Mr. RICHTER. Yes. Madam Chairman and Members of the Committee, I want to thank you for this opportunity to testify on the impacts of climate change on our water resources. My name is Brian Richter, and I am the director of the Global Freshwater Initiative for The Nature Conservancy. The Nature Conservancy is a leading conservation organization that protects ecologically important places for nature and for people. Our on-the-ground conservation work is carried out in all 50 States and in more than 30 other countries. While The Nature Conservancy's mission is focused on sustaining the Earth's diversity of plants and animals, we know

the protection of ecosystems is also critical to human well-being. Therefore, we are gravely concerned about the potential for climate change to substantially disrupt the things that everyone in this room cares about: our economy, our culture, and the ecosystems that support our way of life.

Failing to protect freshwater and coastal ecosystems from these climate changes will have tangible societal, cultural, and economic consequences. That is why The Nature Conservancy is calling for legislation and policies to address greenhouse gas emissions by establishing a strong, cost-effective cap and market-based program to reduce emissions. In addition, we believe that it is critical that such a program help to reduce emissions from deforestation and support land conservation by crediting activities that deliver sustainable, high-quality emissions reductions and carbon sequestration.

Now, we also urge your support for adaptation programs that can help ecosystems, and the human communities reliant upon them, to cope with the impacts of climate change. As we all know, even immediate reductions in greenhouse gas emissions will not avert the expected climate impacts of gases we have already put into the atmosphere. Therefore, we need to ready ourselves for the associated changes that will come. To meet human and ecosystem needs in the face of climate change, we must do a much better job of comprehensively managing our water resources. Dr. Galloway made these points very eloquently a moment ago.

First, we need to assimilate much better data on the availability of water and how it is being used. Today, most States possess only a rudimentary understanding of who is using water, how much they are using, when they use it, and how much is left for other purposes. Fortunately, there are promising efforts underway in a number of States, including Texas, which has developed state-of-the-art computer tools to help support water management. To ensure that all States have a similar ability to account for and manage water resources comprehensively, we must substantially increase State and Federal investment in basic water accounting, particularly for the U.S. Geological Survey and the United States Environmental Protection Agency.

Comprehensive water management also involves improved management of our existing water infrastructure, such as the more than 2,000 large Federal dams in this country. By reevaluating current operations of these facilities, we can better serve human needs and adapt to changing conditions, while also protecting our natural ecosystems.

For example, through a national partnership with the Army Corps of Engineers, called the Sustainable Rivers Project, The Nature Conservancy and the Corps are working together to improve the management of 27 dams in nine different river basins across the country. Together we are finding abundant opportunities to better protect the river ecosystems affected by these dams, while continuing to provide flood control, water supply, hydropower generation, and recreational benefits.

The second issue I would like to address is substantially greater flooding of our Nation's coasts and inland waterways that is expected to occur with climate change. To adequately respond to more

frequent and intense flooding, our flood management efforts must account for the services that are provided by healthy natural ecosystems. By allowing rivers to once again safely spill onto their original floodplains in places where they have been leveed or channelized in a carefully managed manner, we can restore critically important natural flood storage, while simultaneously increasing the production of fish and waterfowl, recharging our groundwater aquifers, and naturally purifying water as it flows through flooded wetland areas.

By increasing the flood storage capacity of natural floodplains, some of the reservoir capacity presently being used to store floodwaters could be made available for storing water supplies that will be needed during more extreme droughts in the future.

The Conservancy has already begun innovative projects that use nonstructural approaches to flood protection needs. In Hamilton City, California, along the Sacramento River, we are working to improve flood protection for a town whose only flood defense is a degraded levee that may not even hold during a 10-year flood. This project will replace the existing levee with a setback levee that will provide vastly improved flood protection, while reconnecting the floodplain to the river. This win-win project increases the flood storage capacity of the river basin and provides critical habitat for wildlife.

We must replicate projects like this around the country. To enable more of this work, we must increase investment in aquatic ecosystem restoration and create incentives that discourage development of critical floodplains and coastal wetlands.

Finally, there is perhaps no smarter action that can be taken today than to simply do everything we can to preserve our future options and flexibility. When we allow people to use all of the water available from a river, we put those water users and the ecosystems they depend upon at great risk as the climate and associated water availability begins to change. The Nature Conservancy is working with leading scientists around the world to develop new decision tools to inform water managers about the volume of water that must be left in a river to support its health and our future needs. Many States are ready and willing to use these new tools, but they will need help and support from the Federal Government.

In closing, it is important that all of our policy and on-the-ground adaptation measures recognize the need to maintain healthy and resilient ecosystems that preserve the ability to adapt in the face of climate change and continue to meet the needs of both humans and wildlife. If we do, we can ensure that our rivers will continue to sustain us and inspire us.

I want to thank you for your attention and this opportunity to share our thoughts with you today.

Ms. JOHNSON OF TEXAS. Thank you very much.

Mr. Brandt.

Mr. BRANDT. Thank you, Madam Chair. My name is Alf Brandt. I am the water law and policy expert for the California State Assembly, and I am here to talk a little bit about the policy. I am not a scientist, but we are—we have started a conversation about climate change in California and its water resources. And it is the fact that we have started the conversation. No, we don't have final

answers, and no, we don't have final plans; but we have started the conversation and are starting to do things to respond to it and prepare for it. So that is what I would like to explain.

And the first question would be why.

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And part of that is the nature of our system. It is perhaps the most sophisticated water supply and flood system in the world, because it stores and conveys water for hundreds of miles. And this is the same system. Both the flood and the water system are combined. They rely on the same reservoirs and the same rivers to deal with both flood and supply.

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And, of course, going down to the bottom of each of the major rivers in the Central Valley, Sacramento and San Joaquin, is the delta, which is critical to California.

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Yes, it is perhaps some of the most valuable ecosystem, estuary ecosystem on the west coast of North or South America. It is also an agricultural area. But most importantly for this Committee, it is the heart, the true heart of the California water system. From the delta, the urban areas—yes, agriculture gets a lot of its water from here, but most importantly both the Bay Area and San Francisco, as well as Southern California, get about a third of their supply from the delta. It is critical.

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And, of course, the delta is more than just a water conveyance as far as infrastructure goes. It is also—keep going—it is also infrastructure, urban infrastructure, highways, railroads, gas lines, electric lines, major power lines, although things are in the middle of the delta. So infrastructure is a critical part of why the delta is so important. And, of course, it is in the center, it is at the bottom of both streams, it is in the center of—go ahead—it is in the center of the Central Valley and in the middle of what used to be called and known by the Indians as the ″inland sea.″ it is a bowl. And it is—it creates huge challenges, because this used to be, for many months of the year, a huge, perhaps 40 miles wide, 200 miles long, inland sea for much of the year during the wetter months. Go on.

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And what we did is we created these narrow channels, putting it into a narrow channel to wash down gold mining-era sediment and scour out those channels and get rid of that sediment to protect us, protect farmland at that point. Of course, next we put houses right next to it, as well at this point, thousands of houses across the Central Valley.

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And of course this sophisticated system, the important part for climate change is the use of energy, use of power for our water system. About 19 percent of California's electrical energy is used by the water system, both to convey it, to treat it, to clean it up after it is used, before it is put back in. So it is a substantial amount of our energy is used by the water use—by the water system. So it is a critical tie to climate change.

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Of course, add to that climate change, and you can see here some of the—just one the many graphs that we have seen of showing how much climate has changed in California. This goes up through 1995. And you can see some significant differences. Since then it continues. That trend continues. Warmer temperatures leads to less snow, more rain, earlier spring runoff, and for the purpose of this Committee, the interests of this Committee, that can lead to more floods.

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Loss of our snowpack is critical to us, both to the water supply as well as the risk to floods. You can see this is a slide I chose—this is the worst case I have seen—that at the end of the century, we may be looking as bad as 11 percent of our snowpack. And we rely on the snowpack, both for water storage, seasonal water storage, so it comes down slowly so it can feed irrigation during the summer, as well as for flood protection. Because the more that comes down as rain, the higher the flood levels.

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And that is consistent with what we have seen in the 100 hundred years, a continuing trend going up as far as seriousness of the floods over the last 100 years. And that trend has advanced in the last 10 to 15 years.

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Of course, that has led to greater awareness of the real risk to people from floods. This slide shows the depths. In some of these places it can be very deep. The dark blue shows more than 9 feet. Some of those areas are as deep as 20 feet deep. That is about the height of a 2-story house. That is how deep some of our floodplains are. So it is a serious risk for us. And climate change added to that makes it a major threat for us.

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Of course, at the bottom of the system, suffering one of the greatest threats, is a delta which is created by a bunch of levees surrounding islands that were created in the last 150 years. It is an area that has subsided. So many of these islands are below sea level. The orange areas that you see on this map are below sea level or below the water level right next to the island. As sea level, rise goes up and other kinds of influences, the floods coming down, all those make these levees more at risk. These are all private levees. These are not State or Federal levees.

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And, of course, the risk for us, for our water supply, and for flooding if these levees collapse—say if there were an earthquake and many of these levees collapsed—this would turn into an inland sea, a very deep inland sea, no longer that wetland that was shown, but very much of an inland sea.

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So that brings us to what we are doing. Keep going. This shows all the things that we have been talking about, we have been looking at, starting in the last year or so. Now, we haven't passed all these bills, but we have started the conversation about how to do it. Our State agencies have already started assessing how climate change can be incorporated into it and how we can manage for the uncertainty. We have started planning for climate change and deal-

ing with floods, for instance, allowing for some of the flexibility to allow us to take water off the floodplain, off this river to predict that, and also dealing with floodplain land use so people in these deep floodplains are protected and not putting houses there. And we have had some great success with recycling and conservation, which contributes to reducing the greenhouse gases. And, of course, we are making choices, and we are looking at making choices—we haven't made them yet—based on climate change information. All that can be helpful.

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So let's go next slide, to the information about the Federal Government. And I will just run through this quickly. I think this has already been talked about. Actually, this is consistent with both Mr. Richter and Dr. Galloway. But it is things that—I think the key point here is the relationship between the State and the Federal agencies on flood needs to change at this point, and particularly for California, whose voters have approved $5 billion in bonds for floods. The nature of the relationship, with the Corps not having the money that it used to have, we cannot afford to have them be in total control and get in the way of us trying to make some fundamental changes and choices about climate change. That may be different than what they have traditionally done. And I think that is the one I want to emphasize most. But just like we have started to incorporate climate change into planning, it is necessary that they start doing it as well. It is key for us to work together on doing this. And I wish you luck.

Ms. JOHNSON OF TEXAS. Thank you very much.

Ms. Linda Strout, you are the last witness. And that doesn't mean that your testimony is not very important. You may proceed.

Ms. STROUT. Thank you. My name is Linda Strout. I am the deputy CEO of the Port of Seattle, and today I am testifying, however, on behalf of the American Public Ports Association. AAPA represents all major public seaport agencies on the Pacific, Atlantic, Gulf and Great Lakes coasts. We thank you for the opportunity to testify today.

Air emissions are an area of growing concern for U.S. public port authorities and the communities in which they operate. And reducing air emissions is a priority for our industry. The Port of Seattle and many AAPA members have been engaged in air quality improvement efforts related to seaports for several years. Recently, those efforts have grown to specifically include greenhouse gases. Greenhouse gas emissions related to ports are primarily carbon dioxide, formed whenever fuel is burned. And efforts to reduce these emissions have therefore focused on increasing fuel-use efficiency or the use of alternative fuels. Diesel engines power the yard equipment that handles containerized cargo, such as rubber-tired gantry cranes and yard hostlers, and they also power the trucks, the rail engines and the marine vessels used to bring cargo into and out of our ports. While remarkably efficient and durable, these engines are a significant source of air pollution.

There are a number of ways to reduce diesel engine emissions, and ports across the country and across the world are engaged in a wide variety of programs and initiatives to reduce those emissions for their own facilities, their fleets, their vehicles, and their

dock equipment within their control. Such efforts are detailed in the written testimony, but cluster in four main areas. And those are the use of alternative fuels, such as biodiesel, ultra-low sulfur diesel and blends, and some natural gas forms. Also, the use of electricity. The use of repowering, which is replacing older engines. And finally, retrofitting existing engines.

At the ports of Seattle and Tacoma, nearly all of the yard equipment and the port's own diesel-powered vehicles are fueled by ultra-low sulfur diesel, biodiesel or a blend. At the Port of Seattle, in addition, now, our Shilsole Bay Marina, a 500-slip recreational marina, makes biodiesel available to all recreational boats and tenants. The port of Long Beach is testing three liquefied natural gas yard hostlers, which the port estimates will produce a 60 percent reduction in NOX and an 80 percent reduction in particulate matter over conventional Tier II diesel engines. Electricity is being implemented as a diesel alternative at several ports, including L.A. For several cargo terminals, and in Seattle for its cruise terminals.

At most major seaports now, the large cranes used to transfer containers between ships and terminals are all electric, and ports usually provide plugs on terminals for powering refrigerated containers instead of using diesel engines. We are aware that shoreside power for ships is not a one-size-fits-all solution. It is expensive. It requires substantial infrastructure. And if the electricity is produced by a source that is also creating greenhouse gases, then it is not a perfect solution.

Repowering equipment that uses older legacy engines is a third strategy that has proven effective, generally by use of on-road engines to replace off-road equipment such as yard tractors. Both New York-New Jersey and L.A. have enjoyed real success in their programs in this regard.

The fourth diesel emissions reduction strategy is that of retrofitting older diesel engines with a piece of after-treatment technology such as diesel particulate filters, selective catalytic reduction systems, or diesel oxydation catalysts. An interesting example is the Port Authority of New York-New Jersey retrofitting one of the Staten Island ferries with two types of retrofit technology to achieve a more than 70 percent reduction in NOX.

All of these efforts focus on equipment within—that I have just described—focus on equipment within a port's control by lease or agreement or because it owns equipment. But I would want to spend a couple of moments focusing on the efforts within the port industry. Those are important, but outside of the port control, which is really where we can use help from Congress. Oceangoing vessels are, generally speaking, the most efficient way to move goods. And their demand, therefore, for their services is predicted to rise. Oceangoing vessel owners and operators are taking steps at lower emissions too. Some, like Westwood Shipping Lines, have chosen engines that are certified to reduce emissions. However, because the majority of vessels calling on the U.S. port facilities are foreign flagged, they are not regulated by EPA. The International Maritime Organization, IMO, sets standards for these vessels.

In 1997, the IMO, as you all know, adopted Annex VI of the International Convention for the Prevention of Pollution from Ships, or MARPOL. AAPA supports the legislation to implement

the MARPOL Annex VI treaty as quickly as possible. We applaud this Committee's leadership in the swift passage of H.R. 802 in this Congress, and we urge you to help ensure that the Senate addresses this issue as expeditiously as well. It is critical that the United States become a party to this treaty, which is the necessary regulatory mechanism to mandate lower ship emissions. Implementation of MARPOL Annex VI is supported by the shipping industry, as well as the port industry.

Trucks and rail emissions outside of our fences also are not under port control. While new trucks must comply with EPA's on-road standards, older legacy engines can contribute disproportionate amount of air emissions. Port authorities do not own the trucks that—in general do not own the trucks that service their terminals, and therefore cannot mandate when older engines are retired or whether they are retrofitted.

Another barrier to addressing truck emissions is the prevalence of independent owner-operators, who often simply do not have the capital to invest in expensive new equipment or to upgrade their vehicles before their engines become useless. Therefore, in order to more effectively reduce emissions on the land side of port operations, AAPA encourages Congress to fully fund the Diesel Emissions Reduction Act or the D-E-R-A, DERA.

This legislation, which was enacted as part of the Energy Policy Act of 2005, would allow for up to 200 million annually for the EPA to fund voluntary emissions reduction projects at ports, some of which I described in construction equipment, in school bus fleets and in the movement of the freight. To date, EPA has funded 11 port-related projects with $1.9 million in Federal funds and 2.5 million in matching funds.

Some of the projects have included installing diesel oxydation catalysts on cargo handling equipment at the ports of Philadelphia, Seattle, Houston, Tacoma, the Massachusetts Port Authority, as well as buying low-sulfur fuel for cruise ships in San Francisco.

US EPA grant funding also supported the landmark Regional Maritime Emissions Inventory for the Puget Sound region that recently was completed by a collaborative group of air agencies, industry ports, and advocacy groups, and was led by the Port of Seattle. It is the first of its kind in the Nation, and it is under an agreement, a separate agreement reached with the Vancouver port in B.C. They will do a similar air emissions inventory that will utilize the same modeling so that the entire air shed will be reviewed in concert.

Ms. JOHNSON OF TEXAS. Can you begin to wrap up?

Ms. STROUT. Yes. I am right at the end.

Finally, the Federal Government can help reduce port-related air emissions through legislation that would encourage short sea shipping by eliminating the double collection of harbor maintenance tax on domestic-only movements. Getting rid of this financial barrier to the coastwide movement of cargo will encourage shippers to move goods by America's waterways, thereby taking trucks off the Interstates and reducing air pollution.

AAPA wishes to commend Chairman Oberstar and Subcommittee Chair Cummings for their leadership in introducing H.R. 1499. Thank you very much for this opportunity to testify.

Ms. JOHNSON OF TEXAS. Thank you very much.

And I now will recognize Mr. Costello to begin the first round of questioning.

Mr. COSTELLO. I thank the Chairlady.

Mr. Altman, let me ask you, the Committee heard testimony earlier today from Jonathan Lash with the World Resources Institute. And in his testimony he indicated that coal-to-liquid processing would be much more expensive than gasoline. I wonder if you agree and if you would state your opinion for the record.

Mr. ALTMAN. Well, again dealing with aviation, we are not talking about aviation gas. We are talking about a diesel form of fuel. In that particular case, there has been an excellent study done by Scully Capital, under contract to the Department of Energy, the Air Force and the EPA. And the conclusion that was reached was that on crude equivalent with carbon capture that the oil could be—that you could receive this kind fuel at $55 to $58 a barrel and allow the producer to have a 19 percent return on investment. That does not include the sequestration. If you were able to use an enhanced oil recovery, such as might be the case in Southern Illinois, that market would stand on its own. There have been other studies that I have seen. Nothing in terms of the data—and we are only a data collection agency— all the data collection agency says we are now in the ballpark where you can start to have a discussion.

That said, to get financing for the major projects there needs to be some level of support beyond the number that is being produced now, while Wall Street Standard and Poor said in order to finance the projects you need to be down in the $40 area on a per-barrel basis in order to support a bond rating at a reasonable level. So I haven't seen any data. I have heard these words before. And, again, I am only a data collection agent for our sponsors, and the data that we have collected says that it is viable.

Mr. COSTELLO. I wonder, for the record, if you might explain the Fischer Tropsch process and how it converts renewables and nonrenewables into liquid jet fuel.

Mr. ALTMAN. Let me do this very briefly for you and try to put it in simple terms because I am not a chemist; I am a mechanical engineer, so it kind of hurts my cause to be able to do this. But basically what the Fischer Tropsch process does is it results and takes, in conjunction with gassification of solids, it allows with the use of catalysts the use of hydrocarbon chains through a process that simulates when it comes out the actual same output as you get in an oil refinery. So that process has been in use for—since the 1920s. The difference now is that the catalysts that are used and the processes of gassification if we are dealing with solids are much more sophisticated. There is a lot of activities going on in a number of the manufacturing customers here that will allow it to be much more economic. So while it has been around for nearly 80 years, we are in a position now where it can be far more economically than it has been previously.

Mr. COSTELLO. I think you indicated in your testimony that it could be approved for use in aviation by the middle of this year. Is that correct?

Mr. ALTMAN. That is correct. There are two fuels that have been tested; one is a 50-50 blend of Syntroleum. All of the necessary

R&D has been done in that particular process, including missions measurements, which have shown some very favorable local air quality aspects. The Air Force indicates now that they should be ready about mid-year with that. The testing on 100 percent liquid from the Sasol Corporation was completed in January at United Technologies Research Center where Mr. McQuade is. And that now in conjunction with the other companies that were involved, which included Rolls Royce and also General Electric were all involved, the whole industry was involved, has produced the necessary data to pursue the approvals. And the estimates that have been provided to me by those people indicate that could happen in mid-year as well.

That said, you have two point sources. The effort right now of the capping certification qualification committee in conjunction with the Air Force is to put together a generic specification for all fuels of this nature. When the Air Force put out a request for information last year on the acquisition of these fuels, there were 27 qualified suppliers that came into play. So to limit the capability of just Sasol or Syntroleum would not be economically the best situation for us. So a very concentrated effort and great cooperation between the FAA and the Air Force on this right now. And I think it is going to be a very good exercise.

The issue is going to be, how do you get sufficient supply. Right now the problem is that if you took all of the plants that are under the DOE planning process and dedicated a third of that to aviation, we still wouldn't have enough fuel to support O'Hare's 80,000-barrel-a-day hunger for fuel.

Mr. COSTELLO. Mr. McQuade, can you tell us a little bit about the Pratt and Whitney testing of the geared turbo fan and how that turbo fan engine differs from the engines of today?

Mr. MCQUADE. I would be happy to. Thank you very much. In a conventional jet engine, the fan, which is the big bladed object on the front, the fan has two responsibilities. It pulls air in through the compressor and turbine for combustion later in the engine. But in a modern bypass engine, a significant portion of that air is taken through, around the outside to generate thrust out of the back of the engine. Turns out a fan really wants to run at a lower speed than a compressor and turbine. You want the fan to run at lower speed, be bigger, to move a lot of air, and move at low speed so it is quieter, to meet the noise requirements for our in city airports.

In a normal jet engine, the fan, the compressor and turbine all rotate on the same shaft. It has taken 20 years of technology development to devise a geared means todecouple the rotation of that fan so that gives you the ability to take the compressor and turbine, let them run at a high speed, high-speed turbine could be done, high-speed compressor could be done with a smaller number of parts; therefore they run more efficiently. They reduce the weight, the maintenance requirements. At the same time, the fan now geared to run at a slower speed operates much more efficiently than a normal configuration, runs slower, runs quieter. That is what generates the kind of numbers I talked about before, roughly 12 percent engine burn efficiency reduction, roughly 20 DB noise reduction versus current standards.

So it is a long development program underway. Good testing that is underway right now. It is our expectation it will be available for the next generation aircraft with the air framers they are working on.

Mr. COSTELLO. Thank you.

I thank the Chairman.

Ms. JOHNSON OF TEXAS. The Chair recognizes Mr. Oberstar.

Mr. OBERSTAR. Thank you, Madam Chair. Just a few quick questions and observations.

Mr. May, you were very pointed in your remarks about the EU and emissions trading and emissions tax. In the beginning of April bipartisan Committee Members met with Jacques Barrot, the minister of transport for the European Union, and two members of the European Parliament Committee on Transportation as well as other, the EUROCONTROL, the European aviation safety agency recently established, and many others. We later met with Air France, with the minister of aviation and transportation for France. We made it very clear that whatever Europe does in its sovereign air space is their business, but it is not their business to tell us what to do in our sovereign air space.

I acknowledged in the conversation that, in 1990, as Chair of the Aviation Subcommittee, we ran 10 years ahead of Europe on emissions—I am sorry, on noise—on noise and that it took Europe 10 years to catch up with us. That was unilateral. But that was our air space. We didn't attempt to tell Europe what to do in their air space. And we are not going to accept Europe telling us what to do in our air space. That should give you some comfort.

Mr. MAY. Mr. Chairman, I applaud your position, obviously. We know and respect Mr. Barrot. He is a fine fellow, and we have done a lot of business with him. But the aviation marketplace and the environmental marketplace in the United States is vastly different than it is in Europe. I think that is one of the principal reasons that we have always advocated working with ICAO. And broadly for voluntary standards that is underway. I think the other thing that we appreciate is the fact that you and the other Members of the Committee appreciate that the aviation industry is probably one of the greenest forms of transportation available, and we very much appreciate that support.

Mr. OBERSTAR. I would state it was a bipartisan initiative, and Mr. Costello can verify, he was there for every bit of the discussion, and we—but we didn't say that means hands off on emissions, and made it clear that we are going to have this hearing and Mr. Altman's testimony is significant but also Mr. Principato. And I pointed this out to the Europeans, that it is not just airplanes; it is what is on the ground at airports. And, furthermore, if you take a look at the world fleet, there are10,000 aircraft worldwide; 5,000 of the world's commercial aviation fleet is in the United States. Of that 5,000, roughly 10 percent, 500-plus, are in the international trade. That is a small fraction of emissions and of contribution to carbon in the atmosphere. It is not insignificant and it is not to be ignored, but it is one in which there is a concerted effort in the United States, and we welcome Europe in a joint effort with the United States, not on regulation but on research, development, testing, engineering, to bring new fuels, to bring higher-quality en-

gines, higher productivity. Europe should join us rather than simply initiating a regulatory regime.

I yield to my colleague, Mr. Costello.

Mr. COSTELLO. I couldn't have said it any better. I mean, the Chairman of the Full Committee was very clear in making that point, and I think the other point that we made as well is that we are not a parliament; that the Congress has a large voice in the policy that will go forward and that we are a co-equal branch of government and not a parliament. I think the message was delivered very loud and clear. I thank the Chairman for yielding. If I can make another point on the issue of talking about the environment and green initiatives. I just want to state that we were at O'Hare International Airport to attend a briefing on the modernization program, and I have to tell you that Mayor Daley and the City of Chicago really should be complimented on what they are doing, not only in the modernization program, what they are doing as far as the green roof of the new air traffic control tower. I think it will be the first in the Nation. And in addition to that, in the construction of the additional runway and the modernization program, they have gone really out of their way to retrofit. It has been a model project, and I would hope that other airports throughout the country would take a look at what Mayor Daley and the City of Chicago has done with the modernization program.

Mr. OBERSTAR. I concur. I didn't have the briefing at O'Hare; I had it here. I concur with your remarks that the initiative at O'Hare is really significant and representative of what airports working with airlines can accomplish. Mr. McQuade, you discussed the engine washing with atomized—what is atomized water?

Mr. MCQUADE. Very highly particulate waters, special nozzles.

Mr. OBERSTAR. I see what you mean. Sure. I understand that. But the savings in fuel is enormous.

Mr. MCQUADE. Yes, it is. It is an enormous savings.

Mr. OBERSTAR. Do all airlines engage in this technique?

Mr. MCQUADE. The eco power system is a relatively new entry to market.

Mr. OBERSTAR. Not that they are all using this particular technology, but as you said, this technology raises the savings. Mr. Altman, do you have further ideas on alternative fuels and higher capacity, higher fuel-saving engines?

Mr. ALTMAN. Well, not on the engines. I ended that part of my career December 31st and left it to Mike here, working a great deal of the time by the way on the geared fan, which I fully believe in, and it is encouraging to see the support that the corporation is providing it now. So I don't have any ideas on engines themselves. I will leave that to Pratt and Whitney, GE, and Rolls Royce. In the fuels area, I do think it important that there be an equivalent, so we can talk about data and not broad statements, equivalent look at the renewables side of the equation here. I know Boeing is very committed to looking at oil production, as are the engine companies, as is NASA. I know that Jim made a statement about NASA research. And one of the discussions that I think is important is that NASA continued work in this area. It is extremely important. They are putting about $3 million this year into the process. We need to make sure that continues to happen, go forward, and it is

not all left to the FAA and that NASA continues to do this work. I know that is not the jurisdiction of this Committee, but I think it is critical. I would very much like to see the next initiative of DOE in partnership perhaps with the Agriculture Department, which I know has some interest in this area, to look at renewable fuels and just how that could work economically in a similar way to what Scully Capital had done.

Mr. OBERSTAR. I think the challenge is getting the energy output, the power output per pound of fuel comparable to that of today's——

Mr. ALTMAN. That is. The other point I should make for aircraft fuel, aircraft fuel is very different, obviously, and it's specification is much tighter for safety reasons. There are two primary reasons why biofuel needs to be looked at. One is the freezing point of the temperature. The reason there is no discussion of ethanol in our business and some of the other processes is simply because the freeze point of the fuel is too high.

Mr. OBERSTAR. We heard that earlier in the day with railroads.

Mr. ALTMAN. When you fly up 30,000, 40,000 feet in very low speed conditions, it is even more important. The other thing that is not mentioned as often is the significance of what we refer to as thermal capacity. And the ability of the Fischer Tropsch fuels we are looking at right now to absorb a lot more heat in the fuel without creating a maintenance problem for fuel nozzles. This is very important on modern engines and modern airplanes because there is a lot more power offtakes. For example, in the military, the next version of a military aircraft will probably get ten times as much heat rejection to manage as a JSF airplane right now. The Fischer Tropsch fuels go in the right direction for that, including the use of bio mass. The fuels that NASA has tested so far in the bio area go in the wrong direction, so thermal capacity is actually reduced. It is extremely important that the technical side of the biofuels effort continue and we do the economics in parallel, but right now, there is a gap in that area, particularly looking at things like vegetable oil, algae, which is a form of fuel that is being looked at, and you are so very right about the quantities that may be available from the bio measures. There just really hasn't been enough study done. There will be more data coming out from both the Air Force and DOE here I am told within the next month. They are doing some additional studies looking very hard, certainly at the bio mass side of the equation.

Mr. OBERSTAR. Thank you very much. I would say to the aviation panel that suggestions that you may have for legislative initiatives, Mr. Costello is continuing with a series of hearings on the reauthorization. We are also at the same time—the Full Committee with all the Subcommittees—participating, preparing an agenda of legislation for the leadership's overall energy initiative to reach the floor in July. We will have—our goal is to have a legislative package by the end of June so it can be submitted for this general initiative.

Ideas you have, we would like you to get those into the Aviation Subcommittee and to the Full Committee as well to initiate that. As to the water panel, they had very specific suggestions, we would like to invite you to make those recommendations, and of course

the statements that have you already submitted have been a wealth of knowledge about the subject matter.

I have no further questions, Madam Chair. We might dismiss the aviation panel and proceed with questions for the water panel. Thank you.

Ms. JOHNSON OF TEXAS. Thank you very much for your testimony. Mr. Richter, can you expand on the planning tools that were developed for the Texas water planning program?

Mr. RICHTER. Yes, Madam Chairman. I am very happy to do so because I think this is a great area where the great State of Texas can take pride in how they are approaching water resource management. I think there are probably three things to highlight about the Texas approach. One is that they have invested considerably in collecting information about who is using water, where they are using it, how much they are using it and compiling that information into a computer model that can be used to inform decision-making. Very, very important investments made in that respect.

The second factor is that they have facilitated stakeholder participation throughout the State, 20 different watershed planning groups that have been working on making decisions about what they want their water future to look like, what kind of protection of the natural environment, what type of water development facilities need to be built. And this is an opportunity for fishermen and farmers and government leaders to interact with each other in making those decisions about the future of the State.

The third area is that Texas has shown true leadership in thinking about how to protect the river system's natural environment through providing what we refer to as environmental flow protection. In other words, how much water and what timing of water flows is necessary to remain in the rivers in order to sustain the health of those rivers. I think this really springs from the fact that Texans have a deep and abiding love for their rivers, and they use them for fishing and recreation and scenic attraction, and it is a mainstay of the tourism industry, as you know. I think that they are appropriately putting, placing adequate value on the protection of the natural environment while they are trying to meet all of these other water needs.

Ms. JOHNSON OF TEXAS. Can this model be expanded nationally, do you think?

Mr. RICHTER. Yes. I think the basic approach certainly can be. Not to suggest that there aren't some other States that are doing an excellent job of management as well, but I think, again, the three points that I emphasized and in particular the investment in the data collection so that they really understand how much water is available, how much water is flowing through their streams. A couple of other presenters placed a lot of emphasis on the importance of investing in data collection and data collection technologies. The U.S. Geological Survey as well as the State water agencies are very, very important providers of that type of information, and without that type of information, we simply cannot make informed decisions about their future use of water supplies.

Ms. JOHNSON OF TEXAS. What about how the levee setbacks can benefit eco systems and flood control?

Mr. RICHTER. The basic idea here is that, in some instances, through our efforts to manage floods or control floods, that we have really enclosed or encased the rivers in many places so narrowly that it is beginning to cause some problems. It puts a tremendous amount of pressure on the levees to hold back the floods. But, more importantly, it takes away the natural abilities of a flood plain to store flood water. And so the idea is that, as you move those existing levees back away from the river, you are creating a lot of natural space out in the flood plain to store those flood waters. The win-win benefits though come from the fact that, by doing so, you allow the river to behave more like a natural river. And that is very good for the wildlife that is dependent upon the river, very good for water quality benefits, and the river begins to function as a more healthy river when you move those levees back.

Ms. JOHNSON OF TEXAS. Thank you.

Dr. Galloway, would you like to comment on that?

Mr. GALLOWAY. I would certainly agree with my colleague; I think it is a real challenge. Many levees in this country are accidents of their birth. They grew into a levee, and they were on the bank in their precarious positions. The challenge, in many places, is homes are next to those levees. So how do you accommodate the levee setback without a major real estate action? That is what is taking place in several areas. Clearly where it is possible in rural areas where it has not been developed, levee setbacks make great sense, and you can see that happening in the State of California. They are looking at ideas like that. I think it has to be something to be considered. The challenge is in areas where it is highly developed, it is very difficult to do so.

Ms. JOHNSON OF TEXAS. Thank you.

Mr. Brandt, we don't know exactly what climate change impacts are going to be so should the Federal Government wait until we are sure on exactly what climate change impacts will be before we start to——

Mr. BRANDT. I would say, no. In fact, to quote someone just a couple days ago from the Merced Irrigation District, which operates a reservoir and is trying to get a rule change from the Corps, we can't afford to wait.

Things are happening; change is already happening, first of all. The second piece is, we may never know, and that is part of the challenge and that is the direction we are going, is we are managing for uncertainty, we are anticipating that we are not going to know exactly what is going to happen. And that is the challenge of using things like setback levees or being able to take water off to prepare for those uncertain floods that come suddenly, and we may need to prepare but in a controlled way to take it off. So I don't think we can afford to wait until we know because we may never know exactly. We need to start moving to start incorporating the information we do have. For California, we are fortunate to have a lot of information. We have top flight academics and an agency doing a lot of work with this. We have a model, those kinds of things. So we have a lot of information to get started on.

Ms. JOHNSON OF TEXAS. What can other States take from California's experience?

Mr. BRANDT. I think the first step and that is the biggest thing that we have had just in the last couple of years, which is starting to acknowledge that things are changing and things have changed rapidly in the last 15 to 20 years and taking that first step to incorporate the information that we do have into their planning and into their project and their choices about what kind of infrastructure that they build. There is a lot of information out there that they can at least start to incorporate. They may not have perfect answers but they can start.

Ms. JOHNSON OF TEXAS. Thank you. Dr. Galloway, I have been very impressed with your statements. Would you please comment on the state of the Nation's water monitoring system, if it is adequate, if upgrades are needed?

Mr. GALLOWAY. Depends on what you are monitoring for. Certainly, I would say, we are in trouble in many of those areas. A few years back, a couple of years back, the former assistant administrator of EPA, Tracy Mehan, was quoted in a magazine as saying, we can't tell you what the quality of the water is in this country because we don't have the assessment and monitoring mechanisms.

We know that each year we are losing gauges on our rivers that tell us the history on which we base future projections and deal with the issues of climate change. It is always easy to push aside the maintenance and the upgrade of monitoring systems, and I am afraid we have done that. If we want to have the quality systems necessary to do the adaptive management that my colleague Brian Richter has discussed and do the things that the State of California is moving to understand better climate change, we need more monitoring, and we are not investing in the monitoring we need.

Ms. JOHNSON OF TEXAS. Thank you. Ms. Strout, we hear a lot about more water into the bodies of water from melting and of course more pollution in the water. How do you think that is going to affect the ports?

Ms. STROUT. I think sea level rise is one of the critical areas that ports are concerned about. Clearly ports are located in coastal areas and sea level rise would have a huge impact on dock levels, berthing, where the berths are located, how they should be restructured or reconfigured to handle the heavy equipment that rests on top of them like the huge container cranes and also another area of global warming that is of concern to ports is the impact on rainfall density and wind velocity in storms and the increase in storms that might be expected in the world's oceans, the disruptions to commerce that might flow from that.

Ms. JOHNSON OF TEXAS. Thank you very much. I think we are at the end of this day, believe it or not. Well, Ms. Napolitano is coming in, from California. Do you have any questions for the water panel? I should have known you would.

Ms. NAPOLITANO. Thank you, Madam Chair. There have been questions in regard to the water issues in California, and since I am the Chair of the Subcommittee on Water and Power, part of it is dealing with the issue of global warming, the precipitation loss, less precipitation, less water delivery to the cities, to the users. And recently, the Governor issued a statement that in essence indicated that he was very much for increasing the funding for aboveground water storage; dams, in other words. Well, all great and

good except, not only are they exceedingly expensive, they take a long time to put into use. In the meantime, we are losing out on the ability to be able to store, whether it is underground, in storage capacity that our State has.

The question then as he addressed the Association of California Water Agencies in the spring conference and indicated, I am not quoting, that investing in conservation only is not enough to solve our water problem alone. Conservation alone does not provide flood protection; conservation alone will not allow us to take full advantage of our ground water storage potential; and conservation alone cannot get California through a prolonged drought either. We need additional above-ground storage.

Do you agree with the statement?

Mr. BRANDT. Representative Napolitano, well, storage, yes, but surface storage, not necessarily. Surface storage may not be the place we need it. It may not be on the river where we need it. We need to have a lot more flexibility to allow ground water storage. It may be conservation may not be enough. But there are a number of ways. And this is another example where flood and water supply come together because there may be opportunities to have what our Department of Water Resources started calling flood plain storage, in other words, we reduce the flood but at the same time allows it to infiltrate into the aquifer. We already have a sophisticated ground water banking system, although, like Texas, we don't have a ground water management system in California. But we have that kind of thing and that is what the urban areas are relying on.

So there are needs for storage. There is a need for additional storage. But whether that is a surface storage, a very big dam that produces very little yield, I mean, the dam that the Governor is proposing is a million acre-foot size and produces about 165,000 acre-foot in production or in supply every year, or yield. So, no, we don't need a big dam, but we need to look at a variety of things. And allowing for flexibility, allowing for that uncertainty to take off water wherever it comes down, it may not be on that particular stream where the dam is.

Ms. NAPOLITANO. Thank you. That is very refreshing to hear because we have discussed the many other areas that we should be looking at and increasing the recycling capability of many of the city's waste water and being able to find aquifers to store rain water when you have excess flooding water.

It bothers me that somehow somebody is convincing the Governor that, in order to address global warming, we should do thus and such. Well, it is okay if we had lots of time. We don't. We need to start looking at the imminent threat of another drought cycle and the fact that we must understand how our cities have to start gearing themselves to protect their supply and to be able to have enough for the patterns of growth that California still is experiencing.

Mr. BRANDT. Yes, and that is the challenge that ties together climate change and floods that ties together water supply. All those things interact and are interdependent, by doing a diverse set of things, and there is no magic pill, no big project, not like a hundred years ago when Los Angeles built the Owens Valley Project and Mr. Mulholland said here's the water, take it, and that was it. We

have to do a number of things. A lot of things these other witnesses have talked about are all part of the answer.

Ms. NAPOLITANO. One of the other issues we were just discussing with my water staff is Arizona's ability to take gray water, rinse, whatever, and be able to get credit to able to put that back into use through a recycling process. Have we looked at other States, what they are doing? To be able to then realize that we may have another source of water that we can clean and put back into use?

Mr. BRANDT. Yes, we have been looking at other States as well to see what we can learn, just as I think other States may look at us. The gray water issue is a hugely controversial public health issue that has a long way to go. There are a lot of other ways we can deal with things more effectively, including recycling and conservation, upfront and more quickly.

Ms. NAPOLITANO. But we have taken waste water and utilized it. Why can't we take gray water and clean it and utilize it?

Mr. BRANDT. It is the nature of how you use it and the issues of piping. There are a whole range of issues that go into gray water that are not quite the same as recycling. So that is why we haven't gone there yet at this point in California.

Ms. NAPOLITANO. Then maybe something in the future we might consider as we face more drought and more global warming challenges.

Mr. BRANDT. There are many things we can do. there are many things that we can do. Gray water may be the thing, but that may be the step a couple steps down the road.

Ms. NAPOLITANO. Great. Thank you, Madam Chair. Appreciate you being so patient.

Ms. JOHNSON OF TEXAS. Thank you very much. Does the Chairman have any final words?

Mr. OBERSTAR. Thank you, Madam Chair. I particularly want to express my appreciation to this panel for your forbearance, your patience and understanding of the legislative process; well, maybe not understanding, but at least tolerance of it. It was one of these moments in history that we didn't expect to be here at 7:00 tonight.

Reminds me of just a little historical footnote. In 1964, I was on the staff of my predecessor. The House Judiciary Committee was considering the Johnson administration civil rights bill, and the Judiciary Committee was meeting as we have been, except they were in markup. And they started about the same time. They went late into the evening, and it was Representative Wagner of Louisiana who was opposed to everything that the Judiciary Committee was doing to establish civil rights for African Americans, to protect their rights to vote, to exercise their rights in every aspect of society.

And Mr. Wagner called a quorum call as frequently as the legislative process on the floor allowed him to do that, which was roughly about the same we had here, about every half hour and sometimes more often. In those days, we had what were called notice quorum calls, where Members would appear on the House floor; and if 100 appeared, that was a quorum of the Committee of the Whole and would suffice. And Members were not recorded, and they would go back to their rooms. As soon as they did, he would

call a quorum call again, saying that you don't have 100 Members on the floor.

So either you had to maintain 100 Members continuously on the House floor to allow the House to continue its House in the Committee of the Whole, to continue its business, or keep running back and forth.

That disrupted the Judiciary Committee. But the Judiciary Committee, both Democrats and Republicans, maintained their presence, and they kept going to the floor, recording their presence, coming back to Committee and, by 11:00 at night, concluded the markup on the Civil Rights Act of 1964, which Lyndon Johnson signed into law.

What was happening on the floor today was nowhere near the moment in significance of what happened in 1964, but it sure disrupted our proceedings. And in the end, there was an underlying issue that turned out to be a rumor, not a reality. And that has been resolved. And then a Member who was disappointed that his amendments were not made in order under the Defense Authorization Bill, which is now being considered on the floor, has conceded to his leadership that we ought to proceed with the regular order. That explains what was happening, but it also gives you a little historical perspective.

Ms. Strout, your testimony was excellent. But you also, as did Mr. Principato for the airports, talk about, discuss initiatives that ports are taking to deal with air emissions in the port jurisdiction. Ultra low sulfur diesel, natural gas and using electricity and compressed natural gas stations, all of those contribute to reducing pollutants, particulates and carbon, particularly emissions in the port area. If you have some further suggestions about what the Committee might do to support those initiatives, I would welcome them if you have any further comment.

Ms. STROUT. I guess not at this time. I am not sure; was there some particular area that you would like me to address?

Mr. OBERSTAR. If you think there are some legislative initiatives that we can include in the climate change package that we are submitting, such as emissions issued by trucks and locomotives that operate at the port, the non-port specific activities, those are things that we can deal with. An interesting initiative that I didn't have time to raise with the rail panel was, I have been a great advocate for magnetic levitation rail. But it was the Port of Long Beach, Los Angeles, that came up with the great idea. While the technology now has been perfected, it is operating in Japan, operating in test tracks in Germany, and the General Automics, which had the contract with the U.S. Department of Transportation, came to me with the idea that we can now apply it at the Port of Long Beach, Los Angeles, which rather than send rail and truck into the interior to riverside, we could put a mag lev in operation. It is above ground, the footprint is much smaller than rail, and of course vastly less than trucks, put the containers on the mag lev and have a continuos loop bringing empties back to the port and sending full containers inland. And with the rail infrastructure loan program, it can borrow the funds to build a facility, and you have a paying customer, which you don't have for other proposals that have surfaced

with the RIF loan program. That makes an awful lot of sense and is another one of the great California initiatives.

Ms. STROUT. This is not maybe as far thinking as that, but we certainly do see a need for some way, some mechanism to change out old engines in trucks. Truck diesel particulates is one of the major, major issues, and of course, having rail go someplace is great, but the rail can only go where the rails are set. So trucks will always play a part in the distribution system, but the more we can do because of the high impacts of diesel particulates, the more that we can do to create programs that encourage, that provide incentives and actually provide independent operators who don't have a lot of capital of their own some way to move, upgrade their truck engines would do a lot of good. And we are actually at AAPA looking ourselves to try to figure out some way to come up with a program that is not overly capital-intensive but could help out in that area.

Mr. OBERSTAR. Thank you. I welcome your suggestions.

Mr. Richter and Dr. Galloway, you both emphasized an issue that I have long advocated, and that is watershed approach to planning and coordinating water resources activities. Mr. Richter, your comment, let rivers flow, rings a responsive cord with me. In the 1850s, when the treaties were being negotiated with the National Government and the Native American tribes—and I have read a great many of the treaties that apply in Minnesota; six tribes are in my district—they conclude with this remarkable phrase, that the words of this treaty will remain in effect as long as rivers flow.

But I think your point, to let rivers flow in their natural meandering pattern that naturally creates power absorption channels in the riverbed rather than channeling and rushing and losing the sediment deposition effects that create wetlands and create mitigation forces against floods.

Mr. RICHTER. Yes.

Mr. OBERSTAR. Mr. Brandt, your testimony is remarkable. I would say, as a former staff member, that it is typical of the attention to detail that a staff person must do, and your astonishing slide on the snow pack, I have not only professional and intellectual interest, but I also have personal interest, two beautiful granddaughters that live in that flood plain off the Sacramento River.

Mr. BRANDT. Urge them to move.

Mr. OBERSTAR. So I am going to pay very careful attention to the level of flood protection in the levees along the Sacramento and American Rivers. I don't want those grandchildren standing on the roof of their homes waving white handkerchiefs, saying, Coast Guard, come rescue us.

Mr. BRANDT. I hope not, and that is one of the challenges we face. At this point, the legislature is in the middle of the challenge of, how do we deal with those deep flood plains, how do we make sure people are out of harm's way. The Governor for the first time actually a few weeks ago finally said, I am ready for a bill on flood plain land use to come to my desk, and I will sign it. That was a major change, and I think we will see flood plain land use to make

sure people in those deep flood plains—there are not more houses put in those deep flood plains and more people at risk.

But that is a challenge. That is a huge challenge. You can understand the challenge of developers and builders taking on and saying, "we don't want any of those restrictions." But I think you will be seeing that in the next year. That is the kind of climate change issue we are confronting. The important part is we have taken that first step to actually say we have actually got to deal with this.

Mr. OBERSTAR. Climate change is creeping north in my district in Minnesota, such that the resort operators and maple sugar gatherers, including those of the Native American tribes, now don't know when the flow will start from the maple trees because it is getting earlier and earlier in the season. And if your snow pack is melting in the Sierra Nevadas, I didn't believe this, but my son said, well, you know, they get 20 to 30 feet and 40 feet of snow. I said, you mean inches. No, feet.

So I went up to see that much snow. We used to have a lot of snow in Minnesota but nothing like that. But if it is down 27, 30 percent and more, doesn't mean you are not getting the moisture; it means that the moisture will not be in frozen form and dissipate more gradually. It will mean huge runoff, and it will mean that that moisture will be lost to the lower reaches of California that depend upon it.

Mr. BRANDT. That is right.

Mr. OBERSTAR. That may mean more basins for retention, may mean more resources spent in controlling that water and protecting it for the future. That is a climate change issue we have to address. I will yield to the gentlewoman.

Ms. NAPOLITANO. Thank you, Mr. Chairman.

I was just going to address Natomis and some of those areas in the flood plain, because when I served in the State house, I would watch ships going by. And I was about 20 feet looking up. Well, the sad part is anything happens and any of those levees go, there is not going to be a developer that is going to sit there and say, I am responsible; I am putting money in it. And the people on councils who approved them may not be there when this happens, and then, of course, the insurance companies are going to turn around and say, sorry, you didn't pay for this insurance.

So who are the losers? The people. Who do they look to? The Federal Government for the bailout. So it is a real, very important issue for those people living in those areas, and the fact that the developers, bless their hearts, they are trying to make money, which is okay, but unfortunately, the people who are going in there paying for something, should an emergency ever occur—good heavens, I hope not—it is going to be the taxpayers.

Mr. BRANDT. The key piece is communicating that, and one issue that is in front of you, has been in front of you is this concept under FEMA of the 100-year flood plain. Many of these people who live in Natomis were told when they moved in there, oh, we are out of the flood plain. We are not in a flood plain because they have 100-year levees. That kind of certainty with climate change just isn't go to work any more. They need to understand residual flood risk, and they are still at risk even if they have a 100-year flood levee. That changes as we learn more and with climate changes.

But that is the challenge, trying to communicate that to everyone, that if you are going to live in that place, that is still a flood plain and you are still at risk.

Ms. NAPOLITANO. Thank you.

Ms. JOHNSON OF TEXAS. Thank you very much. Thank you, Mr. Chairman, for your extraordinary contributions. Thanks to all of you for being here and being so patient. We had no control over what happened today. If we could have, we would have made it different. Thank you, again. Committee adjourned.

[Whereupon, at 7:19 p.m., the Committee was adjourned.]

Committee on Transportation and Infrastructure

Hearing on "Climate Change and Energy Independence: Transportation and Infrastructure Issues"
Wednesday, May 16, 2007

Statement – Congressman Jason Altmire (PA-04)

Thank you, Chairman Oberstar, for holding today's hearing on climate change and energy independence. This is the second in a series that started with last Friday's hearing when we heard testimony from federal agencies about what is being done to conserve energy within each agency and promote environmentally-friendly policies across the country. Today, we have the opportunity to hear from witnesses from the private and non-profit sectors. I look forward to learning about the innovation occurring in these sectors to address climate change and energy independence. I thank the Chairman again for his attention to this issue and yield back the balance of my time.

# # #

OPENING STATEMENT OF
THE HONORABLE RUSS CARNAHAN (M0-3)
TRANSPORTATION AND INFRASTRUCTURE COMMITTEE
U.S. HOUSE OF REPRESENTATIVES

Hearing on
Climate Change & Energy Independence: Transportation and Infrastructure Issues

Wednesday, May 16, 2007, 10:00 AM
2167 Rayburn House Office Building

Chairman Oberstar and Ranking Member Mica, thank you for calling this important hearing on the affect of climate change on our nation's transportation and infrastructure.

The existence of climate change has been scientifically verified and it is now time to make corrective measures, both reactive and proactive, to diminish the effect of climate change. There is great potential within the transportation industry to ensure sure that our cars, trucks, airplanes, trains, and ships improve their emissions standards.

Promoting mass transit and alternate forms of transportation is critical to this process. When I served in the Missouri House of Representatives, I helped initiate a program called Bike St. Louis. This 20-mile system of bike lanes on existing roads has greatly improved my constituents' ability to bike to work or simply to use for recreational enjoyment. Bike St. Louis is among a number of successful models which this committee can use as it addresses the important issue of transportation's influence on climate change.

Again, I would like to thank the Chairman and Ranking Member and I look forward to hearing from our witnesses.

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Chris Carney

Good Morning Mr. Chairman. I want to thank you for holding this hearing today; you have assembled an impressive panel of transportation and climate change experts. As I stated during last Friday's hearing, scientists have been warning us of the real and ever increasing problem of global climate change, and urging governmental leaders to begin taking the issue seriously. I believe the testimony we receive today will provide us with numerous policy options that Congress and the nation should review in an effort to arrest and reverse the global climate change.

As I mentioned on Friday, one effect of global climate change is the increased frequency of severe flooding. Northeastern and central Pennsylvania has experienced numerous 100-year floods in the just the past few years! Recent flood events have occurred in January, 2006; June, 2006; November, 2006; April,

2005; and September, 2004 (Hurricane Ivan). On February 23, 2007, President Bush declared seven counties in my district a federal disaster area in the aftermath of the November storm. This declaration follows previous declarations from earlier storms I mentioned. Collectively these floods have caused millions of dollars in damage to public infrastructure and private property. Mr. Chairman, we can no longer afford to stick our heads in the sand with respect to this issue because the economic and human toll of doing nothing is too great.

I also am very interested in pushing for an increased commitment to passenger rail service. One such project that is being developed in my district would go, I believe, a long way to helping reduce greenhouse gas emissions. The rail project offers a realistic remedy to the congestion that plagues the I-80 corridor in eastern Pennsylvania and New Jersey.

Some 200,000 commuters travel daily from eastern Pennsylvania into New Jersey and New York for work and pleasure. Traffic actually backs up from the Lincoln Tunnel exit in New Jersey to the Pennsylvania border each morning. Re-opening the former Lackawanna Cutoff Rail Line will dramatically ease this congestion and I am excited for this project to be completed.

I look forward to the testimony of the witnesses you've assembled, Mr. Chairman, and I am eager to learn about their views and suggestions about what we need to do to adequately address the problem.

Doris O. Matsui

Statement of Congresswoman Doris O. Matsui
Transportation and Infrastructure Committee Hearing on Global Warming
May 16, 2007

Thank you, Chairman Oberstar, for calling this hearing today. I appreciate your leadership in focusing the committee's attention on global warming.

Mr. Chairman, we know we must move quickly to combat global warming. If we delay any longer, the consequences for our constituents will be disastrous ... no matter where they live.

We need good transit policy to avoid the worst possible results of global warming. And we need good infrastructure to deal with the water and environmental problems that we are simply too late to stop.

In California, we have much to lose from a rise in sea levels. In my flood-prone hometown of Sacramento especially, we must address global warming now. If we don't, we could soon suffer devastating floods.

Transportation policy is critical in this regard. More than a quarter of our greenhouse gas emissions come from the transit sector. I look forward to hearing ideas from today's panelists about how this Committee can help lower our emissions.

As we all know, the President just ordered federal agencies to reduce greenhouse gas emissions. But they won't actually have to do anything until he is out of office, which is convenient for him.

My constituents' lives depend on our response to global warming. So I am hopeful that today's witnesses are more creative and assertive on this account than our President.

The fact remains that our planet will continue to get warmer in the near future, regardless of what we do. Because of this, we must strengthen our flood protection infrastructure.

In Sacramento, our flood control system protects our homes, our businesses, and our lives. The levees and dams that ring Sacramento are as much a part of our communities as our roads and transit lines. Unlike roads and light rail, however, our levees and dams are designed to be responsive to the weather.

Weather can be unpredictable to begin with. In Sacramento, this unpredictability can mean catastrophic flooding, loss of life, and billions of dollars in economic damage.

That is why constant vigilance is so important for my constituents. People in Sacramento understand that flood protection is about maintenance.

Global warming presents us with new challenges. As weather patterns change, shouldn't our flood protection approach adapt accordingly?

For example, earlier snowmelts will test the dams and levees that protect us from flooding. The Sacramento and American Rivers will be swollen with water at unpredictable times.

We have to be sure that our infrastructure can deal with these scenarios. If we fail to invest in our dams and levees, we are not merely being foolish ... we are risking jobs, we are risking livelihoods, and we are risking lives.

As a result, our national transportation and infrastructure policy must be focused on the challenges we face today ... without neglecting the future.

I am encouraged by the Committee's work to get a WRDA bill passed this year. WRDA will help us address today's infrastructure problems by shoring up the dams and levees that protect our communities.

Once WRDA is completed, our next step needs to focus on transit. We have the tools and the creativity to make good policy that addresses global warming. We can do this while we make our transportation system more responsive, adaptable, and effective.

When it comes to global warming, our infrastructure is the key to the present. Our transportation policy is the key to the future. Both must work in tandem for us to avoid the largest environmental disaster we have ever faced.

Thank you, Mr. Chairman.

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Statement of Rep. Harry Mitchell
House Transportation and Infrastructure Committee
5/16/07

--Thank you, Mr. Chairman.

--The International Panel on Climate Change delivered sobering news in February when it announced its unanimous agreement that human activity is 'very likely' causing global warming.

--Global warming is happening right before our eyes. Ice caps are melting. Weather patterns and climates are changing. Drought is ravaging parts of the world. The consequences are real.

--The consequences are especially real in my home state of Arizona.

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--In Arizona, we are experiencing longer and more severe fire seasons. Rain pattern changes and insect migration are destroying our forests. As snow pack decreases in the Rocky Mountains, Arizona feels the heat – literally. We're experiencing lengthy droughts that could become even more troublesome in managing our water as our population continues to grow.

--For the people I represent, the time for debate about the existence of global warming is over. Now, it is time for action. And it's important that we take action in a thoughtful and bipartisan way.

--Congress can help solve this crisis by leading the way to an energy independent America. An America powered by clean energy technologies such as solar energy and biofuels ends our dependence on Middle Eastern oil, and reduces the harmful greenhouse gases we emit to our atmosphere.

--I believe we can use American's ingenuity, and our unique innovative spirit to become energy independent. But it will take work on our part, and a real investment in the future of our country.

--The United States makes up just four percent of the world's population, yet we produce 25 percent of the world's greenhouse gases.

--I believe we can do better.

--We began earlier this year with the CLEAN Energy Act, but clearly we need to do more.

--And that is why we are here today.

--I look forward to hearing from our witnesses.

--I yield back the balance of my time.

For the Record.

STATEMENT OF

REP. THOMAS E. PETRI, Ranking Member

SUBCOMMITTEE ON AVIATION

HEARING ON

Climate Change and Energy Independence:

Transportation and Infrastructure Issues

May 16, 2007, 11:00 a.m., 2167 RHOB

Over the last few years, rising crude oil costs worldwide and refining capacity issues here at home, coupled with environmental concerns related to emissions have focused a lot of attention on research into cleaner and more fuel efficient modes of transportation. The aviation industry is no different.

America's commercial aviation industry was directly impacted two years ago when Hurricanes Katrina and Rita crippled our Gulf Coast refineries and two major pipelines. The resulting supply disruption propelled commercial jet fuel prices to a record-high of $3.13 per gallon up from January 2005's average market price of a gallon of commercial jet fuel, $1.33. To put this into perspective, every penny increase in the price of a gallon of jet fuel results in an additional $195 million in annual fuel costs for the U.S. airline industry.

Around the world, the aviation industry has been singled out, somewhat unfairly, as a particular bad-actor in the environmental arena.

This criticism has impeded the progress of the aviation industry in those corners of the world. America's economy cannot afford such a slow-down—Aviation is too important to our national economy. The Aviation sector of our economy is a $190 billion industry supporting 1 million jobs. Further, the Aviation Industry contributes $640 billion to our national economy, and creates 9 million related jobs. A slow-down in our aviation industry would have a ripple effect throughout the U.S. economy.

While supporting the aviation industry is important, we must also be good stewards of the environment.

NextGen modernization efforts currently underway at the FAA, such as required navigational performance (RNP) approach procedures, offer more efficient routes that reduce fuel burn and emissions. Promulgation of these relatively new procedures represents attainable short-term environmental progress as research continues towards long-term solutions.

Alternative fuels possibilities are also a fascinating prospect. According to the Air Force's scientific advisory board, bio-diesel renewable fuels could be possible in the near to mid-term, (5-15 years), and bio-fuel renewable fuels are a long-term possibility for aviation use.

The most immediate opportunity for alternative fuels are "drop in" additives that are essentially interchangeable with today's jet fuel. I am encouraged by the work our scientists are doing in getting the right blends, which will eventually reduce our dependence on foreign oil, and hopefully reduce emissions.

U.S. airlines have improved fuel efficiency in the last five years by changing operating procedures and utilizing technology to make their aircraft more fuel efficient. In addition, the use of composites and other advanced aircraft manufacturing technologies offer possibilities to make future commercial jetliners more fuel efficient.

Airports around the country are also doing their part. Airports are investing in alternative fuel and low emissions ground vehicles, acquiring green sources of power, and providing emissions reducing services for aircraft parked at the gate.

I look forward to hearing the progress that industry partners is making in the arena of bio-fuels, engine design, and other fuel-saving procedures in and around our airports.

I thank our witnesses for participating in today's hearing, and look forward to your testimony. With that, yield back the balance of my time.

Statement for the Record for Congressman Walz
"T & I Committee on "Climate Change and Energy Independence"
May 16, 2007

I want to thank Chairman Oberstar and Ranking member Mica for calling today's hearing on "Climate Change and Energy Independence."

Climate change and energy independence issues in surface transportation, aviation, and maritime transportation are vitally important to this nation. According to the Environmental Protection Agency, 27.7 percent of the total greenhouse gas emissions produced by the U.S. come from the transportation sector.

While we have implemented programs such as the Congestion Mitigation Air Quality Program (CMAQ), which provides funding for projects that contribute to air quality improvements and reduce congestion, there is more that can be done toward controlling climate change. We should continue to encourage the use of public and non-motorized transportation.

We can reduce our dependence on foreign oil by looking at renewable and alternative fuels such as ethanol, cellulosic fuels, and biodiesel. We can produce electricity through the use of wind generation. Wind power is the world's fastest growing electricity generation technology. It is inexhaustible, affordable, and widely used in southern Minnesota. According to the Department of Energy, the costs of wind power are projected to continue to fall and may rank the cheapest electricity source of all options by 2020.

This hearing today, to look at addressing both energy needs and climate change concerns, is timely. Thank you again, Mr. Chairman, for holding this hearing and I look forward to hearing from our witnesses and to working with Committee members as we address some of the most pressing problems facing this country today.

TESTIMONY TO THE HOUSE TRANSPORTATION COMMITTEE

HEARING ON ENERGY INDEPENDENCE AND CLIMATE CHANGE

Richard L. Altman
Executive Director,
Commercial Aviation Alternative Fuels Initiative (CAAFI)

May 16, 2007

Thank you for providing the Commercial Aviation Alternative Fuels Initiative with the opportunity to testify on the compelling issues of energy independence and climate change, as it relates to Aviation. It is particularly satisfying to be represented on a panel with three of our sponsors (ACI, ATA, and UTC)

CAAFI is a data gathering and communications process that seeks to increase both the quantity and the quality of dialogue among its Airline, Airport, Manufacturer and FAA sponsors. It also seeks to engage multiple government, industry and university stakeholders. The fundamental belief of the sponsors in forming the CAAFI process is that aviation is data driven and relatively small in size allowing it to benefit from such a process. CAAFI's sponsors and stakeholders recognize that data they develop and collect, in the hands of key analysts and decision makers in such matters as safety, security, and the environment. will be a catalyst for informed and expedited solutions which serve all components of the supply chain well. Such clarity of solutions and message, it is believed, will spur suppliers to invest in solutions suitable for Commercial

Aviation. The goal is to make our relatively small sector of the transportation a "customer of choice" for alternative fuels.

My role as Executive Director is simply to be the facilitator of that process. While I am an independent contractor to our FAA sponsor in this role, my task is to balance the interests of all four supply chain sectors.

With this in mind two areas will be covered in during this testimony.

First, information that is either available today to CAAFI for joint dissemination, or is in the process of being developed, regarding alternative fuel candidates for aviation will be reviewed. Aviation is more limited in the range of fuels that it can use than other transportation modes. Solutions for aviation in this testimony will be limited to non-renewables from sources other than oil and to renewable bio fuels. These are the liquid fuel types, which have an opportunity to succeed as they can be compatible with existing aircraft and have an opportunity to meet the rigorous safety and performance standards of aviation. .

Second, and more briefly, the workings of the CAAFI process and how it brings together its airline, airport, manufacturer and FAA sponsors and the stakeholders that interface with these entities will be explained. Particular emphasis will be placed on the role of the CAAFI environmental team. This is a key focus of the hearing and a unique expertise that it is believed CAAFI sponsors and

stakeholders have in aviation arena. The testimony will conclude with brief thoughts on how going forward plans are being structured within the FAA in particular to continue CAAFI's efforts.

Information presented in these areas represents what CAAFI's sponsors and stakeholders have contributed to this joint activity during since the outset of its very brief existence (since 10/06). Regard this input is very much a snapshot of unfolding events. Do note the date! Events and new results arrive and are conceived almost daily in this rapidly developing focus area. Some of these developments are proprietary in nature and not shared among all sponsors and stakeholders.

Aviation Alternative Fuel candidates presently being examined begin with largely non-renewable (coal and gas) sources near term (0 to 5 years). As can be expected there is far more data available on these sources and consequently more information that will be discussed regarding both technical and business perspectives.

In the near to mid-term (5 to 15 years) bio-diesel renewables and some more difficult to extract non-renewable sources such as shale oil are possible according to the USAF scientific advisory board. Blends of renewable and non-renewable sources can be brought in play in this time period. Some analyses of

how deployment can be effective in this area have been brought to CAAFI's attention and will be addressed.

Long term (15 years and beyond) Bio-fuel renewable candidates from a variety of alternative processes could be targets for aviation use. The range of possibilities being examined is extensive and many efforts are being executed at a small scale level as it applies to aircraft applications.

The most immediate opportunity for alternative fuels for aviation are derived from Fischer Tropsch processes. These processes convert alternative hydrocarbon bearing feedstocks (mostly renewable and non-renewable solid materials) to essentially identical hydrocarbon chains that are used in jet aircraft. For this reason they are classified as "drop in" replacements. "Drop in" means that these fuels are interchangeable with, and can be mixed with, today's jet fuel. There has been extensive testing of some of these fuels and there are no known consequences to aircraft and engine performance or airworthiness in candidates that have been received extensive attention of qualification/certification authorities. .

A key step in FT processes not found in oil refineries, and important to the climate change discussion, is the gasification of solid feedstocks. That process does produce more C02 than is produced in an oil refinery. Hence the capture, use and/or storage of that C02 is critical. While Fischer Tropsch processes have

been in use since the 1920's improvements in efficiency, proprietary process catalysts that are used, and the ability to capture and sequester C02 are relatively straight forward commercialization will be dependent on added clarity in public policy according to sources available to CAAFI.

Two specific Fischer Tropsch candidates, coal and natural gas derivatives are on a track to be qualified for aviation use as early as the middle of this year.

The first of these candidates is 50/50 blend derived from natural gas is produced by Syntroleum. This candidate completed testing on a USAF B-52 aircraft last year. Qualification is possible by mid-year.

The second candidate a 100% a coal derived liquid fuel from South African Company, Sasol, completed testing with a combustor test for emissions in January. Engine Manufacturers Pratt and Whitney, Rolls Royce and Honeywell conducted this battery of required checks in test facilities and on commercial aircraft.

Both of these candidates were tested and are being evaluated to establish conformance with performance, durability and emissions characteristics under protocols developed by ASTM (the American Society for Testing and Materials Standards).

The current plan of CAAFI's FAA Air Worthiness led Certification/Qualification team; working with USAF over the next year is to create a generic specification for FT fuels. For this purpose the two candidates above, along with other fuels available at the laboratory level and having similar characteristics, will be examined. The goal is to allow any producer who meets the aviation fuel specification requirements, in addition to the two above, will be able to bid on initial procurement contracts forthcoming from USAF later in the decade

From and energy independence perspective first mover FT plant projects could come on line in the 2010 to 1012 time frame. These first mover facilities could economically provide up to 1/3 of their production for commercial aviation if plant economics are the sole factor.

From a climate change perspective some, but not all, CTL first movers who have been in contact with CAAFI interests indicate that they will incorporate provisions for carbon capture and sequestration, and have markets available for C02 use (e.g. enhanced oil recovery).

There is also a growing intent to factor in some biomass capability to reduce CO2 exposure over the life cycle. Per studies executed by Princeton University this provision will place aviation fuel from FT Coal at about the same level as today's output resulting from refining Jet A. if only today's technology for gasification efficiency is assumed (ref 1). New technology now in the demonstration phase

by private industry and government can improve significantly on that outcome. Without such action the C02 production produces by CTL would be as much as 75% higher than Jet A production.. Again according to Princeton Studies inclusion of biomass feedstock at as much if 20% of the feedstock could place these facilities at levels significantly below jet fuel in life cycle C02 production of Jet A and approach carbon neutral outcomes..

While considering Climate Change and Energy Independence issues it is important to note four other significant factors associated with FT fuels..

First, FT fuel candidates have significant potential benefits in local air quality as they are regulated under the Clean Air Act in the U.S. Measured levels of small particles (PM2.5) have been measured at levels 50% to 90% better than JP8 during jet engine tests.

As they are sulfur free FT fuels can be used in Ground support equipment as a diesel substitute. This raises the possibility that the number of fuels used at airports could be reduced coupling economic benefits with environmental gain. A tool to allow airports to assess the potential environmental and economic gains associated with these factors is currently being executed via a CAAFI inspired project under the Airport Cooperative Research Program (ref 2)

Second, recent studies executed by Scully Financial (ref 3), under contract to DOE and USAF are showing FT CTL to be in a reasonable cost ballpark (< $60 / barrel crude equivalent) even when the cost of sequestration technology is included in plant cost.

The third and fourth points are words of caution.

While technically feasible, and while evidence of financial viability exists, availability of these fuels in quantities that will make a significant dent in aviation supply does not yet exist. Far more is needed to achieve energy independence than what could be available at current plant investment levels.

Most initial plants, that CAAFI are aware of average 30,000 barrels a day production. At this level maximum economies of scale are achieved in production while construction costs can be minimized to a mere $3 billion per facility. Assuming that maximum economic potential of 1/3 supply from IGCC plant fuel output goes to aviation sources this quantity is only 1/10th the supply needed for daily operations at O'Hare. DOE's current inventory of planned CTL facilities lists only a dozen candidates (ref 4) some much smaller than 30,000 barrels per day and at locations remote from airport infrastructure. This is a start – but it is not energy independence.

Lastly the economics of blended biomass FT (from switch grass or other bio candidates) to achieve superior climate change benefits will likely require the development and predictability for a carbon trading market that will compensate the agricultural sector adequately for channeling crops in the direction of these fuels. This matter was studied in (Ref 1). The committee is referred to the Princeton authors of those studies for further details.

None the less, near to mid-term Fisher Tropsch solutions likely offer the best approach to the combination energy Independence and local air quality concerns. As noted they can have superior characteristics to limit climate change consequences compared to petroleum fuels production when Biomass is added to the blend and meet "drop-in" standards for today's aircraft.

That said, these candidates may not represent the best technical long term solution to address climate change concerns, particularly if adequate bio-mass supplies are not obtained. It is understood that in the next several months both USAF and DOE will provide significant new information on the technical and economic viability of FT CTL/biomass blends.

Biofuel production alternatives to Fischer Tropsch production could offer the best opportunity for C02 reduction. These are however further away in time, and could have several additional technical hurdles to overcome in applications to

aircraft. In addition little substantive information has been made available to CAAFI on production economics to date..

Biofuels are combustible liquids that are manufactured from renewable resources such as plant crops or animal fats. Crops with high oil content such as soybeans, rapeseed (canola), and sunflowers are the starting materials used to produce bio-oils or bio-oil blending components.

Several challenges exist for the use of current biofuels in commercial aircraft using conventional esterfication processes that are not issues when used in other transportation modes.. These fuel types have a propensity to freeze at normal operating cruise fuel temperatures, their energy content is lower than jet fuels causing sacrifices in payload and range. Thermal capacity – or the ability of the fuels to act as a heat sink – particularly in future aircraft that may require increased heat rejection requirements may be poorer than Jet A and significantly poorer than FT fuels.

Efforts to overcome these deficiencies and to maintain the current fuels standards could require changes to the aircraft – e.g. fuel heaters to compensate for freeze point changes and added heat exchangers. These compromises may give back portions of the C02 benefits achieved by requiring configuration changes that increase fuel burn, not to mention the capital costs to make these changes to aircraft. Study of the required scope of these changes is a CAAFI

high level study goal brought to the attention of NASA, FAA, USAF and CAAFI's University stakeholders for assessment..

An alternative approach to esterification of bio-fuels described above, which may add significantly to their attractiveness to aviation is the hydroprocessing of raw oil from plants. In this process, hydrogen is added to the fuel to remove oxygen atoms and to improve product stability. The resulting biofuel is a carbon/hydrogen fuel that looks very similar to petroleum jet fuel. The unique advantage of this approach is that the hydrogenation of the biofuel can be done in existing refineries or in combination with FT plants.

While hydroprocessing of plant oils may offer promise technically the business case at refineries creates additional processing steps and adds cost. In addition there will likely be significant competition for hydrogen to be used in this process. Information on the supply potential and the degree to which C02 based economics can contribute to making this candidate attractive have yet to be made available to CAAFI. It is a priority to obtain such data.

CAAFI's Certification and Qualification Teams will be seeking to increase its focus on a bio-fuels certification and qualification roadmap when it meets next month. One catalyst for this effort is the recent announced intent of Boeing, Richard Branson's Virgin Fuels and General Electric to pursue a 747 flight demonstration using bio fuels (ref 5)

A more complete discussion of Bio-fuels candidates is contained in a recent article from Boeing fuel specialist, CAAFI and ASTM member Oren Hadaller (ref 6). Much of the technical information on bio-fuels above is drawn from this ASTM paper.

While Commercial Aviation appears to be on track that will produce technical alternatives to commercial JET A and its Military equivalent JP8, commercial drivers for fuel suppliers to produce alternative aviation fuels in adequate quantities are more difficult to come by.

. .

As 5 to 10% user of transportation fuel the commercial aviation industry, aircraft manufacturers, airports, FAA and most specifically airlines must be highly focused and consistent in their message to fuel suppliers if they are to be an early "customer of choice" for the supply sector. In spite of its relatively small size as a consumer the concept that aviation had the potential to achieve this goal motivated the formation of the Commercial Aviation Alternative Fuels Initiative (CAAFI) by user entities.

CAAFI Sponsors believe that the aviation enterprise with its relatively compact size, global reach, and well articulated supply security and stability needs, and data driven focus are well positioned to achieve "customer of choice status". CAAFI is a process that simply facilitates needed data generation and the

maintenance of an efficient means of delivering that data to enable informed decision making by our component entities.

The CAAFI process uses four panels to channel the expertise of its sponsors as well as the multi-disciplinary stakeholders that compose 80% of its manpower pool. These panels consist of an R&D panel, a certification/qualification panel and a business /economics panel and an environmental panel. Three of these panels have created roadmaps to communicate and to guide their activities. An executive summary detailing CAAFI's mission and how it is organized to execute its mission (ref 7) is available upon request. For the purposes of this hearing it is appropriate to discuss the activities of CAAFI's environmental panel in greater depth.

Dr. Lourdes Maurice, Chief Scientist of the FAA's Office of Environment and Energy, leads CAAFI's Environmental Panel. Primary to the Environmental Panels mission is a full life cycle analysis of a variety of alternative fuel options being evaluated over their entire life cycle from raw material to engine exhaust. Much of the life cycle effort is being executed by the FAA's MIT led PARTNER Center of Excellence with Cost sharing support from major OEM's Boeing, GE and Pratt & Whitney. The PARTNER Analysis is currently in its initial phase. Once complete PARTNER will also provide tools to the enable the extension of FAA's emissions prediction tools used by airports and airlines, to alternative fuels. In addition these tools are and will be used by airports in the execution of

benefit /cost analysis handbook by the Transportation Research Board under the Airport Cooperative Research Program (ACRP).

Going forward in FAA's reauthorization proposals both efforts to maintain an Alternative Fuels function at levels elevated from FY07' are provided in the FAA's CLEEN proposal. An increase in the ACRP program is also included in the Reauthorization. Both are crucial to CAAFI and Aviation's overall success in the arena of alternative fuels..

Thank you again for recognizing the CAAFI process as a an instrument seeking both Energy Security and Climate Change gains. We welcome further inquiries on the subjects covered above and other matters related to alternative fuels.

Richard L. Altman
Executive Director,
Commercial Aviation Alternative Fuel Initiative
altrich@cox.net
05-16-07 rev. 1

Ref 1. "Co- Production of Synfuels and Electricity from Coal+biomass with Zero Net Carbon Emissions: A case Study for Illinois" Robert Williams, Princeton Environmental Institute, Princeton University" presentation to DOE Sixth Annual Conference on Carbon Capture and Sequestration, 5/9/07.

Ref 2. "ACRP 02-07 [RFP], Handbook for Analyzing the Costs and Benefits of Alternative Turbine Engine Fuels at Airports", Robert E. David, Transportation Research Board , 4/25/07

Ref 3. "The Business Case for Coal Gasification with Co-Production - An Evaluation of the Business Risks and Potential Incentives for Early Commercial Gasification with Co-Production Project", Brian Oakley, Director, Scully Financial Services, USAF Energy Forum, March 9, 2007.

Ref 4. "Summary of Activities for Coal-to-Liquid Fuels, Section II – Projects – Existing and/or Proposed, Status of May 3, 2007" prepared for: DOE Office of Sequestration, Hydrogen, and Clean Coal Fuels, by: Technology and Management Services, Inc., Leonardo Technologies, Inc. and Mitretek Systems, dated 5/4/07.

Ref 5 Publication, Jet Fuel Intelligence ©, Vol. XVIII, No. 17 "Boeing's New Deal with Virgin Envisions Biojet for Aviation" Christina Haus, April 30, 2007

Ref 6. Smartbrief, ASTM Standardization News, "Alternative Aviation Fuels" April 2007, Orren Hadaller, The Boeing Company.

Ref 7. COMMERCIAL AVIATION ALTERNATIVE FUEL INITIATIVE (CAAFI), Process Mission/ Background / Goals / Accomplishments, Richard L. Altman, Executive Director, CAAFI, March, 2007

Climate Change and California Water Resources

Alf W. Brandt
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My name is Alf W. Brandt and I serve as the California State Assembly's water law and policy expert. As principal consultant for the Committee on Water, Parks & Wildlife, I advise the Assembly on both water supply and flood protection issues. Before coming to the Assembly, I served in the Solicitor's Office for the United States Department of the Interior and as chair of the City of Los Angeles delegation on the Board of Directors of the Metropolitan Water District of Southern California, this nation's largest water supply agency.

With that background, I appear before you today to share some perspective on how California has and will respond to climate change in the water resource context. I will provide information as to:

1) why climate change has become so critical to California's water resource system;

2) the tools that we use to assess how climate change will affect our water system;

3) our current and planned responses; and, finally,

4) how the Congress may contribute to California's efforts to address climate change in its water system

The Federal Government remains an integral part of California's water system. It holds more California water rights than anyone else. It oversees the Central Valley flood protection system. And, its regulatory agencies work closely with ours on water issues ranging from quality to our state's abundant fishery resources. Indeed, the Federal Government has been an important partner in addressing our most important water resource – the Sacramento-San Joaquin Delta.

While the Legislature was successful in passing last year's landmark climate change bill, AB 32 by Speaker Fabian Núñez and Assemblywoman Fran Pavley, we have just begun addressing how our water policy will change in light of climate change. Speaker Núñez spoke on climate change and water resources to this year's American Bar Association Water Law Conference. In recent years, academic experts from our universities have studied climate change and water resources. Our state agencies have completed preliminary studies of the connection between climate change and water resources.

In February, the Committee on Water, Parks & Wildlife held its first informational hearing on climate change and water resources, where we considered the growing body of evidence as to the changes that already have occurred. Our Committee chair, Assemblywoman Lois Wolk, has authored Assembly Bill 224, to incorporate climate change into all the existing water planning processes that we now have in California. I would encourage your staff to review our Committee web page related to climate change, which we will continue to update with new information resources and links on climate change and water resources. *See*, http://www.assembly.ca.gov/acs/newcomframeset.asp?committee=26.

I. The Challenge

In the last century, California constructed one of the most sophisticated water systems in the world. Relying on historical hydrological records, California's water pioneers studied, designed, and created a complex water infrastructure to support a robust agricultural and urban economy, now ranking in the top five of the world. The Federal Government built the Central Valley Project, which was originally adopted by the State Legislature and now is the crown jewel of the Bureau of Reclamation system, and the Central Valley's two flood control projects, on the Sacramento and the San Joaquin Rivers. In addition, the Corps of Engineers has worked with local governments throughout the State to address flood control issues.

The nature of California's water system makes climate change a central challenge for our continued development. Climate change will both affect – and be affected by – the operation of our water system. Changes in hydrology and water use mean that existing water infrastructure, which was designed to address historic droughts and floods, may not meet our needs. At the same time, our movement of water over great distances and treatment requires vast amounts of energy and, therefore, contributes greenhouse gases to the atmosphere and the climate change cycle. California therefore cannot avoid addressing climate change in the water resource context.

A. The System

California's water system relies substantially on snowpack – from the Sierras to the Rockies – to hold the greatest proportion of water supply, releasing the water in late spring and early summer for irrigation needs of agriculture and urban communities.[1] Assembly Speaker Fabian Núñez recently noted that the National Academy of Science forecasts that climate change will reduce California's snowpack by 29% by the end of this century – a sobering statistic. Other studies have projected even more severe loss of snowpack.

Snowpack and Reservoirs. Reduced snowpack will change the efficiency of our existing water system, particularly our reservoirs, which were designed to provide flood protection, fill as the snow melted, and then hold water temporarily for use later in the summer or the following year. Those reservoirs cannot hold the entire amount of water coming down from the Sierras at once, leading to larger releases of flood flows and less water supply storage. Moreover, less snowpack – and more rain – translates into larger flood events.

Sacramento-San Joaquin Delta. The heart – both figuratively and literally – of the California water system is the Delta, where two large rivers – the Sacramento and San Joaquin – converge and then flow out to San Francisco Bay. Not only is the Delta the richest estuary ecosystem on the west coast of North or South America, but it is the transfer point for vast amounts of water to the San Francisco Bay Area, Southern California and San Joaquin Valley agriculture. The Delta is a unique network of leveed islands, major rivers and small sloughs. Climate change may affect the Delta by sea level rise, increased flood flows and longer dry periods. Sea level rise will put greater pressure on – and may overtop – levees surrounding Delta islands, many of which already lie below sea level. Increased flood flows similarly put more hydraulic pressure against Delta levees. Reduced water flowing into the Delta can affect both

[1] Agriculture remains the largest user of California developed water supply – in the range of ¾ of water use.

Delta water supply and quality, as greater proportions of the water flowing in comes from upstream discharges and downstream sea water pushing in from San Francisco Bay.

Groundwater. Our water supplies also depend substantially on groundwater, which also can be affected by and can affect climate change. Many groundwater aquifers, particularly in the Central Valley, rely on natural infiltration. Drier conditions man less natural infiltration. As those relying on depleted aquifers then drill deeper for water, their water use requires more energy, leading to greater greenhouse gas emissions. It is not unusual for isolated groundwater pumps to rely on diesel engines.

Flood Protection. The flood system, particularly the federal-state flood projects in the Central Valley, will suffer perhaps the greatest challenge because of its design. California voters approved almost $5 billion in bonds to pay for repair and improvements to the flood system, with the bulk going to the Central Valley. The Indians called the Central Valley "the Inland Sea" due to its regular, expansive flooding during several months of the year. The flood "control" system of narrow channels enclosed by earthen levees was designed to channel flood flows and scour out mining-era sediment. In the last century, the system has worked so well, that we are now scouring out the levees. After Governor Schwarzenegger declared a state of emergency due to 24 sites of critical levee erosion, the Corps and the California Department of Water Resources (DWR) discovered 71 new critical erosion sites last year alone, after two rather moderate flood events. Add to that, substantial new Central Valley development, including housing in some of the deepest floodplains, and you face overwhelming risk of substantial flood damage. With the flood system already under stress, climate change will challenge every part of our flood system.

Energy System. The complexity of the water conveyance systems also has impacts on California's energy supplies. A recent California Energy Commission report estimated the energy use arising out of California's water use at about 20% of California's total energy use. This proportion reflects the energy costs of moving water hundreds of miles, including south over the Tehachapi mountains to Southern California, and treatment both before and after its use. California water use therefore is a significant contributor of greenhouse gases to the climate change dynamic. In short, water use both affects and is affected by climate change.

B. The Changes

We now know that climate change is not just coming, it has arrived in California. We are fortunate to enjoy world-class academic and agency resources that can provide the Legislature, as policymakers, with the latest information on climate change, both current and projected. At recent hearings, we have learned the following facts:

- Sea level in the Delta has risen ½ foot in the last 100-years, advancing more quickly in the last few decades. Additional sea-level rise of this level or more will fundamentally change the Delta, threatening levees, land-use, water quality, ecosystem, and water conveyance capability.

- Floods have shown an upward trend, with floods getting worse as each decade passes, again, particularly in the last couple decades.

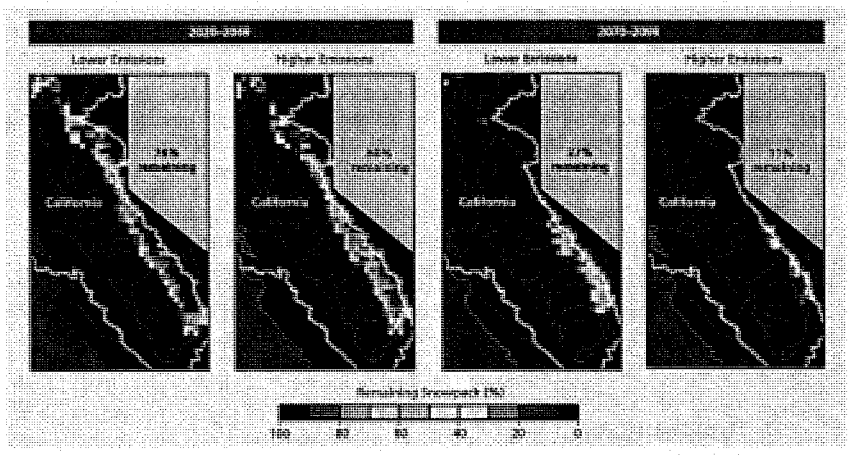
- California is warming, most dramatically in the last quarter century and over the winter months. We have reports of localized "heat bubbles" arising out of urban development, raising snow elevation 1500 feet since 1980, which means less snow pack and more rain.

- River flow is coming earlier in the year, reflecting less retention in snow pack. Late season (April-July) runoff has shown a downward trend over the last century.

- Scientists, using data from the Intergovernmental Panel on Climate Change, have forecasted that the Colorado River basin, on which Southern California relies, will be drier, similar to the droughts of the 1950's or this decade.

- The National Academy of Science has forecasted reduced Sierra snow pack of at least 29% by the end of the century, while other scientists have predicted a more severe drop.

These historic trends lead to projections of substantial climate change in the next 50 years. The most important projection of change for California's water system is the reduction in snowpack, our state's biggest water supply reservoir and winter flood reduction process. Reduction in snowpack means less storage for summer irrigation and larger winter floods, increasing hydrodynamic force on the weakened Central Valley levee system.



Climate change also means changes in California water-use patterns. Higher temperatures may mean less natural soil moisture, requiring greater reliance on irrigation. Higher temperatures also mean increased urban water demands for household irrigation, which comprises a significant portion of urban water use. Even current incremental changes in Southern California temperatures are reflected almost immediately in their water demands. This provides a good example of the interconnections between water supply and demand. As climate changes, these interconnections may appear more pronounced.

C. Water Agency Responses

With the growing scientific consensus on climate change, water policymakers across California have begun assessing how best to respond. These efforts are not uniform, but are concentrated in the large urban water agencies in Southern California and the San Francisco Bay Area. Most agricultural water agencies have not started initiatives on climate change. Some have gathered anecdotal evidence of significant changes in the hydrology and a need to change operations, but some others reject any climate change projections. California's Department of Water Resources (DWR) has begun a concerted effort to integrate climate change into all its activities, both water planning and operations. California voters recently approved $1 billion in funding for "integrated regional water management," and DWR has announced that its new guidelines for making regional funding grants will include requirements for assessment of climate change. For more specific information on water agency responses, see Appendix A.

II. The Tools

In preparing for climate change, California enjoys a wide array of tools that will assist in preparing the water system to adjust to change, including:

- **Hydrologic Record & Modeling.** California enjoys more than a century of detailed hydrologic records. State and federal agencies also have worked closely to use that record to develop sophisticated modeling of the state's water system.
- **Climate Modeling.** Due to the substantial academic and federal/state agency resources that have focused on California's diverse climates, we have access to climate modeling that provides more precision than other states may enjoy.
- **Energy.** The California Energy Commission recently updated its 2005 study of the energy costs of water use, which may allow California to assess the energy costs – and greenhouse gas effects – of alternative water resource development plans.
- **Water Planning.** California has a long history of sophisticated water infrastructure planning efforts, in addition to the federal agency (Bureau of Reclamation and Army Corps of Engineers) planning processes. The State prepares a state water plan every five years and basin water quality plans are updated regularly. We also require local urban water suppliers to prepare an "urban water management plan" that looks out 20 years to assess the reliability of the supplier's water resources.
- **Land-Use Planning.** Since 2001, new housing developments with more than 500 units are required to show that they have an adequate water supply, based, in large part, on the water supplier's urban water management plan.
- **Delta Plans.** A large number of State and federal agencies have responsibility for managing the California Delta, which leads to large planning efforts on an almost continuous basis. Since the mid-1990's, Delta planning and management efforts have focused on the CALFED Bay-Delta Program. At this point, however, that program has collapsed and the State has initiated a process to develop a new, long-term "vision" for the Delta, including what changes will be necessary to sustain the Delta.

The diversity of tools has and will serve California well in preparing the water system for climate change. California's robust scientific resources may give our state an advantage in assessing, planning and implementing strategies for addressing climate change and California's continued population growth.

III.New Approaches

Recent and projected climate changes demand a response. Climate change is not something that is far off in the future for California. We have experienced change already, requiring us to reassess our current water system and how improvements might provide the flexibility required to respond to uncertainties and unexpected changes. California continues to grow and urban water demand often increases with that growth. Climate change – both current and forecasted – adds a level of uncertainty that has led us to work toward preparing to respond to uncertainty and change.

A. California's Climate Change Response

California's water and flood policies are in transition, due in part to the threat of climate change. Events of this decade have led the State to re-examine its water policies, which were developed in the last century. Delta ecosystem collapse, declining water quality, a failed levee and Hurricane Katrina all led to California setting course to adopt a new long-term "vision" for the Delta for the next 50 years. A key part of the Delta vision process is how to address the changes over which we have little or no control – sea-level rise, invasive species and climate change upstream in the Sierras.

Hurricane Katrina and other local events, including a court decision placing liability for federal-state levee failures on the State, also have focused the attention of the Legislature and the voters on improving flood protection in the Central Valley, in light of changing climate. We are assessing the reliability of our levee system in light of climate change and new understanding. We are setting course for new strategies to protect our burgeoning urban centers in the Central Valley, with the largest and most-at-risk cities lying at the bottom of the river systems. The most important strategy is expanding the flood system's capacity, with setback levees, expanded flood bypasses away from urban centers, and use of natural floodplain diversions in case of larger than anticipated flood events. Even with $5 billion in voter-approved bond funding for flood protection, California cannot afford to only repair and improve the "piles of dirt" that serve as levees protecting our Central Valley cities.

In responding to climate change, California is laying the foundation for a fundamental realignment of our water policies. We have begun this process, but have not finished it. Debate as to the best course of action continues We can look ahead to further debate about how to respond to climate change, but the most important fact is that we are having that debate. We can no longer argue over whether the climate is changing. It already has changed. So, now the question is how to proceed in light of that change. We have laid the foundations for change with several efforts:

- **Assessment.** California has started with an assessment of its existing water infrastructure, particularly the levees protecting the Central Valley's urban communities. We also have begun examining how our water supply infrastructure may be operated differently to respond to climate change. Assembly Bill 224, by our Committee Chair, Assemblywoman Lois Wolk, would require State agencies to assess effects on climate change from alternative water supply development proposals, particularly recycling and conservation.
- **Planning.** AB 224 (Wolk) also takes a critical first step in incorporating climate change into California's water planning efforts. First, the bill would require the Department of Water Resources (commonly called DWR) to incorporate climate change into all its planning efforts, from the State Water Plan (Bulletin 160) to the developing State Plan of Flood

Control for the Central Valley. More importantly for California's diffuse water management system, DWR would build the foundation of climate change information by identifying peer-reviewed scientific information regarding climate change and California water resources. Then local water suppliers would incorporate, at least, that State-identified climate change information into their water planning efforts, including urban water management plans. Of course, those agencies with their own information may use information they deem reliable.

- **Infrastructure Choices.** Decisions regarding future water infrastructure development also need to include consideration of climate change information. Many California water agencies already have begun developing and incorporating climate change information into their development and operational decisions. As a state, we have begun discussing how climate change affects our water infrastructure decisions, but we have not concluded how best to incorporate such information and do not have broad agreement on the outcome of incorporating climate change into our decisions. (You may have heard about Governor Schwarzenegger advocating two particular dams/reservoirs based on a climate change theory.) But, based on the California Energy Commission (CEC) study, we have recognized that our choices on water infrastructure affects – and is affected by – climate change.
- **Promising Water Alternatives.** The CEC study also has suggested that some alternatives for expanding California water supply may help minimize greenhouse gas emissions, particularly recycling and conservation, which have some of the lowest energy-intensity ratings for water supply options. AB 224 supports these efforts by requiring our State Water Resources Control Board to study the greenhouse gas emissions arising out of these two alternative water supply options.
- **Flexibility in Floods.** In the flood protection context, California has begun assessing how best to prepare for larger flood flows, assuming that the current flood trends continue or worsen. DWR has focused its efforts on "managing for uncertainty" and developing ways to expand the flood system's capacity to accommodate more flood water. These expansions may be long-term or short-term, to respond to peak flood flows from sudden, unexpected flood events. These options may include identifying areas in the Central Valley to divert flood flows, so that the downstream cities of Stockton and Sacramento do not suffer the brunt of peak flows. Use of the floodplains in that way is consistent with nature's response to floods, allowing floods to spread out over the floodplain. Preparing for that floodplain use before the flood, however, will allow flood flows to be directed away from established development, thereby minimizing risks to life or property.
- **Floodplain Land Use.** California has begun the conversation about how to minimize risk of flood damages in light of climate change, particularly the increasingly larger flooding we have experienced in the last 25 years. After Hurricane Katrina, there was broader public recognition that levees cannot completely protect communities from flood risks. No matter how strong the levee, there remains residual flood risk. Then the question becomes how to minimize flood damages, and particularly risks to life, in Central Valley floodplains. The Legislature has considered bills to require greater flood protection for new development in floodplains where water is anticipated to be deeper than 3 feet if a levee fails. This year, our Committee Chair, Assemblywoman Lois Wolk, has authored legislation to engage local governments, which have responsibility for floodplain land-use decisions, in partnering with the state in implementing flood protection strategies.

B. Federal Role & Recommendations

Federal agencies play an integral role in the management of California's water resources, so they necessarily have a role to play in helping address climate change in the water resource context. At this point, California has assumed a leadership role in addressing climate change. The Federal Government has three options for responding to that leadership: 1) support California's climate change efforts and work with our State water agencies; 2) do nothing and allow current federal law and policy to inhibit change; or 3) resist California's climate change efforts. I hope that we will see federal agencies adopt the first strategy and work closely with State agencies.

Congress may play a positive role in directing federal agencies to set a new course for addressing climate change in the water resource context, in cooperation with the State of California. In light of California's leadership on climate change and water resources, I would encourage the Congress to consider several options for enhancing our national capacity to respond, in the water resource context, to climate change:

1) **Require federal agencies to incorporate climate change into water planning.** Both the Bureau of Reclamation and the Army Corps of Engineers has a long history of completing water development or feasibility studies for water projects. Federal agencies also implement the National Environmental Policy Act (NEPA). Planning is integral to all that they do in water resources. These studies and planning initiatives should include climate change as an inherent part of any analysis or projection of the future. Incorporating climate change would require assessment of effects both on and from climate change.

2) **Adopt policies that address uncertainty in water and flood management.** Accepting uncertainty does not mean giving up on trying to protect Americans from flooding or providing water supplies. Rather, uncertainty calls for water system designs that allow for unanticipated change, such as the way California is pursuing long-term and temporary expansion of flood system capacity, to be prepared for the next big flood.

3) **Direct cooperation with leading states, including California.** California is fortunate to enjoy substantial academic and agency resources to study and prepare for climate change. California voters also have chosen to invest almost $5 billion in better flood protection statewide. But, California's investment of scientific and financial resources in water resources does not allow the Federal Government to abdicate its responsibilities to protect the Californians from flood or drought. Instead, these investments call on the Federal Government to share in the financial and operational responsibility and follow the lead of the State of California in addressing climate change. The Army Corps of Engineers traditionally played the leading role in flood protection, but their funding in recent years prevents them from asserting leadership – or control – over the way that Californians choose to address water resource issues. Federal agencies need direction to cooperate with, not control, state decisions as to water resources and climate change.

4) **Recognize residual flood risk.** The Federal Emergency Management Agency's policies requiring only 100-year flood protection appear to ignore the residual flood risk arising out of 100-year flood protection, which means that homeowners have a 1-in-4 risk of suffering a flood over the life of their 30-year mortgage. At the very least, the Federal Government needs to do a better job of explaining residual flood risk to those who buy national flood insurance policies.

5) **Support states that minimize flood risks to life and property by effective floodplain land-use policies.** While the Federal Government is protected by federal flood immunity, its policies should nevertheless discourage development in the most dangerous floodplains, in order to minimize flood risks.

Appendix A
California Water Agency Responses to Climate Change

California Department of Water Resources:

- Issued the first major, quantitative report on climate change and California's water resources in July 2006
- Participates in the Governor's Climate Action Team; developed the greenhouse gas (GHG) emissions reductions goals for the California water management community in the CAT report
- Joined the Climate Action Registry and are evaluating the "carbon footprint" of the State Water Project and the rest of the Department
- Formally notified Nevada Power that we will not renew our Reid Gardner (coal) contract when it expires in 2013.
- Developing a renewable portfolio standard for the SWP.
- Exploring carbon sequestration opportunities in the Delta.
- Initiated the next update of the California Water Plan (Bulletin 160), the main theme of which will likely be the adaptation of California water management to climate change (including an in-depth analysis of the "water-energy nexus").
- Established a Climate Change Technical Advisory Group to help us better incorporate climate change into Bulletin 160.
- Includes climate change considerations in CEQA and other planning documents.
- Supports the Delta Vision Process, a main driver of which is climate change.
- Will require applicants to consider climate change/energy intensity/GHG emissions for Proposition 84 water-use efficiency and integrated regional water management grants.
- Initiated water system re-operation studies in response to climate change.

San Francisco Public Utilities Commission (SFPUC) organized and hosted a Water Utility Climate Change Summit early this year [Jan 31-Feb 1]. This watershed event brought together some 250 water and wastewater utility leaders from around the nation, agency officials and top climate researchers, and representatives from NGO's and the business community. Organized by and for water utility leaders, the Summit focused primarily on adaptation responses utilities are - and should be - thinking about in light of climate change. As a result of that Summit, a Steering Committee chaired by SFPUC General Manager Susan Leal and made up of managers of some of the largest utilities in the nation (including Metropolitan in Southern California, New York, Seattle, Las Vegas, Denver, Portland and San Diego) has begun meeting to learn from one another and speak with a collective voice about what we need from our federal, state, and regional agencies to help us grapple with these issues. Another important focus will tackle technical and scientific issues, where the group wants to raise the level of urgency for data collection and applied modeling efforts that will enhance our understanding of future precipitation and heat effects as they impact water supply, urban drainage, sea level rise, and other conditions. This information is urgently needed to inform water supply and capital improvement planning in the water and wastewater utility community.

Metropolitan Water District of Southern California (Metropolitan): Climate change has become an important consideration in the water planning efforts undertaken by the Metropolitan. For Metropolitan to respond to future uncertainties resulting from climate change, it has developed a diversified integrated resource plan (IRP) portfolio which includes investments in conservation and recycling, as well as maximizing storage and transfer programs to address "extreme" situations. In addition, Metropolitan actively attempts to identify and manage potentially harmful impacts of its facilities and operations – including energy-use reduction through capital improvements; employee programs, such as rideshare; and assessing the State Water Project-related energy cost-use relationship. Ignoring the potential causes and effects of climate change, and resisting the need to change, provides no solution to an inevitable problem that directly impacts Southern California's water supply.

Santa Clara Valley Water District (SCVWD) has been looking at climate change and its effects on the water supply of Santa Clara County (Silicon Valley) for almost a decade. Currently, they are working on two levels of response. The first is mitigation – developing an inventory of their greenhouse gas emissions and focusing on reducing these emissions. SCVWD reports emissions to both Sustainable Silicon Valley and the Climate Action Registry. In addition, SCVWD was the first water agency in California to quantify the greenhouse gas emissions avoided as a result of their conservation savings. These avoided emissions come from all parts of the water supply chain and include reductions in energy usage for conveyance, treatment, distribution, end use (heating and cooling), and wastewater treatment. The amount of energy saved from their water conservation programs is greater than 5 times SCVWD's total energy usage. SCVWD is actively working with cities, water retailers, and power companies to increase water conservation efforts to maximize the emissions reduction potential of these programs.

SCVWD is also adapting its business to account for climate change when planning flood protection and water supply projects. Climate change is a priority strategic challenge for SCVWD. The projected loss of Sierra snow pack threatens the reliability of their imported water supplies, the risk of severe and prolonged drought threatens the economy of Silicon Valley, as does the increased potential for flooding due to rising sea level and more intense storms. They are working with other water utilities and flood control agencies to understand the future reality of climate change and update projections based upon the best available science. Climate change is also being addressed in their watershed, flood control planning, and habitat conservation planning processes. Climate change analysis is also to be included as part of their environmental documentation for all their projects.

East Bay Municipal Utility District (EBMUD) is addressing both climate change effects on its water supply and its greenhouse gas (GHG) contributions to climate change.

- Approximately 99 percent of EBMUD's electrical energy production is from renewable sources, including small hydropower, methane production, and solar (photovoltaic systems). Currently, EBMUD generates 90 percent of the electricity needed to run its wastewater treatment plant from biogas that is recovered and combusted on-site.

- Our water conservation program is currently investigating the "embedded energy" in the treatment and distribution of both potable water and wastewater. EBMUD is working with the California Public Utilities Commission and the Pacific Gas and Electric Company to better quantify embedded energy.
- EBMUD was the first water agency to join the California Climate Action Registry, which records our efforts to measure and mitigate our greenhouse gas (GHG) emissions. EBMUD also actively supported the landmark bills AB 32 and AB 1493, which have established California as a global leader in addressing climate change.

Inland Empire Utilities Agency (IEUA) is a public water and wastewater utility that distributes imported water and recycled water as well as provides regional wastewater treatment services for six cities and two water agencies located in western San Bernardino County. The Agency serves 800,000 people within a 242-square mile service area.

IEUA is working to address the impacts of climate change through several initiatives. First, IEUA is developing local water supply projects in our Southern California service area including recycled water (100,000 acre-feet of new supplies), groundwater (150,000 acre-feet of dry year yield planned) and conservation to reduce our dependence on imported water supplies from northern California and, as a result, reduce greenhouse gas emissions. For example, the use of recycled water alone is expected to save approximately 3,000 kWh per acre-foot compared to the use of imported water, which is equivalent to 34 MW annually and would result in greenhouse gas reductions of about 100,000 tons of CO2 equivalents per year (see attachment).

Second, IEUA is demonstrating the effectiveness of green building/low impact development by committing to maintain the highest standards in its facilities. Our new office headquarters, located in the city of Chino, is the first Platinum LEED-rate energy efficient facility to be constructed by a public agency in the nation. We expect our headquarters to become a zero-energy" facility by 2008, which will make IEUA the first public agency to achieve this goal in the country. The headquarters also demonstrates water efficient landscaping and storm water best management practices, and is used as a model by local cities to showcase use of permeable concrete and other water conservation strategies that reduce outdoor water usage (again, resulting in reduced imported water needs which will reduce future greenhouse gas reductions -- over 60% of residential water use within the Chino Basin is for outdoor landscaping). As part of this initiative, IEUA recently established the Inland Empire Landscaping Alliance which will develop recommendations for landscaping best management practices that will be incorporated into local ordinances and general plans.

Third, IEUA is building California's largest enclosed composting facility, which will provide significant air quality benefits as well as reduce greenhouse gas emissions. On the energy side, IEUA has developed an aggressive renewable energy program using energy efficiency as well as anaerobic digesters that convert organic material into methane gas that can be used as fuel rather than released to the atmosphere as a potent greenhouse gas. Currently we self-generate power, meeting over 30% of our own energy needs. Additionally, we have partnered with the dairy industry in the Chino Basin (the largest concentration of dairy cows in the world) to build the first centralized digester in the nation to use a combination of dairy manure and food waste. Using a monitoring protocol developed/peer-reviewed through the California Energy Commission, the project has documented emission reduction of almost 20,000 tons of CO2 equivalents from the dairies over the past three years. IEUA has registered these greenhouse gas emission reductions and is the first entity in California to sell greenhouse gas credits that were

generated by "cow power" (see www.ecoregistry.org).

Finally, IEUA participated in a study led by the RAND Corporation to evaluate the potential impact of climate change on future water supplies and to identify resilient water development strategies that will finish by the end of summer. This information will be incorporated into local water supply plans including the Santa Ana Watershed Integrated Water Management Plan which is now being updated.

Merced Irrigation District (MID), located in Central California with water rights on the lower Merced River, is concerned about recent observed trends in snow pack conditions in its Sierra watershed, contained mostly in Yosemite National Park. With over a century of water records and decades of Merced River management experience vested in its water managers, MID has noticed a curious phenomenon: the snow pack seems to be melting earlier. That means the period of highest inflow occurs earlier – creating earlier peak reservoir inflow. This peak period appears to be averaging a couple of weeks earlier and it appears to be moving further into the spring.

MID operates the only reservoirs on the Merced River. Because of the National Park and the Wild and Scenic River designation for the river, no other reservoirs were ever developed in the Merced River. That means that MID has no upstream storage to help impound flood flood flows. During the 1997 "pineapple express" flooding event in California, MID experienced maximum inflow to the reservoir in excess of 100,000 cubic feet per second (cfs) with a rated downstream capacity of 6-8000 cfs. That experience, the lack of upstream storage and the hydrology data has led MID to the conclusion that its operating criteria must change.

In that regard MID contacted the Army Corps of Engineers (ACE) to discuss potential modifications to its "Rule Curve". MID sought rule changes to allow earlier storage of water when a light snow pack is detected. Tools now available for water supply planning such as snow water sensors in the watershed that relay real time data via satellite, snow pack radar scans, and manual confirmation studies performed throughout the winter are very helpful tools in managing reservoirs for water supply, but they are not used in flood control. Rule curves dictate exact formulas for operation without reference to local reality often resulting in wasted water.

ACE has just finished an analysis of the problem and will propose Rule Curve changes for most of the San Joaquin system. In the meantime MID is developing a groundwater storage system in the district in anticipation of using groundwater storage to offset potential surface storage loss. It is also studying the potential for raising the spill gates (not the dam) to provide more protection and potential storage. MID has an ongoing temperature study examining the potential effects of early snowmelt on water temperatures and hence on fisheries, particularly salmon.

MID also has invested over $10,000,000 of grower money in conservation projects to better utilize the water available. The district has mechanized its diversions which are now centrally controlled by a computer driver control room. Regulating reservoirs inside the district avoid the loss of already diverted water. Agreements with local cities to use recycled water have been negotiated, and a district grant program for water conservation or conjunctive use projects established.

Many of these efforts have been undertaken for multiple reasons. However, the loss of water arising from the loss of surface storage is the economic incentive for them all.

WRITTEN STATEMENT OF ANDY CLARKE
EXECUTIVE DIRECTOR
LEAGUE OF AMERICAN BICYCLISTS
SUBMITTED TO THE COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE
May 16, 2007

Mr. Chairman and members of the committee, on behalf of the League of American Bicyclists' 300,000 affiliates and members, and the 57 million adults who will ride a bike this year, I thank you for allowing me to speak with you regarding the considerable role cycling and walking can play in combating climate change and promoting energy independence.

This Friday, May 18th, tens of thousands of people in communities across the country will bicycle to work in celebration of National Bike to Work Day. In the Washington, D.C., area alone, more than 7,000 riders will converge on Freedom Plaza and other locations. If those 7,000 riders chose to drive to work instead of bicycling, they would generate 32 tons of carbon dioxide, one and a half tons of carbon monoxide, burn half a tanker truck full of gasoline, and they would do the same on the way home.

That's just one day, here in Washington. The potential to increase the numbers of people bicycling to work in the United States in the very hear future is even more impressive. San Francisco and other cities more than doubled bicycle commuting between 1990 and 2000 through investment in bike lanes, trails, bike parking, maps, education programs, encouragement activities and a focused bicycle plan, however, there is much more we can do. The 2000 Census reported that there are 500,000 bicycle commuters in the United States – less than half of one percent of journeys to work and woefully short of the percentages in Canada (1.2%), the United Kingdom (2%), Germany (11%), Denmark (20%) and the Netherlands (27%).

Bicycling to work, moreover, is just part of the picture. We know that more than three quarters of trips made today aren't for commuting. They are social or recreational, for shopping or the like. Amazingly, the 2001 U.S. National Household Travel Survey (NHTS) tells us that in our metropolitan areas more than 40% of those trips are two miles or less – a very manageable bike ride – and more than one-quarter are just one mile or less.

Furthermore, the data shows that within the 28.3% of the trips that are one mile or less in urbanized areas, 65.7% are made by auto. This means that 18.6% of all trips in metropolitan areas are auto trips one mile or less. These short trips are the most polluting and the most feasible to switch to bicycling or walking. The city of Chicago recently adopted a 2015 goal of having 5% of all trips five miles or less made by bicycle. The federal government must encourage more urbanized areas to establish such goals.

Survey after survey shows that people want to ride and walk more but are dissuaded by concern over traffic danger and other barriers. In fact, a recent study conducted by the Shimano Corporation confirms the enormous latent demand for bicycling among the 160 million non-bicycling adults in America. When barriers to bicycling are removed, people start riding. As a case in point, Portland, Oregon, has seen bicycle use quadruple since 1994 as their bike network has grown from 60 miles to 260 miles. They have also invested in cyclist and motorist education, encouragement programs, simple measures such as providing bike parking, and fully integrating transit, walking and bicycling.

Many of the short car trips in our metropolitan areas are school-related; parents driving their children to and from school over very short distances. The Federal Safe Routes to School program created by SAFETEA-LU in 2005, is a welcome opportunity to change the habits of a generation of school children by enabling them to walk and bicycle to school – and we know from the initial Federal pilot project in Marin County that real mode shift is possible.

What else can Congress do today to encourage more people to walk and bicycle instead of automatically reaching for the car keys for all their trips?

1. Establish Vehicle Miles Traveled (VMT) reduction targets that states and localities can meet by shifting short, polluting trips from automobiles to walking, bicycling and transit.

2. Congress can appropriate funding for the Conserve by Bicycle Program, which was authorized in the 2005 Energy Policy Act (PL 109-58). The program directs the USDOT to collect and analyze data to develop best practices to replace car trips with bicycle trips for short distances.

3. Congress should pass the Commuter Tax Benefit Act 2007, (H.R. 1498 and S 858). This legislation revises the tax code to allow employers to extend the transportation fringe benefit currently offered to transit, vanpooling, and qualified parking plans, to bicyclists.

4. Congress must ensure that any future rescissions of Federal transportation funds do not disproportionately hit bicycle and pedestrian funding sources. In 2006, for example, $600 million were cut nationally from the Transportation Enhancement program.

5. Congress should direct the General Services Administration (GSA) to make the Federal government a model employer for promoting bicycling and walking to work.

6. In the next transportation reauthorization, Congress should codify the U.S Department of Transportation "Design Guidance" on accommodating bicyclists and pedestrians so that every new and improved highway project is a "Complete Street."

Mr. Chairman, members of the committee, there has been much deliberation over the past few months in regards to addressing global climate change issues. Many new technologies and solutions have been brought forward as potential strategies for reducing greenhouse gas emissions and oil consumption. We support a full range of strategies from congestion pricing to carbon taxes; from increased intercity and freight travel by train to road pricing. All of these have the potential to help shift travel to bicycling and walking – provided the two modes are considered from the outset.

To illustrate my point, on Friday you heard from the Secretary about the U.S. Department of Transportation's proposed $175 million congestion reduction initiative. You heard from the EPA Administrator whose agency has developed a detailed "wedge analysis" of the transportation sector. In neither case is there a reference or incentive to promote bicycling and walking as an option.

I urge you all, as you deliberate and work to provide leadership in this area, not to overlook simple, tried and tested, existing technologies – bicycling and walking. Unlike any of the other options presented to you as we move forward these two options will simultaneously address critical issues such as obesity, physical inactivity, traffic congestion, and air quality.

Thank you again for allowing me to comment on this very important issue, and I look forward to your questions.

Highway Use, Climate Change, and Energy Independence: The Road Forward

Testimony of Gregory M. Cohen, P.E.
President and CEO
American Highway Users Alliance

Committee on Transportation and Infrastructure
U.S. House of Representatives
May 16, 2007

Chairman Oberstar, Ranking Member Mica, and Members of the Committee, I am honored to have the opportunity to present testimony on behalf of highway users on the subject of climate change and energy independence. In 2005, the U.S. transportation sector accounted for 33% of the nation's carbon dioxide emissions. Highway users are greatly concerned about climate change and energy dependence and we are enthusiastic about contributing to the solutions for these problems.

As you know, the public at-large has grown increasingly concerned. According to last month's *Washington Post*/ABC News/Stanford University poll, one-third of Americans see global warming as the world's single largest environmental problem. Seven in ten want more federal government action; however, there is little consensus on what exactly the government should do.

Organizational Background

Formed 75 years ago, the American Highway Users Alliance (The Highway Users) is a non-profit, non-partisan organization, which advocates for public policies that improve mobility and safety, to benefit the millions of American road users. We are an association that brings together the interests of users of all the highway modes that contribute to the Highway Trust Fund, through a membership roster that includes numerous AAA clubs from coast-to-coast, trucking groups, bus companies, motorcyclists, and recreational vehicle enthusiasts. These members and the hundreds of other member businesses and associations require safe, reliable, and efficient roads to facilitate the movement of their employees, customers, and products. Since 1932, The Highway Users has worked closely with this Committee as a key stakeholder and grassroots advocate for improvements in surface transportation legislation and for a strong and trustworthy Highway Trust Fund.

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What Can Individual Highway Users Do?

As Americans become increasingly concerned about global warming and energy dependence, they are seeking out ways to conserve energy, and are making simple changes to protect the earth. Most individuals say that they are willing to change some things they do in order to mitigate climate change. At home we can save electricity by turning off unnecessary lights, recycling, planting trees, buying products with the Energy Star® label, etc. For example, seven in ten already use at lease one compact fluorescent light bulb to conserve energy.

Highway users need to become educated as well. The American Highway Users Alliance partners with the federal government, a variety of environmental groups, and other non-profits to promote educational programs that increase awareness of how to reduce transportation emissions. Solutions include trip chaining, ride sharing, properly maintaining vehicles and tires, avoiding fuel purchases on hot days, telecommuting, and listening to traffic reports to avoid unnecessary delays. For more information on these solutions, please visit www.italladdsup.gov.

We recommend that the federal government substantially increase support for these educational programs by expanding them into major public relations campaigns, so that many more Americans can take simple, relatively painless steps to reduce emissions and save fuel.

What Can the Transportation and Infrastructure Committee Do?

A number of Congressional committees are also studying environmental and energy issues. They are struggling to come up with the right policies to reduce greenhouse gas emissions and increase energy efficiency, while also preventing serious harm to the American economy. The good news is that the Transportation and Infrastructure Committee is uniquely capable of developing solutions that will reduce greenhouse gas emissions, minimize wasted fuel, AND grow the economy and increase America's global competitiveness.

Americans are demanding congestion relief. The Department of Transportation estimates that congestion costs America $200 billion. In wasted time and fuel alone, traffic congestion costs Americans $63 billion, according to the Texas Transportation Institute. It also results in 2.3 billion gallons of wasted fuel per year. When considering the economic impacts of poor reliability, lost productivity, crashes, and environmental externalities, the cost of highway congestion is likely to be far greater than $100 billion. Fortunately, congestion relief projects decrease pollution, greenhouse gas emissions, and wasted fuel.

The Transportation and Infrastructure Committee should authorize a comprehensive, data-driven, congestion relief program. We believe such a program would greatly boost public support for the federal-aid highway program and may even increase support for additional user fees to keep the program solvent and growing. Like

the new, data-driven, Highway Safety Improvement Program (HSIP) authorized under SAFETEA-LU, a core congestion relief program that is measured to reduce congestion would be a powerful aid to highway users. Eliminating the worst bottlenecks and reducing every urban area's "travel time index" will provide tremendous air quality and fuel savings benefits. (The "travel time index" is a measure of congestion developed by the Texas Transportation Institute.) We recommend that this new program be considered as a major reform to the current Congestion Mitigation and Air Quality (CMAQ) program with a significant funding increase. The major problem with the current CMAQ program is that traditional highway improvements are ineligible for funding from the program, even if they provide the most effective congestion relief and emissions reductions.

Remove the Nation's Worst Bottlenecks

Bottlenecks are locations where highway demand exceeds capacity. Bottlenecks represent 50% of total congestion. The Highway Users studied bottlenecks over the six-year period from 1997 to 2002. The number of bottlenecks with more than 700,000 annual hours of delay increased 40%, from 167 to 233. Improving these bottlenecks would reduce carbon dioxide emissions by an astounding **390 million tons** over 20 years, even after accounting for increased emissions during reconstruction. **On average, the carbon dioxide emissions and fuel usage at the worst bottlenecks would drop by a remarkable 77.2%. The amount of fuel saved would be more than 40 billion gallons**.

Not only would the environmental and energy benefits be more than sufficient to justify the program, the safety, time, and productivity benefits would be astounding. If the worst 233 bottlenecks were fixed, an estimated $470 billion in economic benefits would be realized. The average commuter traveling through these bottlenecks would save more than $350 per year in time and fuel alone if improvements were made. More than 222,000 lost lives and serious injuries would be avoided. Forty-eight billion vehicle-hours would be saved as well.

Reduce Delays from Non-Recurring Events

According to the U.S. Department of Transportation, non-recurring events account for the other 50% of congestion-related delays. These include traffic incidents (25%), work zones (15%), bad weather (10%), and traffic signal problems (5%). Investments in real-time operations programs to clean up non-recurring incidents are vital to reduce this type of congestion and associated emissions and wasted fuel. In addition, Intelligent Transportation System (ITS) investments that provide better traveler information help highway users re-route around incidents, preventing delays and the associated wasted fuel and emissions. Next generation ITS investments, particularly Vehicle Infrastructure Integration (VII), which will allow real-time communication between vehicles and roadway infrastructure, hold great promise in relieving congestion caused by non-recurring incidents as well as preventing crashes.

The Transportation & Infrastructure Committee should continue and significantly increase support for these programs to reduce emissions, reduce wasted fuel, and reduce congestion.

Pitfalls for the Committee to Avoid

Currently highway travel constitutes 99% of total passenger and vehicles miles traveled (excluding air). Unfortunately, it is a popular (and mistaken) notion that reducing highway use is a realistic and advisable approach to reducing greenhouse gas emissions and saving fuel. Some advocates of this approach even promote punitive approaches that create financial and time burdens, punishing highway users so that driving becomes more costly or congestion more severe. The goal is to convince drivers to give up their cars or reduce their vehicle-miles of travel. Some of these dangerous approaches include diversion of the dwindling supply of highway user fees to off-highway purposes, congestion pricing and tolling, and opposition to new highway projects that add capacity. We contend that these so-called "solutions" are not only unlikely to succeed, but actually will be damaging to quality-of-life, the economy, and even the environment.

These "solutions" are particularly damaging to working class and disadvantaged populations, because, as a Democratic Leadership Council study on Welfare-to-Work has shown, "in most cases, the shortest distance between a poor person and a job is along a line driven in a car." *The Washington Post* has reported that economists see a direct link between car ownership and financial success because cars provide flexibility and freedom for commuters.

At 99% of all ground vehicle and passenger miles traveled, it is almost impossible to conceive of highway travel losing its overwhelming dominance of U.S. travel, regardless of federal policy (barring economic collapse or intense contraction). For freight travel, the increased share of freight moving by truck is a reflection of increasing shipper demands for speed and reliability. According to the Department of Transportation, trucks carry 70% of the nation's freight by value; 60% by weight.

What Else Can Congress Do?

Congress can take a number of additional actions beyond congestion relief to reduce emissions and save fuel. Congress has also shown a repeated willingness to provide incentives to help create markets for alternative fuels and vehicle technology solutions.

Hydrogen, ethanol and other biofuels, electricity, and other alternative fuels hold great promise in reducing emissions and improving energy independence, as alternate-fuel capable vehicles continue to be introduced. E-85 vehicles already on the road today have the potential to reduce U.S. gasoline consumption by 22 billion gallons. For the Transportation and Infrastructure Committee, it is important to consider the effect of these advances on revenue into the Highway Trust Fund and ensure that the Trust Fund is compensated.

Under the Corporate Average Fuel Economy (CAFE) requirements, the auto industry's carbon emissions have effectively been regulated for thirty years. The Highway Users supports increasing CAFE standards, while taking into account economic impacts and the need to preserve consumer choices. We have already offered to work with the Commerce Committee to provide advice and potential support for more stringent CAFE standards.

For both consumers and industry, the economic key to successes on fuel economy, alternative fuels, and advanced engines is for Congress to consider incentives that create the modest price signals that influence consumer purchasing decisions. However, Congress must be cautious to avoid overstepping this role by pursuing policies too aggressively in ways that could cause economic damages or create substantial price changes that greatly harm consumers .

We also recommend that Congress proceed cautiously with European-style cap-and-trade approaches. If a cap-and-trade or carbon tax approach is approved by another House Committee, we urge the Transportation & Infrastructure Committee to take steps to ensure any increased taxes or equivalent price increases are fully credited to the Highway Trust Fund, because they are essentially highway user fees. The Highway Users opposed the original 2004 McCain / Lieberman cap-and-trade bill, S. 139, because the Energy Information Administration's analysis indicated that the price of gasoline would artificially rise by 40 cents per gallon by 2025, without any corresponding revenue to the Highway Trust Fund.

Conclusion

America's highway users are ready to help reduce greenhouse emissions and prevent wasted fuel. We stand particularly ready to support congressional action to reduce traffic congestion, and we believe this approach provides a tremendous opportunity to reduce greenhouse-gas emissions and save fuel. This approach is also one of the few direct actions that Congress can take to reduce energy use that provides enormous benefits to drivers, consumers, and the economy. We urge the Committee to stand united by choosing this "win-win" approach. Other approaches need to be considered carefully but we ask that you reject unrealistic and punitive suggestions that highway users be punished for driving or that dwindling highway user fees be diverted from desperately needed highway projects. As every Member of the Committee knows, these road needs are overwhelming.

Fast Facts about Ground Transportation in the U.S.

- In 2004, highway vehicles account for 99% of vehicle miles traveled & passenger miles traveled. Despite tremendous investment in non-highway alternatives, these investments represent a very small opportunity to reduce congestion, emissions, and wasted fuel.

- From 1980 to 2004, road capacity has increased by 4%, lane capacity by 6%, but highway vehicle miles traveled has increased by about 94%, and highway passenger miles traveled has increased by about 81%! No wonder there is congestion, wasted fuel, and excessive greenhouse gas emissions!

Vehicle Miles Traveled (Millions)				
	1980	1990	2000	2004 prel.
Cars	1,111,596	1,408,266	1,600,287	1,704,982
Light Trucks/SUVs	290,935	574,571	923,059	1,014,342
Trucks	108,581	146,242	205,520	226,505
Freight Rail	29,277	26,159	34,590	37,071
Motorcycles	10,214	9,557	10,469	10,048
Buses	6,059	5,726	7,590	6,637
Rail transit	403	561	648	710
Commuter Rail	179	213	271	295
Intercity Rail	235	301	368	308
Other transit	15	324	833	986

Passenger Miles Traveled (Millions)				
	1980	1990	2000	2004 prel.
Cars	2,011,989	2,281,391	2,544,457	2,693,872
Light Trucks/SUVs	520,774	999,754	1,467,664	1,758,542
Buses		121,398	160,919	140,716
Rail transit	10,939	12,046	15,200	15,930
Motorcycles	12,257	12,424	11,516	12,761
Commuter Rail	6,516	7,082	9,402	9,719
Intercity Rail	4,503	6,057	5,498	5,511
Other transit	390	841	1,631	1,874

Roadway Extent (Miles)				
	1980	1990	2000	2004
Public Road Length	3,859,837	3,866,926	3,950,035	3,995,490
Lane-Miles	7,922,174	8,051,081	8,255,521	8,372,283

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Testimony of the National Association of Flood
And Stormwater Management Agencies

Presented by Steve Fitzgerald
Chief Engineer
Harris County Flood Control District
Houston, Texas

Climate Change and Energy Independence:
Transportation and Infrastructure Issues

U.S. House of Representatives
Transportation and Infrastructure Committee
Rep. James Oberstar, Chairman

Water Resources and Environment Subcommittee
Rep. Eddie Bernice Johnson, Chairwoman

May 16, 2007

The National Association of Flood and Stormwater Management Agencies (NAFSMA) is pleased to present this testimony concerning climate change and the related infrastructure energy independence issues of importance to our members and their constituents.

NAFSMA

NAFSMA is a national organization based in the nation's capital that represents more than 100 local and state flood and stormwater management agencies. Its members serve a total of more than 76 million citizens. Formed in 1979, NAFSMA works closely with the United States Army Corps of Engineers (USACE), as well as the Federal Emergency Management Agency (FEMA) and the U.S. Environmental Protection Agency (EPA) to carry out its mission.

The mission of the Association is to advocate public policy relating to flood protection, stormwater and floodplain management in order to enhance the ability of its members to protect lives, property, and economic activity from the adverse impacts of storm and flood waters. Many of NAFSMA's members are currently non-federal partners with the U.S. Army Corps of Engineers in water resources projects, including flood damage reduction and environmental restoration projects.

NAFSMA members are on the front line protecting their communities from loss of life and property. Our membership is keenly aware that flood risk management is a necessary investment required first to prevent loss of life and ensure the safety of our citizens and secondly, to reduce the risk of damages to peoples' homes and businesses and protect them from economic disruption. Flood management has proven to be a wise investment that pays for itself by preserving life and property, and reducing the probability of repeat requests for federal disaster assistance.

We appreciate the committee's interest in the voice and experience of NAFSMA and its members relative to the design, construction, and operation of our nation's stormwater management and flood protection systems.

The Role and Function of NAFSMA Members

NAFSMA members are responsible for, or directly influence, the design, construction, operation, maintenance, environmental compliance, financing and public education about the nation's stormwater management and flood control infrastructure.

The systems designed, constructed and operated by these state and local entities include a wide range of infrastructure from road culverts to streets, canals to levees, wetlands to reservoirs, drainage channels to detention basins, and water pipelines to dams.

Neither NAFSMA nor its members gather climatological, meteorological, or hydrological information for scientific analysis and interpretation, instead relying on sources such as the National Oceanic and Atmospheric Administration (NOAA) and the United States Geological Survey (USGS) for this function. However, the data assembled in the historical climatological and meteorological record is of foundational importance to stormwater and flood control systems design and operations, providing the most basic component of the design and operational decisions made by our members.

Designing Stormwater and Flood Control Systems for a Defined Risk

All stormwater and flood protection systems are designed, constructed and operated to protect people and property from a "defined risk". That risk is defined by public policy based on several categorical factors. These include among others, lives at risk, damages avoided, residual risk, environmental impacts, costs, willingness (or ability) to pay and political prioritizations.

This "defined risk" for which a stormwater or flood protection system is designed is most often expressed as a level of protection related to the probability of occurrence of an event of a particular size or intensity (ie. the 100-year event, having a 1% chance of occurring, in any given year). The calculation to determine the size or character of that defined risk event and the related level of protection is based on the data in the historical climatological/meteorlogical record.

For a particular project, community or state/federal program, it is prudent to also establish or identify a residual risk from which the community is not protected. A levee or channel designed for the 100-year event does not protect against the 200-year event, though if structurally sound, it will significantly reduce the damages which would otherwise have been produced by the 200-year event.

Actually obtaining the selected level of protection against the defined risk requires taxpayers (through direct vote) and/or their representatives (through legislative action) or federal agency action (for smaller flood management projects) to affirm the plan and provide the necessary legal empowerment and financial resources. Only then may the selected structural and/or non-structural protective measures be implemented, and the desired level of protection against the defined risk be secured.

Current Stormwater and Flood Protection System Designs

Stormwater and flood protection systems currently in place or under construction have their designs based on risk as defined from the existing historic record of climatological and hydrological data and events. From this data the public policy process determines the level of protection to be afforded various locales. For example, levees designed to protect various agricultural lands may be designed for a 25 or 50-year event while a protective structure for a large urban area typically may be designed for 100-year protection.

Many urban areas, however, currently have far less than 100-year protection. In addition, the accepted or minimum level of protection, established for certain locales or situations can vary among agencies (ie., Corps, FEMA, EPA, USFWS, states, locals). Similarly, the manner in which levels of protection are calculated or prioritized can also vary.

It is important to note that even under the current system of defining risk, establishing acceptable levels of protection and prioritizing projects, flood protection agencies have neither the fiscal resources, nor the priority empowerment to fully meet the nation's current flood protection risks. In the week prior to this hearing significant flood flows

along the Missouri River and its tributaries overtopped many levees and flooded substantial areas.

In that regard, the Hurricane Katrina experience raised a number of questions, among them: "Was the project approval, funding and construction process so onerous as to contribute to its failure?" Secondly, "Was the selected level of protection adequate, based on the historical record?" and third, "Can the design and construction be sufficiently robust so as not to fail in an event which might exceed the design?" Clearly, a 100-year event structure which is overtopped, but which does not fail in a 200-year event, is far preferable to a 200-year event structure which fails in the designed 200-year event.

Considerations Raised by Climate Change

The consideration of climate change as a potential design factor for stormwater and flood protection systems raises many questions requiring resolution in order to enable the public policy process to establish an implementable defined risk and level of protection.

While current risk definitions and levels of protection are built on known historic climatological and hydrological data, risk definitions and levels of protection built on climate change projections are built on events which have not yet occurred, or on events which might occur in some unknown time frame, or events which might not occur at all. The weight of this design challenge is seen in the climate change discussions which suggest some areas might receive more rainfall, or more intense rainfall, and others less. Some might see fuller, more erosive streams, some less so. Some might see more snow fall and snow melt runoff, others less. Some might see higher stage receiving water, others less.

Clearly, the question of climate change as a stormwater and flood protection system design factor produces a factor of design uncertainty that reaches deeply into the infrastructure planning of every community, impacting every system feature from the smallest road culvert to the largest pipelines, dams and levees.

Examples of important design questions needing resolution are as follows: If the selected level of protection is, for example, the 100-year event, what is the appropriate data base from which to calculate storm or flood flow and to design the control structure? How much of the calculation is built on historical data, and how much on future climate projections. Lastly, how is the future climate projection factor determined for each local community or watershed?

Recommendations

In view of the significance of a decision to include, or exclude, climate change as a factor in defining risk and determining an appropriate level of protection for stormwater and flood protection systems, NAFSMA respectfully submits the following recommendations for the Committee's consideration.

1. The federal government should develop and implement a unified targeted research initiative, pursuing the science requisite for the necessary public policy enactments. The wrong public policy concerning this matter could result in massive misdirected or unnecessary expenditures, or in enormous damages and losses otherwise avoidable.
   - The research initiative must address the question of climate change as to each hydrologic region.
   - The research must determine within a reasonable confidence level the impact on the previously documented hydrologic regime and climatological record.
   - The research must help develop new or alternative means of defining risk and calculating levels of protection, and the associated degree of uncertainty.
   - NAFSMA supports the research initiatives outlined in the testimony of the Honorable John Paul Woodley, Jr. of May 11, 2007.

2. Currently active projects should be allowed to proceed under existing flood protection program policy and design parameters. In many areas of the country, unprotected or under protected communities are at great risk under current known conditions. Allowing projects to proceed with definitive protection today, instead of awaiting a pending future climate condition yet to be determined, is in the public health and safety interest.

3. Maximize the effectiveness of the current federal/state/local stormwater management and flood protection system. Improvement in interagency coordination, unified flood protection policies and standards, improving project approval and completion processes, improving design and construction standards, and improving project operations and maintenance procedures will produce robust projects which will perform well in design events.
   - Develop in conjunction with state and local interests, a functional definition of "residual risk".
   - Update the current project evaluation process to give public safety equal standing with the national economic development standard.
   - Strengthen the utilization of non-structural and other options to maximize risk reduction and mitigation techniques.
   - NAFSMA strongly supports the streamlined or facilitated permitting for flood protection systems operations and maintenance activities.
   - NAFSMA strongly supports the aggressive funding of Corps of Engineers flood damage reduction studies and projects.

4. Ensure that the project approval, administration, and funding processes will implement the policies ultimately adopted to define the risk and calculate the level of protection, thus guaranteeing timely construction of the projects approved consistent with that policy. By the mid-1980's the time required to move a Corps project from congressional authorization to construction was 25 years or more. In the 1990's, the goal was to reduce that time to ten years. These timelines don't include construction, and much progress is still needed.
   - Policies should be developed on the basis of the results of the research and science initiatives; project designs, construction and operation standards and practices would then be based on those clear policies.
   - Ensure that the level of protection selected is commensurate with the defined risk.
   - Policies should define the means by which risk and design uncertainties are recognized and taken into account.

- NAFSMA supports efforts to reduce the time to identify projects and reduce redundancies and unnecessary steps, such as the Lean Six Sigma Process recently initiated by the Corps.
- NASFMA supports the establishment of a national levee safety commission to be charged with the development of a national levee safety policy and program, with state, regional and local participation in this effort.
- NAFSMA supports the national levee inventory program initiative of the Corps and FEMA.

5. Include state and local expertise in the climate change research and policy initiatives. All of the impact and much of the cost of any decision to incorporate, or not incorporate, climate change as a stormwater and flood protection design factor will be borne by state and local entities. Their expertise and interest will be valuable.

6. NAFSMA urges strong interagency coordination among the federal agencies, as well as their state, regional and local counterparts on this critical issue. Since August 2005, the Federal Emergency Management Agency and the U.S. Army Corps of Engineers have set an example that should be followed by other federal agencies. Their joint efforts, which began prior to Hurricanes Katrina and Rita have helped to lay the groundwork for a National Flood Risk Management Strategy. This work needs to reach even further to include leadership of other federal agencies, such as the EPA, the U.S. Geological Survey, the Bureau of Reclamation, the National Weather Service/NOAA, and others. In addition, the programs supported by these agencies are critical elements to increasing our preparedness to address climate change issues.

7. NAFSMA urges Congress to provide adequate funding for the federal programs needed for federal, state and local agencies to sufficiently equip them to respond and adapt to climate change issues. In this regard, NAFSMA supports the following:

   - NAFSMA strongly supports full funding of the U.S. Geological Survey's streamgaging programs. NAFSMA urges Congress to provide appropriations of $78 million for the Cooperative Water Program (CWP) and $34 million for the National Streamflow Information Program (NSIP) in FY 2008. This request has

been supported by NAFSMA and 26 other national organizations in testimony submitted to the House Interior and Environment Appropriations Subcommittee.

- Full funding of FEMA's Map Modernization Program through at least 2012.
- NAFSMA urges aggressive funding to address aging infrastructure issues in this country. NAFSMA applauds the House, and especially this Committee under its past and current leadership, for its efforts to approve water quality financing legislation earlier this year. Within EPA's existing programs, adequate funding is needed for EPA's State and Tribal Assistance Grants Program, Cooperative Water Quality Grants and research programs to address aging infrastructure and climate change issues.
- Approval of a Water Resources Development Act every two years.
- NAFSMA supports the NOAA & NWS efforts.

Thank you for the opportunity to submit these comments, and for your consideration of our recommendations.

AMERICAN WATER RESOURCES ASSOCIATION

Community, Conversation, Connections

Statement of

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to the

Committee on Transportation and Infrastructure
US House of Representatives
May 16, 2007

Water Resources and Climate Change

Chairman Oberstar, members of the Committee. It is a distinct privilege to participate in this important and most timely hearing and I want to thank the Committee for the opportunity.

I am Gerald E. Galloway, President of the American Water Resources Association and a Glenn L. Martin Institute Professor of Engineering at the University of Maryland where I teach and do research in water resources and public policy.

The American Water Resources Association is a non-profit professional association dedicated to the advancement of men and women in water resources management, research, and education. AWRA's membership is multidisciplinary; its diversity is its hallmark. It is the professional home of a wide variety of water resources experts including engineers, economists, educators, foresters, biologists, ecologists, geographers, managers, regulators, hydrologists and attorneys. Its mission is to advance multidisciplinary water resources education, management and research. AWRA is also a member of the World Water Council and is one of three US government and NGO organizations on the Board of Governors of this international Council.

My message today is straightforward. Our nation and the world face significant water resource challenges and we are not now properly addressing water issues either at home or as they affect the rest of the world. Climate change will only exacerbate the challenges and place greater fiscal and management burdens on our society. Unless steps are taken to deal with and adapt to these challenges, the long term social and economic health of the nation and the world is at significant risk.

Water resources are a critical component of our national existence and our national security. The availability of water, its quality and its allocation and use have immense impacts on the health and welfare of our citizens and our economy. Failure to provide good stewardship of these resources is a roadmap to long term disaster and places a significant burden on the generations that will follow us. Global water issues threaten the stability of world economies and the lives of millions, especially the young. They also serve as the roots of conflict among nations over these resources.

Let me review some of the water challenges we are facing today.

- The Nation faces periodic drought and has no drought plan. The recent congressional authorization of a National Drought Information System was a step in the right direction but a funding stream is now needed to ensure efforts to help forecast and monitor drought. It is important to remember that in 2002, 49 percent of the contiguous United States was in moderate to extreme drought.

- Annual flood losses in the United States continue to increase in spite of nearly 71 years of federal flood control and 39 years of National Flood Insurance. While these latter programs have prevented billions of dollars in damages, the pre-Katrina annual flood costs to the Nation are estimated to be in excess of $6 billion. The Katrina costs will drive this even higher.

- Demands for municipal and industrial water supplies are growing in many parts of the country and governments are struggling to deal with these demands. While average per-capita use is declining, the population is growing. By 2050 the U.S. population is expected to grow by almost half from its 2000 level, adding more than 137 million persons and a consequent increased water demand.

- Many ports, gateways to domestic and international trade and overseas military operations, are operating at the margin in terms of channel depths. The inland waterway system is congested and is in need of rehabilitation.

- Wetland losses on nonfederal lands are between 70,000 and 90,000 acres annually.

- More than 1300 plants and animals are listed as threatened or endangered. While the Endangered Species Act has prevented extinction for many, it has recovered few. Recovery plans exist for 976 species but are difficult and costly to implement and require many years to move to fruition.

- Multi-billion dollar ecosystem restoration projects in the Everglades, Coastal Louisiana, the Great Lakes and Chesapeake Bay, and on the Upper Mississippi River, are essential to the ecological health of those areas, but lack adequate or, in some cases, any funding.

- EPA's latest assessment of U.S. water quality – 2000 – indicates that of the 699,946 river and stream miles that were assessed by the states (or 19% of the nation's river and stream miles), 269,258 (39%) were not fully meeting water quality standards (i.e., at least one use was impaired). Of 31,072 assessed square miles (36% of the nation's estuarine square miles), 15,676, or 51%, were not fully meeting water quality standards. Emerging contaminants may threaten the viability of many of our current treatment approaches.

- The 2005 American Society of Civil Engineers Report Card for America's Infrastructure assigns a D grade to water infrastructure and cites an annual shortfall of $11 billion needed to replace facilities that are nearing the end of their useful life. Wastewater systems face a $12 billion annual shortfall in funding for their needs. States presently report more than 3,500 "unsafe" dams.

- Conflicts over the primacy of one water use over another, the water needs of natural systems, and the water rights of Native Americans, continue to occur. These differing viewpoints can be seen in the nearly 19 years of disagreement over management of the Missouri River and the nearly eight years that Alabama, Georgia and Florida have been working to allocate waters of the Apalachicola-Chattahoochee-Flint Rivers.

- At the international level, the starkest statistic indicates that 1.1 billion people lack access to improved water supply and 2.6 billion to improved sanitation.[2] Five million people, mostly children, die each year from lack of access to clean water.[3] Transboundary water disputes over the sharing of water offer potential for increased tensions among nations and are the roots of possible conflicts.

Climate change will have substantial impacts on water resource problems. In an April 2007 report, an Intergovernmental Panel on Climate Change (IPCC) Working Group reported that "by mid-century, annual average river runoff and water availability are projected to increase by 10-40% at high latitudes and in some wet tropical areas, and decrease by 10-30% over some dry regions at mid-latitudes and in the dry tropics, some of which are presently water stressed areas...Drought-affected areas will likely increase in extent. Heavy precipitation events, which are very likely to increase in frequency, will augment flood risk...In the course of the century, water supplies stored in glaciers and snow cover are projected to decline, reducing water availability in regions supplied by meltwater from major mountain ranges, where more than one-sixth of the world population currently lives...The resilience of many ecosystems is likely to be exceeded this century by an unprecedented combination of climate change, associated disturbances (e.g., flooding, drought, wildfire, insects, ocean acidification), and other global change."[4] Others indicate that sea level rise will increased the vulnerability of coastal infrastructure to flooding and storm surge, speed the loss of coastal wetlands and lead to salt water intrusion into coastal aquifers and upstream in coastal rivers. This is not a very bright picture.

On a subject familiar to this committee, the protection and restoration of areas affected by riverine and coastal flooding, climate change will make the work ahead even more difficult than it is now. It will add significantly to the engineering and social challenges faced in Louisiana and around the nation in reconstructing, maintaining, and upgrading dams, levees and other flood risk reduction structures. Those conducting congressionally directed studies of the protection and restoration of coastal Louisiana are not dealing with getting things back to where but with adapting future hurricane protection systems to the impacts of climate change. What you are facing in Louisiana is mirrored in highly populated areas throughout the nation.

As we move to face these challenges we are operating without a sound understanding of the specifics of our water issues. It has been 30 years since the last national water assessment took place and much has changed across the physical and social landscape. The Administration and Congress should address the urgent requirement for a national assessment of water resources needs. A comprehensive review of physical challenges as well as policy gaps, overlaps, and contradictions is long overdue.

On a higher level, water resources challenges that imperil our quality of life and economic security have been identified by numerous groups and government agencies over the last decade. Major policy implications were identified in three National Water Resources Policy Dialogues conducted by AWRA under the sponsorship of ten federal agencies and nearly 40 state, local, business, and nongovernmental organizations. The water resources experts participating in the Dialogues heard from members of the cabinet, Congress, tribes, state and local agencies, and nongovernmental organizations.

We reported the results of the Dialogues to the President, the Congress, and the governors in 2003, 2005 and earlier this year. The general conclusion of the Dialogues has been consistent — efforts to deal with water issues need focus and immediate attention and can no longer be pushed into the background. Our nation's approach to dealing with water is ad hoc. Numerous studies by the National Academies, other nonpartisan organizations, and both the Administration and the Congress speak to "management by earmark." We address problems as they appear or as they

merit political support rather than addressing long term needs. Tackling these problems in a rational manner will require that the nation – the Administration, the Congress, state, tribal, and local officials, and the public – develops a vision that provides a national versus federal perspective on water resources.

What needs to be done?

- The Administration and Congress should work with governors and tribal leaders to establish broad principles for water management – in essence, a national – not a federal - vision for use of our waters today and under these stark future conditions. In turn the vision must be translated into water policies that first clearly define the roles and responsibilities of federal, state and local governments and the public with respect to water and second, set out the goals and objectives that would establish a blueprint for future actions – how we are going to adapt to the results of climate change. I should note that there was a strong sense within the Dialogues that the center of gravity for national water actions should rest at the state level and be backed by appropriate support from the federal government.

- The Administration and Congress should better coordinate water resources activities. The efforts of federal agencies can overlap and at times conflict, and there is no body within the Administration to provide substantive coordination or adjudication of disagreements among agencies and to ensure needed collaboration. Furthermore, the Congress should work to eliminate the frequently uncoordinated actions of the numerous Congressional committees that deal with water.

- The Administration, Congress, and the governors must encourage policies that promote watershed planning and change policies that do not. Federal agency operations and programs need to be more watershed-oriented rather than tied to political boundaries and project-level authorizations and appropriations that often create more problems than they solve. Much should be learned from the successful efforts of some states and tribal organizations to operate in this manner.

- The Administration, Congress, and the governors must ensure that the Nation's vast scientific knowledge about water is available to all, clearly presented, and fully considered in making decisions on key water issues. Critical data about water resources must be collected and maintained, and research and development on critical water issues must be supported. Our need for accurate streamflow, groundwater and other water resource data continues to increase along with our population, economy, land uses and education, yet each year, we eliminate needed gages and other data collection infrastructure.

- With specific respect to climate change:

    - Congress should provide adequate funding to federal agencies to undertake climate change impact analyses for the planning of new projects and the operations of existing projects. These agencies already have the requisite authorities but lack the resources. Cost-shred planning is another impediment to exercising these authorities

are outdated benefit-cost analysis framework which effectively discount the long term-benefits of adapting to climate change.

- Congress should closely examine the allocation of funds for water resource infrastructure. Our current situation points to the failure of the current funding levels to adequately deal with the challenges we currently face. How can we expect to deal with climate change on top of these current problems without a substantial increase in resources devoted to dealing with water?

In summary, stewardship of the Nation's water resources is being neglected and the manner in which we deal with water issues and climate change is dysfunctional.

We urge you to initiate substantive efforts to develop a coordinated, collaborative, national (not federal) approach to preserving and protecting our water resources now. A failure to do so will threaten the health and welfare of our citizens, endanger the economy, weaken our national security, and pass our problems to our grandchildren/

Thank you.

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[1] Gerald E. Galloway is currently Glenn L. Martin Institute Professor of Engineering and an Affiliate Professor in the School of Public Policy, at the University of Maryland He is also a Visiting scholar at the US Army Institute for Water Resources and a consultant to several organizations. Previously, he served as secretary of the United States Section of the International Joint Commission in Washington, D.C.

He has been a consultant to the Executive Office of the President, and has assisted the U.S. Water Resources Council, World Bank, Organization of American States, Tennessee Valley Authority, U.S. Army Corps of Engineers and various other organizations in water resources related activities. He was appointed by President Reagan to the Mississippi River Commission and served on the Commission for seven years. Following the disastrous 1993 Mississippi Flood, he was assigned to the White House and led an interagency study that investigated the causes of that flood and made recommendations to improve the nation's floodplain management. He commanded the Army Corps of Engineers District in Vicksburg, Mississippi from 1974 to 1977 and has served on the faculty of the U.S. Military Academy at West Point. In 1990, he was promoted to Brigadier General and appointed the ninth Dean of the Academic Board (Chief Academic Officer) of the Military Academy. He retired from active duty after a 38 year military career.

Dr. Galloway holds master's degrees from Princeton, Penn State, and the U.S. Army Command and General Staff College. Dr. Galloway received his Ph.D. degree in geography from the University of North Carolina. Dr. Galloway is a member of the National Academy of Engineering, a fellow in the American Society of Civil Engineers and an Honorary Diplomate of the American Academy of Water Resources Engineers and a registered professional engineer in New York.

[2] World Health Organization. http://www.who.int/water_sanitation_health/mdg1/en/index.html

[3] Peter H. Gleick.. *Dirty Water: Estimated Deaths from Water-Related Diseases 2000-2020.* Pacific Institute Research Report.. August 15, 2002

[4] Intergovernmental Panel on Climate Change, Working Group II. *Climate Change 2007: Impacts, Adaptation and Vulnerability.* Contribution to the Fourth Assessment Report Summary for Policymakers.. Geneva: IPCC: April 2007.

Statement of

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Before the

House Committee on Transportation and Infrastructure

Climate Change and Energy Independence:
Transportation and Infrastructure Issues

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Mr. Chairman, Members of the Committee. Good morning and thank you for inviting me to address the Committee and provide GE's perspective on climate change and energy independence. Today, my testimony will focus on some innovative technologies that are beneficial both for reducing generation of greenhouse gases and increasing our energy independence.

I am Ed Hall, Executive Leader of Engine Engineering for GE Transportation. In this role, I am responsible for, among other things, all phases of diesel-fueled engine development. GE Transportation is the world's leading manufacturer of diesel-electric locomotives with more than 15,000 locomotives operating around the globe. At the same time, we're a significant provider of on-board and wayside signaling, communications, control and information systems. We're also the industry leader in service, maintaining an installed base of more than 8,000 locomotives worldwide. Our customers include major and shortline freight railroads, passenger lines and urban transport systems around the world.

GE Transportation's history of innovation dates back to the late 1800s, when Thomas Edison invented an electric locomotive that helped launch the GE Company. We built our first diesel engines for rail nearly 90 years ago, and today we remain at the forefront of technology advancements in the rail transportation industry.

GE has more than 28,000 technologists across the company and around the world representing virtually every scientific discipline. Our mission today is the same as it was at the time of our founding in 1900 -- to drive innovations that create new or better GE products and meet the needs of our customers and of society. From developing the first U.S. jet engine to developing many of the technologies that helped build today's modern electrical grid, GE has a proven record of moving the state of technology forward in a meaningful and practical way. Our breakthroughs have had real impact not only in transforming the nation's infrastructure, but also in improving people's lives.

We gather at a time when concerns about energy security and global climate change are at the top of everyone's list. In May 2005, GE launched ecomagination. Ecomagination represents the company's commitment to develop cleaner, more efficient and environmentally friendly products. As part of this initiative, we have pledged to double our level of R&D investment in green technologies from $700 million to more than $1.5 billion by the year 2010.

Since launching ecomagination, we already have more than doubled the number of green products from the 17 that had originally been identified. GE's customers and consumers now have more and better choices to reduce their emissions and energy consumption. In the years ahead, we will introduce even more products to help address the challenges of global climate change. GE Aviation's GEnx aircraft engine will deliver 15% better fuel efficiency than the engines it will replace. The number of these engines projected to be sold in the next 20 years will emit an estimated 77 million fewer tons of greenhouse gases than would have been produced by older comparable engines. If today's fleet of 200-300 passenger aircraft had GEnx engines, annual carbon dioxide emissions would be reduced by an amount equal to removing more than 800,000 cars from the road for a year or adding more than 1.2 million acres of forest. And, by using

GEnx engines, that same fleet could save nearly 500 million gallons of jet fuel annually.

In February of this year, GE's Vice Chairman, and President and CEO for GE Infrastructure, John Rice, testified before the Subcommittee on Energy & Power, Energy & Commerce Committee in the U.S. House of Representatives, and called for enactment of U. S. legislation on climate change at the earliest date possible. He further stated that science has reached a point where such legislation is possible. Indeed, if Congress enacted climate change legislation today, the technology exists to support viable options for the regulated community. We have technologies available that can reduce greenhouse gas emissions, including the rail sector. Also, on these topics and just a week ago, Mark Little, GE's Senior Vice President and Director of Global Research, testified before the Senate Subcommittee on Private Sector and Consumer Solutions to Global Warming and Wildlife Protection highlighting many technologies that GE has developed and is developing to address climate change.

Today, my testimony will focus on two technologies that are being introduced right now for locomotives – hybrid technology and what we call "trip optimizer." In discussing these technologies, it's important to understand that success in providing readily available solutions in terms of climate change is directly tied to government setting a clear, consistent policy direction and continuing its strong commitment with industry and academia to aggressively invest in and accelerate the advancement of clean energy technology. That means that regulatory agencies need to value and promote development of these technologies and to ensure that existing and future regulations are written flexibly to complement, not hinder, their introduction and deployment. We have already seen how government policies can positively impact the growth and availability of

clean energy solutions, and we hope that future policies and regulations will do the same.[1]

The first technology I would like to discuss is the hybrid locomotive, which we will be demonstrating for the first time later this month at a planned *GE ecomagination* event in California. We are all familiar with hybrids in the automotive context, but let me explain how it works for locomotives. All hybrid vehicles use some form of energy storage to recover energy that would otherwise be wasted. The difference between a car and a train, however, is that while a hybrid car can recover and store energy from a single vehicle, a hybrid locomotive has the potential to capture and store the energy from the hundreds of cars and thousands of tons of freight being pulled. It is therefore easy to imagine that a single hybrid locomotive could exceed the energy savings impact of hundreds of automobiles.

Locomotives, like non-hybrid cars, use brakes to dissipate the energy of the moving vehicle by converting this energy to heat and venting that heat to the atmosphere. GE's Evolution Hybrid is a modified version of our Evolution locomotive that has the ability to store some of the energy generated during braking in a series of specially designed lead-free batteries. The Evolution Hybrid utilizes the existing drive motors to convert this braking energy into electrical energy that is stored in the battery system. When needed, the batteries supply the locomotive with extra power that can then be used to reduce fuel consumption and reduce emissions.

So now, when the locomotive is traveling downhill, making sharp turns, or slowing down for speed limits, the energy generated by braking will be stored in the battery – that power won't go to waste. This reduces the total power that

[1] For example, the enactment of the federal Production Tax Credit and the new Renewable Portfolio Standards in more than 20 states have helped to fuel a three-fold expansion of the wind industry in the U.S. over the past few years. In Europe where policies have been more consistently applied, the growth has been more rapid and substantial.

needs to be generated by the diesel-electric engine, saving on total fuel burn and emissions. The Evolution Hybrid can even use the batteries as the primary source of power to reduce emissions in restrictive zones.

In terms of carbon reduction, the Evolution Hybrid has the ability to reduce fuel consumption by 10% when compared to a today's Evolution. Using 10% less fuel directly reduces the emissions of carbon dioxide, NOx, and particulate by 10%. If Hybrid technology replaced 100 Tier 1 locomotives in service,[2] over the next 10 years it would save over 510,000 tons of carbon dioxide from being produced every year. This is equivalent to removing 89,000 cars annually or 890,000 over 10 years from our roads.

In terms of potential energy savings, if the Evolution Hybrid replaced 100 Tier 1 locomotives in service, it would save more than 45 million gallons of fuel over the next 10 years.

We are excited about this new innovative technology and are confident it will continue to develop and improve as we gain experience in the field.

The second technology I would like to discuss today is called "Trip Optimizer." Trip Optimizer is a locomotive control system "enhancement" that manages the speed and throttle settings to minimize fuel consumption, taking into account train composition, terrain, track conditions, train dynamics and weather, without negatively impacting the train's arrival time. Put simply, Trip Optimizer uses global position systems or "GPS" and forward-looking terrain mapping to plan a locomotive's trip, and it develops a recipe to minimize fuel usage and meet speed limits along the way. The "recipe" is constantly updated and gives the onboard crew a tool to manage the journey in a completely novel way, by allowing explicit trades between journey completion time and the fuel

[2] It is expected that hybrid sales will capture approximately 10% of the annual locomotive market. This will lead to the retirement of existing engines that will be meeting the current Tier 1 emissions standards.

used, as opposed to operating at or near the speed limit all the time. In principle, Trip Optimizer could be applied to any engine and achieve a 10% fuel savings and a 10% reduction in carbon dioxide, NOx, and particulate emissions. To give you a sense of the large potential benefits of this technology, applying Trip Optimizer to a single GE Evolution locomotive could save 360 tons per year of carbon dioxide emissions and 32,000 gallons of fuel annually. If this technology is installed on 1,000 Tier 2 GE Evolution locomotives in a given year, we have the possibility of 360,000 fewer tons of carbon dioxide emitted.

These two technologies show that there are innovative solutions for our transportation systems that can achieve both a reduction in all emissions *and* a net fuel savings benefit.

As this Committee considers climate change and energy independence, GE believes that it is critical that government policies

- encourage innovations that save on fuel and reduce emissions overall – taking into account traditional pollutants and carbon dioxide;
- at a minimum, provide incentives to railroads that adopt such technologies; and
- ensure that existing and future policies do not present obstacles to their introduction; on the contrary, policies should promote their development.

GE believes several technologies can be readily deployed today in the short-term and that there are even more new and exciting technologies on the horizon. The success of these technologies depends upon having the right policies in place and a committed partner in government to help accelerate needed advancements.

Mr. Chairman, I want to thank you and members of the Committee for the opportunity to provide testimony. Addressing the issues of climate change and energy independence is a tremendous challenge both for our nation and the

world. GE is providing now – and developing for the future – technologies that will help to meet that challenge.

Thank you.

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Ed is a three-time Mechanical Engineering graduate of Iowa State University (B.S. '81, M.S. '83, Ph D. '89). Ed began his professional career with the Allison Gas Turbine Division of General Motors. Ed was awarded a General Motors Fellowship in 1985 enabling his doctoral studies. Upon returning to Allison, Ed participated in a series of NASA-funded advanced gas turbine programs where he developed the industry-leading ADPAC code for predicting performance in multistage compressors and turbines. Later, Ed led the aero/thermal design/analysis team at Allison that focused on aerodynamics, heat transfer, acoustics and dynamics of advanced gas turbine engines. Ed contributed to several production engine designs including the AE3007 regional jet engine now in service with Continental and American Airlines, the Joint Strike Fighter LiftFan vertical takeoff and land military aircraft, and the AE2100 turboprop engine that provides power for the C130J military transport aircraft. Ed also led the Leadership Training Initiative for Rolls-Royce following their acquisition of Allison.

Ed joined GE in 2002 at their Global Research Center in Niskayuna, NY. Ed led the Fluid Mechanics Lab in developing aerodynamic technologies for aircraft and stationary power gas turbine engines as well as wind turbines, steam turbines and other fluid power devices. In 2003 Ed was named Global Technology Leader for the Physical Sciences organization within GE. This team employed a combination of advanced physics and mechanical technologies leading to new products for several GE businesses including Healthcare, Plastics, Energy, Transportation and Aviation.

In 2006, Ed joined the GE Transportation business as executive leader of the Engine Engineering organization. His responsibilities include all phases of diesel fueled engine development for GE Transportation as well as gas-fueled engines for the GE Jenbacher business.

STATEMENT OF

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BEFORE THE
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COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE

HEARING ON CLIMATE CHANGE AND ENERGY INDEPENDENCE: TRANSPORTATION AND INFRASTRUCTURE ISSUES

MAY 16, 2007

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The Association of American Railroads (AAR) appreciates the opportunity to address the issue of climate change. AAR members account for the vast majority of freight railroad mileage, employees, and traffic in Canada, Mexico, and the United States.

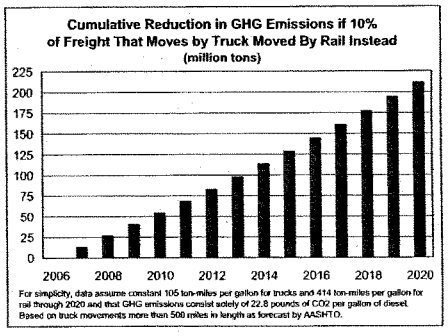
Freight railroads are committed to being part of the solution to the challenge of climate change. Greater use of freight rail offers a simple, inexpensive, and immediate way to meaningfully reduce greenhouse gas (GHG) emissions. Building on its strong record of success, the industry recognizes and accepts its role of delivering continuing environmental improvements while meeting the nation's energy and transportation needs. Going beyond what the law requires, AAR's members plan to pursue further advances, providing tangible improvements in air quality, reductions in GHG emissions, and increased fuel efficiency.

Moving More Freight By Rail Would Reduce GHG Emissions

Freight railroads are the mode of choice for fuel efficiency. Because railroads are, on average, three or more times more fuel efficient than trucks (in terms of ton-miles per gallon) and because GHG emissions are directly related to fuel consumption, every ton-mile of freight that moves by rail instead of truck reduces GHG emissions by two-thirds or more.

Consequently, moving more freight by rail is a straightforward way to meaningfully reduce GHG emissions without negatively impacting our economy. Based on data from the *Freight Rail Bottom Line Report* published by the American Association of State Highway and Transportation Officials (AASHTO), for each 1 percent of the long-haul freight that currently moves by truck that would move by rail instead, fuel savings would be approximately 110 million gallons per year and annual GHG emissions would fall by some 1.26 million tons. Thus, if 10 percent of long-haul freight now moving by truck moved by rail instead, annual GHG emissions would fall by approximately 12.6 million tons.

Because freight transportation demand is expected to rise sharply in the years ahead, future fuel savings — and GHG reductions — would be much higher if more freight moved by rail. For example, AASHTO projected that ton-miles for truck movements of more than 500 miles in length would increase from 1.40 trillion in 2000 to 2.13 trillion in 2020. If 10 percent of truck traffic went by rail — perhaps via efficient intermodal movements in which both railroads and trucks participate — cumulative estimated GHG reductions from 2007 to 2020 would be 211 million tons.

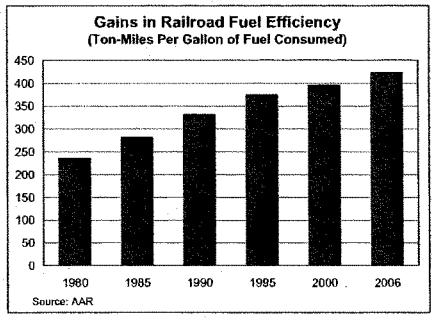


In addition to reducing fuel consumption and GHG emissions, moving more freight by rail would help reduce highway congestion and save fuel that otherwise would be consumed by motor vehicles. According to the Texas Transportation Institute's *2005 Urban Mobility Study*, the annual cost of highway congestion in the United States is $63 billion just for wasted travel time (3.7 billion hours) and wasted fuel (2.3 billion gallons) sitting in traffic. According to the U.S. Department of Transportation, the total costs of congestion are approximately $200 billion per year if lost productivity, costs associated with cargo delays, and other items are included. A single intermodal train can take up to 280 trucks off the highways; depending on the type of cargo and the length of a train, other trains can take up to 500 trucks off our highways. Railroads thus help reduce highway congestion, enhance mobility, and reduce the costs of maintaining existing roads and the pressure to build costly new roads.

Policymakers can and should take steps to attract more freight to railroads and expand the GHG-emissions benefits of rail transportation. For example, transportation-related GHG reductions would accrue more quickly if tax incentives for projects that expand rail capacity were instituted and more public-private partnerships for freight railroad infrastructure projects were implemented.

Railroads Are Constantly Working to Improve Fuel Efficiency

U.S. freight railroads have steadily boosted their fuel efficiency. In 1980, one gallon of diesel fuel moved one ton of freight by rail an average of 235 miles. In 2006, the same amount of fuel moved one ton of freight by rail an average of 423 miles — roughly equivalent to the distance from Boston to Baltimore and an 80 percent increase over 1980.



In 2006 alone, U.S. freight railroads consumed 3.3 billion fewer gallons of diesel and emitted 38 million fewer tons of carbon dioxide than they would have if their fuel efficiency had remained constant since 1980. From 1980 through 2006, U.S. freight railroads consumed 44.6 billion fewer gallons of fuel and emitted some 509 million fewer tons of carbon dioxide than they would have if their fuel efficiency had not improved.

The seven U.S. Class I railroads have all joined EPA's SmartWay Transport, a voluntary partnership between freight transporters and the EPA that establishes incentives for fuel efficiency improvements and GHG reductions. The initiative is designed to reduce annual CO_2 emissions by 36 to 73 million tons and nitrogen oxide (NOx) emissions by up to 220,000 tons. As part of the partnership, each railroad has committed to evaluating the

environmental impacts of its operations and agreed to work with the EPA to develop and implement plans to improve fuel efficiency and reduce emissions in coming years.

Already railroads use technology, training, and changes in operating practices to curb fuel consumption. For example:

- *New locomotives*. Railroads have spent billions of dollars in recent years on thousands of advanced locomotives that are far more environmentally friendly than older models. Railroads have also overhauled or rebuilt thousands of older locomotives to update their performance and environmental friendliness.

  Many of the new locomotives are high-horsepower units that pull freight over long distances. For example, one major locomotive manufacturer recently began commercial production of 12-cylinder long-haul locomotives that produce the same 4,400 horsepower as the company's 16-cylinder predecessor while saving substantial amounts of fuel and dramatically reducing particulate and nitrogen oxide emissions.

  Some new switching locomotives that are used to assemble and disassemble trains in railroad yards are "genset" (generator set) switchers that sharply reduce fuel consumption and emissions. Gensets have two or three independent engines that cycle on and off, depending upon need. If load conditions are such that one engine can handle the task, just one is engaged; if loads are heavier, other engines switch on.

  Some switching locomotives are hybrids — *i.e.*, they have a small fossil-fueled engine in addition to a large bank of rechargeable batteries. Hybrid switchers can save up to half the fuel of conventional switchers while releasing a fraction of smog-inducing emissions. Research is ongoing on advanced hybrid technology for long-haul locomotives that will store energy captured during braking for later use.

- *Locomotive monitoring systems*. Railroads are using and further developing sophisticated on-board locomotive monitoring systems that gather and evaluate information on train location, topography, track curvature, train length and weight, locomotive condition, and more to provide engineers with real-time "coaching" on optimum speed for that train from a fuel and operational standpoint.

- *Training*. Railroad fuel efficiency in many cases is directly related to how well a locomotive engineer handles a train, which is why railroads are also using the skills of their engineers to save fuel. For example, railroads commonly offer programs through which engineer peer trainers and simulators provide fuel-saving tips. On one railroad, the fuel consumption performance of participating engineers in the same territory is compared, with awards given to the top "fuel masters."

- *Information technology.* Railroads use advanced computer modeling software in a wide variety of ways to improve their operational efficiency and, therefore, their fuel efficiency. For example, railroads use sophisticated software that identifies the best ways to sequence cars in a large classification yard. The result is more efficient, faster yard operations.

  Railroads are also designing, implementing, and improving "trip planning" systems that automatically incorporate and analyze a mix of ever-changing variables (*e.g.*, crew and locomotive availability, terminal congestion, the priority status of different types of freight, track conditions, etc.) to optimize how and when cars are assembled to form trains and when those trains depart. The result is smoother traffic flow, better asset utilization, and lower fuel use.

- *Reduced idling.* Historically, locomotive engines have often had to idle when not in use to prevent freezing of the coolant (most do not have anti-freeze), charge batteries and air reservoirs, prevent possible difficulty in restarting, and provide for crew comfort. To help reduce emissions and save fuel, railroads have widely implemented "stop-start" idling-reduction technology that allows main engines to safely shut down when ambient conditions are favorable. One advantage of "genset" locomotives is that their smaller engines use anti-freeze, thus allowing them to shut down in cold weather. Some railroads also use auxiliary power units, which warm engines so that locomotives can be shut down even in cold weather.

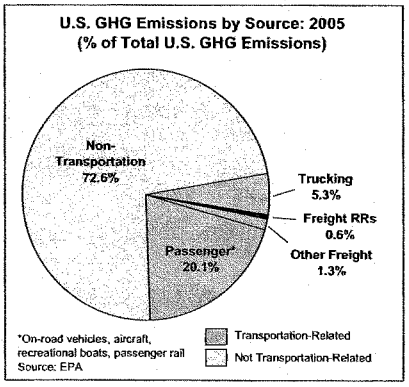
- *Freight car and locomotive components and design.* Railroads are utilizing innovative car and locomotive components to help achieve fuel-conservation goals. For example, low torque bearings help reduce bearing drag, saving energy in the process. Advanced top-of-rail lubrication reduces wheel and rail friction and wear and, in turn, fuel use. Lighter freight cars mean less fuel consumed to move a given amount of freight. And railroads are making design improvements — *e.g.*, improving the aerodynamic profile of trains — to save fuel.

Freight Railroads Account For a Small Share of U.S. GHG Emissions

According to EPA data, in 2005 total U.S. greenhouse gas emissions were 7,260 teragrams of CO_2 equivalents ($TgCO_2Eq$), of which transportation accounted for 28 percent.[1] The vast majority of transportation-related GHG emissions are due to fossil fuel consumption — mainly gasoline, diesel fuel, and aviation fuel.

[1] EPA – *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2005*, Table ES-7. Because some gases have a higher global warming potential than others, emissions of greenhouse gases are typically expressed in a common metric ($TgCO_2Eq$) so that their impacts can be directly compared.

According to the EPA, in 2005 freight railroads accounted for 44.1 $TgCO_2Eq$ of GHG emissions, equal to 2.2 percent of the transportation-related total and just 0.6 percent of total U.S. GHG emissions. Although freight rail volume rose by 64 percent from 1990 to 2005, freight railroad GHG emissions rose by only 29 percent.



Total U.S. GHG Emissions By Economic Sector: 2005

Economic Sector	Tg CO2 Eq.	% of Total
Electr. generation	2,429.8	33.5%
Residential	380.7	5.2%
Industry	1,352.8	18.6%
Agriculture	595.4	8.2%
Commercial	431.4	5.9%
Transportation	2,008.9	27.7%
U.S. Territories	61.5	0.8%
Total	7,260.4	100.0%

Data are in teragrams of CO2 equivalents.

Source: EPA, *Inventory of U.S. GHG Emissions and Sinks: 1990-2005, Table ES-7, A-110, and A-111*

U.S. GHG by Transportation Sector: 2005

Economic Sector	Tg CO2 Eq.	% of Transport. Total
Trucking	385.8	19.4%
Freight Railroads	**44.1**	**2.2%**
Waterborne Freight	49.9	2.5%
Refrigerated Transport	13.6	0.7%
Pipelines	31.1	1.6%
Aircraft	170.3	8.6%
Recreational Boats	14.4	0.7%
Passenger Railroads	6.7	0.3%
Pass. Cars & Light Duty Trucks	1,201.4	60.5%
Buses	15.3	0.8%
Mobile Air Conditioners	53.1	2.7%
Total	1,985.7	100%

Figures for "transportation" in the two tables do not match exactly because of estimation issues.

Conclusion

The amount of carbon dioxide released per unit of transportation service (*i.e.*, per ton-mile) is directly related to the energy efficiency of the mode providing that service. That's why freight railroads are the mode of choice in terms of fuel efficiency and reduced greenhouse gas emissions. Railroads look forward to working with policymakers in Congress, the Administration, and elsewhere to address the challenges of climate change.

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House Transportation and Infrastructure Committee
May 16, 2007

Reducing Government Energy Waste

Introduction

The Alliance to Save Energy is a bipartisan, nonprofit coalition of more than 120 business, government, environmental and consumer leaders. The Alliance's mission is to promote energy efficiency worldwide to achieve a healthier economy, a cleaner environment, and greater energy security. The Alliance, founded in 1977 by Senators Charles Percy and Hubert Humphrey, currently enjoys the leadership of Senator Mark Pryor as Chairman; Duke Energy CEO James E. Rogers as Co-Chairman; and Representatives Ralph Hall, Edward J. Markey, and Zach Wamp along with Senators Jeff Bingaman, Susan Collins, Larry Craig, and Byron Dorgan as its Vice-Chairs. Attached to this testimony are lists of the Alliance's Board of Directors and its Associate members.

The Alliance has promoted effective federal energy management for many years. Recently we formed a new Board committee, the Government Energy Leadership Action Team, dedicated to achieving dramatic energy savings throughout the federal government. Thus the Alliance is pleased to testify at this important hearing on energy use in the federal government.

I will begin with some comments on the importance of energy efficiency in federal facilities and operations, in order to save taxpayers' money, reduce the government's energy-related greenhouse gas emissions, and provide a powerful model for action by other energy users. Next, we will turn to specific provisions in current laws and policy guidance, emphasizing the importance of follow-up actions by Congress, the Administration, and federal agencies themselves to assure that energy saving activities are adequately funded and effectively implemented – and the results tracked and reported in a timely way. Last, I will suggest some further opportunities to extend federal energy-efficiency initiatives, building on the accomplishments to date and establishing the federal government as a true market leader in transforming the overall market for energy-efficient products and services

Federal Energy Use and Waste

The United States federal government is the single largest consumer, and the single largest waster, of energy in the world. In 2005 the federal government overall used 1.6 quadrillion Btu of "primary" energy (including the fuel used to make the electricity it consumed), or 1.6 percent of total energy use in the United States. Taxpayers in this country paid $14.5 billion for that energy.

Almost half of that energy, and more than half of the cost, was for vehicles and equipment, primarily for military planes, ships, and land vehicles. The rest, 0.9 quadrillion Btu at a cost of $5.6 billion, was for heating, cooling, and powering more than 500,000 federal buildings around the country.

Repeated efforts over the last two decades have resulted in dramatic energy and cost savings, but large cost-effective savings remain available. Overall federal primary energy use decreased by 13 percent from 1985 to 2005, and the federal energy bill decreased by 25 percent in real terms, even after the 27 percent jump in fuel prices in the United States in 2005. Federal "standard" buildings reduced their primary energy intensity by about 13 percent, while "site" energy declined by 30 percent ("Standard" buildings are those not exempted due to industrial uses or national security needs; "energy intensity" is energy use per square foot of building space; "site" energy is measured at the point of use, excluding electricity system losses). Congress and the president have set even more aggressive targets for future savings that could yield well over $1 billion in energy cost savings each year from federal buildings alone.

It is important to place this savings potential in context. As the world's largest energy consumer, the federal government could play a unique role as a market transformer through the early adoption of new, energy-efficient technologies and practices. Still, the federal government accounts for just two percent of U.S. oil use and a similar portion of U.S. greenhouse gas emissions. Thus, addressing federal energy use is but one of many congressional actions that are necessary to solve the many critical energy issues facing our country. A number of federal policies and funding decisions, such as appliance efficiency standards, tax incentives, and energy-efficiency research and development must be undertaken – in addition to ending federal energy waste – if we are to ensure Americans a sustainable energy future.

Notwithstanding the need for these broader actions, the federal government's own energy-savings potential is significant, the taxpayer savings are worth pursuing, and it is valuable to establish the government as a successful role model for actions by state and local governments, the private sector, and consumers in general. There is extraordinary interest in Congress right now in addressing federal energy use, from greening the Capitol buildings to improving the energy efficiency of weapons and support systems that will in turn reduce the need for fuel supply convoys in Iraq. I will talk first about implementing, overseeing, and funding the policies that are already in place, and then about new initiatives to make the government even more efficient.

Meeting Current Federal Requirements and Targets

There already are a number of targets, standards, and requirements intended to reduce energy use by federal agencies. Together, they set a reasonably ambitious agenda for reducing energy use, at least in standard federal buildings, but many of these requirements have been initiated within the last two years and not yet fully implemented; achieving them remains a challenge. Among the more important of these existing requirements are:

- Agencies were required by 2005 to install in federal buildings all energy and water conservation measures with payback periods of less than ten years (Energy Policy Act of 1992, Sec. 152). This has not been fully accomplished.

- All new federal buildings must be designed to achieve energy use at least 30 percent below the national model building energy codes (EPAct 2005, Sec. 109), if such improvements are cost-effective. The Department of Energy (DOE) just issued interim final rules in December 2006.

- Agencies must purchase efficient Energy Star or FEMP-designated products unless suitable energy-efficient products are not available or are not cost-effective in a specific case (EPAct 2005, Sec. 104). DOE has not yet issued final regulations to implement this provision, and the federal supply agencies, GSA (General Services Administration) and DLA (Defense Logistics Agency) continue to supply their federal customers with inefficient as well as efficient energy-using products.

- All federal buildings must be metered for energy use by 2012, using advanced meters that record electricity use by time when practicable (EPAct 2005, Sec. 103). DOE issued metering guidelines in 2006, but limited the metering requirements to electricity use, excluding natural gas, steam, and hot or chilled water. Most agencies have prepared implementation plans, but will need funding from appropriations or alternative finance contracts to implement these metering plans.

- Each agency is to reduce the energy use intensity of its buildings by 3 percent per annum, or 30 percent by 2015 (Executive Order 13423). Agencies mostly met earlier targets culminating in a 30 percent reduction between 1985 and 2005; however, total energy use reductions have been smaller as energy-intensive facilities are excluded from these targets and as the savings targets are interpreted as applying to site energy – thus excluding losses from the growing use of electricity.

- Each agency is to reduce the water use intensity of its buildings by 2 percent per year or 16 percent by 2015 (EO 13423). This is the first quantitative target for water efficiency in federal buildings.

- Each agency is to reduce the petroleum-based fuel use by its vehicle fleet by 2 percent per year through 2015 (EO 13423).

The most important step in reducing federal energy use is to **implement fully the policies that are already in place**, including those listed above for federal building standards, procurement

requirements, savings targets, cost-effectiveness guidelines, and others. Energy use and decision-making are dispersed among many people at dozens of federal agencies. Agency leaders, of course, have many mission responsibilities, financial constraints, legal requirements, stakeholder demands, and impending crises that compete for attention. Energy efficiency must be adopted as a primary goal and embodied in action throughout the government if we are to meet the targets already established.

For example, while procurement of energy-efficient products has been required since a 1991 Executive Order and by law in EPAct 1992, that requirement has never been fully implemented in the complex processes and multiple paths of federal procurement. Product specifications in competitive solicitations often do not include the efficiency requirements. GSA product schedules still include inefficient and outdated equipment, including inefficient air conditioners, refrigerators, lighting, and other products.

The requirement in the new Executive Order 13423 that each agency appoint a senior civilian officer to be in charge of implementing the Order may help focus attention on energy efficiency. However, the responsibilities of that designated official are now broadened to include other aspects of environmental management, not just energy efficiency. Moreover, government officials may be held responsible for an energy-efficiency project gone awry, but no one is ever held responsible for wasted energy due to inaction. There may be debate about the amount of energy savings from a project, but no one ever measures the energy not saved by failing to make a new building "green" or from delays in replacing old equipment with the best new technologies.

We believe Congress's first duty and most important role in improving federal energy management is effective and sustained oversight. Through requiring regular reports, questioning agency heads at hearings, sending letters to agencies in committee jurisdictions, and/or initiating Government Accountability Office studies, Congress can focus the attention of key officials at all agencies on energy use, and demand accountability for meeting energy savings and cost-effectiveness targets.

This continuing oversight also helps keep the attention of top agency officials focused on energy efficiency, and makes it easier for energy managers in the field to get a positive response, from their own chain of command, to energy-saving ideas and recommended actions.

Funding for Federal Energy-Efficiency Measures

While energy-efficiency measures save taxpayers money in lower federal energy bills, they often require an up-front expenditure. It is already government policy to look at total life-cycle cost, not just first cost, when making decisions on new buildings, retrofits, equipment and vehicle purchases, weapon design, and more. Life-cycle cost considers both the initial purchase price of a product **and** the estimated future costs of energy use, operation and maintenance (O&M), and repair over the life of the product. This life-cycle-cost perspective is used for some large capital and military systems procurements, but not all. And, regardless of policy, in practice agencies trying to use this approach face hard limits on the availability of appropriated funds to pay the up-front costs for an energy-saving investment, along with many competing priorities.

Billions of dollars of investment will be needed to meet the current energy targets and reap the associated energy savings. However, in recent years annual appropriations for energy efficiency, water conservation, and renewable energy projects in existing federal buildings have ranged from only about $100 million to $300 million. But in order to meet the new targets and conduct all cost-effective improvements several times this level of investment—$1–2 billion each year—is needed. Funding for energy efficiency through appropriations must be increased. If we do not provide more funding for energy-efficiency measures, federal agencies may fail to meet their energy targets and are assured of spending even more money on energy bills. We must invest more to save more.

Increased funding also is needed for DOE's Federal Energy Management Program (FEMP), the primary source of technical assistance, training, and policy coordination for energy managers throughout the federal agencies. FEMP is the office responsible for issuing and updating rules, guidelines, and reports to implement the many legal mandates. FEMP funding has been cut for years, despite increasing responsibilities, and its technical resource base of DOE National Laboratory experts and outside contractors has been greatly curtailed. More funding and more management attention are needed to restore this vital program.

But if we focus only on increasing appropriations, while we wait we will be letting money escape out the window (and also out of poorly insulated walls and roofs!). That's why Congress has authorized the use of private, third-party financing so that agencies can upgrade buildings with no up-front cost to the government. Energy Service Companies (ESCOs) finance and help implement energy-saving projects through Energy Savings Performance Contracts (ESPCs). The contractor is paid out of the resulting stream of energy bill savings. By law, the savings must be at least as great as the contractor payments—if the savings are not realized, the contractor does not get paid. Many electric and gas utilities also offer financing for energy-efficiency projects through Utility Energy Service Contracts (UESCs), as well as rebates and technical assistance to federal agencies as part of their demand-side management (DSM) programs. Similar to ESPCs, utility investments under UESCs are repaid from the utility bill savings resulting from the projects.

ESPCs and UESCs used to provide more than $500 million per year for energy-efficiency investments in federal buildings. But in September 2003 authority to enter into new ESPCs lapsed, and despite being re-authorized by Congress in 2004 and 2005, the use of these innovative and effective financing tools has not recovered to their earlier levels. In fiscal year 2005 ESPCs provided $97 million, and UESCs $76 million.

A number of barriers have prevented ESPCs and UESCs from reaching their full potential. Ultimately, successful use of such innovative financing requires a champion—a committed agency official who is willing to "stick his neck out"—to overcome bureaucratic bottlenecks, lack of support, and the concerns over audits and other special scrutiny. If the projects fall short of expected savings goals, they are criticized. In contrast, energy-efficiency projects implemented with appropriated funds receive comparatively little oversight. And, as I said before, there is no systematic process of oversight for facilities in which the improvements are never made and that are allowed to simply go on wasting energy.

In short, government energy managers are seldom rewarded, either financially or professionally, for achieving energy savings, nor is there much risk in failing to seize energy-saving opportunities. Proper oversight of ESPC and UESC contracts is needed, but there must also be recognition of the major costs of **inaction**. The focus should be on maximizing energy and cost savings, rather than requiring perfection and avoiding any possible risk in the use of alternative financing and the introduction of promising new ways to save energy.

A New Paradigm for Improvements to Existing Federal Buildings

In addition to oversight and funding of existing federal energy management policies and programs, new legislation is needed to expand the scope of federal energy management and to make the federal government a true example of leadership in energy efficiency. It is important, however, that these new initiatives not reduce attention and funding for existing activities, but support and build on them.

In order to make the necessary increase in investment in energy savings in existing federal buildings, we think that a new paradigm and a new structure are needed. Energy waste should not be allowed to continue until appropriations happen to be available or an energy manager is willing to take the effort and the risk needed to push through an ESPC or UESC. Federal agencies should not wait to take all cost-effective steps to reduce energy use. Appropriations should be increased, but federal agencies should also make more aggressive use of alternative financing through ESCO and utility performance contracts, to implement all energy-saving measures that make economic sense. And regardless of the funding source, agencies must have in place effective procedures for operations and maintenance, measurement and verification of savings, and monitoring and benchmarking to make sure the measures are implemented correctly and continue to work as intended.

Thus, we recommend the following package of policies:

- All large federal buildings and facilities should conduct comprehensive energy and water savings evaluations ("energy audits") to identify and prioritize all economic opportunities for investments to reduce energy and water use. These evaluations should consider both capital investments, such as a new boiler or chiller, and operational improvements, such as checking and adjusting lighting or mechanical system controls. Updated energy audits and building system diagnostics should be conducted every few years.

- Agencies should implement all measures identified in the energy and water evaluations that have a simple payback of fifteen years or less. The calculation of cost savings should consider not only energy and water costs but also reduced costs of building operations, maintenance, repair, and equipment replacement. "Externality" costs, such as the added value of avoided air pollution or reduced greenhouse gas emissions, could also be incorporated in these payback estimates as an adder to the value of energy saved.

- It is critical that the agencies not only make the capital investments but also make sure that the measures work, and keep on working. Start-up commissioning, and periodic re-commissioning, are an essential part of all measures to ensure that they work as intended –

followed by effective operation, maintenance, and repair as well as measurement and evaluation of savings.

- Sustained oversight is needed to ensure that every agency is identifying all cost-effective energy savings opportunities, investing in them with either appropriated funds or third-party financing, and following through with good commissioning, O&M, and tracking of savings. While congressional action is important, the first level of oversight should be agency self-certification through a web-based tracking system that makes both the process and the agency's progress transparent to all. Larger federal buildings and facilities should also benchmark their energy and water use, so all can see how well they are doing. And implementation of these requirements should be incorporated in the agency energy scorecards that the Office of Management and Budget already prepares.

- Both the energy-savings evaluations and the measures themselves should be funded through a combination of increased appropriations and private financing through ESPCs and UESCs. To that end, a number of arbitrary impediments on ESPCs should be removed by: permanently extending authority for federal agencies to enter into ESPCs; allowing the combined use of appropriations and performance contracts to fund a single project; and ending any self-imposed agency caps on the duration of ESPC contracts (i.e., projects should "dig deeper" to include all measures that are life-cycle cost-effective, up to the statutory 25-year ESPC limit) and on total obligations under ESPCs.

Together, we think this set of policies could help ensure that all large federal facilities identify and implement actions to reduce their energy and water waste, that initial funding is available for all cost-effective measures, and that the necessary follow-up is done – regardless of the funding source – to ensure that the expected savings are actually realized.

Expanding the Scope of Federal Energy Savings Initiatives

Almost all of the current federal requirements and programs focus on energy use in federally owned "standard" buildings, with less attention paid to "energy intensive" facilities that house industrial processes, as well as other "exempt" facilities (often exempted for national security reasons). This focus on fixed facilities **neglects more than half of all energy use** by the federal government, for transportation and mobile equipment. Also overlooked is the energy use and potential savings by federal contractors, many of whom perform "outsourced" functions that would otherwise be the direct responsibility of a federal agency. The Alliance believes that several additional measures would greatly enhance the potential of wringing out energy waste by the government. Among the potential ways for capturing these savings are:

- A government-wide energy savings target or a savings target aimed specifically at all vehicles and equipment ("mobility" energy). In addition to the target for federal buildings, Executive Order 13423 includes 10 percent reduction in oil consumption by federal fleet vehicles – but if this is narrowly interpreted to apply to wheeled vehicles it represents only about 10% of total federal mobility energy, the vast majority of which is used for aircraft, ships, and military "deployed systems." In addition, the executive order rescinded the only target that directly addressed greenhouse gas (GHG) reductions for the federal sector: Executive Order 13123 previously called for a 30 percent reduction of GHG emissions

from federal buildings, from 1990 to 2010. If Congress chooses to reinstate a similar performance target for federal agencies, it should apply to energy-related GHG emissions from **all** federal energy use, including buildings, vehicles, and equipment.

- Energy savings requirements for buildings leased by the federal government. The current building standards and energy-saving targets apply only to government-owned buildings. However, the government also leases a large number of buildings, many of which are built specifically for use by federal agencies based on long-term lease commitments. One way or another, federal taxpayers pay for the energy used in these buildings, and the federal government should demand that they be energy-efficient. Other buildings, such as privatized military housing, also are built for the government and often with government assistance, and should be required to be energy-efficient as well.

- Smart growth or "locational efficiency" policies. Just as building design impacts the energy use in federal buildings, the location of federal buildings can have a dramatic impact on the energy use of employees in commuting and other driving. This impact, for good or bad, is often multiplied as federal buildings often attract additional residential and commercial development and infrastructure. Moving federal facilities to far suburbs or other areas outside of cities encourages sprawl, more driving, and greater oil use. Requiring a transportation energy impact assessment for all major new federal facilities could positively influence decisions on where to locate major new or expanded federal facilities.

- A directive to encourage federal contractors to improve their own energy efficiency. Some industry leaders, including Wal-Mart, are not only dramatically reducing their own energy use but also requiring their suppliers to improve efficiency, both to lower costs and reduce environmental impacts. Federal agencies could encourage and assist their large contractor base to reduce their own energy use, through procurement preferences or requirements.

- Application of energy-saving policies, requirements, and savings targets to Congress. Congress could take an important symbolic step by applying all the agency energy savings targets and requirements to its own buildings, vehicle use, and procurement—making the Capitol complex a model for energy efficiency.

Successful federal energy management also can further vital federal goals by influencing others to use energy wisely. The federal government could:

- Challenge state and local governments and major businesses to match the federal commitment to energy efficiency. Many federal programs, including ESPCs and procurement requirements, have been models for other levels of government. The federal government should challenge other major energy users – both public and private – to commit to aggressive energy savings goals and policies at least comparable to the federal ones. Federal agencies might be encouraged (or required) to report on these positive "spillover benefits" from their policies and programs, and should get some recognition for their market-leading actions that save energy outside the federal sector, as well as for savings in their own facilities and operations.

- Support state and utility energy-efficiency and demand-side management (DSM) programs. Utility DSM programs have been among the most effective public tools to reduce energy use, and many federal facilities have taken advantage of state and utility energy-efficiency rebates, technical assistance, and other programs. Conversely, the federal customer base has been essential to building the important infrastructure of energy service companies and other energy service providers. When utilities and state regulators are considering new or expanded DSM programs, all federal agencies and their representatives should strongly support cost-effective utility DSM programs and the associated surcharges to pay for them.

Conclusion

Federal energy management is only one piece of the solution to the economic, environmental, and security challenges to clean, reliable, and sustainable energy use in this country. But the federal government, as the nation's and the world's single largest energy user, can and should be the most influential model for using advanced energy-efficient technologies and practices. Congress has an important role to play. First, sustained congressional oversight is needed to focus agencies' top management attention on maximizing energy savings. Second, sufficient funding is needed to pay for the necessary initial costs to achieve long-term savings, along with continued support for alternative financing mechanisms. Third, new legislation could expand the scope and savings of federal energy management activities to all large federal buildings, other facilities, and to federal vehicles and uses of "mobility" energy. These actions will save taxpayer dollars, help save the planet, and at the same time inspire many others to act.

Statement of Jonathan Lash
President
World Resources Institute

To the
U.S. House of Representatives
Committee on Transportation and Infrastructure
May 16, 2007

Mr. Chairman, distinguished members of the Committee, good morning and thank you for inviting me to testify about a matter of compelling national and global significance. I am Jonathan Lash, President of the World Resources Institute.

The World Resources Institute is a non-profit, non-partisan environmental think tank that goes beyond research to provide practical solutions to the world's most urgent environment and development challenges. We work in partnership with scientists, businesses, governments, and non-governmental organizations in more than seventy countries to provide information, tools and analysis to address problems like climate change, and the degradation of ecosystems and their capacity to provide for human well-being.

The Earth is warming, and the warming is caused, mostly part by human activities. The cheap plentiful fossil fuels that have enabled huge increases in human productivity and great improvements in human well being over the past 200 years together with significant deforestation have been the most important causes of global warming. The buildup of Carbon Dioxide and other so-called "green house gasses" (GHGs) is accelerating, and unless we act very soon to control emissions warming during our childrens' lifetimes will rise to very dangerous levels.

In February 2007, the Intergovernmental Panel on Climate Change (IPCC -the official science process sanctioned by the world's governments and participated in by the United States) released its report on climate change science. The report states that it is "unequivocal" that Earth's climate is warming, and confirms that the current atmospheric concentration of carbon dioxide and methane, two important greenhouse gases (GHGs), "exceeds by far the natural range over the last 650,000 years." Further, the IPCC concludes that it is now "very likely" (greater than 90% probability) that greenhouse gas emissions from human activities have caused "most of the observed increase in globally averaged temperatures since the mid-20th century."

Indeed, the impacts of warming have become increasingly evident to non-scientific observers. Sea ice in the Arctic is shrinking, Greenland's massive ice sheet in melting – far faster than predicted. Glaciers are rapidly shrinking from the Rockies to the Alps. There have been killer heat waves in Northern Europe and a 3 year drought in the Amazon. As oceans have warmed the number of category 4 and 5 hurricanes and typhoons (the most severe) increased from 171 in the 14 years from 1975 to 1989, to 369 in the 14 years from 1990 to 2004. Farmers and hunters across the United States report changing growing seasons and changing bird migration patterns.

Disturbing natural ecosystem cycles has economic, aesthetic and environmental consequences. An old pest, the Pine Bark Beetle, its numbers multiplied by longer summers and warmer

winters, has emerged to destroy forests that have been weakened by drought and warming in the west. In Utah, for example, the spruce beetle has infested more than 122,000 acres and killed over 3,000,000 spruce trees. This has resulted in 333 million to 500 million board feet of spruce saw timber lost annually. Similar losses have been recorded in Montana, Idaho and Arizona, and Alaska has lost over three billion board feet.

Those impacts are the effect of less than 1 degree Centigrade warming. But the emissions that cause warming are rising at an accelerating rate. Unfortunately, even if we act today to reduce emissions from cars, power plants, industrial facilities, and other sources, we will see some degree of continued warming because past emissions will stay in the atmosphere for decades or more.

While any level of warming may have consequences, many scientists believe we must limit global warming to no more than 2 degrees Celsius above current levels to avoid the worst impacts of climate change. To limit global warming to less than 2 degrees Celsius, it is believed that atmospheric carbon dioxide concentrations must not exceed 450-500 ppm (the current level is around 380 ppm and rising at more than 2 ppm per year). To achieve this, global emissions would need to decrease dramatically during this century, perhaps on the order of 60 to 80 percent below current levels by 2050.

We are already seeing what impacts may lie ahead. Storms the strength of Hurricane Katrina are more likely, and scientists tell us the rise in temperature is forecast to produce a number of significant impacts, including increasingly severe weather (such as prolonged droughts, more intense tropical cyclones, and extreme heat waves), continued melting of polar ice caps and glaciers, changes in water storage and water flow, rising sea levels, and unprecedented changes in ocean chemistry. These outcomes, in turn, would likely lead to loss of agricultural productivity, greater water scarcity, widespread habitat degradation, extinction of species, and inundation of coastal areas.

A few weeks ago, eleven retired admirals and generals issued a report on their review of the issue of global climate change. They also came to the conclusion that the evidence is sufficiently compelling and the consequences sufficiently grave to require substantially more analytical effort by the intelligence and defense community to mitigate and adapt to the potential threats. The general's report notes, for example, that 40 percent of the world's population gets at least half its drinking water from the summer melt of mountain glaciers that are rapidly disappearing. They state that climate change is "a threat multiplier for instability in some of the most volatile regions of the world", which will "seriously exacerbate already marginal living standards in many Asian, African and Middle Eastern nations, causing widespread political instability and the likelihood of failed states."

In the U.S. we are already experiencing decreased snow cover in the Northwest causing competition between human use, energy generation and ecosystem needs. Warmer temperatures are melting the permafrost in Alaska putting local communities, oil pipelines and species at risk. These trends will increase.

The IPCC projects that in 2039, average temperatures across North America are projected to rise by 1.8 to 5.4 degrees Fahrenheit. Half the U.S. population – approximately 150 million people

live in a coastal community. With sea levels rising in the US coast at a rate of .08-.12 inches each year, these communities are at risk. Armed with these statistics, insurers are now denying coverage to homeowners in the state of Florida, and rates are increasing elsewhere.

Water impacts may be significant in the U.S. Reduced rainfall will impact the Southwest, though rain will increase elsewhere and extreme precipitation events will make flooding more likely. Rivers with already strained resources, such as the Colorado River will be especially vulnerable to decreased water flow. In addition to changes in water level, warmer water will threaten fish – some species in the Washington DC area are already at the top of their tolerance ranges. Navigation in the central U.S. Gulf Coast will continue to be vulnerable to sea level rise and weather events.

The IPCC categorizes these types of impacts. Table 1 summarizes climate related impacts that are already being observed, and that are projected over the next century:

Table 1. Recent trends, assessment of human influence on the trend, and projections for extreme weather events for which there is an observed late 20th century trend

Phenomenon[a] and direction of trend	Likelihood that trend occurred in late 20th century (typically post 1960)	Likelihood of a human contribution to observed trend [b]	Likelihood of future trends based on projections for 21st century using SRES scenarios
Warmer and fewer cold days and nights over most land areas	*Very likely* [c]	*Likely* [e]	*Virtually certain* [e]
Warmer and more frequent hot days and nights over most land areas	*Very likely* [d]	*Likely (nights)* [e]	*Virtually certain* [e]
Warm spells / heat waves. Frequency increases over most land areas	*Likely*	*More likely than not* [f]	*Very likely*
Heavy precipitation events. Frequency (or proportion of total rainfall from heavy falls) increases over most areas	*Likely*	*More likely than not* [f]	*Very likely*
Area affected by droughts increases	*Likely* in many regions since 1970s	*More likely than not*	*Likely*
Intense tropical cyclone activity increases	*Likely* in some regions since 1970	*More likely than not* [f]	*Likely*
Increased incidence of extreme high sea level (excludes tsunamis) [g]	*Likely*	*More likely than not* [f, h]	*Likely* [i]

Source: IPCC 4th Assessment Report, February 2007

These current and projected impacts are largely due to the fact that worldwide emissions of GHGs have risen steeply in the past 60 years. About 42,000 Megatonnes of CO_2 were in the atmosphere in 2000 (the last year for which there is authoritative global emissions data). Global emissions of all greenhouse gases were up 7.5% from 1990-2000 (that number would be 10.4% except there was a substantial decrease in global deforestation rates which contribute to global warming). Electricity and heat represent 25% of the total global emissions, with land use change

and forestry the second source at 18% globally. In terms of economic activity, road transport was responsible for nearly 10% of global emissions.

U.S. emissions of GHGs come from every part of the economy, but certain sectors, and certain sources are key. In 2005 (the latest year for which U.S. data is available), total U.S. emissions were 7,241 Mt CO2 which represents a 16.3% increase over 1990. Within that total, transport emissions were approximately 26% - and were up 32% from 1990. There are three drivers for surface transport emissions:

- the number of vehicle miles traveled (VMT) which increased 39.4% between 1990 and 2005;
- gasoline consumption which increased 27% during this same period;
- and population growth which increased 15%

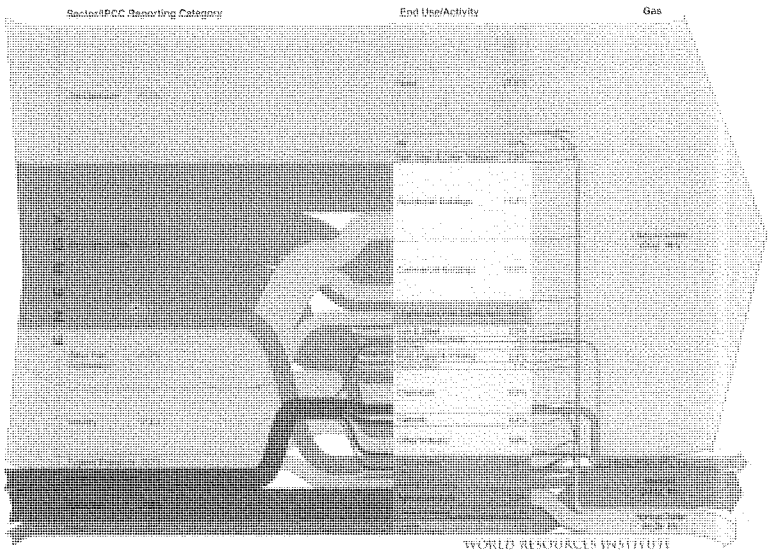
Buildings account for 38% of CO2 emissions in the United States - more than either the transportation or industrial sectors. In fact, according to the U.S. Green Building Council:

- Buildings consume 70 percent of the electricity load in the U.S.
- Over the next 25 years, CO2 emissions from buildings are projected to grow faster than any other sector, with emissions from commercial buildings projected to grow the fastest at 1.8% a year through 2030
- Buildings have a life span of 50-100 years, during which they continually consume energy and produce CO2 emissions. If half of new commercial buildings were built to use 50 percent less energy, it would save over 6 million metric tons of CO2 annually for the life of the buildings - the equivalent of taking more than 1 million cars off the road every year.

Chart 1 is a flow chart that looks at how emissions move through the U.S. economy. It tracks the sector responsible for emissions, and the end user as well as providing a breakdown by GHG of what is emitted as a result of these activities.

Chart 1:

U.S. GHG Emissions Flow Chart



Thus, for the United States, the core of the problem of reducing emissions is cars, coal, and buildings. We know that the choices we make today about the infrastructure we build and maintain will profoundly affect the emissions trajectory we are on. This is a matter of moving beyond decades old technologies for generating electricity, powering automobiles, and creating comfortable, well lit, and attractive spaces for Americans to live and work in.

The scientific debate on the cause of global climate change is basically over - the focus has turned to action. It is essential that the US take strong action at the national level to reduce emissions. The rest of the world cannot solve this problem without the US. Action by the US will make clear that in tomorrow's markets there will be a price for carbon, and will give US companies an advantage in preparing to compete in those markets.

That is why twenty two leading U.S. businesses including large energy consumers and customers such as General Electric, AIG, Alcoa, Caterpillar, DuPont, John Deere, Duke Energy, and General Motors joined with WRI and five environmental organizations to urge Congress to enact mandatory policy measures to "slow, stop and reverse" the growth in US GHG emissions. The United States Climate Action Partnership (US CAP) on January 22, 2007, issued "A Call for Action" which provided recommendations to Congress and the Administration on mandatory, economy-wide policy design to achieving a cap and trade program with step-wise emissions reduction of between 10-30% within 15 years of rapid enactment with a long term goal of reducing U.S. emissions by 60-80% by 2050.

We'll turn to the leadership role needed by your committee and Congress in a moment. Let's look at what we know about how to reduce emissions.

According to the International Energy Agency, the world will spend $20 trillion on new energy infrastructure in the coming decades (and approximately $4 trillion in North America alone). If those investments are made in old fossil fuel-based technologies, the opportunity to prevent dangerous climate change will be lost.

The solution is a shift in energy technology development and deployment at an unprecedented rate. The change in technology must affect the three primary uses of energy – power, transportation, and heating – all basic elements to modern life, whether in industrialized or developing economies. The catalysts for this shift are straightforward: government policy and private sector investment. Importantly, the transformation of the energy sector to a diversified, low-carbon system need not be an economic hardship. Rather, it offers an opportunity to manufacture and develop cutting-edge technologies that will clean the air, improve people's health, and provide greater economic and political stability.

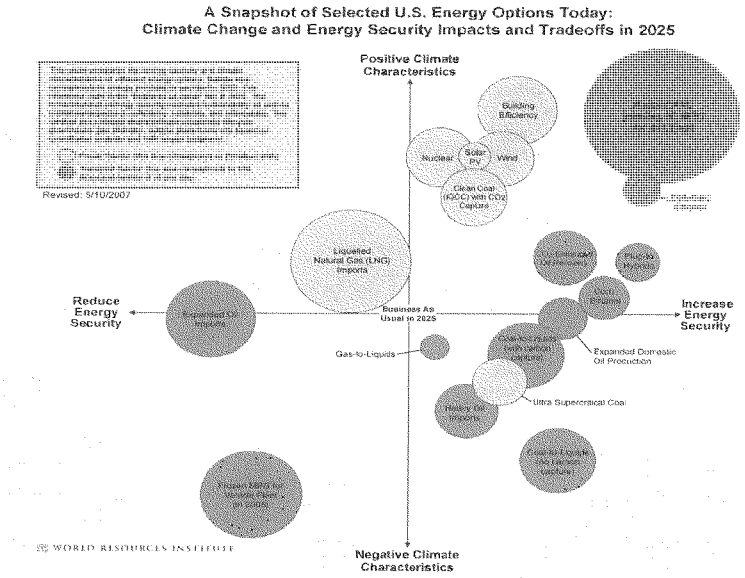
Table 2 provides a sense of the types of policy action required immediately and over the long term by sector.

Table 2: Policy outcomes required to achieve reductions

Sector	Near Term Priorities	Medium Term Priorities	Long Term Priorities
Power	[illegible]	[illegible]	[illegible]
Buildings	[illegible]	[illegible]	[illegible]
Transport	[illegible]	[illegible]	[illegible]
Industry	[illegible]	[illegible]	[illegible]
Land Use	[illegible]	[illegible]	[illegible]

The U.S. Congress faces a variety of policy and technology choices as it reviews energy security and climate change issues. However, not all options are created equal, and choices made in the name of energy security may have significant and detrimental impacts on the climate. The trade-offs are calculated and represented in **Chart 2**, below.

Chart 2: Energy Technology choices and security and climate impacts



The chart looks at U.S. energy options today and calculates and compares selected energy technology options and the impacts these technology choices would have on our relative energy security and climate performance in 2025.

As you can see, energy technologies in the upper right quadrant have a positive impact on climate change and energy security, while those in the lower left have a negative impact on both. Those in the other quadrants involve tradeoffs. The size of each bubble represents the potential of that technology to meet future energy demand.

Key take-away messages from this review:

- Increasing fuel efficiency standards has the potential to make the biggest contribution to meeting our energy needs. In addition, this option has very strong positive implications for both energy security and climate.
- While coal-to-liquids can make a small contribution to increase U.S. energy security in this timeframe, pursuing this option would have significant negative impacts to the climate. Even if most of the CO_2 from the conversion process is captured and stored, climate impacts are still negative compared to petroleum.
- Ethanol from corn would deliver significant new energy and increase U.S. energy security, but would deliver relatively small benefits to the climate. This is due to the

high energy input required to produce and process corn – and the fact that most of this energy is derived from fossil fuel (in particular, coal). Cellulosic ethanol will likely deliver slightly less energy than corn-based ethanol over this timeframe, but has a greater positive impact on climate change on a life-cycle basis.

The options graphed here are not drawn from specific pieces of legislation, nor are they part of an energy forecast. Different policy designs would lead to different placement of "bubbles" on the chart as well as influence the size of the bubbles themselves. Attached is basic background on the chart, and in a separate file, some basic technology descriptions. For specific assumptions, go to **www.wri.org/usenergyoptions**.

Responding to the Climate Challenge

So, if technology and the development of a new energy and transport infrastructure are critical in the fight against global warming, separating the elements of a response is a critical step. Sir Nicholas Stern, in the "Stern Report" issued last fall, comments that:

> *Three elements of policy are required for an effective global response. The first is a price on carbon, implemented through tax, trade or regulation. The second is policy to support innovation and the deployment of low carbon technology. And the third is action to remove barriers to energy efficiency and to inform, educate and persuade individuals of what they can do to respond to climate change."*

We at WRI agree that it will require a carbon price to be enacted by policy makers, that there must be a concerted emphasis on technology deployment, and that individuals and organizations must change their behaviors and find ways they can make a difference.

1) create a carbon price: With a price on carbon, emitters, industry and consumers all have an incentive to change their behavior. The key is to build a program that can drive emissions out of the economy and reward clean technology and changes in behavior. A combination of new, tighter standards offers a variety of environmental benefits, spurs industry innovation, and can create investment in new American jobs, technology and industry. Global markets are emerging for low carbon technology – and countries that have domestic industries calibrated to provide those services will be the winners in the global energy infrastructure and product provision. A carbon price could be implemented through a variety of policies – including a cap and trade program or a carbon tax.

2) focus on technology deployment: Policy is as enabling force – the government sets standards and creates demand for innovation and investment.

The United States can create markets to deliver new technology and a clean and secure future. According to the Cleantech Venture Network, a group that tracks venture flows in to clean technology companies, clean energy investments totaled a $2.9 billion for 2006, representing a 78% increase over 2005 clean technology investment of $1.6 billion, and a 140% increase over 2005 investment of $1.2 billion. In addition, the group also reports there is increasing investment in clean technology as a percentage of overall venture capital. In the fourth quarter of 2006, clean technology ranking third in size as an industry segment (behind software and biotech).

And the growth in these markets is not only for venture capitalists - Citigroup announced last week it will spend $31 of a $50 billion climate change commitment will go toward supporting the "commercialization and growth of alternative energy and clean technology", and Bank of America made a $20 billion pledge for climate change and clean energy investments. For these investments to be successful there must be an active and engaged market in driving emissions and energy consumption down.

3) commit to changing behavior: buyers and consumers of energy and technology can also make a difference. The estimated government percentage of total U.S. commercial and residential building energy consumption comes to about 1.9% - the government itself can help shape the building infrastructure and support a transformation in energy and emissions by taking a leadership role. US government as a building owner/operator/lessee can help bring new a new era of advance building technologies and building energy performance standards. A federal fleet requirement could help bring advanced car technology to scale.

In the area of transportation, the combination of policy, technology and behavioral change will be required. No one piece of this three-legged stool will be adequate. U.S. must look for opportunities for significant, scalable change in its transportation systems and infrastructure as a first step:

Create transit-oriented development (TOD) corridors and improved transit infrastructure: This committee could review and support policies that promote the use of public transportation and authorizing funding to build energy-efficient and environmentally friendly modes of transport like clean buses and light rail. These transportation systems also use less fuel. Currently, only 6-7% of Americans are currently using mass transit like buses and rail to commute. Cities like Portland, OR and Seattle, WA have created efficient busing systems, and the U.S. Department of Transportation could increase grants to state and local governments for TOD corridors, to construct or improve facilities for transit, bicycles, and pedestrians.

Support climate and environmentally friendly fuels and fuel performance standards: It is clear that we are poised to embark on a broad examination of potential transportation fuels to help reduce U.S. oil dependence. Some policies, such as California and other states are interested in developing, focus on the characteristics of the fuel, a "low carbon fuel standard." Other proposed programs pick specific technologies, like ethanol, and seek to overcome the specific technology barriers associated with one fuel. In reviewing the options, water impacts, land-use impacts and infrastructure requirements must be reviewed. For example, coal to liquids technology, profiled in **Chart 2**, requires significant amounts of water – estimates range up to 10 tons/water for each ton of oil. With both climate and water concerns, this technology may not be a good investment as a long term or scalable fuel source. In the case of ethanol, food vs. fuel debates for current technology may be shorter term if we can quickly move to cellulosic technology. But ethanol cannot be shipped with gasoline, and will require a different distribution system. And commercial airliners could be burning biofuels derived from algae within five years, according to Boeing, the world's largest aircraft manufacturer. Yet we have not examined the impacts. We need to link our climate, energy, and water resource challenges and look for comprehensive solutions.

Support automobile fuel economy/performance standards

Contrary to urban myth, since the early 1980s, American automakers have poured technology into new cars. Today's cars get almost twice as many ton-miles per gallon as cars got in the late 1970s, and roughly twice the horsepower for a given fuel economy.

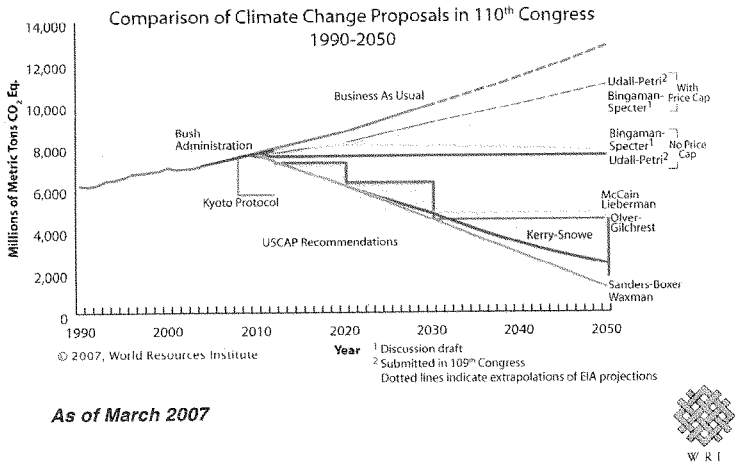
The trouble is that the US auto makers decided to sell size and power, not better gas mileage (others, like Toyota and Honda, bet on a mix of good gas mileage with more power). Now as our oil use for light duty vehicles spirals upwards American automakers tell us it would now cost thousands of dollars per car to make them "fuel efficient."

In the last few years a new option has appeared, the hybrid. It too, could go down the wrong road. The first hybrid models, from Honda and Toyota, truly saved fuel – 40-55 mpg on the road. When larger models, like the Honda Accord hit the market something like half of the hybrid advantage seemed to be used to save fuel and half to increase power. As American companies start offering hybrids, they are focusing on big SUVs that will guzzle a little less gas, but seem again to assume that tomorrow's customers will want size and speed whatever the cost of gasoline or the consequences for the climate.

The key question now is what package of incentives, mandates and assistance will shift US auto makers to the efficiency road they bet against for so many years and enable them to prosper there? In order to solve our fuels problem the first thing we need to do is cut it down to size. I am convinced that the answer must include strong CAFÉ standards.

These are the leadership challenges facing the Transportation and Infrastructure Committee, and Congress. Congress will be reviewing bills that will influence the trajectory of emissions in the United States. **Chart 3** offers a graphical depiction of some of the options in consideration for a cap and trade program.

Chart 3: US CAP Targets and Current Legislative Proposals



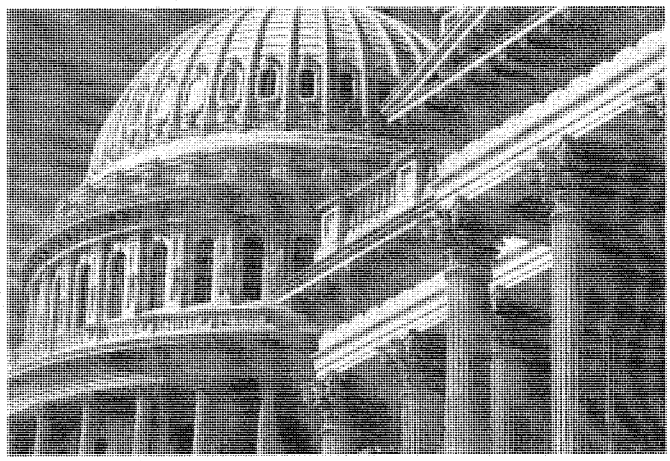
As of March 2007

WRI

Your jurisdiction over many of our public works, our federal buildings, our infrastructure means you can craft a clear, compelling and meaningful vision to help us re-invent the energy economy. Congress must look at the investments needed to ensure that our water supply, our infrastructure and our mobility needs can be sustained. We must pursue action by creating a price on carbon, re-directing our mobility efforts to include improved mass transit, implementing technology standards to help U.S. industry innovate and sell low-carbon, advanced technology. These efforts will not only help the U.S. secure its future, it will help our industry compete globally in a carbon and energy constrained world. The U.S. government can lead by example in purchasing efficient technologies and changing its behavior. There is limited time, but there are policy options on the table today. The choice to act is yours.

ATA TESTIMONY

Climate Change and Energy Independence: Transportation and Infrastructure Issues



Statement of James C. May
President and CEO
Air Transport Association of America, Inc.
before the
House Committee on Transportation and Infrastructure

May 16, 2007

AIR TRANSPORT ASSOCIATION

Thank you, Mr. Chairman. ATA airline members transport more than 90 percent of all U.S. airline passenger and cargo traffic. Our airlines take climate change and energy independence very seriously and I appreciate the opportuuity to appear before you today to discuss these issues.

INTRODUCTION AND OVERVIEW

In the broadest policy terms, the task before Congress is how to achieve reductions in greenhouse gas (GHG) emissions while maintaining economic growth and enhancing energy security. The importance of environmental responsibility cannot be overstated and the risks and opportunities associated with transforming the American economy, which has been fossil-fuel dependent from day one, are inherent and significant. It will not be easy. It will take time and we have to get it right. I want to emphasize three points essential to moving this effort forward:

First, ***commercial airlines are extremely carbon efficient***. They will become even more efficient moving forward and will be ***key in any successful strategy*** for simultaneously addressing climate change and energy security while preserving economic growth. For the past several decades, commercial airlines have dramatically improved our carbon efficiency by investing billions in fuel-saving aircraft and engines, and innovative technologies like winglets and cutting-edge route-optimization software. Fuel is our largest cost center, creating an economic imperative to maintain our record of continuously improving carbon efficiency. A vibrant, growing aviation sector is a key part of the solution – not an impediment to ensuing a future where a strong economy, freedom from foreign oil and cleaner air are the order of the day.

Second, ***we ask Congress to contribute to the solution***. Technology development and implementation will be the key to success. In the aviation sector, Congress can ensure significant GHG reductions in the near term by updating the antiquated air traffic control (ATC) system and, specifically, supporting funding of the Next Generation Air Transportation System (NextGen). Implementation of this satellite-based navigation technology will improve fuel efficiency and reduce GHG emissions by 10 to 15 percent. Congress also has an indispensable role to play in facilitating carbon-efficiency gains in the longer term. Advancements in aviation technology that will further improve carbon efficiency will come only with reinvigorated investments in basic aeronautics research and development programs at NASA and Federal Aviation Administration (FAA). The nation as a whole benefits from this research and thus general funds should be used. Congress should provide the funding necessary to support this research. In addition, we ask Congress to take steps to further provide incentives for the development and commercial deployment of alternative fuels.

Third, the United States should ***continue to support the ongoing efforts of the International Civil Aviation Organization's (ICAO)*** to further address aviation's contribution to climate change in a global context. ICAO already has made considerable progress toward achieving a solution appropriate to addressing the uniquely global climate-change issue in the context of a uniquely global business. We urge Congress to allow the ongoing ICAO process to play out.

COMMERCIAL AVIATION IS EXTREMELY CARBON EFFICIENT AND WILL BE KEY IN ANY SUCCESSFUL STRATEGY

Recently, there have been media reports, many coming out of Europe, raising alarm bells about commercial aviation's contribution to climate change. Let me set the record straight. U.S. commercial aviation contributes about 2 percent of domestic U.S. greenhouse gas emissions.[1] To put that into context, domestically, power plants produce about one-third of GHGs[2] worldwide, cattle and other livestock account for 18 percent of GHG emissions.[3]

At the same time, commercial aviation is critically important to local, national and global economies, underpinning a large percentage of economic output. A March 2006 study by the Campbell-Hill Aviation Group found that "the national economy is highly dependent on commercial aviation, which is directly or indirectly responsible for 5.8 percent of gross output, 5.0 percent of personal earnings and 8.8 percent of national employment."[4] The study further noted that this translated into $380 billion in earnings, 11.4 million jobs and $1.2 trillion in U.S. output in 2004. Placing our economic output side by side with our GHG output, it is clear that we are extremely carbon efficient.

We have been able to deliver continually more value to the economy even as we have dramatically reduced our carbon footprint because we are constantly improving our fuel efficiency. Commercial aviation has achieved a 35 percent improvement in fuel efficiency since 2001 alone. In fact, absolute fuel consumption of U.S. carriers in 2006 remained 5 percent below the peak reached in 2000, though carriers transported 12 percent more passengers and 22 percent more cargo.[5] Similarly, EPA recently observed that "[w]hile CO_2 emissions from commercial aircraft grew approximately 14.8 percent . . from 1990 to 2005, passenger miles traveled increased by 69 percent over the same period."[6] In other words, our productivity grew 4.7 times faster than our CO_2 emissions from 1990 to 2005. In contrast, freight trucks showed the reverse trend – with GHG emissions growing faster than vehicle miles traveled.[7] Passenger vehicles also have lagged far behind aircraft in efficiency – as EPA noted:

> Since 1990, there has been a significant increase in vehicle miles traveled (VMT) by light-duty trucks, freight trucks and aircraft. At the same time, the fuel economy of light-duty trucks and freight trucks has remained roughly constant. By contrast, commercial aircraft have become noticeably more fuel efficient and have operated with an increasing percentage of seats occupied.[8]

Within the aviation sector, it is important to remember that different types of commercial aircraft have vastly different impacts on the environment. Commercial jets are five to six times more fuel efficient than corporate jets. The math is simple: carrying 250 people and cargo across the country in a single plane burns a lot less fuel than over 30 separate corporate jets, each flying six people. U.S. airlines are highly motivated to continue this trend. Fuel, long one of the two highest costs for airlines, today is our largest cost center, averaging 20 percent to 30 percent of total operating expenses and costing over $38 billion in 2006. In light of this, even in the highly constrained financial environment we have encountered in recent years, our airlines have invested heavily in capital and technology to realize our remarkable fuel-efficiency gains.

We have left no stone unturned. Some examples of our efforts to reduce fuel burn to date include:

- **Upgrading Fleets** – Airlines have expended billions to upgrade their fleets through investments in new airframes and engines, removing less fuel-efficient aircraft from their fleets and improving overall fleet efficiency
- **Introduction of Innovative, Cutting-Edge Technologies** – Airlines also have invested in technologies to make existing airframes more efficient, for example installing winglets, which reduce aircraft drag and thereby reduce fuel consumption. Airlines also have developed software to analyze flight paths and weather conditions, allowing aircraft to fly more direct, efficient routes (subject to air traffic control approval)
- **Improved In-Flight Operations** – Airlines utilize systems to optimize speed, flight path and altitude, which not only reduces fuel consumption in the air, but avoids wasting fuel while waiting for a gate on the ground. Airlines also have analyzed redistribution of weight in the belly of aircraft and introduced life vests on certain domestic routes, allowing them to overfly water on a more direct route
- **Improved Ground Operations** – Airlines have introduced single-engine taxiing when conditions permit, plugged into electric gate power where available to avoid running their auxiliary power units, used tugs to position aircraft where feasible, and have redesigned hubs and schedules to alleviate congestion. They also have converted to electric ground support equipment when feasible
- **Reducing Onboard Weight** – In recent years, as fuel prices skyrocketed, airlines exhaustively reviewed ways to reduce aircraft weight – removing seat-back phones; excess galley equipment and magazines; introducing lighter seats and beverage carts; stripping primer and paint; and a myriad of other detailed measures to reduce weight and improve fuel efficiency

Looking ahead, airlines will continue to do whatever it takes to drive down fuel costs by driving up fuel efficiency and, thus reducing GHG emissions. For example:

In the next three years over 500 new aircraft will be delivered at an estimated cost in the range of $40 billion; that's on top of the already significant fleet turnover.

Just last week, FAA Administrator Blakey highlighted the tremendous success of required navigation performance (RNP) systems that allow us to fly very precise approach paths, achieving significant fuel savings. Our airlines announced plans to invest hundreds of millions of dollars to retrofit aircraft with equipment necessary to take advantage of RNP.

ATA also has expressly endorsed legislation supporting the development of alternative fuels and we are participating in various initiatives in this regard. Mr. Altman of the Civil Aeronautics Alternative Fuel Initiative (CAAFI) is speaking today about the effort to develop alternative aviation fuels. ATA supports that effort and all efforts to develop safe alternatives that increase incremental fuel supplies – especially if both environmentally friendly and economically viable.

Since commercial airlines already have achieved such tremendous fuel efficiency improvements, it is important to remember that additional near-term improvements necessarily will be evolutionary, rather than revolutionary. We have made our achievements in fuel efficiency primarily by demanding new airframe, engine and other technologies from manufacturers and investing billions of dollars to acquire them. As a result, this equipment and technology already has been driven extremely close to currently achievable fuel-efficiency limits, and revolutionary advances are not expected in the near term. In addition, aircraft are extremely expensive capital commodities, with a useful economic life of 30 years or more. Consequently, unlike some other sectors – which either have not pursued efficiency improvements as aggressively or are not as reliant on such high-cost, low-turnover equipment – commercial aviation will, of necessity, rely on evolutionary advances to achieve fuel efficiency improvements in the near term.

In sum, ***unrelenting carbon-efficient improvement is business as usual for commercial airlines***. Because GHG emissions are directly related to fuel burn, GHG emissions are not an "economic externality" for us and we have been, are and will continue to be driven by an economic imperative to reduce fuel consumption and thus GHG (and other) emissions. Looking back, our improvement in fuel efficiency has been remarkable. If other sectors had done half of what airlines have done – even since 1990 – to improve fuel efficiency, we'd be facing a much less formidable task. Looking ahead, the aviation sector is just the type of carbon-efficient economic engine Congress should be looking to drive its effort to create a future in which our economy is vibrant, we are free from dependence on foreign oil and our air is ever cleaner. In short, ***a growing aviation sector is a key to making this future a reality***.

CONGRESS CAN *AND MUST* CONTRIBUTE TO THE SOLUTION

While we are committed to driving our carbon efficiency even further, we welcome the opportunity to work with Congress and seek congressional leadership and action in three key areas.

First, and foremost, Congress should ensure that our outdated, inefficient air traffic control system is modernized. This is entirely in the hands of Congress and the FAA. Studies consistently have shown that modernization of the ATC system will improve fuel efficiency and reduce GHG emissions by 10 to 15 percent. Put another way, inefficiencies in the current ATC system are responsible for at least 10 to 15 percent of the GHGs from commercial aviation. To date, the airlines have worked closely with the FAA to improve efficiency within the existing ATC system. For example, adopt reduced vertical separation minimums and continuous descent approaches (CDA), and implementing ADSB capabilities. We are also working with the FAA and other agencies on a fundamental redesign of the ATC system through the Next Generation Air Transportation System (NextGen) project, Operational Evolution Partnership, and other initiatives. The FAA reauthorization legislation now before Congress will support NextGen by providing for the satellite-based navigation technologies that are indispensable in eliminating inefficient routings, congestion and delays. ATA is supporting the modernization initiative through our "Smart Skies" initiative.[9] We urge your support.

Second, we urge Congress to reinvigorate NASA and FAA environmental aeronautics research and development (R&D) programs. As noted, previously pointed out above, commercial aviation will continue to improve the GHG intensity of its operations in the near term through evolutionary advances in airframe and engine technology and through implementation of operational measures to reduce fuel burn. Given the significant achievements to date, further revolutionary advancements in technology can only come through renewed investments in environmental aeronautics research and development programs at NASA and FAA, which only government can provide. The pending FAA reauthorization legislation contains such a program, the Consortium for Lower Energy, Emissions and Noise Technology Partnership (CLEEN), which would take much-needed, initial steps to support research that will accelerate the introduction of more fuel-efficient, low-emissions technology into the fleet. [See H.R. 1356, 110th Cong. § 606 (2007).] Such government-led R&D also serves to preserve American leadership in aeronautics and, thus, an extremely important component of our economy.

Third, we encourage congressional action to spur further commercial development of alternative fuels. ATA and its members are actively engaged in efforts to develop alternatives to traditional petroleum-based jet fuel. Alternative fuels have the potential to bring significant economic, operational and environmental benefits to the airlines, as well as energy security for the country. The primary factor here, of course, is ensuring flight safety. Another critical factor is establishing the infrastructure for deployment of alternative fuels on a widespread, commercial basis. While there are many such issues that need to be addressed, ATA is encouraged by efforts by the Department of Defense, NASA, the FAA, airframe and engine manufacturers, and academic institutions to ensure that a range of coal-to-liquid (CTL) technologies, biofuels and other alternative fuels are fully explored and considered by the marketplace. Any incremental fuel supply, especially if both environmentally friendly and economically viable, is something worth pursuing. We urge Congress to move forward with appropriate legislation.

We are confident that we will continue to improve our carbon efficiency into the future. In this context, careful consideration must be given to the question of whether the economic underpinnings of putative regulatory schemes, such as cap-and-trade or carbon charges, make sense when applied to commercial aviation. Specifically, any regulatory scheme that is intended to send a "carbon price signal" to drive investment needs to be considered very carefully to ensure that it has the intended effect of providing incentive for industry to reduce GHG emissions. Most importantly, policies should generate meaningful results and not unfairly burden early actors like the commercial aviation sector with additional costs, or compromise their ability to continue heavily investing in capital and technology.

GLOBAL INDUSTRY - GLOBAL CONSIDERATIONS; CONTINUE TO SUPPORT INTERNATIONAL CIVIL AVIATION ORGANIZATION (ICAO) EFFORTS

The International Civil Aviation Organization (ICAO) is in the midst of ongoing efforts to further address aviation's contribution to climate change. Several factors militate in favor of letting this ICAO process play out.

- The causes and effects of climate change are borderless, raising the potential that unilateral action by the United States will not protect the U.S. public because other countries like China and India may not act
- Aviation is a global business and U.S. carriers are subject to intense foreign competition. Raising the cost of operating in the U.S. market necessarily would disproportionately impact U.S. carriers, potentially threatening the global competitiveness of U.S. airlines
- ICAO, the United Nations body charged with establishing standards and recommended practices for international aviation, has a proven record of effectively dealing with environmental issues and already is far down the road toward reaching a consensus on aviation-related GHG emissions

We ask Congress to look to opportunities to address this global industry on a global basis. As discussed below, ICAO is uniquely positioned to achieve a global solution for the aviation sector and already has made considerable progress toward achieving such a solution. Thus, we urge Congress to allow the ICAO process to play out.

Recognizing that coordination between countries is needed to facilitate international aviation, ICAO has been charged with establishing standards and recommended practices for international aviation pursuant to the Convention on International Civil Aviation, commonly referred to as the "Chicago Convention" (to which 189 countries, including the United States, are parties). The world's airlines and related government bodies have been fully engaged on the climate-change issue for many years. Since 1998, ICAO, which is charged with setting emissions standards for aircraft,[10] has been studying how to further reduce GHGs from aviation, consistent with the imperative that safety must remain the prevailing consideration.

Based on its extensive studies, ICAO specifically has endorsed the use of voluntary measures and has adopted formal guidance on voluntary agreements as well as guidance entitled "Operational Opportunities to Minimize Fuel Use and Emissions," which ATA and its member carriers helped develop. In light of this work, countries such as Japan and Canada, both of whom are parties not only to the United Nations Framework Convention on Climate Change (UNFCCC) but also to the Kyoto Protocol, and whose economies are closely aligned to the United States, have chosen to address the GHGs from their aviation sectors through voluntary agreements targeting specific fuel-efficiency goals.[11] ICAO also has undertaken study of GHG taxes and charges and emissions trading, and concluded that GHG taxes and charges are ***not*** cost effective. Specifically, assuming a hypothetical target of a 25 percent decrease in projected growth of emissions, ICAO found that GHG taxes/charges would cost $47 billion annually on a worldwide-basis.[12] Considering that the U.S. share of global aviation is approximately 34 percent,[13] this would translate to a cost to U.S. carriers of approximately $16 billion annually. ICAO found that targeting absolute emissions would be even more costly. For example, a hypothetical target of a 5 percent absolute reduction from 1990 levels was estimated to cost approximately $245 billion annually if implemented on a worldwide basis.[14] In light of these considerations, in 2004, ICAO member states agreed to a moratorium on implementation of GHG charges on international aviation through the ICAO Assembly meeting in September 2007, when this issue will again be discussed.

Despite the general consensus among ICAO Member States that a well-designed emissions trading system would be more cost effective than taxes or charges on aviation activity, ICAO has also found that emissions trading, nonetheless, would be very expensive for aviation. This is because aviation is fossil-fuel dependent, as alternative fuels that are now available for some industry sectors simply are not viable for commercial jet aircraft, and airlines already are driven to be as fuel efficient as possible. ICAO analysis of the costs puts this in context. Assuming a hypothetical target of a 25 percent decrease in projected growth of emissions, ICAO found that open emissions trading would cost the airlines $17 billion annually on a worldwide basis if "baseline" allowances were auctioned, or $1.63 billion annually if all "baseline" allowances were grandfathered (i.e., distributed free of charge);[15] the U.S. share of these costs would be approximately $5.8 billion and $550 million, respectively, annually. Further, a hypothetical target of a 5 percent absolute reduction from 1990 levels was estimated to cost over $60 billion annually on a worldwide basis if "baseline" allowances were auctioned, or $17.3 billion annually if all "baseline" allowances were grandfathered;[16] the U.S. share of these costs would be approximately $20.4 billion and $5.9 billion, respectively, again on an annual basis.

In light of the fact that aviation already has incentive to minimize fuel burn and resulting GHGs, and in light of the significant costs of open emissions trading, ICAO has declined to adopt an emissions trading system for international aviation or to recommend that its members do so. Accordingly, we urge Congress to decline to adopt such a system for U.S. commercial aviation and to defer to ICAO for further work on this issue. However, should Congress consider covering U.S. aviation in a U.S. trading regime, it should take into account ICAO guidance on emissions trading.[17]

CONCLUSION

I close by asking you to note the achievements that commercial airlines have made in reducing fuel burn and emissions, particularly when compared to other industries, and the actions that we are taking to continue our progress in this regard. While we are fully committed to working with Congress and are asking for congressional leadership in each of the areas I have described, we are not asking you to work **for** us, we're asking you to work **with** us in addressing this environmental and energy concern.

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[1] According to the most recent United States Environmental Protection Agency (EPA) analysis of GHG emissions in the transportation sector, commercial aviation's contribution to total U.S. GHG emissions in 2003 was 1.75%. EPA, *Greenhouse Gas Emissions from the U.S. Transportation Sector – 1990 -2003* (March 2006) at pages 5 and 21 ("[t]ransportation sources were responsible for about 27 percent of total U.S GHG emissions in 2003," "[a]ircraft produced about 9 percent of U.S. transportation greenhouse gas emissions in 2003," and "[c]ommercial aircraft produced 72 percent of U.S. aircraft GHGs in 2003"). The more recent inventory of GHG emissions estimates total GHG emissions from "commercial aircraft" to be 158.1 teragrams of carbon dioxide equivalent (Tg CO_2 Eq.), or about 2.2 percent of the nation's 7,260.4 Tg CO_2 Eq. EPA, *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990 – 2005*, Table A-108 at p. A-128 and Table ES-2 at p. ES-6 (April 15, 2007). It is not clear, what is included in the "commercial aviation" category, but is clear the category has been expanded to include operations other than those conducted by carriers like ATA members. See note *c* to Table 3-7 at p. 3-9.

[2] EPA, *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2004* at ES-13.

[3] United Nations, Livestock Environment and Development Initiative, *Livestock's Long Shadow – Environmental Issues and Options* (2006) at 271.

[4] The Campbell-Hill Aviation Group, "Commercial Aviation and the American Economy," March 2006. It is estimated that on a world-wide basis, commercial aviation accounts for approximately 3% of total GHGs, while at the same time contributing over 8% of the world's economic activity. See, International Air Transport Association, "Debunking Some Persistent Myths about Air Transport and the Environment."

[5] ATA analysis based on 2006 Revenue Passenger Mile (RPM) data submitted by carriers on DOT Form 41. *See* http://www.airlines.org/economics/energy

[6] EPA, *GHG Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990 – 2005* at 3-8.
[7] Id.
[8] Id. at 3-7.
[9] Smart Skies is a national campaign led by the ATA airlines, which advocates modernization of the U.S. air traffic control system (ATC) and its funding mechanisms. For more on this initiative, see the Smart Skies web site, at http://www.smartskies.org

[10] ICAO has established such standards for oxides of nitrogen (NO_x), carbon monoxide (CO), hydrocarbons (HC) and smoke. These standards, which have been made more stringent as technology has allowed, have been incorporated into U.S. law.

[11] See, e.g., Memorandum of Understanding Between Transport Canada and the Air Transport Association of Canada (Nov. 15, 2004). The official announcement of this agreement by the Canadian government can be found at: http://www.tc.gc.ca/mediaroom/releases/nat/2004/04-h105e.htm

[12] These figures are derived from "Analysis of Market-Based Options for the Reduction of CO_2 Emissions for, Aviation with the Aero Modeling System," page A-3, Table A2 (November 2000) (prepared by ICAO's Committee on Aviation Environmental Protection MBO Analysis Task Group, hereinafter "MATG Report").

[13] ATA analysis based on 2006 Revenue Ton Miles (RTM) data submitted by carriers on DOT Form 41 and worldwide traffic reported by ICAO.

[14] Id.

[15] These figures are derived from ICAO's MATG Report, at A-28 and A-30, Tables A21 and A23.

[16] Id.

[17] ICAO also has studied voluntary emissions trading as well as how international aviation emissions might be included in a country-specific or region-specific emissions trading scheme. As a result, in February of this year, ICAO's Committee on Aviation Environmental Protection (CAEP) adopted a "Report on Voluntary Emissions Trading for Aviation" and "Guidance on the Use of Emissions Trading for Aviation." These documents, which will be considered by the ICAO Council and ICAO Assembly in their upcoming meetings identify many of the considerations that should be taken into account if a country is considering emissions trading for aviation. While believing that inclusion of aviation in an emissions trading system is unnecessary and counterproductive, for the reasons cited above, should the U.S. pursue such a course, the ICAO guidance should be taken into account.

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TESTIMONY OF J. MICHAEL MCQUADE
SENIOR VICE PRESIDENT, SCIENCE AND TECHNOLOGY
UNITED TECHNOLOGIES CORPORATION

BEFORE

HOUSE TRANSPORTATION AND INFRASTRUCTURE COMMITTEE
HEARING ON
CLIMATE CHANGE AND ENERGY INDEPENDENCE: TRANSPORTATION AND INFRASTRUCTURE ISSUES

MAY 16, 2007

On behalf of United Technologies Corporation (UTC), I am pleased to testify at today's hearing, "Climate Change and Energy Independence: Transportation and Infrastructure Issues." The approach Congress and businesses adopt to tackle the climate change issue will present both challenges and opportunities.

UTC is a global diversified company, headquartered in Hartford, Connecticut. We build aircraft jet engines at Pratt & Whitney, helicopters at Sikorsky, elevators at Otis, heating and air conditioning systems at Carrier, fire protection and security systems at UT Fire and Security, aircraft and space systems including aircraft electric power and cabin temperature/pressure and even the space suits for the American space program at Hamilton-Sundstrand. Finally at UTC Power, we build hydrogen powered fuel cells and a line of on-site co-generation products of particular interest today.

The common denominator of everything we do is to convert energy to useful work, whether elevators or air conditioning or aerospace. So we're highly alert to the energy and conservation agenda for stationary and transportation applications.

UTC is a member of the Fortune 50 and the Dow Jones Industrial Average index. We bring a credible voice to the policy debate, as we've been a leader in addressing climate change by reducing energy use in our global operations and incorporating energy efficient innovations in our products.

Since 1997, UTC worldwide energy use is down by 19 percent in a company that has doubled its size. We are focusing on energy conservation and climate change for our new 2010 environmental goals to reduce absolute greenhouse gas emissions by an additional 12 percent in the next four years. We expect to achieve this aggressive target in part with significant energy conservation projects and with investments in technologies to create power from waste heat. UTC will also extend its influence across the value chain to reduce negative environmental impacts by its factories, products and suppliers.

UTC's products can be found in almost every country on earth. And since many have long lifespans, we've worked hard to improve the efficiency of products to minimize our environmental impact. Given the long useful life of our products, even small improvements in efficiency yield significant long term benefits. Our 2010 goals include a ten percent reduction in product packaging and a ten percent increase in the operating energy efficiency of the portfolio of products we sell.

A national climate change program should include flexible market-based policy measures but it must be coupled with strong support for research, development, demonstration and commercialization of emission-reduction technologies. We believe emerging technologies provide the answer to climate change problems; that is why we dedicate nearly $3 billion annually to research and development -- to identify and develop those innovative technologies. A coordinated federal approach to accelerate the development of these advanced and emerging energy technologies is a key solution to reduce greenhouse gas emissions.

In my statement, I describe how a technology focus can help achieve climate change and energy goals in the following areas: aviation, surface transportation and buildings – and, relevant to this panel, I'll discuss a couple of important opportunities related to surface transportation and buildings that are relevant to the aviation industry.

AVIATION

Aviation is a global industry. On a given day, an airplane can literally be in multiple countries and on multiple continents. In this international arena, we must compete in with the best products we can develop. It also means that we must work with the international community, and organizations like the International Civil Aviation Organization (ICAO). ICAO has 190 contracting states, all impacted by aviation, and consequently they need to have input on actions taken to regulate aviation's environmental performance.

The Kyoto Protocol stipulates that the limitation or reduction of greenhouse gas emissions from international aviation be pursued through ICAO. ICAO is currently working on developing a global response to aviation and climate change and UTC supports these activities and believes ICAO is the appropriate organization to deal with the issue. ICAO's Committee on Aviation Environmental Protection (CAEP) has intensified its activity at developing international solutions to address the issue of aviation's impact on climate change.

Pratt & Whitney is an active participant in the CAEP Process and supports global solutions to global problems. Pratt & Whitney participates in all CAEP Working Groups and Task Groups dealing with climate change, local air quality and community noise and considers ICAO, through CAEP, to be the preferred body to establish guidance and policy to address environmental issues. We are taking a leadership role in developing new technologies, such as our unique geared turbo fan (GTF), that will offer significant improvements in fuel efficiency and thereby directly reduce carbon dioxide (CO_2) emissions.

Fuel Efficiency and Emissions

My colleague, Rich Altman, will speak in detail about alternative fuels for aviation, and I want to state our support for alternative fuels industry initiatives. We are an active participant with the industry team and are supporting the Commercial Aviation Alternative Fuels Initiative (CAAFI) as an instrument to address civil and military aviation concerns. The effort is especially important as we consider our nation's energy independence.

While we remain firmly committed in our support to alternative fuel initiatives, we believe the more immediate path to lower CO_2 emissions for aviation is through engine efficiency gains. When we talk about reducing aircraft emissions, we talk in terms of fuel efficiency. The connection between fuel burn, or fuel economy, is directly related to CO_2 output. Since 1971, aviation fuel efficiency has tripled, which is double the improvement automobiles have made over the same time period. Better fuel efficiency means less emissions, but clearly also lower operating costs. At $120 billion per year, fuel represents more than 25 percent of all airline industry operating costs. In 2006, fuel overtook labor as the industry's largest expenditure which further induces operators and manufacturers to improve fuel efficiency.

Improved Engine Efficiency for Next Generation Singe-Aisle Aircraft
Pratt & Whitney will have in place production-ready engine technologies for the next generation of single-aisle aircraft. Key elements of our technology plan include our geared turbofan now under development, a next generation TALON™ (Technology for Advanced Low NOx) low-emissions combustor, an advanced high-pressure compressor, and a suite of high-pressure turbine technologies. Let me describe the first two of these in a little more detail.

Geared Turbofan Technology
In a geared turbofan engine, a reduction gear allows the fan to operate independent of the low-pressure compressor and turbine. The fan can operate at a slower speed for lower noise and its diameter can be larger to achieve a higher bypass ratio for greater efficiency and fuel economy. At the same time, the low-pressure compressor and turbine can operate at higher speeds to achieve their best efficiency. At faster speeds, the turbine can power the compressor and fan with fewer stages to reduce part count, component weight, and operating costs. The compressor also benefits by fewer parts, lower weight, and lower operating costs.

The geared turbofan engine, building on nearly 20 years of technology development, allows the engine's low-pressure spool to operate at high speeds for peak efficiency, while the fan operates at slower speeds for both optimum efficiency and significantly lower noise. This engine configuration will deliver:

- 12% reduction in fuel burn over best current single-aisle engines;
- 55% reduction in NOx emissions over ICAO 2008 standard;
- 20dB reduction in noise over ICAO Chapter 4 requirements; and
- 40% reduction in engine maintenance cost

A 12% reduction in the aviation industry's fuel usage would save $14.4 billion a year – a figure which would exceed the current profitability of the industry.

TALON Combustor Technology
Our rich-quench-lean (RQL) TALON combustor uses advanced fuel/air atomizers and mixers, metallic liners, and advanced cooling management to lower emissions during takeoff, high-altitude cruise, and landing. Our newest version – called, TALON X – is being developed in partnership with NASA and has demonstrated extremely low emissions, while at the same time ensuring smooth ignition both at sea level and altitude conditions, and excellent reliability. It is extremely important that as new technologies to reduce emissions are introduced, we maintain or improve the current excellent safety record of our industry's products. I can assure you that we, along with the FAA, will ensure this happens.

EcoPower Wash
Regular washing of aircraft engines can also provide real benefits. During the course of normal operations, airborne material is ingested into the engine and deposited on the internal parts. Over time, this material builds up and leads to a drop in fuel efficiency. This performance deterioration can be restored by regular engine washing. Pratt & Whitney has made this once labor and time intensive process operationally efficient with EcoPower Engine Wash Services. Without impacting our airline customers' tight schedules, we can perform engine washes anywhere on the tarmac in about an hour.

EcoPower water wash restores on-wing fuel efficiency using pure, atomized water to remove the contaminants instead of traditional toxic chemicals as cleaning agents. The technology allows the process to be completed as much as six times faster than traditional engine-washing systems while capturing the water for re-use. Washing every airliner engine twice a year with Pratt & Whitney's EcoPower engine wash could save over half a billion gallons of fuel - the equivalent of over 10 billion pounds, or 5 million tons of carbon dioxide.

Fuel Cell Opportunities at Airports

With the high demand for aviation travel predicted to continue, our airports are expanding. At the same time, airports are coming under increasing pressure to reduce air pollutants. We need to work with them to make those reductions, bringing benefits to the airport and local community. In some areas of the country, air pollution is the limiting factor for airport growth. Major sources of air pollution at an airport are not limited to aircraft operations, where we make progress by improving engine efficiency and emissions reduction. Ground vehicles such as automobiles, shuttles, and public transportation for people and goods and ground support equipment such as aircraft towing, baggage handling, maintenance repair, refueling and food service also contribute to the energy and emission footprint of our airports.

With more than 40 years of experience, UTC Power is the world leader and the only company that develops and produces fuel cells for applications in each major market: on-site power, transportation and space flight. Fuel cells provide an opportunity to address a variety of U. S. energy needs including: reducing dependence on foreign oil; delivering assured, high quality reliable power; decreasing toxic air and greenhouse gas emissions; and improving energy efficiency.

Fuel cells and other clean power technologies like microturbines can be used to reduce air emissions in the following airport applications:

Buses – To shuttle passengers to and from airport parking and rental car centers

Ground Support Equipment (GSE) – In light, medium and heavy-duty applications for baggage handling, maintenance, fuel delivery and food service

Aircraft tugs – To move planes to the runway and back thus allowing aircraft to shut down their main engines. There is also the potential to over-size the fuel cell so electrical power can be exported to aircraft to reduce the use of auxiliary power units (APU).

Electrifying gates – At terminal facilities and providing conditioned air

Terminal and adjacent hotel operations – Base load power as well as combined cooling and heating

Backup power systems – Can operate 24/7 in applications as described above and eliminate the need to have diesel back up generators. Because this equipment is operated on natural gas, it burns cleaner than diesel and provides an additional measure of reliability due to power diversity (i.e., grid and onsite power).

Uninterruptible Power Supply (UPS) – Small hydrogen fuel cells can be used as back up devices to replace need for lead acid batteries to support critical airport instrumentation and communication devices.

These clean technologies can be used separately or in combination with one another to reduce overall air pollution. Many of these measures provide for greater energy efficiency and therefore reduce carbon dioxide emissions. For example, UTC Power's PureCell™ and PureComfort® systems provide total efficiencies of greater than 80 percent when waste heat is captured and used for cooling and heating

Airport vehicles typically stay within the immediate proximity of the facility and go to a central location for fueling. This provides the opportunity to create a hydrogen infrastructure with economies of scale. As such, airports can be a nucleus to build a small city that uses hydrogen in a clean and efficient manner. This can act as a demonstration site that is a model for the future.

We want to recognize the Committee's attention to low-emission vehicles with the VALE program in the 2003 FAA Reauthorization bill. We look forward to building on that initiative and working with the Committee during this year's FAA Reauthorization process to craft a provision that would provide further incentives to airports to utilize fuel cells in bus, stationary, back up power and ground support applications. We envision a pilot program with committed funding and an increased federal cost share to incentivize airport participation.

Although I'm here to testify on the aviation panel today, I also want to share some of our technology solutions for two prior panels, those addressing surface transportation and public buildings.

SURFACE TRANSPORTATION

Fuel cell transit buses offer the best strategic, near term potential to address energy concerns in surface transportation. In 2002, transit buses consumed the equivalent of more than 43,000 barrels of crude oil per day. The fleet of zero emission hybrid fuel cell buses currently powered by our fuel cells in revenue service in California is demonstrating greater than twice the fuel economy of a conventional diesel bus. We also have a bus in service in our home state of Connecticut, offering an opportunity to cold-weather test our technology. Transit buses and fleet vehicles allow us to begin to reduce oil imports in the near term while also improving air quality and reducing greenhouse gas emissions.

Buses and heavy duty commercial vehicles travel a relatively low percentage of the nation's vehicle miles, but they produce significant levels of toxic air emissions in densely populated urban areas. The transit buses equipped with UTC Power's PureMotion™ 120 fuel cell power system are eliminating overall emissions due to the zero-emissions technology inherent in hydrogen fuel cells.

Fuel cell fleet vehicles also have less demanding requirements and can compete at production unit costs higher than those required by autos. Automobiles and airplanes are geographically more mobile and thus technology change requires additional considerations. We are concentrating on those applications that enhance our ability to establish a profitable industry today and create stepping stones to the most demanding longer term auto application. Few companies can survive the next ten years waiting for the high volumes offered by the car market to develop. Instead, they must find applications where profits can be realized today that will support the development of a strong industrial base in preparation for the future auto market. Success in these early applications can build the necessary public awareness and public confidence.

UTC Power does not see any "show stopper" technical barriers to the advancement of fuel cells, but continued U.S. commitment to research, development, demonstration and market transition initiatives are essential to reduce cost, improve durability and enhance performance. Hydrogen storage and infrastructure requirements represent challenging obstacles for transportation applications, but near term opportunities that minimize these concerns exist with fleet vehicle applications such as transit buses.

We therefore need to increase our immediate focus on near term applications that are available today such as fleet vehicles, including transit buses, to stimulate early volume and build the industry's supplier base. Since fuel cells represent a disruptive technology, the supplier base is reluctant to make the necessary investment. Early successes in the transit bus application will help to overcome these fears.

PUBLIC BUILDINGS

The buildings sector consumes more than 40 percent of the energy produced in the United States and is responsible for nearly 40 percent of greenhouse gas emissions. The generation and transmission of electricity for residential and commercial buildings account for most of this energy use. Climate control accounts for more than a third of total buildings energy consumption worldwide and ranks near the top in total energy uses, and as in many energy applications, significant efficiency gains are possible and achievable. With Carrier's leadership within its industry, the U.S. government raised the minimum electrical efficiency for residential systems sold in the United States by 30 percent.

Moving toward high-performance and sustainable buildings will cut energy consumption and cost; improve human health and productivity through better indoor environmental air quality; provide reliable electricity from on-site renewable and alternative power generation that is less susceptible to disasters and security threats; reduce waste and water use; and reduce the nation's reliance on foreign sources of energy.

A properly constructed energy technology roadmap for commercial buildings can identify actions the private sector and government can take to improve energy efficiency and reduce greenhouse gas emissions. UTC supports legislation that requires the federal government to plan and implement a multiyear national action strategy to reduce commercial building energy use and achieve zero-net-energy commercial buildings. Federal policy should take a whole-building life cycle approach in the design of new and the renovation or retrofitting of existing buildings. The federal government should leverage a wide variety of government policies, partnerships, incentives and support for a broad portfolio of energy technologies to accelerate the transition to net-zero energy buildings. These technologies include, but are not limited to, energy-efficient heating, ventilating and air conditioning systems; advanced combined heat and power systems for distributed generation; stationary fuel cells; building automation, security and communications; and renewable energy sources.

UTC supports the goals of several "green buildings" bills introduced in the 110th Congress. *The Public Buildings Cost Reduction Act of 2007* (S. 992) accelerates efforts to improve the energy efficiency of federal buildings managed by the General Services Administration. In addition, it authorizes the Environmental Protection Agency to establish a grant program to help counties and municipalities increase energy efficiency in their buildings with new techniques and green infrastructure. The bill also establishes within the GSA a centralized program to coordinate cost reduction recommendations, practices, and activities to improve energy efficiency within federal buildings. *The Energy Efficiency Promotion Act of 2007* (S. 1115) requires new and renovated federal buildings to reduce fossil fuel energy consumption by 50 percent compared to existing federal buildings of the same type. Fossil fuel consumption in new and renovated buildings shall be reduced by at least 10 percent every 5 years and by 2030 new and renovated federal buildings are to be "carbon neutral". Other bills create a National Office of Green Buildings, which would act as an advisory organization, coordinating the federal government's green building projects, making standards and best practices publicly available, and making legislative recommendations. Still others create grant programs to help schools become green. High-performance and sustainable buildings legislation provides the opportunity for aggressive action to dramatically improve building energy efficiency.

Let me give you a real world example of how UTC is contributing to increased building energy efficiency. Our Otis Elevator division has shown remarkable innovation. Along with advances that improve the ride for passengers, Otis introduced regenerative drive technology that returns energy to the building's internal electrical grid during elevator system operation. This option makes a Gen2 Elevator system easily the most energy-efficient elevator ever developed – as much as 75% more efficient than conventional elevator drive systems.

SUMMARY

Energy conservation presents the greatest near-term opportunity to reduce both consumption and emissions and should be a high priority for our nation. Currently available technologies can save considerable energy use in a cost-effective manner. New technologies are emerging that can lead to further cost-effective savings. UTC is investing heavily and working in partnership with various government agencies to bring climate friendly technologies to the marketplace that address aviation, surface transportation and building sector emissions.

The federal government should increase its focus on and investment in existing and emerging alternative energy and energy efficiency technologies that have a high potential to be affordable and cost-effective and to gain market acceptance.

In particular, climate change technology research, development, demonstration and deployment programs should focus on:

- Improving energy efficiency and reducing greenhouse gas emissions in transportation, residential and commercial buildings and industrial processes.
- Applying advanced technologies, such as combined heat and power and distributed generation, to the electricity transmission and distribution infrastructure as well as to light, medium and heavy duty transportation applications.

The federal government plays a central role in creating the incentives and adopting the requirements necessary to encourage customers to invest in efficient, clean technologies that will increase our nation's energy independence and security through sustainable means. Government is also an important customer because its vast purchasing power can help increase volume and reduce costs to levels more competitive with traditional energy sources. Government purchase and deployment of climate change technologies also lends invaluable credibility that, in turn, stimulates private investment.

It is essential to make wise investments in order to expedite innovative and cost-effective approaches to reducing energy demand and greenhouse gas emissions. Such investments are also critical to ensuring and maintaining America's competitive position in energy technology deployment.

UTC looks forward to working with members of this Committee and other stakeholders to ensure the commercialization of advanced energy technologies that provide environmental, climate change, energy security and economic benefits for our nation.

Thank you for the opportunity to testify.

TESTIMONY OF

WILLIAM W. MILLAR, PRESIDENT

AMERICAN PUBLIC TRANSPORTATION ASSOCIATION

SUBMITTED TO THE

HOUSE COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE

ON

PUBLIC TRANSPORTATION, ENERGY INDEPENDENCE & CLIMATE CHANGE

****

May 16, 2007

SUBMITTED BY

American Public Transportation Association
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APTA is a nonprofit international association of more than 1,500 public and private member organizations including transit systems and commuter rail operators; planning, design, construction and finance firms; product and service providers; academic institutions; transit associations and state departments of transportation. APTA members serve the public interest by providing safe, efficient and economical transit services and products. More than ninety percent of persons using public transportation in the United States and Canada are served by APTA members.

INTRODUCTION

Chairman Oberstar, Ranking Member Mica and members of the committee, on behalf of the American Public Transportation Association (APTA), I thank you for holding today's hearing on the role of transportation and transportation infrastructure in addressing climate change and energy independence. As you may know, the transportation sector is the largest consumer of petroleum in the United States – accounting for 67 percent of America's petroleum consumption and 28 percent of our greenhouse gas (GHG) emissions. If we are serious about reducing America's "addiction to oil" and reducing GHG emissions, then we must also reduce transportation-related petroleum consumption. This will require a multi-pronged approach that must include expanded public transportation use.

As the Congress examines our nation's patterns of energy use, how we could use limited oil resources more efficiently, and how we can reduce GHG emissions, we must recognize the important energy savings that are derived from transit use. Public transportation already reduces gasoline consumption directly by 1.4 billion gallons each year. Giving credit for the contributions that the use of public transportation services makes toward improving the energy efficiency of travel must be a key element of any federal policy. Current law recognizes the consequences that transportation plans and investments have on air quality. Indeed, such integration of air quality goals with transportation planning was one of the hallmark achievements of the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA). The time has come to recognize similarly the implications of transportation planning and investments on long-term energy use and greenhouse gas emissions.

To realize additional energy savings and the concomitant environmental benefits, we must invest in both public transportation facilities and service expansion. APTA believes that any tax or cap and trade program the Congress authorizes to address energy conservation and climate change should be designed to increase America's travel choices while encouraging energy efficiency by directing a portion of revenues generated to strategic public transportation investments. There are also a number of immediate changes to current federal law that can promote public transportation, and I will detail the proposals later in my testimony. Increasing access to public transportation is clearly needed to create a prosperous, sustainable and strong America. Forty years from now when America's population exceeds 400 million, we will be glad we had the foresight to discuss, plan and invest in the future of public transportation today when it is relatively inexpensive to do so.

PUBLIC TRANSPORTATION REDUCES PETROLEUM CONSUMPTION AND DIMINISHES GHG EMISSIONS

Earlier this year, a report by ICF International, "Public Transportation and Petroleum Savings in the U.S.: Reducing Dependence on Oil," calculated that public transportation today reduces petroleum consumption by a total of 1.4 billion gallons of gasoline each year. This means:

- 108 million fewer cars filling up – almost 300,000 every day
- 34 fewer supertankers leaving the Middle East – one every 11 days
- over 140,000 fewer tanker truck deliveries to service stations per year

- total savings as great as the entire amount of gasoline consumed in states the size of Utah or New Mexico
- five times greater savings than converting the entire 478,000 federal light duty vehicle fleet to alternative fuels.

These savings are the product of several efficiencies that result from public transportation service: transit carries multiple passengers in each vehicle, traffic congestion is reduced because transit riders do not make additional trips on our roadways, and transit systems do not rely exclusively on petroleum to power their fleets. To calculate the total petroleum savings from transit, ICF examined all of these efficiencies. ICF first looked at how much petroleum would have been used to provide the same amount of passenger travel using automobiles. This is the largest source of petroleum savings: direct savings through the substitution of public transportation trips for automobile trips. This is also an area where future energy savings could be significant. Increasing transit ridership on existing transit systems is almost all savings since there is little additional cost to provide the service and each new rider does not use the fuel they would have otherwise required to operate their automobile.

The second major source of petroleum savings comes from avoiding excess fuel use in congested traffic by replacing automobiles on the roadway with public transportation trips. According to the 2005 Texas Transportation Institute Annual Urban Mobility Report, transit is successfully reducing traffic delays and costs in the 85 major urban areas studied. Without transit, delays in these metropolitan areas would have increased 27 percent, and residents would have lost an additional $18.2 billion in time and fuel as a result of increased congestion. ICF used this research to calculate transit's congestion-related petroleum savings.

The final type of petroleum savings calculated by ICF is the savings from the varied sources of fuel that transit systems use. Transit vehicles that use electric power, including most rail service and some buses, use less petroleum than similar trips would require using private automobiles. All of the savings identified by ICF are based on a conservative analysis, and the savings calculated are the net reduction of the petroleum used to provide transit service.

INCREASED TRANSIT USE CAN INCREASE PETROLEUM SAVINGS

All of the petroleum savings from public transportation would be multiplied further with increased use of transit relative to the automobile. Cities that have greater access to quality transit use much less energy per capita than auto dependent cities. According to research by urban transportation experts Peter Newman and Jeff Kenworthy, U.S. cities use two and a half times more transportation energy than comparable cities in Europe, and five times more transportation energy than comparable cities in Asia.

Mr. Chairman, Americans clearly want increased transit service and are willing to use public funds to pay for it. In 2006, Americans took 10.1 billion trips on public transportation. This is the highest ridership in 49 years. Transit ridership growth of 30 percent since 1995 is outpacing both the growth of our population – 12 percent – and the growth in the use of the nation's highways – 24 percent – since then. Each weekday, 34 million trips are made on public transportation in our nation. Americans want travel choice, too, and are willing to pay for it. A 2006 Harris Interactive poll showed that 44 percent wanted more commuter trains, 23 percent

wanted more travel by bus, and only 11 percent wanted more travel by car. From 2000 - 2005, voters in 33 states approved ballot measures that authorized more than $70 billion for transit projects. Transportation measures have an amazing 70 percent approval rate with voters -- even when it meant local taxes would be raised or continued. This is more than twice the approval rate voters gave other types of ballot initiatives.

A clear obstacle to increasing public transportation ridership is the lack of access to transit services. Americans can't use what they don't have. Only one in four households has access to adequate public transportation, and about one half have only limited transit service. The federal government needs to partner with state and local governments to expand the availability of transit services across the country. Without new investment in public transportation, the key hubs of the United States' surface transportation system could become so congested that our highway systems will no longer work effectively for large portions of the day and the amount of transportation-related GHG emissions would only continue to increase.

PRINCIPLES FOR FEDERAL EFFORTS TO REDUCE ENERGY CONSUMPTION AND GREENHOUSE GAS EMISSIONS

There are a number of approaches that Congress can employ to systematically reduce energy consumption and reduce greenhouse gas emissions in the U.S. The deployment of new technology, the improvement of fuel efficiency and the promotion of alternative and renewable fuel resources should all be examined, but we must also utilize solutions like increased transit that create mode choice in our transportation system, allowing for growth in non-automotive travel. It also appears likely that some form of carbon/GHG "cap and trade" or other credit program may be needed. Until the details of proposed programs are released, it is difficult to offer specific recommendations, but APTA would like to offer general principles for Congress to consider as it develops new federal programs to encourage energy savings and reduce GHG emissions.

Principle #1 - Transit use significantly reduces energy consumption and GHG emissions.

Based on current gasoline savings produced by transit and the potential for even greater savings if transit ridership is increased, significant additional benefits from public transportation can be achieved if transit is recognized as part of any new federal programs. APTA is now doing additional research to quantify the energy and GHG savings captured by communities that utilize transit, and we will share these findings with the committee when they are available this summer.

Principle #2 - Energy savings and GHG emission reductions from increased transit use are long-term savings.

When communities invest in public transportation and improve and expand transit service, particularly fixed-guideway transit, they create what is essentially permanent energy and GHG savings. Residents in the Boston and New York City metropolitan areas still benefit from investment decisions made over a century ago when their initial segments of subway were built.

Principle #3 - Public entities, like transit agencies, that directly produce energy savings and reduce GHG emissions should be eligible to receive revenues generated from any carbon tax scheme or "cap and trade" program.

Depending on the type of program adopted by Congress, there are a number of ways to compensate public transportation providers for the energy savings and GHG emission reductions they produce, but transit agencies should be eligible to receive revenues both from any program that attempts to limit stationary source emissions and any program that addresses transportation-related emissions. For example, regulated private entities that cannot meet GHG reduction mandates could, as an offset, invest private funding in transit. Similarly, credits in a "cap and trade" program could be given for reduced vehicle miles traveled (vmt) that is attributable to efficient community design (i.e. vmt that never happens or "the trip not taken").

Principle #4 - Energy conservation and greenhouse gas emission reduction should be factors in transportation and land-use planning.

The federal government should encourage state and local governments to coordinate transportation and land-use planning. When communities link land-use decisions with transportation decisions, thus making transit a more effective option, communities not only increase transportation choices, they also significantly reduce their amount of transportation-related energy consumption. The adoption of efficient community design polices (transit-oriented development, increased transit service, pedestrian and bicycle improvements) creates long-term energy savings and GHG emission reductions. Current law recognizes the consequences that transportation plans and investments have on air quality. The time has come to recognize similarly the implications of transportation planning and investments on long-term energy use and greenhouse gas emissions.

Principle #5 – New investments in the energy efficiency of transit vehicles increase the already substantial energy and GHG emission savings from transit.

As transit agencies continue to deploy hybrid and alternative fuel technologies in their bus fleets, the energy savings and GHG reductions from transit service will continue to increase. To capture these savings though, the extra cost of new technologies must be paid for by new funding sources. When transit agencies must use their existing capital funds to purchase hybrid and alternative fuel buses, the extra up-front costs can result in agencies purchasing fewer buses, which is counterproductive to the need to expand transit service. Also of interest, improvements in transit vehicle energy efficiency do not suffer from the "rebound effect," the phenomenon in which an increase in the fuel efficiency of passenger vehicles reduces fuels costs for driver, thus encouraging a counterproductive increase in driving.

APTA RECOMMENDATIONS – IMMEDIATE LEGISLATIVE CHANGES

APTA realizes that systematic change will take time, but there are immediate legislative steps that Congress can take to promote public transportation use. I would like to offer the following proposals to this committee:

APTA Recommendations – Immediate Legislative Changes:

- Amend tax law to make commuter benefits for public transportation equal to those provided for parking. Federal law should provide at least the same tax incentives for transit as that provided for parking.
- A similar step would be to provide a tax credit to employers who pay for transit commute costs, thus encouraging even more commuters to switch to public transportation.
- Make transit agencies eligible for federal incentives to invest in "green technology" at facilities if such incentives are provided to federal, state and local agencies. These incentives would not only reduce greenhouse gas emissions, but would likely reduce the cost of such technology as competition for products increases and research and development costs are spread over an expanding market.
- Require federal facilities to be located in places where public transportation is readily accessible. To do otherwise is to perpetuate an energy-intensive system that does not offer transportation choices or alternatives.
- Increase federal support for transit agencies to purchase buses that utilize new technology to conserve fuel and reduce emissions. The administration's Fiscal Year (FY) 2008 budget proposal would waive the local share on the incremental cost of purchasing hybrid buses. While APTA appreciates this gesture, the waiver would actually reduce the total number of buses purchased since existing federal transit funds would be substituted for the non-federal share. A better incentive would be to offer new federal grants that are in addition to existing grant programs to pay for the cost of implementing hybrid and alternative fuel technology. No local share on these new grants should be required.
- Extend the tax credits created by the Energy Policy Act of 2005 (P.L. 109-58) for the purchase of alternative fuel vehicles, fuel cell vehicles and hybrids and extend the credits for the construction of alternative fuel vehicle refueling facilities. These incentives are set to expire on various dates beginning in 2009, and they need to be renewed.
- Extend the volumetric excise tax credits created by the Safe, Accountable, Flexible Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU, P.L. 109-59) for alternative fuels and alternative fuel mixtures. These credits allow more transit agencies to utilize alternative fuel vehicles, but the credits are set to expire in 2009.

CONCLUSION

APTA hopes that Congress will choose to encourage greater public transportation use as an important policy option to address energy independence and reduce emissions on par with other strategies such as increasing automotive fuel efficiency, developing new energy technologies, and maximizing renewable U.S. energy resources. Mr. Chairman, on behalf of APTA's more than 1500 member organizations, I thank you for this opportunity to express our views.

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Testimony of Christopher O'Brien,
VP Strategy & Government Relations,
Sharp Electronics Corporation, Solar Energy Solutions Group
Chairman, Solar Energy Industries Association

Before the United States House of Representatives
Committee on Transportation and Infrastructure,
May 16, 2007

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May 16, 2007

Thank you, Mr. Chairman and Members of the Committee, for providing me the opportunity to testify today.

My name is Christopher O'Brien. I am Vice President for Strategy and Government Relations for Sharp Electronics Corporation's Solar Energy Solutions Group, and I also serve as the Chairman of the Board of the Solar Energy Industries Association (SEIA). It is in my role as Chairman of SEIA that I appear before you today.

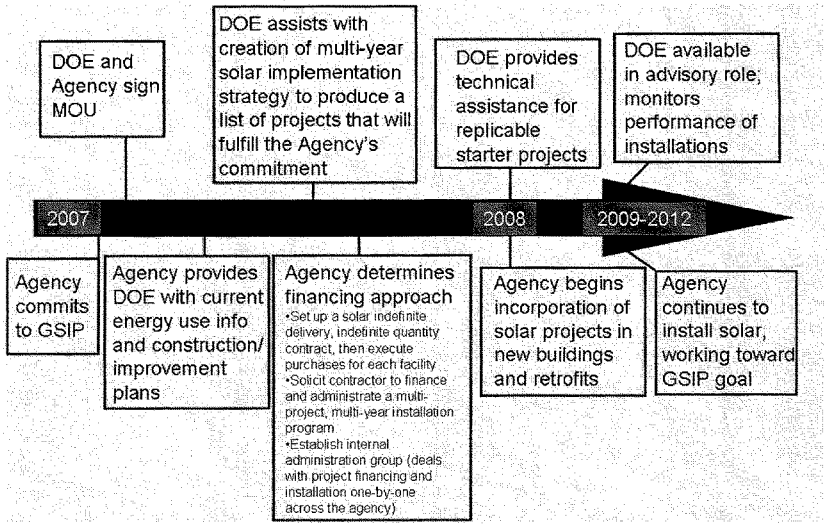
Before turning to SEIA's recommendations on policies that will encourage increased usage of solar energy at Federal facilities, let me first emphasize that the single most important action that the Federal government can take to encourage increased use of solar energy across the country would be to enact the provisions of S590 / HR 550, the Securing America's Energy Independence Act, which includes an eight-year extension of the solar investment tax credit (ITC) for homeowners and businesses who install solar energy systems. The long-term Federal commitment of the ITC extension is crucial to establish parity between congressional support for other electricity generation technologies and solar energy. Parity constitutes equal treatment – not special treatment. An eight-year extension of the ITC will create significant benefits that are not possible through more frequent, shorter term extensions of favorable tax treatment. Solar energy improves our energy independence, energy security and environment, and it deserves long-term, stable congressional support now. Further information on this important legislation is included in Appendix 2 of my written testimony.

Let me now turn to the matter at hand before this Committee, and outline SEIA's recommendations for specific policies to encourage increased deployment of solar energy systems at Federal facilities.

SEIA recommends the creation of a new strategic initiative, the Solar Technology Utilization and Deployment Program (Solar Program). The Solar Program would create a program for Federal, State and local governments that facilitates the installation of solar energy systems, including solar thermal, and expedites the purchase of solar-generated electricity via third party financing. The target would be to achieve 3GW of mandated installed solar capacity at Federal facilities by 2012, and would be complemented by voluntary commitments from state and local governments.

Federal commitments would be established in 2007 and 2008. Agency requirements to deploy solar would be calibrated to their energy consumption: The more an agency spends annually on energy, the more solar it would deploy. It is crucial to recognize that the capital expenditures for these projects would be borne by private financial markets using creative third party financing tools made possible by a long-term extension of the existing solar ITC (HR 550).

An example of a Solar Program project implementation timeline is shown below:



There is a strong policy rationale for the Federal Government to take the lead in launching the Solar Program. The Federal government is the largest single user of energy (1.4% of U.S. energy use); the Solar Program would provide an opportunity to lead by example. The Solar Program would also have a significant impact in stimulating market and jobs growth. Solar companies will grow rapidly to supply a sustained government demand. The Federal Government has the stability to act as a market foundation while adopting a technology shift to solar, and to enter into long term 30 year contracts, which will greatly accelerate the financeability of solar energy projects. Finally, the Solar Program as outlined above would displace roughly 3 million metric tons (MT) per year of CO2 emissions as a result of achieving the target of 3GW of installations.

In order to launch and implement the Solar Program, the following legislative changes and actions would be required:

1. Federal statute (40 U.S.C. 501) currently restricts GSA from entering into utility contracts with a duration greater than 10 years. The Solar Program would require legislation to amend 40 U.S.C. 501 to provide GSA an exemption from this 10-

year restriction for any utility service contract that supplies energy from new renewable resources. This is necessary because most private-sector PV installations will pay out over 10-30 years, so the utility service contract must cover that duration.

2. Authorize Federal agencies to offer a ground lease of underutilized real property (rooftops, underutilized land areas) to solar energy service companies (ESCOs) for on-site power production.

3. Enact legislative language setting required metrics for use of solar power in Federal facilities (e.g. at 2GW for Federal Agencies). Top-down guidance to the responsible agency head to the facilities staff responsible for energy procurement and utility decisions would facilitate broader solar energy use across Federal facilities – this could be administered via GSA or OMB.

4. Pending enactment of the above, Congress should demonstrate its leadership and commitment to solar use and deployment by immediately requiring the Architect of the Capitol to issue a request for proposals to deploy 5 MW of solar on Congressionally controlled property and structures. This immediate-term solar deployment would demonstrate that Congressional Leadership is sincere in its quest to usher in a carbon-smart future and set a powerful example.

Conclusion

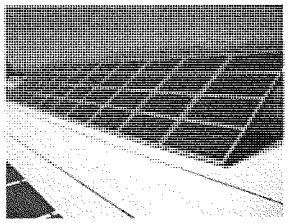
The Federal Government must play a critical role in increasing the usage and installation of solar energy systems across the U.S. In addition to the broad solar market growth that will result from the enactment of HR550 / S590, an 8-year extension of the investment tax credit for solar energy systems, SEIA recommends that the Federal Government enact a new initiative to accelerate the installation of solar energy systems on Federal facilities. The Solar Program would provide a significant stimulus to the national market for solar energy systems, and would provide a high-profile opportunity for the Federal government to lead by example in adopting solar energy as a significant portion of the overall energy mix.

Thank you for the opportunity to comment today. I look forward to addressing any questions that you have.

APPENDIX 1 – OVERVIEW OF SOLAR ENERGY TECHNOLOGIES

Photovoltaics (PV)

Technology

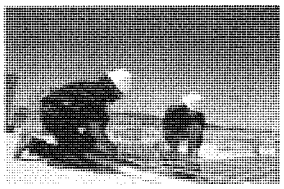


Photovoltaic (PV) devices generate electricity directly from sunlight via an electric process that occurs naturally in certain types of material. Groups of PV cells are configured into modules and arrays, which can be used to power any number of electrical loads.

Crystalline silicon - the same material commonly used by the semiconductor industry - is the material used in 94% of all PV modules today. PV modules generate direct current (DC) electricity. For residential use, the current is then fed through an inverter to produce alternating current (AC) electricity that can power the home's appliances.

The majority of PV systems today are installed on homes and businesses that remain connected to the electric grid. Consumers use their grid-connected PV system to supply some of the power they need and use utility-generated power when their power usage exceeds the PV system output (e.g., at night). In 41 US states, when the owner of a grid-connected PV system uses less power than their PV system creates, they can sell the electricity back to their local utility, watch their meter spin backwards, and receive a credit on their electric bill - a process called **net metering.** The electric grid thus serves as a "storage device" for PV-generated power.

Markets



The global PV market has averaged 38% annual growth over the last five years. Yet PV still accounts for a small percentage of electricity generation worldwide and less than 1/30th of 1% in the US. Furthermore, the US lags behind Germany and Japan in installations as well as in manufacturing. Germany and Japan have surged to the lead with coherent, long-term national incentive policies, despite dramatically inferior amounts of sunshine.

The US possesses the best solar resources in the world, and yet Germany installs **seven-times as much PV as the US**. Germany and Japan have taken the lead in solar manufacturing and installations because of long-term national incentive policies designed to make solar power mainstream. Japan instituted a carefully designed rebate program that lasted over ten years, while Germany incentivizes solar installations by paying 3–4 times retail electric rates for the electricity generated from PV systems for 20 years. The

surging player in the industry, China, has gone from having no PV industry to manufacturing twice the level of the US in just three years.

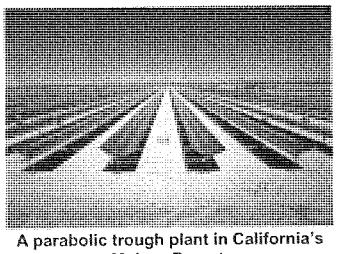
While California is the dominant US market for PV, with 73% of the grid-tied installations in 2006, other states now offer modest PV incentives for consumers, including Massachusetts, Connecticut, Illinois, New York, Oregon, Wisconsin and Washington State. California, Texas and Pennsylvania have long-term policy commitments to develop solar in-state. Major PV manufacturing expansions have occurred in some of the states hardest hit by the outsourcing of US jobs, including California, Washington State, Oregon, Michigan, and Massachusetts.

Concentrating Solar Power

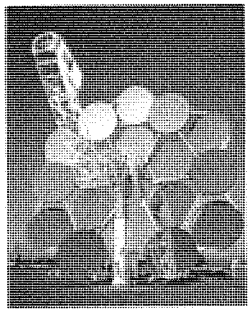
Technology

Concentrating solar power (CSP) plants are utility-scale generators that produce electricity by using mirrors or lenses to efficiently concentrate the sun's energy. Two principal CSP technologies are parabolic troughs and dish-Stirling engine systems.

Using curved mirrors, **parabolic trough** systems concentrate sunlight to drive conventional steam turbines. The mirrors focus the sun's energy onto a receiver pipe or heat collection element. From there, a high temperature heat transfer fluid picks up the thermal energy and uses the heat to make steam. The steam drives a conventional steam-Rankine power cycle to generate electricity. A typical collector field contains many parallel rows of troughs connected in series.



A parabolic trough plant in California's Mojave Desert.



A Stirling dish-engine system at Sandia National Labs.

A solar **dish-engine** system is shaped much like large satellite dishes and covered with curved mirrors. The dish is programmed to always face the sun and focus that energy on a receiver at the dish's focal point, in much the same way that a satellite dish focuses radio waves on a tuner. The receiver is connected to a Stirling engine, which uses the thermal power generated by the focused solar energy to heat liquid hydrogen in a closed-loop system. The expanding hydrogen gas creates a pressure wave on the pistons of the Stirling engine, which spins an electric motor, creating electricity. Individual dish-Stirling units range in size from 10 to 25 kW. With their high efficiency and modular construction, dish-engine systems are expected to be cost-competitive in distributed markets.

Markets

During the 1980s and early '90s, developers built nine concentrating solar power plants in California's Mojave Desert. Then, for nearly two decades, no new plants were built – due to the erosion of federal support for renewables and plummeting energy prices. Yet in the current climate of rising natural gas prices, water scarcity, air pollution and carbon management concerns, concentrating solar power has the potential to play a major role in meeting the Southwest's future energy needs.

The Western Governors' Association recently commissioned a Solar Task Force to report on the potential for clean solar development in the Southwest. The Solar Task Force

Report, adopted in July 2006, identified areas with a potential for CSP generation capacity of approximately 200 gigawatts (GW). This capacity could produce about 473,000 gigawatt hours (GWh) per year.

Solar Thermal Systems

Technology

Solar thermal systems provide environmentally friendly heat for household water and space heating. The systems collect the sun's energy to heat either air or a fluid. The air or fluid then transfers solar heat to your home or water. In many climates, a solar heating system can provide a very high percentage (50 to 75%) of domestic hot water energy. In many northern European countries, combined hot water and space heating systems are used to provide 15 to 25% of home heating energy.

Active solar water heating systems can be either "open loop," in which the water to be heated flows directly through the rooftop collector, or "closed loop," in which the collector is filled with an antifreeze solution that passes through a heat exchanger mounted in or around your normal water heater. During the day, in good weather, your water can be heated entirely by the sun. In any weather, the heating system can back up your existing heater, reducing overall energy costs.

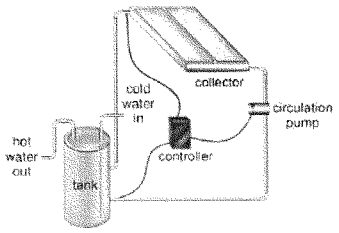
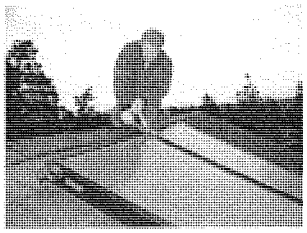


Diagram of an active solar thermal system.

Markets



An installer mounts a solar water heater flush to the roof.

In the absence of coherent national policies, from 1997 until 2005, the US solar water heating and solar space heating market showed little growth, averaging about 6,000 installations per year. In the past year, numerous states, including New York, Florida, Hawaii, and Illinois, have created or expanded incentives to complement the new federal tax credits. Accordingly, the market is projected to increase 25 to 50 percent in 2007.

On the manufacturing side, the past year has seen an influx of new entrants into the US market, and the introduction of new systems that use polymer-based collectors (as opposed to sheet metal). However, domestic manufacturers have stated that with a two-year window for the federal credit, they are unlikely to ramp up production substantially until a long-term market policy has been established.

APPENDIX 2 –

OVERVIEW OF SEIA'S RECOMMENDATIONS ON S590/HR550 –
Excerpt from testimony of Rhone Resch, President of SEIA,
before House Ways and Means Committee,
May 2007

Recent Solar Tax Treatment History and Current Legislation

The Energy Policy Act of 2005 (EPAct 05) created a new commercial and residential ITC for fuel cells and solar energy systems placed in service from January 1, 2006 through December 31, 2007. The credit was further extended for one additional year in the Tax Relief and Health Care Act of 2006. The solar ITC now expires on December 31, 2008.

The new solar ITC is working and has helped more Americans use solar energy in their homes and businesses. However, the credit's limited size and duration has restricted manufacturing investment, failed to significantly increase the number of trained installers, which are critical to drive down future costs, and has not resulted in the construction of new utility-scale solar power plants. In response, Congressmen Michael McNulty (D-NY) and David Camp (R-MI) have introduced the *Securing America's Energy Independence Act* (HR 550) to improve and build upon the existing tax incentive.

The *Securing America's Energy Independence Act* provides a blueprint of the policy changes needed to secure a long-term robust solar marketplace in America. Specifically, the legislation:

- Extends the ITC for all residential and commercial solar and fuel cell equipment for eight additional years;
- Modifies the residential and commercial tax credit for photovoltaic cell technology (direct conversion of sunlight into electricity) to $1,500 per half kilowatt;
- Removes the 30% cap for commercial photovoltaic installations and the $2,000 cap on residential photovoltaic installations;
- Provides alternative minimum tax (AMT) relief; and,
- Provides three year accelerated depreciation for commercial projects.

The short and long-term benefits of enacting these changes would be significant. The benefits include:

- **Increased energy security:** Solar technologies help stabilize the nation's electricity grid, provide clean, reliable power, and reduce the impact of natural disasters and terrorist acts. Producing these home-grown technologies in the US will reduce our dependence on foreign sources of energy, while simultaneously lowering the cost of energy to consumers.
- **Reduction in the use of high cost natural gas:** In most parts of the US, peak electricity demand occurs when solar electricity is near optimal efficiency (9 AM – 6

PM). This demand load is almost exclusively served by central station gas generation that can be easily cycled on and off and is often highly inefficient. An eight-year extension of the ITC will displace over 5.5 trillion cubic feet (Tcf) of natural gas and save consumers over $50 billion.

- **Job creation:** Solar systems require high-tech manufacturing facilities and produce well paying, high-quality jobs. Extending the tax credit will create an estimated 55,000 new jobs in the solar industry and over $45 billion in economic investment.
- **Clean energy:** Solar energy is the cleanest of all renewable energy sources, producing electric and thermal energy with zero emissions, no waste products or other forms of pollution.[1]

The Crucial Nature of the Eight-year Extension

It is critical that the extension of the ITC be for at least eight years, as provided for in HR 550. An eight-year extension will provide the long-term market "demand-signal" that is needed for industry to build new manufacturing capacity, expand the installer work force, and construct new utility-scale solar power plants.

Similar to other emerging energy technologies such as clean coal and new generation nuclear, utility-scale concentrating solar power (CSP) plants and new solar cell manufacturing plants require long lead times that far exceed the two-year time period remaining under EPAct 05 and the Tax Relief and Health Care Act of 2006. Development of a CSP plant can take six years, while new photovoltaic cell manufacturing facilities often require four years to be completed.

Additionally, solar energy is unique from other renewable technologies because it is installed on rooftops and requires an entire workforce of skilled electrical workers, plumbers, roofers, and others to be trained and certified to install solar systems. The creation of an entirely new specialized workforce requires substantial time and expenditure by the industry that will not occur without a long-term extension and improvement of the tax credit.

Long-term regulatory and tax treatment certainty is equally important to project financing. Solar energy power plant projects are more complex than conventional power plants because of the unfamiliarity of the lending industry with the technology. On average, financing can take an additional 12 months for project development. Political and therefore market certainty – in the form of an eight-year ITC – is needed to help reduce the cost of capital for these projects.

Despite the unique needs of the solar energy industry for long-term certainty, concerns have been raised that federal budget constraints may prevent long-term extension of the solar ITC. Similarly, some have argued that all renewable technologies, without regard to past treatment or current differences, should receive the same length of tax credit extension.

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[1] For a comprehensive description of the three commercial solar technologies see appendix

According to this argument, some maintain that it would be unfair to provide solar technologies with a longer duration credit extension than that accorded to other electricity generation technologies. This concern misses the mark. An eight-year credit extension for solar would approximate equal treatment and does not equate to special treatment. This is so for several reasons.

First, in EPAct 05 clean coal technologies were granted favorable tax treatment for ten years and new generation nuclear technologies were provided eight years. Wind energy technologies were also initially granted an eight-year duration (1992-2000) when the Internal Revenue Code §45 production tax credit (PTC) was created. These long-term extensions were an explicit recognition of the fact that emerging technologies need financial, regulatory and market certainty that is only afforded by long-term, consistent federal tax credit policy. Solar energy should be afforded equal treatment.

Secondly, energy technologies with more mature markets are governed by the production tax credit (PTC) provisions in Code §45 (e.g. wind, geothermal, hydropower), while renewable technologies with less developed markets (e.g. solar and fuel cells) are governed by the ITC provisions in Code §48 (commercial) and §25 (residential). Due to these differences in market maturity, it is even more critical to provide long-term incentives to the ITC technologies. Long-term support will encourage market expansion to the level enjoyed by the PTC technologies.

It is also important to recognize that the PTC and the ITC mechanisms function in fundamentally different ways and should not be viewed identically. As a practical matter, a one-year extension of the PTC is tantamount to a ten-year extension of the ITC. For instance, if the §45 PTC is renewed for one year, the duration of the favorable tax treatment is actually 10 years. This is because the "one year extension" for the §45 PTC actually refers to the duration of the "placed-in-service" rule governing the credit, not the actual temporal duration of the credit's availability. Accordingly, under a one year §45 PTC extension, a claimant has one year to place qualifying §45 property (e.g. geothermal, hydro, wind, etc.) "in-service" to trigger an annual, recurring tax credit that lasts for ten years.

In contrast, the §48 ITC (or alternatively the §25 ITC) is a one-time credit for a portion of the cost of installing a qualifying solar system. The "claiming" of the §48 ITC credit ***does not*** trigger annual tax credit eligibility in each of the succeeding ten years. This distinction in the practical operation of the two different credits is fundamental. Furthermore, financial markets place a special premium on long-duration favorable tax treatment.

To the extent that the metric of Congressional fairness to varying technologies is tax extensions of equal duration, then the differences in the mechanics of the §45 PTC and the §48 ITC cannot be overlooked. To do so would fundamentally disadvantage solar energy technologies vis-à-vis competing electricity generation technologies. There is no sound public policy rationale for this lesser and disparate treatment.

The conclusion then, is clear. The ITC for solar energy and fuel cell assets should be extended for eight-years without regard to the length of extensions that are accorded other renewable energy assets. This is especially so given the history of favorable tax treatment that has already been afforded to coal, nuclear, ethanol, wind and other technologies.

An Eight-Year Extension of the Solar ITC Creates Unique Benefits

The value of an eight-year extension of the solar ITC cannot be equated with more frequent credit renewals of lesser duration. Four successive extensions of two-year durations each will not allow the US to construct new utility-scale CSP plants, reinvigorate our solar manufacturing base and pave the way for significant expansion and work-force training in the solar system design and installation industry. Only through a single, eight-year extension can the US solar energy industry realize its full potential. Nothing better illustrates this point than the graph below in Figure 1.

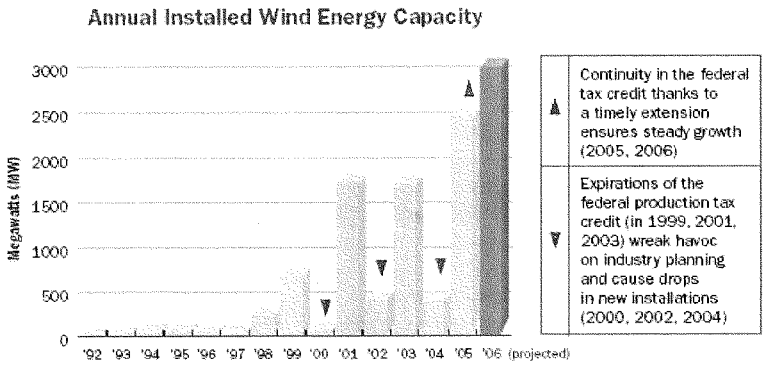

Figure 1: Source: AWEA, Wind Power Outlook 2006

As the chart in Figure 1 demonstrates, short duration, frequent renewals of credit extensions create a "boom-and-bust" cycle that will not favor the longer term development of a robust, national solar energy industry that maximizes the potential of our world-class solar resources.

Accordingly, it is essential that the extension of the ITC be for at least eight years. Such an extension will provide the long-term market demand signal that solar energy needs to transition from a nascent market to a mature one. Congress must eliminate the stop-start incentive cycle and create market conditions that allow solar companies to make new long-term investments that will reduce costs. To date, Congress has provided two short-term extensions (two and one year, respectively) that have not provided sufficient policy certainty for businesses to make long-term decisions.

An eight-year extension is especially critical for the development of large, utility scale (e.g. 500 megawatts) solar power plants. CSP plants (also referred to as solar thermal electric power plants) are large projects that often take six years to complete from the initial planning stages. In this regard, CSP plants face many of the same challenges that other, state-of-the-art power plant designs such as new-generation nuclear plants and "clean coal" power plants confront. In fact, Congress in EPAct 05 recognized the unique challenges facing "clean coal" and new nuclear power plants when it provided ten-year and eight-year duration favorable tax credit authorizations for these technologies, respectively. Congress should accord CSP plants similar treatment.

An eight-year extension is also crucial to reinvigorating the US solar manufacturing base. Because of the capital intensive nature of solar energy hardware production, new US manufacturing facilities will not be constructed unless there is business and investor confidence that the US marketplace will experience a long, steady and robust demand cycle for solar energy products. This need for a strong "demand signal" to spur domestic manufacturing applies equally to the solar thermal (water heating), the CSP, and the photovoltaic segments of the US solar manufacturing base. This point also applies with equal vigor to the entire "solar value chain" that includes research, engineering, polysilicon manufacturing, plastics manufacturing, glass production, copper wire drawing, metal fabrication, instrument manufacturing and battery production, among others.

Finally, an eight-year "demand-signal" is also necessary if the US is going to grow the installer base necessary to sustain robust deployment of solar technology. In order to expand the domestic market for solar energy, a significant number of electricians, plumbers, roofers and designers need to be trained and certified. Yet solar design and installation firms are unable to hire new personnel and bear the expense of training unless it is clear that the US solar market is in a period of long-term sustained activity and growth. Passage of HR 550 will provide the long-term financial, regulatory and business certainty that business owners require to commit significant new capital for workforce training and expansion.

Improvement of the Existing ITC will Maximize Efficiency and Cost Reductions

Passage of the *Securing America's Energy Independence Act*, HR 550, will improve the current structure of the credit for photovoltaic (PV) (for more information see appendix) installations from 30% of the cost of the installed system to $1,500/half kilowatt, based on the nameplate capacity of the system. This modification would mimic the current structure for fuel cells. This change improves the credit by converting it from a cost-basis to a capacity-basis, thereby rewarding greater capacity, not greater costs.

There are several reasons for the PV credit to be modified to a capacity-based incentive. First, capacity-based incentives encourage cost efficiency and expedite the reduction of the cost of solar energy. In comparison, a cost-based incentive could discourage true cost reductions until a mature, highly competitive market is developed.

Second, a capacity-based incentive rewards new technology that can produce electricity at a lower cost. For example, in Washington DC, the "turn-key" cost for an installed PV system is approximately $6,000/half-kilowatt. If enacted, the improved credit structure in HR 550 would subsidize approximately 25% of the cost of the system. As the market matures and less expensive technologies are deployed, in the form of low cost panels or more cost effective installation technologies, it is anticipated that the installed cost would drop to approximately $4,000/half-kilowatt. The improved credit would then represent 35% of the cost of a system. Cost reductions in technology and installation will then encourage greater numbers of installations, further driving down system costs.

Finally, studies have shown that state programs that incentivize solar technology deployment using a capacity-based rebate program result in larger solar installations than state programs that use a straight cost-based structure. This is especially important when we consider how solar can reduce demand for natural gas fired peak power (the most expensive electricity) and bring lower energy costs to all consumers. Larger initial installations have unique benefits, such as grid stability, avoided consumption of high-priced natural gas, myriad environmental benefits, and job creation throughout the entire economy.

The Energy Security, Energy Independence and Environmental Benefits of Solar

Enactment of HR 550 will improve our energy security, move the US closer toward energy independence, and deliver numerous environmental benefits due to the inherent non-polluting nature of solar energy.

Energy Security

As Congress looks to increase the use of carbon-smart renewable energy, it is critical that priority be placed on technologies that also improve US energy security. Solar energy, in all of its forms, is a technology that can greatly improve the US's ability to have a secure and reliable energy supply.

The electricity infrastructure in the US is aging and energy consumers are increasingly subject to outages that affect critical infrastructure and disrupt business. The black out of August 2003 in the Northeast, triggered by a tree limb landing on power lines, cost consumers and businesses tens of billions of dollars. Unfortunately, this event is not unique and will occur with greater frequency if Congress does not take steps to diversify our energy portfolio.

The good news is that this event could easily have been avoided through greater use of solar energy. A 2004 Department of Energy (DOE) study entitled *Solution to the Summer Blackouts?* concludes that if solar energy had met just one percent (1%) of local peak demand, we would have avoided the August 2003 blackout and other local brownouts. DOE's explanation was simple: high air conditioning loads stressed the grid and caused the blackout. These loads occurred on the hottest and sunniest days during the summer – the exact time when output from solar systems are greatest. DOE also concluded that over reliance on central generating stations led to grid fatigue and failure.

This infrastructure vulnerability could have been minimized through greater reliance on distributed solar energy.

Photovoltaic (PV) and solar water heating systems are distributed generation (DG) technologies. Like other DG technologies, they provide energy at the point of consumption rather than at a central power plant hundreds of miles away. As such, DG does not rely on vulnerable regional transmission lines and local distribution networks. By producing energy at the source of consumption, solar power alleviates stress and vulnerability on the grid.

The DOE study also concluded that investing in solar energy is a more economically efficient and cost effective way to improve our energy infrastructure than capital intensive and often community-opposed transmission line upgrades. In sum, using solar energy is a cost-effective, affordable way to alleviate stress on the electricity grid and improve the overall reliability of our electricity infrastructure.

Solar is also the most reliable source of energy. This reliable track record has resulted in wide deployment of the technology in applications where power interruptions are unacceptable, including: oil and gas industry use of solar energy to power pumps and meters at remote locations; telecommunications industry use of solar to power relay stations and remote equipment; and, every satellite that has been sent out into space in the last 30 years has been powered by solar energy.

Ironically, energy industry acceptance of the technology stands in stark contrast to consumer behavior. Consumers are investing hundreds of millions of dollars in small gasoline-powered generators. During grid failure and electricity outages, electronic gasoline pumps at the gas stations do not operate, rendering many generators idle because of fuel shortage. Solar energy is a technology that can provide reliable power during power outages.

Finally, solar stabilizes volatile energy prices, a critical energy security issue affecting the US today. In the last five years, consumers have seen electricity prices escalate between 20 and 78 percent. At the same time, we have seen the price of natural gas triple and the price of gasoline routinely exceed $3.00 per gallon. Each year the cost of energy is taking a larger percentage of a family's income than at any other time in US history. This energy inflation vulnerability especially impacts the poor and elderly on fixed incomes.

Solar can help address this vulnerability because it requires no fuel to operate. Although a solar system is more expensive up front, there are no additional costs for operating a system once installed. Furthermore, solar panels are guaranteed for 20-25 years, allowing consumers to "lock in" their electricity prices for decades. Recognizing the upward trend in energy costs, incentivizing the use of a technology that requires no fuel inputs is an important element of any energy security plan.

Energy Independence

Solar energy is a domestic and abundant energy source in the US. The US has the best solar resources of any developed country in the world. Proportionally, US solar energy resources exceed those of fossil, nuclear or other renewable energy resources. Despite this tremendous advantage, the US has failed to capture and harness this free and readily available energy. In 2006, solar energy produced just 1/30th of one percent of all electricity in the US; Germany in contrast, with the solar resources of Alaska, installed seven times more solar energy property than the entire US.[2]

Congressional determination to increase energy independence hinges upon its commitment to developing our unlimited domestic solar resources. To accomplish this, Congress must pass an eight year ITC extension, such as that found in HR 550.

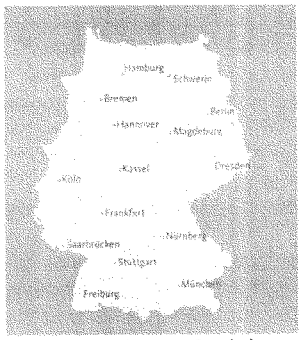

Figure 2: Germany Insolation

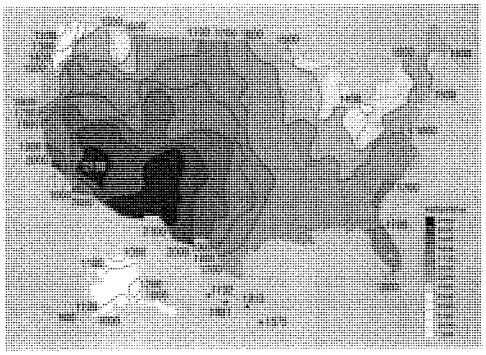

Figure 3: U.S. Insolation

The US is over-dependent on foreign sources of energy. Demand for natural gas continues to rise, primarily for the electricity generation. Increasingly we are turning to countries like Algeria to provide us with liquefied natural gas (LNG) to meet our growing demand. According to the Federal Energy Regulatory Commission, 41 new LNG terminals are proposed for construction in US harbors and off US beaches. Constructing these plants will exacerbate our addiction to foreign sources of energy. Our desire for energy independence demands a different course.

Solar energy directly displaces natural gas used for heating homes and water. In a home, solar can directly replace natural gas used to heat radiant systems and can displace up to 70% of the natural gas used to generate hot water. Many countries that do not have a domestic source of fossil fuels, including Spain and Israel, mandate that all new homes must have solar water heating systems installed. The US can demonstrate similar energy independence by using market incentives that spur solar investment and market growth.

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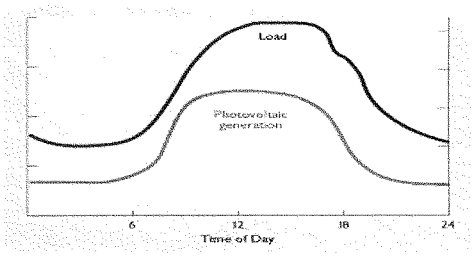
[2] Energy Information Administration, Net Generation by Energy Source by Type of Producer, October 2006.

Solar energy also displaces natural gas used to generate electricity. Almost all intermediate and peaking electricity plants use natural gas as the source of energy. These plants are often very inefficient and produce expensive electricity. Solar energy, which generates electricity from 8 AM – 7 PM daily, can displace these inefficient, high cost power plants, and become a reliable source of firm, dispatchable power.



Utility load and PV output versus time of day.

Given the high price of natural gas to key industrial sectors and consumers, the US can no longer afford to neglect its abundant solar resources. Analysis conducted by the Solar Energy Industries Association concludes that an eight-year extension and expansion of §48 and 25 tax credits for solar energy will displace over 5.5 trillion cubic feet (Tcf) of natural gas, providing an economic value to consumers in excess of $50 billion.[3] This is enough energy to displace the need for all new LNG terminals by 2012.

In addition to tempering natural gas demand growth, solar can also generate electricity to be used by plug-in hybrids and electric vehicles, thereby displacing gasoline derived from foreign oil supplies. Imagine a gasoline-free electric vehicle that also uses electricity derived from the sun rather than a coal-fired plant. The technology is advancing rapidly in this direction, but it is critical that Congress catalyze the market by providing incentives to use solar energy.

Environmental Benefits

Though the environmental benefits of solar energy might be considered a given, it is worth highlighting several points. Solar is the cleanest method of energy generation, in terms of avoided air, waste and noise pollution, energy payback, water conservation, radiation, harm to wildlife, or environmental risk in the event of an accident.

Solar energy produces no greenhouse gases, no acid precipitation or toxic emissions, and no other air pollution of any kind. Over the 40-50 year life of a solar electric system, every kilowatt (kW) of solar electric power reduces 217,000 pounds of carbon dioxide, 1500 pounds of sulfur dioxide, and 830 pounds of nitrogen oxides emissions as compared to electricity produced by conventional generation.[4]

Photovoltaic solar energy generates electricity without use any water. In contrast, fossil fuel and nuclear based electricity generation use substantial amounts of water to run steam turbines. Across the US, approximately 40% of fresh water withdrawals are used

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[3] Solar Energy Industries Association Natural Gas Displacement Model

[4] NREL report, "Distributed Energy Resources for the California Local Government Commission," *October 2000.*

for electric generation.[5] If water-starved communities like Phoenix and Las Vegas are to continue growing, we must place greater emphasis on water-free electricity generating technologies.

Concerns have been raised whether the energy used to produce solar panels is surpassed by the amount of energy generated from the panels. This energy relationship is referred to as the "energy payback period." Currently, the energy payback for PV panels varies from 1-4 years depending on different manufacturing variables. This means that a PV panel with a life expectancy of 40-50 years will generate between 10 and 50 times more energy than was required to create the panel. Despite this superior "energy return on investment", the manufacturing process is still growing more efficient every year as the scale of production increases.[6]

Conclusions

Solar energy is an obvious choice for a carbon-smart, reliable and domestic energy future. Greater reliance on this untapped energy resource will grow the economy, create jobs, increase grid integrity and security, while heralding energy independence. Unfortunately, all of these benefits are dependent on passage of HR 550. In the absence of long-term Congressional leadership, we will continue down the path of over reliance on foreign, highly price-volatile, insecure, carbon-intensive energy sources.

The US stands at an energy crossroads. Independent, carbon-smart energy choices can be made today that will benefit generations to come. However, the window of opportunity is quickly closing. This Congress has an opportunity to invest in solar energy and ensure that the US reclaims global energy leadership and independence.

In conclusion, passing HR 550, the *Securing America's Energy Independence Act,* is the most meaningful solar policy that Congress could enact this year.

I thank the committee for giving me this opportunity to speak, and I am available to answer any questions you may have.

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[5] Sandia National Laboratories, Energy-Water Nexus, http://www.sandia.gov/news-center/news-releases/2006/environ-waste-mgmt/mapwest.html

[6] NREL Report No. NREL/FS-520-24619: "Energy Payback: Clean Energy from PV"

Testimony of Greg Principato
President, Airports Council International-North America

before the

House Transportation and Infrastructure Committee
Climate Change and Energy Independence: Transportation and Infrastructure Issues

May 16, 2007

Chairman Oberstar, Ranking Member Mica, members and staff of the House Transportation and Infrastructure Committee, thank you for allowing Airports Council International-North America (ACI-NA) the opportunity to participate in this important hearing regarding global climate change. My name is Greg Principato and I serve as President of ACI-NA. ACI-NA member airports enplane more than 95 percent of the domestic and virtually all the international airlines passenger and cargo traffic in North America. Nearly 400 aviation-related businesses are also members of ACI-NA.

There is broad international agreement that climate change is an issue of global significance and the world must act now to tackle the problem. The United Nations Intergovernmental Panel on Climate Change (IPCC) estimates that aviation contributes about two to three percent of greenhouse gas emissions globally. While the industry's contribution is relatively small, forecasts continue to predict robust growth in aviation. The IPCC estimates aviation's contribution could increase to five percent or more in 2050. ACI-NA member airports are working proactively to address this issue on a local, regional, national, and international level.

Recognizing that the industry's main contribution to global warming - emissions from the operation of aircraft - is outside the control of any individual airport, our members are doing their part to minimize impacts to climate change just as with other environmental impacts such as water quality, noise, and local air quality.

Aviation is a global industry, but the real constraints on meeting the industry's growing capacity demands are felt on a local level. Even though greenhouse gas emissions are not regulated in the United States, many airports are proactively working to reduce those emissions associated with airport operations on an individual airport basis in order to meet the capacity needs of the global aviation system.

Greenhouse gas emission reduction strategies employed by airports have included: investing in and promoting the use of alternative fuel and low emission vehicles and energy saving equipment; recycling building and construction materials, waste and water; improving the operational efficiency of the airfield and landside system; acquiring green power; and providing emissions reducing services for aircraft at the gate.

As a few examples, Dallas-Fort Worth International Airport has converted 100 percent of the light and medium duty fleet, 72 percent of the heavy duty and off-road fleet, and 100 percent of the bus and shuttle van fleet to low emission or alternative fuel vehicles. Boston Logan International Airport provides preferred parking for drivers of hybrid and alternative fuel vehicles. Operators of several airports, including Portland and Denver

International Airports, have conducted inventories to determine their contribution to greenhouse gas emissions. Los Angeles International Airport has an on-site hydrogen fuel generating station. Numerous airports have installed 400 hertz power and preconditioned air units at gates to minimize emissions from aircraft auxiliary and ground power units. Sacramento International Airport installed a jet-fuel pipeline to eliminate emissions from fuel truck traffic.

Airports have also reduced greenhouse gas emissions by implementing initiatives to reduce waste disposal and energy use. Extensive waste management programs at airports such as San Diego, Seattle-Tacoma, Fort Lauderdale, and Baltimore/Washington Thurgood Marshall International Airports include recycling, reusing and source reduction components that eliminate the need to dispose of everything from coffee grinds to newspapers to construction debris. Last year Terminal A at Boston Logan International Airport became the first airport terminal in the world to be certified by the U.S. Green Building Council as meeting the requirements for LEED – Leadership in Energy and Environmental Design. Several other airports are currently working toward LEED certification for new or renovated terminal projects, including Indianapolis and Oakland.

Sustainability Programs and Environmental Management Systems (EMSs) are also becoming increasingly widespread at airports across the U.S as mechanisms to minimize their environmental footprint. Sustainability has been described as a holistic strategy that strives to balance the needs of the present without compromising the ability of future generations to meet their own needs. Within the airport context, sustainability has broad implications throughout the entire system, including energy consumption, environmental impacts and overall facility life-cycle costs. This typically addresses operating costs such as airport infrastructure, transportation fleet, utilities and a full range of social issues such as employee retention programs and community outreach. Sustainability has become a way of doing business at many airports such as O'Hare, which has developed a Sustainable Design Manual to guide its entire Modernization Program. Several airports, including Miami-Dade County, Westchester County and Denver, have also implemented

EMSs - a set of processes and practices that enable an organization to reduce its environmental impacts and increase its operating efficiency.

Those are just a few examples of the growing number of initiatives airports across the country have taken to reduce their impact to global climate change.

Also on an industry level, ACI-NA works to promote and recognize environmental innovation at airports through an annual awards program now in its 11th year. Providing venues for regular information sharing also helps our member airports learn about the environmental programs and initiatives undertaken by their colleagues across the country.

The Airport Cooperative Research Program (ACRP), established as a pilot program under Vision 100, has provided an invaluable resource for airports in helping to better understand and address many of the environmental issues facing the industry, including a recently-initiated project to develop a guidebook for airports to use in inventorying their greenhouse gas emissions.

There is a concerted effort by all sectors in the aviation industry – airports, airlines, aircraft and engine manufacturers, and air navigation services – to work together to make the industry cleaner and greener. This effort is not new. In the last 40 years for example, aircraft have become 70 percent more fuel efficient (with a 20 percent increase in efficiency in the past 10 years), and these cross-industry efforts continue. One example of those efforts is the Commercial Aviation Alternative Fuels Initiative, in which airports, airlines, manufacturers, and FAA are working jointly to identify and encourage alternative fuel sources for aircraft.

ACI-NA, through ACI, is also an observer to the International Civil Aviation Organization (ICAO), which has endorsed the development of an open emissions trading system for aviation. ACI has called upon ICAO, recognizing its standard-setting role, to devise more stringent emission standards for aircraft. We believe the policy measure with the least negative impact on the aviation industry will be the integration of aviation's

carbon dioxide emissions into a global emissions trading system. Capacity constraints, taxation, or charges that do not satisfy ICAO's criteria for legitimate aeronautical charges are not viable solutions to address aviation's contribution to climate change.

ACI-NA airports will continue to take action to minimize emissions within their control and will support the development of technologies and design strategies in the aviation industry that will help reduce aircraft emissions globally. To further support these proactive efforts, ACI-NA would like to see progress made in the upcoming Federal Aviation Administration (FAA) reauthorization legislation to address the following areas:

Airport Improvement Program (AIP): In order to enhance the environment by encouraging the proactive adoption of best environmental practices, ACI-NA would propose the establishment of a pilot program of not more than 10 public-use airports where airport sponsors could use AIP funds to plan, design and construct new terminal facilities or retrofit existing terminal facilities with equipment, systems or other means of reducing adverse environmental impacts. The Secretary could select applicants for the pilot giving priority to those airports that will achieve the greatest air quality or other environmental benefits. This program would provide an opportunity to develop and employ innovative green systems and for DOT to assess the benefits of such projects.

ACI-NA also seeks to expand AIP eligibility to cover both the development of EMSs and the implementation of measures identified in such EMSs. Development of an EMS is a necessary first step, but the real environmental benefits will be achieved by implementation of measures identified in the EMS. ACI-NA would like to work with the Committee to amend the definitions of both airport planning (for creation of EMSs) and airport development (for implementation of measures identified in such systems).

Additionally, ACI-NA encourages the Committee to remove the requirement in the current AIP program that only allows airports in nonattainment or maintenance areas to acquire low emission vehicles or convert existing vehicles to low emission vehicles. We

believe that the federal government should encourage airports to proactively convert their fleets regardless of location.

We also would ask that AIP eligibility be expanded to include facilities for providing compressed natural gas (CNG), electric recharging facilities for low emission technology vehicles operating on airports. While, as discussed above, conversion of low emission ground support vehicles in nonattainment areas is eligible, many of the vehicles that regularly operate at airports are not owned by the airport sponsor. Many airside vehicles are owned and operated by airlines or other aeronautical service providers. Courtesy vans and buses are operated by rental car companies, parking lot operators or other third parties. Amending the AIP regulations would encourage the use of low emission vehicles by third parties by allowing airports to construct facilities at a convenient on-airport location to provide fuel for such vehicles.

Airport Cooperative Research Program: We urge to the Committee to make ACRP permanent and authorize it at the Administration's requested level of $15 million. ACI-NA also supports the designation of $5 million for much needed environmental research which helps the industry better understand and continue to minimize its impacts on climate change and a whole range of environmental areas.

Next Generation Air Transportation System (NextGen): Airports throughout the United States support NextGen initiatives to modernize the air transportation system. An improved system increase efficiency through smoother air traffic flow, resulting in fuel savings and reduced emissions at the airport level and en route. Airports believe that these investments require that the FAA have a stable and predictable funding system to ensure sufficient capital resources are available.

In closing ACI-NA and its member airport thank you for the opportunity to share our views on this important matter. We look forward to working with you in addressing global climate change.

Testimony of William Prindle,
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American Council for an Energy-Efficient Economy (ACEEE)
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Before the U.S. House of Representatives
Committee on Transportation and Infrastructure
Subcommittee on Water Resources and Environment

Hearing on:
Climate Change and Energy Independence:
Transportation and Infrastructure Issues

May 16, 2007

Summary

The Urgency and the Opportunity for Efficiency Policy

America's greatest energy challenges—energy security and global warming—are converging to force historic changes in U.S. energy and environmental policy. Our growing dependence on imported oil and natural gas, combined with high and volatile fuel prices threaten both our economic health and our geopolitical strength. The recent Intergovernmental Panel on Climate Change Fourth Assessment reports on the growing evidence of climate change, coupled with the Supreme Court's recent decision that carbon dioxide is a pollutant regulated under the Clean Air Act, increase the urgency and clarify the legal basis for national policy action to reduce greenhouse gas emissions.

Cost-effective energy efficiency is the one readily available resource that addresses both the energy security and climate challenges, while also enhancing economic prosperity. Put another way, efficiency is the one resource that every energy security and climate policy has in common. Domestic energy supplies with low carbon content will take time to develop; but we can start now to accelerate efficiency investment, which will enable low-carbon domestic supplies to begin reducing energy imports and carbon emissions. If we do not use efficiency as the "first fuel" in the race for clean and secure energy, clean energy supply technologies may not be able to be deployed fast enough to meet runaway energy demand.

Investing in America's Energy Efficiency Infrastructure

Investing in energy efficiency means rebuilding America's energy services infrastructure: the energy-using systems in our vehicles, buildings, and factories. Contrary to misperceptions that efficiency is only about behavior (driving less or turning off lights) or small purchases like compact fluorescent light bulbs, Americans spend more on energy-efficient technology than they invest in energy supply infrastructure. ACEEE estimates current spending on efficient technologies—efficient appliances, heating and cooling systems, lighting, new buildings, vehicles, and industrial technologies—is about $200 billion, whereas we invest only about $100 billion each year in energy supply infrastructure—for everything from refineries to powerplants and pipelines. So America's energy efficiency infrastructure—the hardware that uses energy more efficiently—is a larger part of the economy than the infrastructure that supplies energy.

The potential for accelerated energy efficiency investment remains very large, in the range of another $200 billion annually. This is supported by numerous studies, including ACEEE's own research as well as that of McKinsey Global Institute and America's national laboratories. The research shows that we can meet most if not all of the growth in America's energy service needs in the next several decades through energy efficiency. However, it will take public policy commitment to stimulate substantial efficiency investment beyond current trends; while market forces are working to an extent, there are significant market barriers and economic factors that are limiting the effect of market forces.

Energy Efficiency's Unique Role in Climate Policy

Climate policy poses special challenges for Congress in striking the right balance between economy-wide policies like carbon cap-and-trade and carbon taxes, and sector-specific policies aimed at stimulating efficiency investment more directly. While energy efficiency has been shown in numerous policy analyses to be the lowest-cost way to reduce carbon emissions, economy-wide policies have also been shown to be relatively weak in stimulating efficiency investment. Cap-and-trade systems are weak in stimulating efficiency investment for two main reasons:

- Caps set "upstream" near the point of energy production do not allow end-use efficiency investments to obtain emission allowance credit. This is particularly true in the power sector; because the cap is on emissions at the smokestack and not on energy use, changes in energy use are deemed "indirect" emission reductions and not eligible for credit in emissions trading markets. This same structural problem applies in different ways in the transportation sector. This fundamental, structural problem in cap-and-trade designs requires specific policies to compensate for it.
- Much of the expected efficiency investment from economy-wide climate policies comes from price elasticity effects. As carbon prices enter the economy, they are expected to motivate efficiency investment through higher energy prices. However, price elasticity effects are increasingly masked by income-elasticity and cross-elasticity effects: income elasticity increases the demand for energy services as incomes rise, and cross-elasticity causes consumers to reduce expenditures on other goods when energy prices rise, rather than saving energy directly.

Because of these limitations in economy-wide carbon policies, we recommend the Committee consider a hybrid policy approach: an economy-wide approach to cover all major emissions sources and to increase flexibility, and complementary, targeted policies that accelerate efficiency investment to sharply reduce the cost of compliance with overall emissions targets.

Policy Recommendations

We recommend the following components be included in U.S. energy climate policies:

1. **Emission allowance allocation policies that support efficiency.** A key element of a cap-and-trade system for carbon dioxide emissions is the design of the emission allowance allocation policy. Allow allocations should be output-based and updated, rather than input-based and fixed, to encourage the most efficient forms of energy production. A significant fraction of allowances should be auctioned, with the proceeds used for low-carbon technologies like energy efficiency that would not be realized through cap-and-trade alone. The Regional Greenhouse Gas Initiative, which produced the first binding regulation on carbon emissions in the U.S., requires participating states to allocate at least 25% of emission allowances for energy efficiency and other strategic carbon reduction purposes.
2. **Complementary policies to reduce the cost of economy-wide carbon dioxide policies.** The two largest carbon emissions sources in the U.S. are electric powerplants and motor vehicles. For the power sector, the most effective complementary efficiency policy is a

national Energy Efficiency Resource Standard (EERS). Some 16 states have or are developing EERS to address electricity and natural gas prices as well as greenhouse gas emissions challenges. An EERS is a natural complement to a federal Renewable Portfolio Standard (RPS) for electricity; some 21 states have RPS policies. Together, EERS and RPS policies can begin reducing carbon dioxide emissions in the U.S. power sector within the next two decades, while keeping electricity prices moderate and economic growth strong.

In the transportation sector, fuel economy policies must be used to reduce the growth in fuel use; but the demand for travel must also be addressed. The Committee's jurisdiction allows it to pursue directly such important policies as:

- Setting **prerequisites for federal funding assistance for new transit lines** to ensure that zoning in host municipalities will promote compact development;
- Requiring state and metropolitan transportation plans and programs **demonstrate reductions in mobile source greenhouse gas emissions;**
- **Shifting the formulas for allocating federal transportation dollars to states** to reflect the importance of reducing oil consumption and vehicle GHG emissions.

3. **Stronger building efficiency policies.** Buildings are the largest collective driver of carbon emissions, accounting for some 40% of total U.S. emissions. They also contain the largest portion of the nation's energy-using infrastructure: some 80 million buildings, most of which are more than 30 years old. There is vast potential for "mining" the efficiency potential of the American building stock. This can be accomplished by:
   - **Creating stronger building energy codes.** The U.S. government can lead the way by setting the nation's highest standards for building energy performance, beginning with 30% improvement beyond national model codes, and improving to 50%. The ultimate goal of building codes should be a "zero-carbon" standard, wherein the energy footprint of new buildings is kept to minimum, and any remaining energy use is offset by efficiency or renewable energy credits. Congress should also direct the executive branch to work with the national model code process to improve national model code energy performance levels by 30% by 2010 and 50% by 2020.
   - **Accelerating building code adoption and enforcement.** The Committee should consider tying federal funding under its jurisdiction to state adoption and enforcement of the most advanced national model building energy codes from the International Code Council. It should also support authorizations and appropriations to provide technical assistance and implementation support for state adoption and enforcement of better building codes.
   - **Setting and providing funding for efficiency targets for existing buildings.** Previous federal energy legislation, and a recent Executive Order, have set new efficiency targets for federal building energy performance. To support achievement of these targets, Congress should permanently authorize the Energy Savings Performance Contracting (ESPC) program that has been successful in bringing private capital into federal facilities, and should consider federal financing mechanisms to further support these investments. To accelerate efficiency in state-owned buildings, the Committee should consider tying federal funding in its jurisdiction to states' setting and achieving target such as states.

- **Accelerating progress in appliance and equipment efficiency standards.** The U.S. has made great progress in setting and updating energy efficiency standards for dozens of common household and business products and equipment. For example, all new refrigerators built since 2001 use only about ¼ the energy of comparable models sold in the 1970s. Congress should help accelerate this progress by creating greater flexibility for the Department of Energy's standards program to set standards on a regional basis, to set standards that regulated multiple features of a given product, to preserve states' rights by limiting federal pre-emption of state standards, and to create an expedited rulemaking process for the growing number of consensus-based standards.

A significant part of America's energy efficiency infrastructure is its research and development institutions. The last 30 years have witnessed a disturbing decline in U.S. energy research and development; federal investment in energy efficiency and renewable energy is only about 1/3 of 1970s levels, and private R&D has also fallen during that time period. As a result, there has been a serious erosion in the capabilities of our national laboratories, our universities, and our state governments to rise to the unprecedented challenges of the 21st century. We urge the Committee to consult with the Science and Energy committees in finding ways to rebuild America's energy efficiency infrastructure, beginning with federal R&D program authorization and appropriations.

Energy and Carbon Savings

ACEEE research shows that new energy efficiency policy initiatives could make a big difference on the energy security and global warming fronts. For example:

- A 2006 ACEEE study finds that we can reduce U.S. oil use by more than 5 million barrels per day by 2020, equivalent to 680 million metric tons of carbon dioxide—nearly 10% of the federal Annual Energy Outlook reference case emissions. Improvements in passenger vehicle fuel economy account for more than 3 million barrels per day of savings, but more than 2 million barrels per day of savings are available in the residential, commercial, and industrial sectors, and in heavy vehicles and airplanes. Not reflected in this estimate are substantial additional savings that could be achieved through reduction in vehicle miles traveled.

- Another 2006 ACEEE study found that doubled efficiency investments in the Regional Greenhouse Gas Initiative (RGGI) cap and trade system for power-sector carbon dioxide emissions would add $13 billion to the regional economy in 2021. This increased energy efficiency investment would reduce average energy bills by up to 12%.

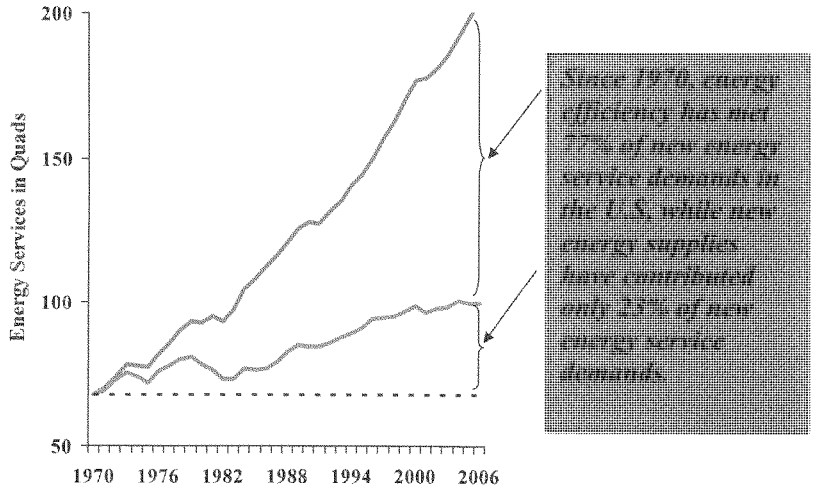
- ACEEE's analysis of Energy Efficiency Resource Standards (EERS) in the electricity and natural gas utilities sectors shows that an EERS target reaching 10% of electricity sales in 2020 would save utility customers a net $29 billion while reducing 2020 carbon dioxide emissions by 343 million metric tons, about 5% of the Annual Energy Outlook reference forecast.

Introduction

ACEEE is a nonprofit organization dedicated to increasing energy efficiency as a means of promoting both economic prosperity and environmental protection. We were founded in 1980 and have contributed in key ways to energy legislation adopted during the past 25 years, including the Energy Policy Acts of 2005 and 1992 and the National Appliance Energy Conservation Act of 1987. I have testified before the Committee several times and appreciate the opportunity to do so again.

Energy efficiency improvements in all forms have contributed a great deal to our nation's economic growth and increased standard of living over the past 30 years. Energy efficiency improvements since 1970 accounted for approximately 75 quadrillion Btus of saved energy in 2005, which is *about three-quarters of U.S. energy use and three times as much as total energy supply growth over the same period.* In this sense, energy efficiency can rightfully be called our country's largest energy resource. If the United States had not dramatically reduced its energy intensity over the past 30 years, consumers and businesses would have spent about $700 billion more on energy purchases in 2005. The figure below illustrates this effect.

Figure 1. Energy Efficiency's Contribution to the U.S. Economy 1970-2006

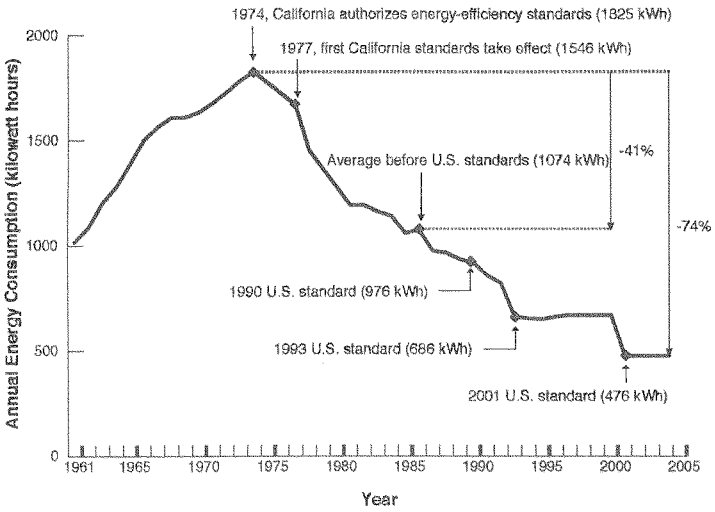


Source: ACEEE Staff analysis

Efficiency's contribution to economic growth may seem abstract in the macro terms shown above. But it also shows up in the progress of individual technologies. For example, today's refrigerators,

due to a combination of effective research and federal appliance standards, use about ¾ less energy than comparable models sold in the 1970s. Figure 2 below indicates this progress.

Figure 2. Refrigerator average electricity usage 1960-2005



Source: Collaborative Labeling and Appliance Standards Program

The Energy Efficiency Infrastructure

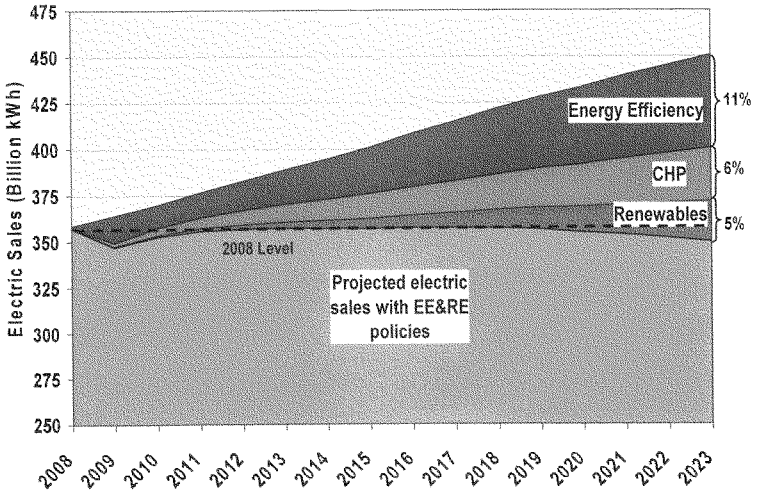
Energy efficiency has also become a major force in the economy in terms of infrastructure investment. ACEEE ongoing research indicates that total energy supply infrastructure investment in the United States in 2005 was approximately $100 billion. Energy efficient technology spending, from high-efficiency lighting to hybrid cars, was in the range of $200 billion in the same period.[1] This means that America spends many times more money on cost-effective energy-saving technology than on energy supply technology. However, this remarkable truth is masked, by the fact that efficiency is typically hidden inside our buildings, vehicles, and factories in millions of products, components, and systems. Yet collectively, these efficiency investments support a much larger fraction of the economy than do all the energy supply sectors combined.

[1] For a useful overview of this perspective, see Laitner, Ehrhardt-Martinez, and Prindle, 2007. "The American Energy Efficiency Investment Market," Washington, DC: American Council for an Energy-Efficient Economy.

Energy Efficiency's Future Potential

There is still enormous potential for additional cost-effective energy savings in America's energy service infrastructure. Some newer energy efficiency technologies have barely begun to be adopted. Other efficiency measures could be developed and commercialized rapidly in coming years, with policy and program support. For example, in a study from 2000, the Department of Energy's national laboratories estimate that increasing energy efficiency throughout the economy could cut national energy use by 10 percent or more in 2010 and about 20 percent in 2020, with net economic benefits for consumers and businesses.[2] Studies for many regions of the country have found similar if not even greater opportunities for cost-effective energy savings.[3] A recent analysis by McKinsey Global Institute found that U.S. energy demand growth through 2030 could be fully met through cost-effective energy efficiency improvements. Our ongoing research indicates that current estimates of $200 billion in annual spending on efficient technology could be doubled to $400 billion, with strong public policies and increase private investment.

Figure 3. Energy Efficiency and Renewable Energy Potential in Texas 2008-2023



Market Barriers to Energy Efficiency

[2] Interlaboratory Working Group, 2000, *Scenarios for a Clean Energy Future*. Washington, D.C.: Interlaboratory Working Group on Energy-Efficient and Clean-Energy Technologies, U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy.

[3] For a summary of many of these studies, see Nadel, Shipley and Elliott, 2004, *The Technical, Economic and Achievable Potential for Energy-Efficiency in the U.S. – A Meta-Analysis of Recent Studies*. Washington, D.C.: American Council for an Energy-Efficient Economy.

Unfortunately, a variety of market barriers keep energy efficiency investment from being accelerated. These barriers fall in two main categories: (1) principal-agent or "split incentive" barriers, in which, for example, home builders must invest added capital in efficient homes, but receive none of the energy savings benefits; and (2) transaction costs, which stem from inability of average consumers or businesses to make "economically optimum" decisions in time-and-information-limited real world conditions. A recent ACEEE study for the International Energy Agency found that, in the major residential and commercial end-use markets in five countries, half or more of the energy used is affected by these kinds of market barriers[4]. This finding suggests that public policies, beyond pricing policies, are needed to overcome such barriers.

In addition, basic forces in the economy work against the tendency of higher energy prices to moderate energy demand. This principle of "price elasticity of demand", while economically correct, is countered by "income elasticity of demand", under which rising incomes cause consumers to be less affected by rising prices. A large segment of our population continues to buy low-mileage, high priced vehicles with little concern for fuel costs. For less-affluent consumers, "cross-elasticities" come into play that cause them to keep using energy as an essential service, but to cut back on other goods and services to balance their household budgets. Recent research indicates that short-run elasticity of demand for motor fuel has fallen as much as sixfold since the 1970s; in other words, drivers are six times less likely than they were 30 years ago to change driving habits based on fuel prices.[5] This is an indication that income elasticity effects may be affecting driver behavior. Economists have documented the slowing of retail sales among low-and moderate-income people in response to rising energy price; this is an indication of cross-elasticity effects. Both the income elasticity and cross-elasticity effects suggest that energy prices alone won't balance our energy markets, and that we need stronger energy policies if we want to stabilize energy markets without wrecking our economy.

Drivers for Increased Efficiency Investment

Recent developments in our energy markets indicate that while efficiency is playing an important role in stabilizing energy markets, the U.S. needs to *accelerate* efforts to implement energy efficiency improvements to meet this century's unprecedented energy and climate challenges. Some of the key drivers appearing in the economy include:

- Oil, gasoline, natural gas and coal prices have risen substantially in recent years. For example, residential natural gas prices in 2005 averaged $13.83 per thousand cubic feet, up 61% from the average price three years earlier (prices averaged $8.57 per thousand cubic feet in 2002).[6] Likewise retail gasoline prices are up 87% relative to three years ago ($2.917

[4] Prindle et al. 2007. *Quantifying Market Barriers in the End Use of Energy.* Draft report to the International Energy Agency. American Council for an Energy-Efficient Economy.

[5] Hughes, Knittel and Sperling, 2006. *Evidence of a Shift in the Short-Run Price Elasticity of Gasoline Demand.* Center for the Study of Energy Markets, University of California Energy Institute.

[6] Energy Information Administration, 2006, *Natural Gas Navigator: U.S. Natural Gas Residential Price.* http://tonto.eia.doe.gov/dnav/ng/ng_pri_sum_dcu_nus_m.htm . Visited June 20. Washington, D.C.: U.S. Dept. of Energy.

per gallon 6/19/06 versus $1.558 per gallon 6/16/03).[7] Even more dramatically, Powder River Basin coal has more than doubled in price since three years ago (spot prices of $13.80 per short ton in May, 2006, up from about $6 per short ton in May, 2003).[8] Energy efficiency can reduce demand for these fuels, reducing upward price pressure and also reducing fuel-price volatility, making it easier for businesses to plan their investments. Prices are determined by the interaction of supply and demand—if we seek to address supply and not demand, it's like entering a boxing match with one hand tied behind our back.

- A recent ACEEE analysis found that gas markets are so tight that if we could reduce gas demand by as little as 4% over the next five years, we could reduce wholesale natural gas prices by more than 20%.[9] This analysis was conducted by Energy and Environmental Analysis, Inc. using their North American Gas Market Model, the same analysis firm and computer model that was employed by DOE and the National Petroleum Council for their 2003 study on U.S. natural gas markets.[10] These savings would put over $100 billion back into the U.S. economy. Moreover, this investment would help bring back U.S. manufacturing jobs that have been lost to high gas prices and also help relieve the crushing burden of natural gas costs experienced by many households, including low-income households. Importantly, much of the gas savings in this analysis comes from electricity efficiency measures, because much of the marginal electric load is met by natural-gas fired power plants.

- The U.S. is growing increasingly dependent on imported oil, with imports accounting for more than 60% of U.S. oil consumption in 2005, of which more than 40% came from OPEC countries.[11] The U.S. Energy Information Administration estimates that imports will account for 68% of U.S. oil use in 2020.[12] While moderate amounts of new oil are available in hard-to-reach areas of the U.S., much greater amounts of oil are available by increasing the efficiency with which we use oil. A January 2006 report by ACEEE found that the U.S. can reduce oil use by as much as 5.3 million barrels per day in 2020 through improved efficiency, including more than 2 million barrels per day in industry, buildings, heavy duty vehicles and airplanes.[13] In other words, *there are substantial energy savings outside of the highly contentious area of light-duty vehicle fuel economy.* These 5.3 million barrels per day of oil savings are nearly as much as we presently import from OPEC (OPEC

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[7] Energy Information Administration, 2006, *Petroleum Navigator: U.S. All Grades All Formulatins Retail Gasoline Prices.* http://tonto.eia.doe.gov/dnav/pet/hist/mg_tt_usw.htm . Visited June 20. Washington, D.C.: U.S. Dept. of Energy.

[8] Energy Information Administration, 2006, *Coal News and Markets, Week of May 5, 2006.* http://www.eia.doe.gov/cneaf/coal/page/coalnews/coalmar.html#spot . Washington, D.C.: U.S. Dept. of Energy.

[9] Elliott and Shipley, 2005, *Impacts of Energy Efficiency and Renewable Energy on Natural Gas Markets: Updated and Expanded Analysis.* http://www.aceee.org/pubs/e052full.pdf. Washington, D.C.: American Council for an Energy-Efficient Economy.

[10] National Petroleum Commission. 2003, *Balancing Natural Gas Policy—Fueling the Demands of a Growing Economy: Volume I Summary of Findings and Recommendations.* Washington, D.C.: U.S. Department of Energy.

[11] Energy Information Administration, 2006, *Monthly Energy Review May 2006.* Washington, DC: U.S. Dept. of Energy.

[12] Energy Information Administration, 2006, *Annual Energy Outlook.* Washington, D.C.: U.S. Department of Energy.

[13] Elliott, Langer and Nadel, 2006, *Reducing Oil Use Through Energy Efficiency: Opportunities Beyond Cars and Light Trucks.* Washington, DC:. American Council for an Energy-Efficient Economy.

imports were 5.5 million barrels per day in 2005).[14] Added measures to reduce vehicle miles traveled would lead to still greater savings. Energy efficiency can slow the growth in oil use, allowing a larger portion of our needs to be met from sources in the U.S. and friendly countries.

- Economists have increasingly raised concerns that the U.S. economy is slowing and that robust growth rates we have experienced in recent years will not be sustained. Energy efficiency investments can help spur additional economic growth; they often have financial returns of 30% or more, helping to reduce operating costs and improve profitability. In addition, by reducing operating costs, efficiency investments free up funds to spend on other goods and services, creating what economists call the "multiplier effect", and helping the economy broadly. This stimulates new economic activity and job growth in the U.S., whereas most of every dollar we spend on oil flows overseas. A 1997 study found that due to this effect, an aggressive set of efficiency policies could add a net of about 770,000 jobs to the U.S. economy by 2010.[15]

- Overall, the U.S. has ample supplies of electricity at present, but demand is growing and several regions (such as southwest Connecticut, Texas, New York, and California) are projecting a need for new capacity in the next few years in order to maintain adequate reserve margins.[16,17] Energy efficiency resource policies can slow demand growth rates, postponing the date that additional capacity will be needed.

- Greenhouse gas emissions continue to increase. Early signs of the impact of these changes are becoming apparent in Alaska and other Artic regions.[18] And several recent papers have identified a link between warmer ocean temperatures and increased hurricane intensity.[19,20] Energy efficiency is the most cost-effective way to reduce these emissions, as efficiency investments generally pay for themselves with energy savings, providing negative-cost emissions reductions. The term "negative-cost" means that, because such efficiency investments cost less than current energy sources, they achieve emission reductions at a net savings for the economy. This important point has been missed in much of the climate policy analysis modeling performed to date. Too many economic models are incapable of characterizing the real economic effects of efficiency investments, and so forecast inaccurate economic costs from climate policies. Fortunately, this kind of flawed policy

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[14] See note #9.

[15] Alliance to Save Energy et al., 1997, *Energy Innovations: A Prosperous Path to a Clean Environment.* Washington, DC: American Council for an Energy-Efficient Economy. See also, Laitner, Bernow, and DeCicco, 1998. "Employment and Other Macroeconomic Benefits of an Innovation-Led Climate Strategy for the United States." *Energy Policy*, 1998, 26(5), pp. 425-33.

[16] North American Electric Reliability Council, 2005, *2005 Long-Term Reliability Assessment: The Reliability of Bulk Electric Systems in North America.* Princeton, N.J.: North American Electric Reliability Council.

[17] New York Independent System Operator, 2005, "The NYISO Issues Reliability Needs Assessment." Press release of December 21. Schenectady, N.Y.: New York Independent System Operator.

[18] Hassol, 2004, *Impacts of a Warming Arctic: Arctic Climate Impact Assessment.* http://www.acia.uaf.edu. Cambridge University Press.

[19] Webster, Holland, Curry and Chang, 2005, "Changes in Tropical Cyclone Number, Duration, and Intensity in a Warming Environment." *Science,* 309, 16 September, 1844–1846.

[20] Emanuel, 2005, "Increasing Destructiveness of Tropical Cyclones over the Past 30 Years." *Nature,* 436, 4 August, 686–688.

analysis is beginning to be corrected. For example, a 2006 ACEEE study just released by ACEEE found that the Regional Greenhouse Gas Initiative (RGGI – the planned cap and trade system for greenhouse gases in the northeastern U.S.) would increase the output of the regional economy by about $13 billion in 2021, provided increased energy-efficiency programs are a key part of implementation efforts.[21] This analysis also showed that efficiency would reduce carbon prices (see Figure 5 below).

The Unique Challenges for Energy Efficiency in Climate Policy

It is widely accepted that energy efficiency reduces the cost of carbon emission reductions, because it is widely available as a resource that costs less than conventional energy. In electricity markets, efficiency potential has been shown to be about 25% of total electricity usage, at a levelized cost of about 3 cents per kilowatthour[22], much less than that the average national retail price of electricity, currently at more than 8 cents per kWh[23], or the marginal generation cost of new power plants, estimated by industry experts to cost 5 cents per kWh and higher, depending on the technology. Figure 4 below illustrates this effect—when a resource like efficiency costs less on a levelized basis than the current cost of energy, it provides a net savings to the economy.

Economic modeling of climate policy often fails to capture efficiency investment effects. ACEEE's research on econometric modeling of energy efficiency investments has identified flaws in some of the principal modeling approaches used to project the costs of climate policies. One school of econometrics takes a highly aggregated view of the economy, applies the estimated effects of climate policy in a fairly simple and aggregated way, and produces findings that tend to show somewhat negative economic impacts. The EIA, MIT, and CRA international studies of the Climate Stewardship Act fall in this category[24].

Another set of analyses tends to look in more depth at the technology and sector impacts that would result from climate policy, including shifts of capital, energy, and labor resources among various sectors of the economy. These more fine-grained studies tend to show that carbon emissions can be realized at much lower levels of economic impact, and indeed can produce positive net economic benefits.[25]

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[21] Prindle, Shipley and Elliott, 2006, Energy Efficiency's Role in a Carbon Cap-and-Trade System: Modeling Results from the Regional Greenhouse Gas Initiative. Washington, DC: American Council for an Energy-Efficient Economy.

[22] Kushler et al. *Five Years In: An Examination of the First Half-Decade of Public Benefits Energy Efficiency Policies.* American Council for an Energy-Efficient Economy, 2004.

[23] See the U.S. Energy Information retail electricity price website at http://www.eia.doe.gov/cneaf/electricity/epa/epat7p4.html

[24] Energy Information Administration. 2003. *Analysis of S.139, the Climate Stewardship Act of 2003.* Washington, D.C.: U.S. Department of Energy, SR/OIAF/2003-02). http://www.eia.doe.gov/oiaf/servicerpt/ml/pdf/sroiaf

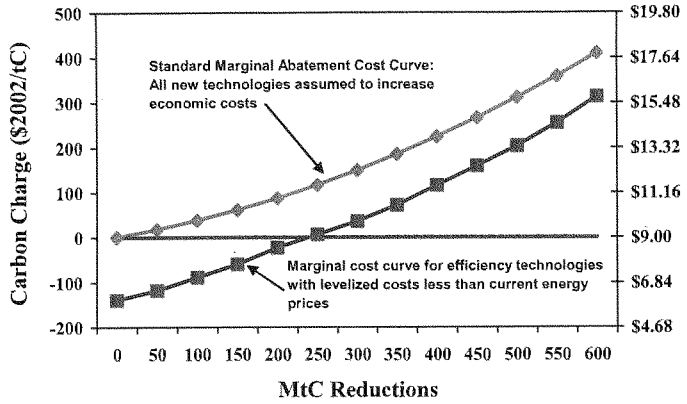
Sergey Paltsev et al.. 2003. *Emissions Trading to Reduce Greenhouse Gas Emissions in the United States: The McCain-Lieberman Proposal* Cambridge, MA: Joint Program on the Science and Policy of Global Change, Report 97.

Anne E. Smith, Paul Bernstein, and W. David Montgomery. 2003. *The Full Cost of S.139, With and Without Its Phase II Requirements* Washington, D.C.: Charles River Associates.

[25] Barrett, James, et al. 2005. *Jobs and The Climate Stewardship Act. How Curbing Global Warming Can Increase Employment.* Natural Resources Defense Council.

Barrett, James and J. A. Hoerner, *Clean Energy and Jobs: A Comprehensive Approach to Climate and Energy Policy*

Figure 4. Negative Cost of Carbon Emission Reductions from Energy Efficiency



Because of these differences between modeling techniques, and because their results can be so important to policymakers, we urge the Committee and others in Congress to take a more comprehensive look at the economic modeling issues around climate change, especially those that involve energy efficiency. We offer two key observations:

- Some macroeconomic models do not assess the economic effects of energy efficiency with any specificity. They tend to simply simulate energy price increases in the economy and assume that energy efficiency will occur through price elasticity effects. They tend to treat reduced energy expenditures simply as a reduction of output from a given sector, ignoring the inter-sectoral substitutions of capital, energy and labor that more detailed models capture.

(Washington, D.C.: Center for a Sustainable Economy and the Economic Policy Institute, 2002)

Energy Innovations: A Prosperous Path to a Clean Environment (American Council for an Energy-Efficient Economy (ACEEE), The Alliance to Save Energy, Natural Resources Defense Council, Tellus Institute, and Union of Concerned Scientists, June 1997)

Florentin Krause et al., "Cutting Carbon Emissions at a Profit (Part II): Impacts on U.S. Competitiveness and Jobs," *Contemp Econ Policy*, Volume 21 (2003)

Hanson, Don, and Laitner, John A. "Skip". 2004. "An integrated analysis of policies that increase investments in advanced energy-efficient/ low-carbon technologies". *Energy Economics* 26 (2004) 739– 755.

Hahneman, Michael, et al. *Managing Greenhouse Emissions in California.* The California Climate Center at UC Berkeley. 2006.

Sanstad, Alan H., Stephen J. DeCanio, and Gale A. Boyd, "Estimating Bounds on the Macroeconomic Effects of the Clean Energy Future Policy Scenarios," *Energy Policy*, Volume 29, Issue 14 (November 2001)

- Some models use a general equilibrium approach in which it is assumed that energy technology is optimally deployed in the economy. This means that any shift in the technology mix must, by the design of the model itself, impose costs on the economy. Yet ACEEE and others have amply documented that market barriers and other forces extensively limit the deployment of cost-effective technologies, meaning that a large measure of efficiency investment can occur at net savings to the economy.

Given these limitations in some of the models used to assess the economic impacts of climate policy, we urge the Committee to conduct a thorough investigation of these issues, so that a more balanced picture can be developed of the likely economic impacts of climate policy.

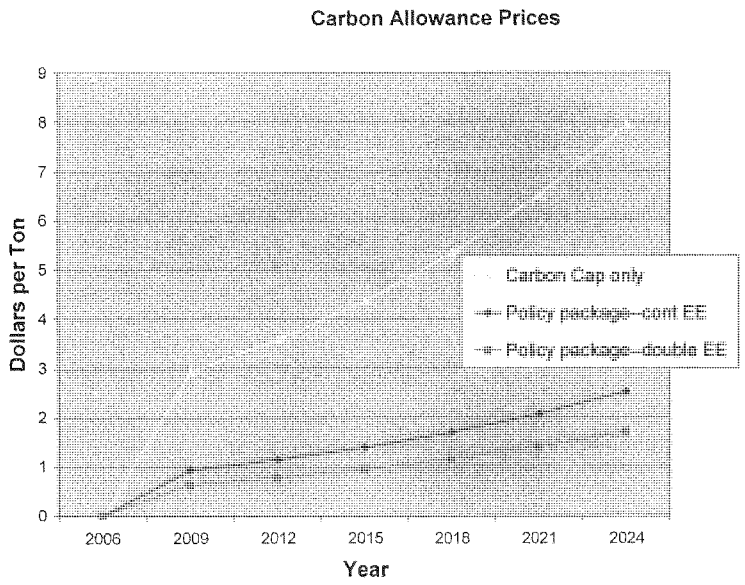
Some opponents of climate policy action have uses flawed modeling approaches in a selective way to claim that vigorous climate policy would exact a heavy toll on the economy. Yet at least as many analysts have found that climate policy, if studied in enough depth, can be shown to generate positive economic impacts. Investing in efficiency thus reduces the cost of climate policy by reducing the average cost of energy, and by stimulating new economic activity in the form of capital investment, increased labor demand, and increased personal income. Research conducted for the Regional Greenhouse Gas Initiative showed that increased efficiency resource investment added $13 to the regional economy, reduced customer energy bills by up to 12% and cut the price of carbon allowances by about one-third, while increasing gross regional product, employment, and personal income[26]. Figure 5 below illustrates these effects.

These results suggest that Congress should take a harder look at the economic analyses conducted for past climate policy bills, and that for future consideration of climate policies, the Committee should seek a more balanced set of economic analyses.

Investing in efficiency thus reduces the cost of climate policy by reducing the average cost of energy, and by stimulating new economic activity in the form of capital investment, increased labor demand, and increased personal income. Research conducted for the Regional Greenhouse Gas Initiative showed that increased efficiency resource investment added $13 to the regional economy, reduced customer energy bills by up to 12% and cut the price of carbon allowances by about one-third, while increasing gross regional product, employment, and personal income[27]. Figure 5 below illustrates these effects.

Figure 5. Energy Efficiency Investment and Carbon Prices in the Regional Greenhouse Gas Initiative

[26] Prindle et al. *Energy Efficiency's Role in a Carbon Cap-and-Trade System: Modeling Results from the Regional Greenhouse Gas Initiative.* American Council for an Energy-Efficient Economy, 2006.
[27] Prindle et al. *Energy Efficiency's Role in a Carbon Cap-and-Trade System: Modeling Results from the Regional Greenhouse Gas Initiative.* American Council for an Energy-Efficient Economy, 2006.



Source: Prindle et al. 2006. *Energy Efficiency's Role in a Carbon Cap-and-Trade System: Modeling Results from the Regional Greenhouse Gas Initiative.* ACEEE, Washington, DC.

Efficiency requires specific policy focus to produce its full benefits. The emissions cap-and-trade policy designs most often proposed to reduce carbon emissions will not, in and of themselves, provide sufficient impetus for the level of efficiency investment needed to realize its benefits. These limitations stem from two principal factors:

- **Upstream caps.** Most cap-and-trade policies place emissions caps "upstream" or at the energy production level. End-use efficiency potential is found "downstream" in individual buildings and vehicles. An upstream cap makes it difficult for covered entities to invest in downstream energy use reductions, because such reductions are "indirect" emission reductions in an upstream cap, and so are not generally accepted as tradable allowance credits. Even if energy users reduce consumption, upstream emitters possess no fewer allowances, and thus can operate high-emitting sources longer, or can sell the unused allowances. It can also be difficult for upstream entities to reach across markets to effectively identify, aggregate, and market such reductions.
- **Limited price effects.** Climate policy analysts often assume that price effects introduced in energy markets by carbon caps or carbon taxes will stimulate sufficient investment in efficiency and other low-carbon technology choices. This argument is flawed because:

- Carbon prices are expected to be relatively low for many years, resulting in very limited price elasticity effects on demand. Efficiency provides its greatest benefits in the early years of a carbon policy, by holding down demand growth until low-carbon energy supplies can come on line over the longer term.
- Demand elasticities are countered in industrialized economies by income elasticity, which tends to drive demand upward as incomes grow, and cross-elasticities, which tends to reduce demand for other goods when energy prices rise, with limited effect on energy demand itself.
- Persistent market barriers, such as the principal-agent problem and information costs, significantly limit efficiency investment by isolating large segments of end-use markets from price elasticity effects. ACEEE's earlier-cited study for the International Energy Agency shows that up to 50% of residential energy use in the U.S. is affected by such barriers.

Policy recommendations for effectively engaging efficiency. In a cap-and-trade policy framework, the following options are needed to effectively tap the benefits efficiency investment offers for attaining emissions targets cost-effectively:

- **Auctioning or directly allocating allowances.** In the restructured electricity markets that prevail in the U.S. today, there is no reason to give generators emission allowances for free, as these costs are embedded in power prices such that generators overall tend to increase their revenues. Accordingly, the most recent cap-and-trade programs such as the RGGI policy require at least 25% of allowances to be auctioned, with the proceeds targeted for such purposes as energy efficiency and other low-carbon options. Many RGGI states are auctioning 100% of their allowances. Allowances can either be auctioned by the administering agency, or can be allocated directly to a designated entity for that purpose.
- **Output-based allowance allocation.** In the past, emissions allowances have typically been allocated to emitters based on their fuel input. However, it is their efficiency in converting fuel into energy output that determines their total emissions, so an output basis is more accurate. Output-based allocation also rewards emitters that use higher-efficiency generation technologies. To make this work, allocations should also be periodically updated to encourage emitters to make regular technology improvements.

Under a carbon tax policy, the allocation issues would be less complex, but the need to dedicate a portion of tax receipts to energy efficiency investment would be important, as the price effects from carbon taxes alone would not stimulate efficiency investment at the rate needed to reach carbon emission goals.

Policy-makers should also pursue complementary efficiency policies in parallel with cap-and-trade or carbon-tax programs, to get at markets that are most affected by market barriers. Such policies include: **Energy Efficiency Resource Standards (EERS),** which several states and three European Union nations have instituted, by setting numerical energy savings targets for utilities to meet through customer efficiency investments, combined heat and power, and other efficiency measures; **appliance and vehicle efficiency standards,** which have been very effective in the U.S. and should continue to be upgraded and expanded; and **building energy codes,** because new construction markets are among the most severely affected by market barriers, as builders are not

motivated to invest the extra design time and capital to optimize energy efficiency for the building's life cycle.

Transportation Planning and Funding Programs

With reauthorization of SAFETEA-LU approaching, it is time to develop ways that federal transportation funding and planning requirements can contribute to the national effort to reduce GHG emissions. Several programs already in place to promote alternatives to driving and to use existing roads more efficiently—including transit system "new starts", the Value Pricing Pilot program, the Congestion Mitigation and Air Quality program, and the Non-Motorized Transportation Pilot—should be considered for major expansion. But new ideas will need to be developed as well, some representing major departures from existing policies.

There is a nearer opportunity for action as well. Members of Congress working on climate change legislation in this session are giving much focus to the transportation sector because it is responsible for one-third of U.S. greenhouse gas emissions. While there has been much discussion on how transportation fuels and vehicles can best be brought into an economy-wide climate policy, the transportation system and other determinants of how much people drive have received far less attention. This is a serious oversight, because vehicle and fuels policies, while important, will not be sufficient to achieve the GHG reductions that will be required of the transportation sector in a comprehensive climate plan for the nation. Shifts in land use planning practices and transportation infrastructure investment decisions can and must make a substantial contribution to reducing emissions.

New policies in the purview of this Committee could be offered as elements of the nation's climate policy, including prerequisites for federal funding assistance for new transit lines to ensure that zoning in host municipalities will promote compact development near transit nodes. Congress could also set requirements that state and metropolitan transportation plans and programs demonstrate reductions in mobile source greenhouse gas emissions consistent with the nation's economy-wide objectives for greenhouse gas reductions. It could also shift state allocation formulas for federal transportation funding to reflect the national importance of reducing oil consumption and vehicle GHG emissions, by rewarding successful travel demand management. Adoption of these actions as part of a national climate policy would set the stage for additional, coordinated actions in the transportation bill reauthorization in 2009.

In addition, climate change legislation introduced prior to the reauthorization should clearly acknowledge and quantify the role of vehicle miles traveled in determining greenhouse gas emissions. Gaining this acknowledgement would serve the additional purpose of positioning transportation planning and infrastructure programs that reduce emissions to be awarded funds that are raised from sales of carbon allowances.

ACEEE analysis has demonstrated the importance of complementing a carbon trading scheme for the power sector with efficiency programs, both to allow the setting of a stringent cap and to minimize the cost of meeting that cap. To ensure that efficiency resources are fully tapped, we recommend that a large percentage of revenues arising from the distribution of allowances be used to fund efficiency investments. The same argument applies in the transportation sector: both

vehicle efficiency and transportation system efficiency will be essential to meeting the sector's carbon reduction obligations, but neither can be tapped easily through a cap-and-trade system. Transportation sector efficiency should therefore be eligible for funds associated with the sales of allowances.

Finally, sound land use planning and neighborhood development can bring major energy savings opportunities in the buildings sector as well as the transportation sector. Compact development not only eliminates trips, reduces trip length, and increases the viability of alternative modes, but also can allow the use of more efficient building designs, district cooling systems, streamlined water/wastewater systems, and other infrastructure efficiencies. In California, the enormous climate benefits of smart growth have been acknowledged in the planning documents for the implementation of the state's new climate legislation (AB 32)[28].

Policy Recommendations

Based on our analysis of energy markets, carbon policy options, and energy efficiency resource characteristics, we recommend the Committee consider several policies to gain the best use of energy efficiency resources in meeting the twin challenges of energy security and global warming. We recommend the following components be included in U.S. energy climate policies:

- **Emission allowance allocation policies that support efficiency.** A key element of a cap-and-trade system for carbon dioxide emissions is the design of the emission allowance allocation policy. Allow allocations should be output-based and updated, rather than input-based and fixed, to encourage the most efficient forms of energy production. A significant fraction of allowances should be auctioned, with the proceeds used for low-carbon technologies like energy efficiency that would not be realized through cap-and-trade alone. The Regional Greenhouse Gas Initiative, which produced the first binding regulation on carbon emissions in the U.S., requires participating states to allocate at least 25% of emission allowances for energy efficiency and other strategic carbon reduction purposes.
- **Complementary policies to reduce the cost of economy-wide carbon dioxide policies.** The two largest carbon emissions sources in the U.S. are electric powerplants and motor vehicles. For the power sector, the most effective complementary efficiency policy is a national Energy Efficiency Resource Standard (EERS). Some 16 states have or are developing EERS to address electricity and natural gas prices as well as greenhouse gas emissions challenges. An EERS is a natural complement to a federal Renewable Portfolio Standard (RPS) for electricity; some 21 states have RPS policies. Together, EERS and RPS policies can begin reducing carbon dioxide emissions in the U.S. power sector within the next two decades, while keeping electricity prices moderate and economic growth strong. In the transportation sector, fuel economy policies must be used to reduce the growth in fuel use; but the demand for travel must also be addressed. The Committee's jurisdiction allows to pursue directly such important policies as:

[28] California Environmental Protection Agency, "Climate Action Team Report to Governor Schwarzenegger and the Legislature," March 2006

- Setting **prerequisites for federal funding assistance for new transit lines** to ensure that zoning in host municipalities will promote compact development;
- Requiring state and metropolitan transportation plans and programs **demonstrate reductions in mobile source greenhouse gas emissions;**
- **Shifting the allocation formulas for federal transportation dollars** to states to reflect the importance of reducing oil consumption and vehicle GHG emissions.
- Conducting a **study of the climate benefits of smart growth and federal policies** in support of coordinated transportation and land use planning

- **Stronger building efficiency policies.** Buildings are the largest collective driver of carbon emissions, accounting for some 40% of total U.S. emissions. They also contain the largest portion of the nation's energy-using infrastructure: some 80 million buildings, most of which are more than 30 years old. There is vast potential for "mining" the efficiency potential of the American building stock. This can be accomplished by:
  - **Creating stronger building energy codes.** The U.S. government can lead the way by setting the nation's highest standards for building energy performance, beginning with 30% improvement beyond national model codes, and improving to 50%. The ultimate goal of building codes should be a "zero-carbon" standard, wherein the energy footprint of new buildings is kept to minimum, and any remaining energy use is offset by efficiency or renewable energy credits. Congress should also direct the executive branch to work with the national model code process to improve national model code energy performance levels by 30% by 2010 and 50% by 2020.
  - **Accelerating building code adoption and enforcement.** The Committee should consider tying federal funding under its jurisdiction to state adoption and enforcement of the most advanced national model building energy codes from the International Code Council. It should also support authorizations and appropriations to provide technical assistance and implementation support for state adoption and enforcement of better building codes.
  - **Setting and providing funding for efficiency targets for existing buildings.** Previous federal energy legislation, and a recent Executive Order, have set new efficiency targets for federal building energy performance. To support achievement of these targets, Congress should permanently authorize the Energy Savings Performance Contracting (ESPC) program that has been successful in bringing private capital into federal facilities, and should consider federal financing mechanisms to further support these investments. To accelerate efficiency in state-owned buildings, the Committee should consider tying federal funding in its jurisdiction to states' setting and achieving target such as states.
  - **Accelerating progress in appliance and equipment efficiency standards.** The U.S. has made great progress in setting and updating energy efficiency standards for dozens of common household and business products and equipment. For example, all new refrigerators built since 2001 use only about ¼ the energy of comparable models sold in the 1970s. Congress should help accelerate this progress by creating greater flexibility for the Department of Energy's standards program to set standards on a regional basis, to set standards that regulated multiple features of a given product, to preserve states' rights by limiting federal pre-emption of state

standards, and to create an expedited rulemaking process for the growing number of consensus-based standards.

A significant part of America's energy efficiency infrastructure is its research and development institutions. The last 30 years have witnessed a disturbing decline in U.S. energy research and development; federal investment in energy efficiency and renewable energy is only about 1/3 of 1970s levels, and private R&D has also fallen during that time period. As a result, there has been a serious erosion in the capabilities of our national laboratories, our universities, and our state governments to rise to the unprecedented challenges of the 21st century. We urge the Committee to consult with the Science and Energy committees in finding ways to rebuild America's energy efficiency infrastructure, beginning with federal R&D program authorization and appropriations.

Energy and Carbon Savings

ACEEE research shows that new energy efficiency policy initiatives could make a big difference on the energy security and global warming fronts. For example:

- A 2006 ACEEE study finds that we can reduce U.S. oil use by more than 5 million barrels per day by 2020, equivalent to 680 million metric tons of carbon dioxide—nearly 10% of the federal Annual Energy Outlook reference case emissions. Improvements in passenger vehicle fuel economy account for more than 3 million barrels per day of savings, but more than 2 million barrels per day of savings are available in the residential, commercial, and industrial sectors, and in heavy vehicles and airplanes.

- Another 2006 ACEEE study found that doubled efficiency investments in the Regional Greenhouse Gas Initiative (RGGI) cap and trade system for power-sector carbon dioxide emissions would add $13 billion to the regional economy in 2021. This increased energy efficiency investment would reduce average energy bills by up to 12%.

- ACEEE's analysis of Energy Efficiency Resource Standards (EERS) in the electricity and natural gas utilities sectors shows that an EERS target reaching 10% of electricity sales in 2020 would save utility customers a net $29 billion while reducing 2020 carbon dioxide emissions by 343 million metric tons, about 5% of the Annual Energy Outlook reference forecast.

Conclusions

ACEEE's research and experience with energy efficiency in the context of climate policy leads us to several conclusions:

- Efficiency is a very low-cost carbon emissions reduction strategy.
- Efficiency can reduce carbon emissions with positive economic impacts.
- Efficiency resources are a major contributor to the U.S. economy, and their future potential is large.
- Efficiency investments, however, lag far behind their economic potential, because of real and persistent market barriers.

- Conventional economy-wide climate policies, including cap-and-trade and carbon taxes, will not by themselves stimulate the level of additional efficiency investment that would be best for the economy. The structure of cap-and-trade designs tends to keep efficiency out of carbon allowance trading markets, and the relatively weak price elasticity effects of carbon prices limit efficiency investment driven by price signals alone.
- Econometric modeling of climate policy has often been flawed in capture the positive economic effects of energy efficiency investment, and Congress should take a deeper look at these issues.
- Efficiency requires explicit policy treatment in climate policy designs. While an economy-wide approach makes sense as a flexible framework to capture all major GHG emission sources, allowance allocation policies should be used to direct funds to efficiency investments. Also, complementary policies should be used to keep the cost of economy-wide policies down by targeting low-cost resources like efficiency that are locked behind market barriers or blocked by cap-and-trade designs.
- We recommend the Committee examine several of these issues in greater detail, and consider policies to support the greater use of energy efficiency resources in responding to the nation's energy security and global warming challenges.

This concludes my testimony. I thank the Committee for the opportunity to share ACEEE's views on these important topics.

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Testimony of Thomas G. Rader, President, Colorado Railcar, before the House Transportation and Infrastructure Committee, May 16, 2007.

Chairman Oberstar and Ranking Member Mica, thank you for the invitation to discuss with your committee today the significance of global warming in the rail transit industry: How it affects the industry and how the industry can respond to the threat it poses.

I, like you, am old enough to remember the magazine covers and numerous headlines proclaiming eternal winter and the coming ice age. Yet, one does not have to accept all of the theories of the day to realize that the time has come to redouble our efforts to reduce fossil fuel consumption and the consequent emissions.

Furthermore, it is time to utilize all of the tools at hand to accomplish this goal.

The Congress of the United States, and specifically this committee, can take several key steps toward significantly reducing the consumptions of fossil fuel in our country by understanding and encouraging the utilization of technology developed and tested during the last four years.

The ever increasing cost of fossil fuels means that the cost of travel, and specifically commuting, is pushing more Americans to utilize more efficient forms of travel, including rail transit. This growth means that rail system capacities must rise and that new rail systems will be created. You can insure that these expanding and new systems contribute to the reduction in fossil fuel consumption and emissions by encouraging the use of newly demonstrated and efficient technologies like the modern Clean Diesel Multiple Unit Train.

When we study the benefits of the Clean Diesel Multiple Unit Train, it becomes obvious why they are so popular in Europe and elsewhere. When we compare the operation of DMU trains to traditional locomotive hauled trains (in applications where DMUs are appropriate) using data from U.S. transit agencies we get some astounding results that are quite relevant to the subject of today's hearing. Clean Diesel Multiple Unit Trains will produce:

- **50 % REDUCTION IN FUEL CONSUMPTION**
- **68 % REDUCTION IN EMISSIONS**
- **75 % REDUCTION IN NOISE**
- **OPERATING COST REDUCTIONS EQUAL TO TWICE THE CAPITAL COST OF THE DMU OVER ITS 30 YEAR LIFE**

- **REDUNDANT SYSTEMS DESIGNED FOR INCREASED RELIABILTY & SAFETY**
- **SUBSTANTIALLY REDUCED CAPITAL COSTS FOR STATIONS, PARKING TRACKS & MAINTENANCE FACILITES**
- **NO INCREASE IN INITIAL TOTAL CAPITAL COST TO ACHIEVE THESE BENEFITS**

Therefore, the development of this technology and the manufacture of DMUs in the U.S., to U.S. standards, addresses many issues of importance to this committee and to the U.S. citizenry as a whole.

CONTRIBUTE TO ENERGY SECURITY
By reducing the fuel consumption per passenger mile by 50% or more, the DMU technology could save millions of gallons of fuel per year for rail operators. This is a conservation measure whose capital cost is self-liquidating over the life of the railcar. This is a significant source of fuel conservation that will help to reduce our dependence on imports of foreign oil.

CONTRIBUTE TO IMPROVED AIR QUALITY
By reducing engine exhaust emission by 68% or more per passenger mile, the DMU technology could save thousands of pounds of emissions from entering our atmosphere. And not just coincidentally, rail systems where DMUs shows the greatest potential returns are concentrated in many of our non-attainment or near non-attainment areas.

DEVELOP U.S. TECHNOLOGICAL KNOW-HOW
Two years ago I testified that "the principal reason that we had not enjoyed the benefits of DMUs in the U.S. was that there were no U.S. owned manufacturers with the incentive to develop advanced cars for the nascent U.S. market. That in fact, foreign manufacturers had brought their structurally non-compliant railcars to the U.S., demonstrated them and then explained that the U.S. just needed to change its standards of strength and safety so that their non-compliant cars could be operated here. This campaign continues to this day."

Today, I am pleased to report that due the joint funding of the Federal Railroad Administration (at the direction of Congress) and the Florida Department of Transportation, Clean Diesel Multiple Unit Trains are in use in South Florida.

In South Florida they are producing a savings of more than 50% in fuel per seat mile and at least a 70% reduction in emissions per seat mile compared to the older locomotive hauled technology also in service there.

Thus, the development of the technological know-how in the U.S. will assure us that we will never again be deprived of the ability to develop uniquely American products that serve to benefit the American people.

CREATE U.S. MANUFACTURING JOBS

The development of the Clean Diesel Multiple Unit Train in the United States is already creating well-paying manufacturing jobs in Colorado, Oregon, Georgia, Pennsylvania, California, Florida, Illinois and numerous other states. Over 98% of the components of the U.S. Clean Diesel Multiple Unit Train are manufactured in the U.S. and they comprise 92% of the value of the railcar.

MAKE RAIL TRANSIT MORE AFFORDABLE TO AMERICANS
By substantially reducing the operating costs of rail transit operations, the U.S. Clean Diesel Multiple Unit Train makes rail transit a more affordable, efficient transportation option for America. At a time when every cost associated with passenger transport, from highways to airports to trains, is escalating, here is a technology that can actually reduce the cost of a transport mode.

INCREASE SAFETY BY MEETING ALL FRA AND APTA REGULATIONS AND STANDARDS
The development of the U.S. DMU means that no one has to compromise the regulations established by the Federal Railroad Administration and the standards of the American Public Transportation Association in order to have a cost competitive commuter or intercity rail system. No one has to accept a reduced standard of strength or safety in order to enjoy the benefits of a DMU.

In fact, Colorado Railcar has developed the largest passenger cars in the world to FRA standards. These super cars are available as both Clean Diesel self propelled cars or as non-propelled coaches. They make a major contribution to the reduction of the cost of expanding or creating rail transit systems. They are so efficient that they even produce lower total emissions per seat mile than electric train systems while reducing the total system cost by hundreds of millions of dollars.

Yes, it is true, electric vehicles are not "Zero Pollution" as commonly held. They use electricity generated principally by fossil fuels in the U.S. When one uses the average emissions per kilowatt hour of all U.S. electric power generators, the Clean Diesel Multiple Unit Train actually produces fewer total emissions per seat mile than a comparable electric train set. Yet a rail transit system constructed for the Clean DMU will cost literally hundreds of millions of dollars less to build and operate than an electrified system.

How can this Committee insure that expanding and new rail transit systems use the best available technology to reduce fossil fuel consumption and reduce emissions?

First: Encourage the FTA to reward systems that reduce fossil fuel consumption and emissions by increasing the percentage of match for those who meet the goals of reduction.

Second: Work with other committees to assure the continuance of the research and development tax credit that incentivizes U.S. companies to continue to develop advanced technologies that achieve the goals.

Third: Continue to encourage and fund demonstration programs at the FRA which get these new technologies into the field where they can be proven and subsequently adopted by rail transit agencies.

Chairman Oberstar and Ranking Member Mica, I again thank you for this opportunity to appear on behalf of the safe, efficient and already low emissions rail transit industry.

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Statement of Brian Richter
Director, Global Freshwater Initiative
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Before the Committee on Transportation and Infrastructure
May 16, 2007

Mr. Chairman and members of the Committee, thank you for the opportunity to testify on the impacts of climate change on water resources. I am Brian Richter, the Director of the Global Freshwater Initiative for The Nature Conservancy. My comments today will focus on three areas:

- streamflow alteration,
- flood management, and
- ecosystem impacts and adaptation.

The Nature Conservancy is an international, nonprofit organization dedicated to the conservation of biological diversity. Our mission is to preserve the plants, animals and natural communities that represent the diversity of life on Earth by protecting the lands and waters they need to survive. Our on-the-ground conservation work is carried out in all 50 states and in more than 30 countries and is supported by approximately one million individual members. The Nature Conservancy has protected more than 117 million acres of land and 5,000 miles of river around the world. Our work also includes more than 100 marine conservation projects in 21 countries and 22 U.S. states.

The Conservancy owns and manages approximately 1,400 preserves throughout the United States—the largest private system of nature sanctuaries in the world. We recognize, however, that our mission cannot be achieved by core protected areas alone. Therefore, our projects increasingly seek to accommodate compatible human uses, and, especially in the developing world, to address sustained human well-being

Water flowing through natural freshwater ecosystems sustains fisheries, wildlife habitat, recreational opportunities, tourism and many other cultural values. Healthy aquatic systems also provide ecosystem services by absorbing pollutants, recharging ground water, decomposing waste, and generating and distributing nutrients that nourish complex food webs, which extend well beyond river channels and lakebeds to floodplains and estuaries. Properly functioning rivers, lakes and wetlands are the very foundation upon which virtually all living things on earth depend. Failure to protect freshwater ecosystems has tangible societal, cultural and economic consequences.

Climate change is perhaps the greatest long-term threat to the healthy aquatic ecosystems that support people, plants and animals. Prompt action to address this threat is critical to minimize future harm to nature and to the social and economic fabric of our communities. We can already see the effects of a changed climate, including increases in global average air and ocean temperatures, increased precipitation in some areas and more frequent and severe droughts in

others, and an increase in the occurrence of intense weather events. These impacts are here today, and they are projected to continue and, in many cases, intensify in the future.

While the testimony provided today will focus on adaptation strategies in order to avert the most extreme effects, strong action to address the causes of climate change is essential. The Nature Conservancy is calling for legislation and policies that include three paramount concepts:

- A strong cost-effective cap on emissions and a well-designed market-based program designed to stabilize atmospheric greenhouse gas concentrations at a level that ensures the well-being of human communities and ecosystems worldwide. As a member of the U.S. Climate Action Partnership, the Conservancy endorses the coalition's call for specific U.S. emissions reductions to achieve the goal of limiting global atmospheric greenhouse gas concentrations to a level that minimizes large-scale adverse climate change impacts to human populations and the natural environment.[1]

- Reduction of emissions from forest and land-use practices through the incorporation of verified credits from these practices in a cap-and-trade program.

- Support for adaptation programs designed to help ecosystems and the human communities that rely on them to cope with the impacts of climate change.

The principles outlined here recognize that strong measures are needed now to reduce the sources of greenhouse gases that contribute to global climate change, but significant effort is also required to mitigate projected impacts. Uncertainties in future human responses and the persistence of previously emitted gases mean that even with reductions in greenhouse gas emissions, we will continue to feel the effects of climate change for decades to come. It is important for organizations, agencies and individuals to identify strategies and policies to help human communities and ecosystems adapt to a changing climate.

Streamflow Alteration

Freshwater and estuarine plants and wildlife have evolved in concert with and are sustained by the natural variations in water flow that occur seasonally, annually and over the course of many years. The natural, seasonal patterns of rising and falling water levels in lakes, rivers, wetlands and estuaries shape aquatic and riparian habitats, provide cues for migration and spawning, distribute seeds and foster their growth, and enable these highly productive natural systems to function properly. Altering the natural flow pattern takes a serious toll on the plants and animals that depend on it.

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[1] The US CAP's Call to Action states

> "We recommend Congress establish a mandatory emission reduction pathway with specific targets that are: between 100–105% of today's levels within five years of rapid enactment; between 90–100% of today's levels within ten years of rapid enactment; between 70–90% of today's levels within fifteen years of rapid enactment. The short- and mid-term targets selected by Congress should be aimed at making it clear to the millions of actors in our economy and to other nations that we are committed to a pathway that will slow, stop and reverse the growth of U.S. emissions. Furthermore, Congress should specify an emission target zone aimed at reducing emissions by 60% to 80% from current levels by 2050."

The Call to Action and more information on US CAP is available at www.us-cap.org.

Nearly all of our nation's rivers and streams already have unnaturally altered flows due to dams, diversions, channelization and land-use changes. Human impacts such as pollution and unsustainable fishing practices further stress these aquatic ecosystems. Many of these ecosystems have been so altered by human influences that their ability for natural adaptation and response to stress has been compromised. The anticipated changes in climate are predicted to happen at an unprecedented rate, further challenging any natural adaptation capacity. For these reasons, aquatic ecosystems are particularly vulnerable to climate change, which will exacerbate the stresses already induced by other human related activities.

In light of these issues, it is important that policy and on-the-ground adaptation approaches recognize the need to maintain healthy and resilient ecosystems that will preserve their ability to adapt to climate change and to continue to provide for both human and wildlife needs.

Climate Change Impacts

Streamflow patterns rise and fall seasonally with changes in precipitation, evaporation and snowmelt. Flow increases in the spring as snow melts and declines with the higher temperatures of summer. Global climate change will profoundly affect these natural streamflow patterns even more than humans have already altered flow directly. Increases in runoff and earlier spring discharge are expected in many glacial and snow-fed rivers, while higher summer temperatures will increase evaporation and evapotranspiration, in turn leading to reduced/lower summer flows.[2]

Regions across the United States will be affected by these changes in differing ways. Alaska anticipates increased flooding, especially in ecologically critical coastal wetlands. Pacific coastal and Rocky Mountain states expect earlier spring peak runoff, more winter flooding and less summer streamflow. Southwestern states are bracing for lower base flows due to reduced groundwater recharge and for increased flash flooding. Midwestern states may expect more severe droughts and possible steep declines in summer streamflow. The Great Lakes are likely to recede due to reduced tributary streamflow. Northeastern states may contend with large reductions in streamflow and changes in the magnitude and timing of spring floods. Southeastern and Mid-Atlantic states may have lower base flows, larger peak flows and longer droughts. Every region anticipates higher water temperatures, which weaken the ability of freshwater plants and animals to tolerate the other changes.[3] And every region is faced with uncertainty regarding the magnitude and timing of climate change impacts.

These changes in streamflow will also severely impair our ability to meet human water needs. Already, competition for limited water resources between irrigators, municipalities, industrial users and hydropower generators has ignited untold conflict in this country. Even water-rich eastern states are mired in "water wars" that we usually associate with the water-strapped western region. Georgia, Alabama and Florida, for example, have involved no less than twelve federal agencies in attempting to resolve long-standing disputes over water allocation in the

[2] Intergovernmental Panel on Climate Change, Contribution of Working Group II to the Fourth Assessment Report, Summary for Policy Makers, 2007.
[3] http://www.isse.ucar.edu/water_climate/html_map.html (Specific sources for each prediction are fully cited here.)

Apalachicola-Chattahoochee-Flint and Alabama-Coosa-Tallapoosa river basins. Climate-change induced reductions in water supplies during critical seasons will only exacerbate the competition for water nationwide.

It is the government's role to ensure that reduced water supplies are allocated to meet demands justly and efficiently. But it is critical that providing for these competing demands in the face of climate change does not come at the expense of our natural aquatic systems. The key to providing for all demands efficiently is flexibility to adapt in the face of uncertainty. Water-supply systems that are flexible to respond to both short- and long-term changes in streamflow patterns have built-in resiliency to floods, droughts and rising temperatures. And resiliency secures water supplies both for direct human demands and for the healthy aquatic ecosystems that support them.

Comprehensive Water Resource Management

Environmental flows are the amount and timing of water flows required to maintain the components, functions, and resilience of freshwater ecosystems. A well-managed water resource is allocated to people and to environmental flows according to the needs of both.

Fortunately, proven approaches for comprehensively managing water resources for humans and nature already exist. But in the vast majority of the country, water managers still lack the basic knowledge of when and where water is physically and legally available in the basins they manage. Despite the availability of sophisticated water accounting systems, very few are actually applied to real-world regional water management in the United States.

In this respect, Texas leads the nation with its Water Availability Modeling (WAM) system. WAM, which was implemented in 1997 by the Texas Commission on Environmental Quality in collaboration with water users and managers, computes water availability and reliability at 13,000 stream sites within 20 watersheds covering 685,000 square kilometers. By systematically accounting for the cumulative effects of all natural and engineered controls on streamflow, including diversions, return flows and reservoir storage, WAM enables competing demands on each stream segment to be managed efficiently, taking into account both upstream and downstream flow requirements. Through WAM, the state incorporates environmental flow requirements into each new water permit, thus integrating ecological resiliency into statewide water management. Although the state does not currently consider climate change in its permitting decisions, WAM is a flexible tool with the proven capability of modeling the impacts of climate change on water availability.[4]

> **Recommendation:** The ability to manage water comprehensively over entire basins is fundamental to ensuring flexibility in the overall system and is particularly important in the wake of a changing climate. To adapt, it is necessary that all areas of the country adopt and implement comprehensive approaches to water accounting and management.

[4] Wurbs, Ralph A., Ranjan S. Muttiah, and Fabrice Felden. 2005. Incorporation of climate change in water availability modeling. *Jounral of Hydrologic Engineering* 10 (5):375-385; Wurbs RA. 2005. Texas water availability modeling system. *Journal of Water Resrouces Planning and Management* **131**(4):270-279.

Demand Management

Equally critical to adaptive, resilient water resource systems is to have water-demand management plans in place for times of drought. Even in water-scarce western states, innovative drought management has successfully averted ecological disaster without threatening senior water rights. The **Big Hole basin** in **Montana** is one such stirring example. After nearly a decade of chronic water shortages and ensuing conflicts, state and federal agencies, working together with local stakeholders, have implemented rules for voluntary cutbacks in irrigation diversions and sport fishing, triggered by measured drops in streamflow. Meanwhile, applied hydrologic research has targeted irrigation efficiency measures to specific stream reaches where they most benefit the rest of the basin. Finally, The Nature Conservancy and others are working to improve degraded stream habitat to enable water to move more freely downstream, helping to maintain cool temperatures and good water quality in the otherwise drought-stressed river.

Thus, after years of distrust and debate among ranchers and agencies over irrigation water use, compounded by the threat of federal listing of the imperiled Arctic Grayling fish as an endangered species and water rights laws that discourage water conservation, the tables are starting to turn. Working together, the people in the Big Hole basin have shown that strategically reducing consumption during periods of drought and restoring stream habitat increases the resiliency of the river and of both the human livelihoods and native species that depend on it.

> **Recommendation:** As changes in climate increase the likelihood of drought conditions in parts of the country, states and localities should develop demand management plans that enable water users to reduce consumption during periods of drought. Federal funding and policy should support these efforts.

Sustainable Water Storage

Historically, society's response to floods and droughts has been to impound surface water in reservoirs, and to release it as needed. However, a dearth of geologically suitable locations for new dams, a decrease in the reliability of water available to fill dams, and an increased awareness of their ecological consequences, will hinder this response to future hydrologic extremes, even as their frequency and intensity increase. In many areas, an integrated solution can be achieved by managing ground water and surface water together. By artificially recharging excess runoff, depleted aquifers can be transformed into underground "reservoirs" to supplement the flood- and drought-buffering capacity of existing surface-water reservoirs. Existing infrastructure such as irrigation systems can be used to distribute water and recharge aquifers.

Another way to increase storage without building new reservoirs is to increase the capacity of existing dams and manage the stored water in environmentally sensitive ways. Increasing storage behind hydropower dams increases renewable energy production but decreases the capacity for flood control. Floods that are allowed to return to their natural floodplains recharge underlying aquifers, which slowly release groundwater back to the river as cool, steady baseflows. By directing some of the new revenues generated by the additional power production toward floodplain restoration and flood mitigation below the dam, both aquatic ecosystems and electricity consumers benefit. The additional water retained behind existing dams can be released

during exceptionally dry periods, buffering the downstream ecosystem's ability to withstand drought.

> **Recommendation:** Storing water is an important strategy for increasing resilience of both human and natural systems to floods and droughts. Great capacity exists for increasing storage and improving its management within existing infrastructure rather than constructing and maintaining new reservoirs.

Streamflow Restoration

Sometimes, increasing resiliency to climate change means removing infrastructure. Everglades National Park in Florida is removing canals and levees that block natural water movement in order to restore the Everglades' capacity to capture and store water. The restored streamflow will recharge aquifers, creating a freshwater barrier to the landward push of rising saltwater as well as maintaining supplies for human use.

Specifically allocating water for instream flow is a prudent way to hedge against future water demands by ensuring that a sufficient amount of water is not allocated to a consumptive use and remains available for future water shortages. However, most states lack effective legal mechanisms for protecting instream flow allocations from downstream depletion. Although water allocation is administered by the states, the U.S. Environmental Protection Agency and the Army Corps of Engineers, through their federal authority to protect water quality and restore aquatic ecosystems, have the responsibility to protect streamflow for ecological health.

The Army Corps of Engineers has a critical role to play in allocating water for instream flows. The operating procedures for the hundreds of dams that the Corps owns and operates still largely reflect the twentieth-century priorities of providing inexpensive water, power and flood control to encourage settlement and economic growth. The Sustainable Rivers Project, an innovative partnership between the Corps and the Conservancy, has already demonstrated at several sites that dam re-operation to increase instream flow allocations benefits downstream ecosystems while only minimally affecting traditional dam functions.[5] Updating operating instructions by specifically incorporating flow releases that benefit the river ecosystem at the nearly two thousand dams under federal control could do a great deal to improve river health and increase resiliency to climate change.

Flood Management

Climate Change Impacts

Climate change will bring significant implications for flood management, requiring greater attention to preparation and adaptation. Both inland and coastal flooding are expected to increase with climate change. An increase in heavy precipitation events combined with a greater level runoff from glacial and snow-fed rivers will cause more inland flooding in some areas across the

[5] Postel S, Richter B. 2003. *Rivers for Life: Managing Water for People and Nature*. Washington, D.C.: Island Press, p. 92-102

country.[6] Sea-level rise and amplified storm intensity will cause more frequent coastal flooding as well.

Higher floodwaters will cause damage to life and property; and more silt and pollution in rivers. Flooding will also dislodge stored organic carbon (an important food source for many species);[7] reduce breeding habitat for amphibians, migratory shorebirds and waterfowl; and increase erosion.

The Intergovernmental Panel on Climate Change reports that climate change will likely mean more intense hurricanes with higher wind speeds and heavier precipitation. In fact, evidence has shown an increase in storm intensity since about 1970, which has been correlated with higher sea surface temperatures.[8] Coastal flooding and erosion will be exacerbated by more intense storms.

It is important that our responses to this challenge consider the role healthy ecosystems can play in mitigating the impacts of these projected changes in flood regimes. For example, coastal wetlands provide natural buffering capacity for the impacts of storm surges and coastal flooding. Similarly, healthy and functioning floodplains provide greater levels of storage and flood capacity during flood events. As a result, the design of flood protection projects should account for the role of healthy ecosystems and seek to implement a mixture of hard and soft infrastructure instead of purely structural approaches to meet flood control needs.

Non-structural Approaches

A prime example of how such an approach can be implemented is the **Hamilton City Flood Damage Reduction and Ecosystem Restoration project.** Hamilton City is located on the Sacramento River, which is the largest river in California, draining approximately 24,000 square miles and supplying 80 percent of the freshwater flowing into the Sacramento-San Joaquin Delta. Historically, the river was lined by 800,000 acres of riparian habitat. More than 95 percent of this habitat has been lost. The remaining mosaic of riparian and aquatic habitats along the Sacramento River is home to several listed threatened and endangered species, including neotropical migrant birds, all four runs of chinook salmon and steelhead trout.

Hamilton City and surrounding agricultural lands are only marginally protected from flooding by a degraded private levee (circa 1904) called the "J" Levee. The "J" Levee does not meet any formal engineering standards and provides only a 66 percent chance of passing a 10-year flood. As a result, Hamilton City has mounted flood fights and has been evacuated due to flooding six times in the last 20 years, a situation that could be exacerbated with the impacts of climate change.

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[6] Intergovernmental Panel on Climate Change, Contribution of Working Group II to the Fourth Assessment Report, Summary for Policy Makers, 2007.

[7] Poff, N. L., M. Brinson, and J. B. Day. 2002. Freshwater and coastal ecosystems and global climate change: a review of projected impacts for the United States. Pew Center on Global Climate Change, Arlington, VA.

[8] Intergovernmental Panel on Climate Change, Contribution of Working Group I to the Fourth Assessment Report, Summary Report for Policy Makers, 2007

For over 25 years, the community attempted—unsuccessfully—to secure federal engagement in their efforts to reduce the risk of flooding to the town and the surrounding agricultural lands that are critical to the town's economy. It was not until habitat restoration was incorporated into the project that the benefit of the project was deemed sufficient to justify the cost. Project partners collaborated to conduct a feasibility study, which produced a plan with broad bipartisan support. The plan involves construction of a new set-back levee and reconnection of about 1,500 acres of floodplain to the river, which will simultaneously facilitate restoration of riparian habitat and significantly enhance flood protection for the community. This dual purpose project has the potential to be a true "win-win"—by meeting the flood-control needs of the local community and providing greater flood storage capacity in the watershed while restoring riparian habitats and natural river processes.

> **Recommendation:** As we attempt to address greater levels of flooding expected with climate change, we must develop projects such as this setback levee project that recognize the services that ecosystems provide and build these services into the project design. As the primary federal agency responsible for flood management projects, the Army Corps of Engineers should build upon existing projects such as the Hamilton City project and expand planning and design approaches to incorporate the role of ecosystems into flood mitigation efforts.

Reconnection of Floodplains

The ability of many ecosystems to provide ecological services such as flood protection has been degraded. Often, floodplains are disconnected from the river by levees and other development, resulting in the loss of an ecosystem's natural ability to store flood waters and reduce the intensity of floods. As flood events increase in frequency and intensity, it will be important to restore the natural capacity of riverine systems to store flood waters.

Floodplain reconnection is one of the most significant aquatic ecosystem restoration needs for the health of an array of aquatic species. As a result, we must make ecosystem restoration and floodplain reconnection a top funding priority. Moreover, policies should be implemented to discourage development of floodplains and to encourage protection of these resources.

The benefits of floodplain restoration are illustrated by the Conservancy's work at **Spunky Bottoms** in **Illinois**. In the relatively few years since the Conservancy began work at Spunky Bottoms, the landscape has been transformed. Once drained and used for farmland, this land now is a thriving wetland landscape that gets richer in plant and animal life every year.

Restoration at the preserve has included the re-establishment of wetlands and open-water habitats by reducing the amount of water being pumped out of the area. The Conservancy has planted 110 acres of upland prairie and more than 6,500 hardwood trees. The replanted species are thriving, as are other wetland plant species that have re-emerged from a seedbank that survived during the decades that the preserve was farmed. Waterfowl are returning to the preserve in impressive numbers—peaks of more than 16,000 ducks and geese have been documented since restoration began.

The Conservancy now is working with the Army Corps of Engineers to reconnect Spunky Bottoms with the Illinois River. Because river reconnection projects are so rare, the work at Spunky Bottoms provides an important model for similar projects within the Upper Mississippi River system and beyond. A managed connection with the river will provide access for migratory aquatic species, including paddlefish and gar, while mitigating the degradation of the preserve's backwater areas from excessive sedimentation, unnatural water level fluctuations and exotic invasive species. In addition to the immense ecological benefits, reconnection of rivers can serve as a mechanism to reduce the intensity of flood events. Such ecosystem restoration projects provide an alternative to increased investment in levees and other structural approaches.

> **Recommendation:** National policy should fund and create other incentives for approaches such as floodplain reconnection that help human and natural communities adapt to climate change by maintaining and restoring healthy ecosystems. To ensure the ability of natural systems to provide flood reduction benefits, there should also be strong disincentives for new development in floodplains.

Planning Tools

To ensure that water resource projects and land management decisions consider projected impacts of climate change and incorporate ecosystems into decision making, it is important to have planning tools that value the role of ecosystems. The Conservancy is working with partners to develop tools that allow decision makers to use ecosystem-based management to make development decisions with the goal of maintaining an ecosystem in a healthy, productive and resilient condition so that it can provide the services humans want and need. Such an approach is critical if we are going to preserve ecosystems while continuing to provide for human needs in the wake of climate change.

These tools will provide information to decision-makers that helps them better address multiple objectives, such as projected climate impacts, flood protection and wetland restoration. The Conservancy conducted a case study that examined approaches for jointly meeting objectives in biodiversity conservation and coastal hazard mitigation on the Gulf Coast in Florida, which is an area with abundant and diverse wetlands and an area where the hazards from tropical storms and hurricanes have significant impacts on human communities and biodiversity.

In this study, spatial data representing risk and vulnerability to coastal hazards was overlain with information on coastal wetlands that could mitigate some of these hazards. The analysis identified areas to target conservation efforts that would meet both biodiversity and coastal hazard mitigation objectives. Only a small fraction of the total wetlands in the Panhandle (less than 20 percent) are identified in this analysis, which places a priority on a particular set of wetlands that are important for meeting both hazard mitigation and biodiversity objectives. As hurricane intensity is likely to increase and coastal systems are changing due to sea-level rise and other climate-induced impacts, this case illustrates an approach that incorporates multiple objectives into decision-making processes.

More information on this tool can be found at www.marineebm.org

Ecosystem Impacts and Adaptation

In addition to the effects discussed above, climate change will also cause a rise in water temperatures. Water temperature plays a crucial role in the health of river and stream ecosystems and is one of the factors of stream ecology that influences the overall health of the ecosystem. For example, the distribution of species and growth rates of aquatic organisms are determined, in part, by water temperature. Stream temperatures are projected to rise 0.9° C for each 1° C rise in air temperature.[9] In some places, water temperatures have already reached the lethal limits for some fish species. A recent analysis projects that thermally suitable habitat for 57 species of cool- and cold-water fish will decline by 50 percent in U.S. rivers if air temperatures rise by 4° C.[10] As water temperatures rise, the survival of many aquatic species may depend on their ability to migrate upstream to cooler waters. Access to suitable migration corridors is necessary for this movement to succeed.[11] Several states in the Northeast are actively removing old, unused dams that block fish migration. Allowing these fish to migrate to higher elevations and latitudes as temperatures increase may be the key to their surviving climate change.

Increases in water temperature will also have perverse effects on coastal ecosystems, affecting all vital processes including activity, feeding, growth and reproduction of aquatic organisms. Coastal marine systems such as coastal waters, bays and estuaries, and adjacent shorelands such as beaches, dunes and barrier islands are also susceptible to sea-level rise, which will increase the depth of coastal waters. Sea-level rise will also allow salinity to intrude deeper into estuaries, threatening the species that inhabit them. Shorelands are most susceptible to sea-level rise, which will inundate lowlands, erode beaches and increase flooding. Saltwater wetlands may also drown if sea levels rise faster than the wetlands are able to build themselves up.

The Nature Conservancy's Climate Monitoring and Adaptation Work

In order to better understand these changes and how wildlife and ecosystems may adapt, scientists at the Conservancy are actively monitoring these and other climate change impacts around the world. With a growing understanding of present and future scenarios, the Conservancy will be better equipped to help ecosystems cope with warming, changes in precipitation and other impacts of climate change. The following are examples of such projects:

- In the **Albemarle Sound** of **North Carolina**, the Conservancy is developing restoration projects that would help protect the shoreline from increased erosion and inundation caused by rising sea levels. In the Albemarle Peninsula, drainage ditches originally dug to drain farmland now channel salt water inland. This inflow is harming native vegetation and threatening natural diversity. Intrusion is further compounded by high tides and

[9] Schindler, D.W. 1997. Widespread effects of climate warming on freshwater ecosystems in North America. Hydrol Proc.

[10] Poff, N. L., M. Brinson, and J. B. Day. 2002. Freshwater and coastal ecosystems and global climate change: a review of projected impacts for the United States. Pew Center on Global Climate Change, Arlington, VA.

[11] Poff, N. L., M. Brinson, and J. B. Day. 2002. Freshwater and coastal ecosystems and global climate change: a review of projected impacts for the United States. Pew Center on Global Climate Change, Arlington, VA.

storm surges. The Conservancy is working to restore the Peninsula, preparing it for sea-level rise through a variety of efforts such as working with landowners to convert lands to forests, installing floodgates to prevent salt water intrusion, removing hard armoring along the coast, and working with the U.S. Fish and Wildlife Service to incorporate additional adaptation measures in their management plan. The Conservancy is also planting native cypress forests, restoring submerged aquatic vegetation beds, establishing reefs to block storm surges, and planting brackish marsh grasses on shore lands that are likely to be submerged. This work is now being applied to other vulnerable coastal areas along the United States eastern coast and into Central America.

- In **New Mexico**, the Conservancy is conducting a statewide analysis to identify places, species, systems and other natural resources threatened by climate change. The study will also propose measures that land and water managers can take to abate threats to plants, animals and ecosystems.

Climate change will alter landscapes, rivers, streams and seascapes as we know them. Projects such as those listed above will help us analyze the impacts of climate change on plants, animals and natural communities. These projects will also help to create innovative conservation solutions that will enable natural areas to cope with and adapt to what may be the unavoidable effects of climate change.

Recommendation: The Nature Conservancy believes that comprehensive climate legislation should include support for adaptation programs that are designed to help ecosystems and the human communities that rely on them to cope with the impacts of climate change. This should include investment to provide detailed and geographically specific information about the impacts of climate change on specific ecosystems and use of such research to guide ecosystem restoration and management activities. Lastly, while investment in adaptation measures is critical, this work does not abrogate the need for addressing the root causes of climate change; reducing greenhouse gas emissions now can avert the most extreme impacts.

Conclusion

The impacts of climate change on aquatic ecosystems will be profound. Hydrologic flow will be altered, incidents of flooding and droughts will increase, water temperature and sea levels will rise, and hurricane intensity will increase. Failing to protect freshwater and coastal ecosystems from these changes will have tangible societal, cultural and economic consequences. Our response to climate change must recognize the role that healthy ecosystems can play in mitigating these impacts to both humans and natural communities. It is important that all of our policy and on-the-ground adaptation approaches recognize the need to maintain healthy and resilient ecosystems that preserve the ability to adapt in the face of climate change and continue to meet the needs of both humans and wildlife.

In order to enable aquatic ecosystems to provide for human and wildlife needs in the face of a changing climate we must:

- Design water-supply systems that are flexible to both short- and long-term changes in streamflow patterns including increased floods, droughts and rising temperatures.

Specifically, states and localities should develop demand-management plans that enable water users to reduce consumption during periods of drought. Federal funding and policies should support these efforts.

- Allow ecosystems the flexibility to adapt to the changes in streamflow by providing water allocation in a manner that meets both human and ecosystem needs. This includes allocating water to instream uses to hedge against future water demands.
- Adopt comprehensive basin-wide approaches to water accounting and management to preserve the flexibility of the water system to adapt to change.
- Utilize a mixture of hard and soft infrastructure, e.g. setback levees, to protect communities from increased flooding associated with climate change and expand planning and design approaches to incorporate the role of ecosystems into flood mitigation efforts.
- Craft national policy that funds and creates incentives for approaches such as floodplain reconnection that help human and natural communities adapt to climate change by maintaining and restoring healthy ecosystems.
- Invest in applied research on the impacts of climate change on specific ecosystems and provide dedicated funding for ecosystem adaptation efforts.

While critical, these adaptation measures do not lessen the need to address the causes of climate change. As outlined above, measures to reduce greenhouse gas emissions are necessary to avert the most extreme impacts of climate change and must go hand in hand with any adaptation strategies.

Thank you again for this opportunity to testify.

AIA

THE AMERICAN INSTITUTE OF ARCHITECTS

STATEMENT OF
RK STEWART
PRESIDENT

"ENERGY EFFICIENT FEDERAL BUILDINGS"

United States House of Representatives
Committee on Transportation and Infrastructure

May 16, 2007
Rayburn House Office Building

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Introduction

Mr. Chairman, Members of the Committee — good afternoon. I am RK Stewart, the President of the American Institute of Architects.

On behalf of our more than 80,000 members and the 281,000 Americans who work for architecture firms nationwide, I would like to thank you for the opportunity to appear today. I would like to share some of our nation's architects' thoughts on energy consumption and energy efficiency, and how these important topics relate to the most overlooked sector in the climate change debate, buildings: the buildings in which our people live, work, and play.

I commend you for holding this hearing to discuss how our nation's transportation and infrastructure contributes to global climate change. It is vital that any serious discussions regarding the reduction of greenhouse gas emissions--thus mitigating the effects of climate change--must include a dynamic conversation about our nation's buildings. It is critical for this Committee to understand the role of the built environment as it relates to climate change and energy usage, particularly as this committee has jurisdiction over the General Services Administration and, consequently, thousands of buildings owned, operated, and/or leased by the federal government. I feel it would be both useful and interesting for the Committee to learn how buildings designed in an energy-efficient manner can significantly reduce energy consumption and greenhouse gas emissions and slow the effects of climate change.

According to the Department of Energy's Energy Information Administration, buildings and their construction are responsible for nearly half of all greenhouse gas emissions produced in the U.S. every year. DOE's recently released Building Energy Data Book reveals that the building sector accounts for 39 percent of total U.S. energy consumption, more than both the transportation and industry sectors.[1] The same study found that buildings are responsible for 71 percent of U.S. electricity consumption and that *buildings in the United States alone account for 9.8 percent of carbon dioxide emissions worldwide.*[2]

In fact, according to the Department of Energy, U.S. *buildings account for nearly the same amount of carbon emissions as all sectors of the economies of Japan, France, and the United Kingdom combined.*[3]

Buildings Energy Data Book: 3.1 Carbon Emissions *September 2006*

3.1.1 Carbon Dioxide Emissions for U.S. Buildings, by Year (10^6 metric tons of carbon) (1)

	Buildings				U.S.			
	Site Fossil	Electricity	Total	Growth Rate 2004-Year	Total	Growth Rate 2004-Year	Buildings % of Total U.S.	Buildings % of Total Global
1980	172.0	255.2	427.1	-	1281.7	-	33%	8.5%
1990	153.7	317.2	470.9	-	1359.7	-	35%	8.1%
2000	167.4	426.2	593.6	-	1581.3	-	38%	9.1%
2004	**164.7** (2)	**443.4**	(2) **608.1**	-	**1610.2**	-	**38%**	**9.8%** (3)
2010	168.0	502.5	670.5	1.6%	1737.1	1.3%	39%	8.6%
2015	174.8	535.3	710.1	1.4%	1833.4	1.2%	39%	7.7%
2020	179.6	577.2	756.8	1.4%	1942.9	1.2%	39%	7.5%
2025	182.5	627.0	809.5	1.4%	2070.6	1.2%	39%	7.4%
2030	186.0	686.2	872.2	1.4%	2214.6	1.2%	39%	7.3%

Note(s): 1) Excludes emissions of buildings-related energy consumption in the industrial sector. Emissions assume complete combustion from energy consumption and exclude energy production activities such as gas flaring, coal mining, and cement production. 2) Emissions differ from EIA, AEO 2006, Feb. 2006 by less than 0.1%. 3) U.S. buildings emissions approximately equal the combined carbon emissions of Japan, France, and the United Kingdom.

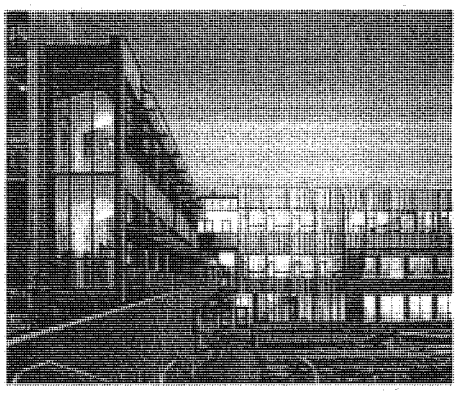
Sources(s): EIA, Emissions of Greenhouse Gases in the U.S. 1985-1990, Sept. 1992, Appendix B, Tables B1-B6, p. 73-74 for 1990; EIA, Emissions of Greenhouse Gases in the U.S. 2003, Dec. 2004, Tables 7-11, p. 28-31 for 1990 and 2000; EIA, Assumptions to the AEO 2006, Mar. 2006, Table 3, p. 9 for carbon coefficients; EIA, AEO 2006, Feb. 2006, Table A2, p. 124-126 for 2004-2030 energy consumption and Table A18, p. 160 for 2004-2030 emissions; EIA, International Energy Outlook 2006, June 2006, Table A10, p. 93 for 2003-2030 global emissions; and EIA, International Energy Annual 2004, July 2006, Table H1, www.eia.doe.gov for 1980-2003 global emission.

Therefore, if we in the United States want to be serious about energy efficiency and energy reductions, buildings *must* become a significant part of the discussion.

Annual U.S. energy consumption is projected to increase by 32 percent over the next twenty five years[4]. The AIA believes strongly that now is the time to act to reverse this course and start making significant reductions in the amount of fossil-fuel generated energy our nation consumes through its buildings.

The data shows that the building sector is only going to become more critical to the discussion. Over the next 30 years, the character of the built environment will change dramatically. Currently, U.S. building stock sits at 300 billion square feet. Experts predict that between now and 2035, 52 billion square feet will be demolished, 150 billion square feet will be remodeled, and another 150 billion square feet will be newly constructed.[5] Because buildings are such a major producer of greenhouse gases, the AIA believes that if Congress and our nation want to address climate change, confronting energy consumption in the next generation of buildings is a vital endeavor. We believe that the federal government can and must take the lead to change the way our buildings use energy.

SHOWING THE PROMISE OF GREEN BUILDING
Sidwell Friends School
Washington, DC



The renovation and addition to the middle school transforms a 55-year-old facility into a school that teaches environmental responsibility by example. The 39,000 ft2 addition more than doubled the size of the existing building, while retaining and enhancing the value of the existing structure. The building was sited to take advantage of passive solar design. Together with high-efficiency lighting, photo sensors, and occupancy sensors, daylighting minimizes energy use. Solar-ventilation chimneys, operable windows, and ceiling fans minimize the need for mechanical cooling. A photovoltaic array generates about 5 % of the building's electricity needs. A green roof and constructed wetland reduce stormwater runoff, improve the quality of infiltrated runoff, and reduce municipal water use. The wetland treats wastewater for reuse in cooling tower.

To reduce energy consumption in the building sector, the AIA believes that architects must advocate for the sustainable use of our earth's resources through their work for clients. To support this principle, in December 2005, the AIA Board of Directors approved an official Institute position stating that all new buildings and major renovations to existing buildings be designed to meet an immediate 50 percent reduction in fossil fuel-generated energy (compared to a 2003 baseline) and that at five year intervals, that reduction target be increased by at least 10 percent until new and renovated buildings achieve carbon neutrality in 2030. Architects across the country have embraced this principle and are currently utilizing design practices that integrate built and natural systems that enhance both the design quality and environmental performance of the built environment. But in order to truly revolutionize the way our nation designs buildings, the public sector, especially the federal government, must also play a role.

This committee alone has jurisdiction over a sizable portion of all buildings in the U.S.[6] Through a combination of both regulation and incentives, we can achieve the goals of greatly reducing fossil fuel generated energy and improving energy efficiency nationwide.

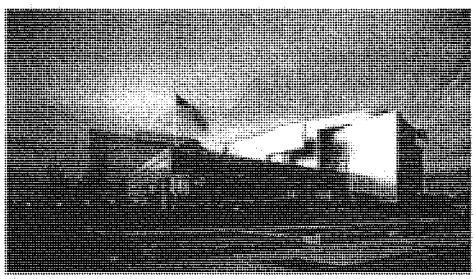
It is important for the federal government to show that energy efficient buildings are both realistic and cost-efficient. Requiring significant energy reduction targets in new and renovated federal buildings will demonstrate to the private sector that the federal government is leading by example. It would help spur the development of new materials, construction techniques, and technologies to make buildings more energy efficient. And it will help show that significant energy reductions are both practical and cost-effective.

The AIA strongly urges Congress to take the lead in the fight against climate change by establishing new energy consumption standards for federal buildings. As Congress has jurisdiction over all federal buildings, Congress can literally show the way for the private sector to attain energy consumption reductions by the built environment.

Federal Building Energy Efficiency

The AIA proposes that federal agencies be required to ensure that new buildings and buildings undergoing major renovations today consume no more than half the fossil fuel generated energy that a similar federal building consumed in 2003.

SHOWING THE PROMISE OF GREEN BUILDING
Wayne L. Morse United States Courthouse
Eugene, OR



Because the courthouse works with high-risk law enforcement and intelligence agencies, courts, judicial offices and highly sensitive government records, the facility has stringent and complex security requirements to protect against bombings as well as ballistic, biological, and chemical attacks. Despite these design challenges, the building provides an architectural expression of judicial presence at a healthy, human scale. The project's energy use was also reduced by approximately 40% through the use of extensive daylighting, shading, high-performance glazing, efficient electric lighting, displacement ventilation, and radiant-floor heating and cooling. At night, air from the building is replaced with ambient air, reducing the cooling load. The building is certified as LEED Gold.

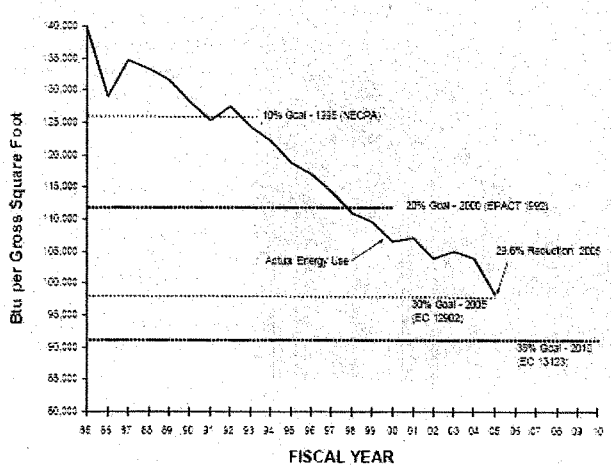
Beginning in 2010, the agencies should then follow a declining cap on energy consumption such that they meet a minimum energy performance reduction when compared to the 2003 baseline. We propose that by 2010, new and significantly renovated federal buildings be required to reduce fossil fuel generated energy by 60 percent. By 2015, the cap would lower to a 70 percent reduction, continuing until 2030 when we would achieve a 100 percent reduction in fossil fuel generated energy in all new federal buildings.

Setting declining caps on energy usage is not a new idea. In 1999, President Clinton issued an executive order requiring energy consumption reductions in all federal buildings; The Energy Policy Act of 2005 extended and deepened these reduction goals, and last year, Governor Bill Richardson of New Mexico signed an executive order calling for a 50 percent reduction in energy consumption for new and renovated public buildings

in the state. And just last month, President Bush issued an executive order requiring federal agencies to reduce energy use by almost a third over a 2003 baseline by 2015. These are important first steps, but we need an aggressive commitment to long term energy reductions for new buildings and major renovations, well into the future.

Energy reduction requirements like these have shown a record of success, as demonstrated by DOE's recently submitted annual report to Congress on Energy Management and Conservation programs. DOE's report found that in 2005, federal agencies responding to President Clinton's 1999 Executive Order had reduced their consumption levels by 29.6 percent, narrowly missing the goal established by President Clinton's Executive Order by only .4 (point 4) percent [see graph below]. This makes it clear that when they are required to do so, federal agencies have the ability to meet reduced energy consumption targets.

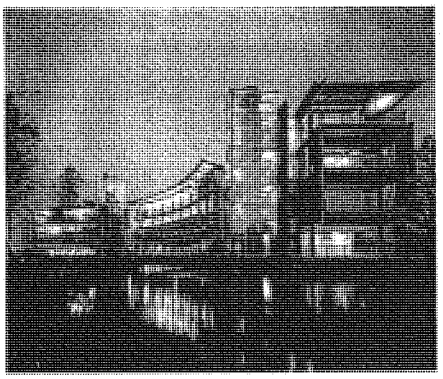
Overall Government Progress Toward the Energy Efficiency Goals for Standard Buildings, FY 1985 through FY 2005
(Certain types of renewable energy purchases are treated as energy reductions)



We encourage Congress to build upon these sound policy steps by taking an even more aggressive stance. Congress should also focus energy reduction goals on new construction and buildings undergoing significant renovations. It is far easier and more cost-effective to address energy usage issues beginning with the design stage of the building process.

Requiring all new and significantly renovated federal buildings to consume significantly less fossil-fuel generated energy is a bold idea, but one whose time has come. It would show the world and the private sector that the United States government believes that climate change is real and that aggressive action is needed in order to reverse its course. It demonstrates that the AIA-recommended energy reduction targets are achievable in

new and significantly renovated buildings, often through little or no additional life cycle costs.



SHOWING THE PROMISE OF GREEN BUILDING
Heifer International Headquarters
Little Rock, Arkansas

This building is designed to use up to 55% less energy than a conventional office building. The narrow, semicircular floor plan provides daylight and views to the adjacent riverfront park and wetland for all 474 employees. A stated goal that zero water leave the site led to the restoration of a wetland on an abandoned railroad switching yard; the wetland collects and cleans stormwater for reuse.

Architects across the country are designing high performance or "Green Buildings" that are environmentally responsible, healthy places to work, and economically practical. We are doing this through the use of better planning, technological tools and smarter material selection that incorporate natural heating, cooling, ventilation, and day-lighting strategies. The AIA's Committee on the Environment (COTE) annually recognizes such accomplishments in its Top 10 Awards for Sustainable Design. Federal buildings can and should be built in ways that reduce energy consumption and decrease the amount of greenhouse gases they produce, as demonstrated through COTE's Top 10 Awards.

The Cost of Building Green

In my professional experience, the primary concern I hear from clients about building "green" is cost. It is true that some energy efficient building systems may cost slightly

more than their traditional counterparts. However once the building is in operation, the savings in energy expenditures alone often far outweigh the initial costs of installing "green" systems. While there have been some studies to date that show this, the AIA is currently working with a team of economists to research the economic benefits of energy efficient federal buildings. This study will analyze the estimated energy and dollar savings that federal government would realize by implementing our energy reduction goals for federal buildings over the lifespan of the building. We expect to have the study complete by this summer and we would be happy to submit it for the record. Other sources, most importantly the noted cost consultant Davis Langdon, argue that the cost of sustainability is statistically insignificant to a project's total cost.[7]

The economic value of energy reductions from federal buildings can be seen by looking at previous energy reduction mandates in federal buildings. Because of federal legislation and President Clinton's 1999 Executive Order, federal agencies consumed nearly 30 percent less energy per square foot in 2005 compared to 1985. As a result of this improved energy efficiency, the federal government saved approximately $2.2 billion on energy costs in standard federal buildings in 2005 when compared to 1985. While there are clearly other factors aside from federal energy management activities that go into this reduced spending, improved energy efficiency and energy reduction clearly played a large role.

America is Ready

Finally, the American public believes the time is now to reduce energy usage and reduce the impacts of climate change. The Tarrance Group and Lake Research Partners recently conducted a nationwide poll of voters and found that 74 percent of those polled agreed that "the government should take the lead in promoting real estate development that conserves our natural resources." In addition, 71 percent of voters agreed that "the government should immediately put into effect new energy policies that drastically reduce greenhouse gas emissions." The American public supports conserving our precious resources, and believes that it is in the best interests of our nation and the world to reduce our reliance on fossil fuel produced energy and move towards a sustainable future. Reducing energy use in federal buildings would be a major step towards that goal.

We encourage Congress to consider our proposal, and I welcome any questions from the committee. Thank you Mr. Chairman and members of the committee.

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[1] http://buildingsdatabook.eere.energy.gov/docs/1.1.3.pdf
[2] http://buildingsdatabook.eere.energy.gov/docs/3.1.1.pdf
[3] http://buildingsdatabook.eere.energy.gov/docs/3.1.1.pdf
[4] http://www.eia.doe.gov/oiaf/ieo/pdf/ieoreftab_1.pdf
[5] http://www.architecture2030.com
[6] http://www.eia.doe.gov/emeu/cbecs/cbecs2003/introduction.html
[7] Matthissen, Lisa and Morris, Peter. "Costing Green: A Comprehensive Cost Database and Budgeting Methodology. June, 2004; Davis Langdon.

House Transportation and Infrastructure Committee

"Climate Change and Energy Independence: Transportation and Infrastructure Issues"

May 16, 2007

Room 2167, Rayburn House Office Building
Washington, D.C.

Testimony of

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Testimony of

Linda Strout,
Deputy Chief Executive Officer
Port of Seattle

Before the

House Transportation and Infrastructure Committee

May 16, 2007

Good afternoon. My name is Linda Strout, and I am the Deputy Chief Executive Officer of the Port of Seattle. Today I am testifying on behalf of the U.S. members of the American Association of Port Authorities. AAPA represents all major public seaport agencies on the Pacific, Atlantic, Gulf and Great Lakes coasts. Thank you for the opportunity to testify today. Air emissions are an area of growing concern for U.S. public port authorities and the communities in which they operate, and reducing air emissions is a priority for the port industry.

The Port of Seattle and many AAPA members have been engaged in air quality improvement efforts related to seaports for several years; recently those efforts have grown to include greenhouse gases. Greenhouse gas emissions related to ports are primarily carbon dioxide formed whenever fuel is burned; efforts to reduce these emissions have therefore focused on increasing fuel use efficiency. Because of the prevalence of diesel engines in and around commercial seaports, port authorities are making efforts to reduce air emissions. Lowering the amount of diesel particulate matter, or DPM, and oxides of nitrogen, or NOx, and oxides of sulfur, or Sox, released into the air is of benefit to communities near ports, port workers and the sustainability of the natural resources needed to keep U.S. ports competitive in the midst of growing overseas trade.

Diesel engines power the yard equipment that handles containerized cargo, such as rubber-tired gantry cranes and yard hostlers, and they also power the trucks, rail engines and marine vessels used to bring cargo into and out of ports. While remarkably efficient and durable, these engines can be sources of air pollution.

Older engines are the biggest problems. While new on-road and off-road engines on land will be subject to more stringent regulations promulgated by EPA in the past six years, so-called "legacy engines" can operate for as many years as they are capable without meeting the stricter standards of the present. Replacing these engines is a costly proposition, as they often have many more years of useable life ahead of them. However, the air quality benefits are significant.

Reducing Emissions from Legacy Engines at Commercial Seaports

There are a number of ways to reduce emissions from diesel engines. One of the most popular approaches used by the port industry is that of refueling, or using a type of fuel other than conventional diesel. This may include the use of biodiesel, a biodiesel blend, ultra low sulfur diesel (ULSD), electricity or natural gas.

The Port of Seattle has recently opened a compressed natural gas station that fuels all port-owned natural gas vehicles and is open for ground transportation operators and others that make regular trips to the Sea-Tac Airport. All yard equipment at the port's two largest container terminals use ULSD or a biodiesel/ULSD blend of fuel. All of the port's diesel-powered vehicles are fueld by 99% biodiesel in ULSD. In addition, the Port has made biodiesel available at its Shilsole Bay Marina and all yard equipment at the port's two largest container terminals use biodiesel fuel. The other major container terminal operates its cargo handling equipment on ULSD. All of the port's diesel-powered vehicles are fueled by 99% biodiesel in ULSD.

Most of the diesel equipment used at the Port of Tacoma is also operated on ULSD. The Port of Tacoma and one of this major operators use biodiesel in all of their diesel equipment.

The Port of Long Beach is testing three liquefied natural gas (LNG) yard hostlers, which the port estimates will produce a 60 percent reduction in NOx and an 80 percent reduction in PM over conventional Tier II diesel engines.

Another type of repowering is that of using electricity in places where diesel had been used for fuel. The Port of Los Angeles has instituted Alternative Maritime Power, or AMP, for its China Shipping Terminal and plans to make all terminals AMP-ready as part of its joint San Pedro Bay Ports Clean Air Action Plan with the Port of Long Beach. At the Port of Seattle, Princess Cruises and Holland America ships now use shoreside power when they are in port. When ships use shoreside power, so-called "hotelling" emissions are drastically reduced. At most major seaports, including the Port of Seattle, the large cranes used to transfer containers between ships and terminals are all electric and ports usually provide plugs on terminals for powering refrigerated containers instead of using diesel engines.

However, shoreside power for ships is not a one-size-fits-all solution. It requires substantial infrastructure on the landside and retrofitting ships on the water side. It is not a cost-effective solution for ports where the same vessels do no call frequently throughout the year. There are other things that ships and ports can do to significantly reduce ship emissions besides AMP.

Using cleaner fuels is just one way that port authorities are reducing air emissions within their facilities. Repowering equipment that uses older, legacy engines has proven to be an effective strategy as well.

Within the facilities of the Port Authority of New York and New Jersey, APM Terminals has achieved significant reductions in emissions by using on-road engines in off-road equipment used for cargo handling. At the Port of Los Angles, APM terminals achieved significant reduction in emissions by equipment turnover and emissions reduction strategies including the

use of on-road engines on yard tractors, as well as the use of ultra low sulfur diesel for diesel equipment. It is estimated that despite a 13% increase in the number of pieces of equipment in the fleet and a 31% increase in cargo throughput from 2002 to 2005, cargo handling equipment emissions decreased between 77 and 84%. Much of this was due to use of on-road tractors. While on-road engines will not work in all applications, they provide significant emissions reductions when they are appropriate for off-road applications.

Another popular emissions reduction strategy in use at port authority facilities is that of retrofitting older diesel engines with a piece of after-treatment technology, such as diesel particulate filters, selective catalytic reduction systems or diesel oxidation catalysts. For example, the Port Authority of New York and New Jersey has retrofitted one of the Staten Island ferries with two types of retrofit technology to achieve a more than 70 percent reduction in NOx. The Port of Seattle has installed diesel oxidation catalytic converters on all eligible yard equipment at our container terminals. I want to thank the federal government for providing grant monies that have allowed us to retrofit this equipment. The project was funded by a combination of public private investment from the Port of Seattle, the US EPA, the Puget Sound Clean Air Agency and the private terminal operators.

Addressing Emissions Outside Port Fencelines

Ocean going vessel owners and operators are taking steps that lower emissions too. Some like Westwood Shipping Lines have chosen engines that are certified to cleaner standards. The cruise industry in Seattle has agreed to use lower sulfur fuels in their main engines while in port. Many cargo lines, such as APM and APL at the Port of Seattle have also switched to much cleaner fuels.

Manufacturers of emissions control technology are also finding applications of after-treatment technology for vessel engines. A promising type of retrofit technology is the seawater scrubber, which significantly reduces sulfur and PM from vessel emissions. The Port of Seattle and the Vancouver Port Authority are currently working with Holland America Line and with US EPA, Environment Canada, the Puget Sound Clean Air Agency and others on a seawater scrubber demonstration project.

While port authorities are taking more proactive steps to reduce their emissions and in many cases are working with their tenants to achieve emissions reductions, these gains are happening primarily on the land sides of ports and harbors, within marine terminals. However, air emissions within port areas also come from sources outside port gates.

Truck and rail emissions, while not under the control of port authorities, can contribute to poor air quality in a port area. While new truck engines must comply with the EPA's on-road standards, older legacy engines can contribute a disproportionate amount of air emissions. While port authorities do not own the trucks that service their terminals and therefore cannot mandate when older engines are retired or whether they are retrofitted, many port authorities have taken steps to reduce idling at their gates. Another barrier to addressing truck emissions is the

prevalence of independent owner-operators, who often do not have the capital to upgrade their vehicles before the engines have become useless.

The Georgia Ports Authority has created an online WebAccess system that allows truck drivers to alert the terminal prior to their arrival and submit much of their gate transaction data ahead of their arrival. This system has reduced truck turn times by 30 percent and has realized a significant reduction in truck idling at the gate. The Port Authority estimates that their gate system saves a ton of NOx and 33 tons of carbon dioxide on a peak day.

In California, the Ports of Los Angeles and Long Beach recently unveiled a San Pedro Bay Ports Clean Air Action Plan, which has a significant component aimed at reduction emissions from independent trucks that call on the ports. Under the Clean Trucks Program, the ports will use their tariff authority to only allow operators using "clean trucks" to enter port terminals without having to pay a new Truck Impact Fee at the gate. The port will waive the fee for trucks that use EPA-standard 2007, or newer trucks, retrofitted trucks manufactured in 1994, or newer, or trucks that have been replaced through the Gateway Cities Truck Modernization Program.

This program will build on the successful PierPASS program, which uses a congestion pricing model that charges truck operators a fee to access the ports during peak hours. Since its operation in July 2005, the program estimates it has saved more than 5 million truck trips during daytime hours in Los Angeles and Long Beach. Slightly more than one third of all truck trips in and out of the two ports now occur during off-peak hours.

Addressing vessel emissions also remains a high priority for public port authorities. Because the majority of vessels calling on U.S. port facilities are foreign-flagged, they are not regulated by the EPA. The International Maritime Organization (IMO) sets standards for these vessels.

In 1997, the IMO adopted Annex VI of the International Convention for the Prevention of Pollution from Ships, or MARPOL. This treaty, which entered into force in May 2005, sets more stringent oxides of sulfur, or SOx, and NOx standards for oceangoing vessels. It also allows for the creation of Sulfur Emissions Control Areas, following the petition of individual countries or groups of countries and the approval of the agency. The US has recently proposed strengthening these requirements.

AAPA supports legislation to implement the MARPOL Annex VI treaty as quickly as possible. We applaud this Committee's leadership in the swift passage of H.R. 802 this Congress, and we urge the Senate to address the issue expeditiously as well. It is critical that the United States become party to this treaty, which is the necessary regulatory mechanism to mandate lower ship emissions. Implementation of MARPOL Annex VI is supported by the shipping industry as well as the port industry.

Federal Support for Voluntary Efforts to Reduce Emissions

In order to more effectively reduce emissions on the landside of port operations, AAPA encourages Congress to fully fund the Diesel Emissions Reduction Act, or DERA. This

legislation, which was enacted as part of the Energy Policy Act of 2005, would allow for up to $200 million annually for the EPA to fund voluntary emissions reduction projects at ports, in construction equipment, in school bus fleets and in the movement of freight.

To date, EPA has funded 11 port-related projects with $1.9 million in federal funds and $2.5 million in matching funds. Some of the projects have included installing diesel oxidation catalysts on cargo-handling equipment at the ports of Philadelphia, Seattle, Houston, Tacoma and the Massachusetts Port Authority, as well as buying low sulfur fuel for cruise ships in San Francisco. US EPA grant funding also supported the landmark regional maritime emissions inventory for the Puget Sound region that was recently completed by a collaborative group of air agencies, industry, ports, and advocacy groups, which was led by Port of Seattle.

DERA funding addresses an important issue in the voluntary reduction of emissions: the high cost of replacing, retrofitting, refueling or repowering equipment that still has a foreseeable long life with its existing diesel engine. In most cases, because port authorities, terminal operators and other equipment owners are wary to incur a significant cost associated with lower emissions from equipment that is still useable for the immediate future, they are not as likely to undertake an emissions reduction project that will result in a net financial loss. However, grant funding through DERA makes an emissions reduction project less costly and therefore more attractive.

Another way the federal government can help reduce port-related air emissions is to pass legislation that would encourage short sea shipping by eliminating the double collection of the Harbor Maintenance Tax on domestic movements. Getting rid of a financial barrier to the coastwise movement of cargo will encourage shippers to move more goods by America's 'water highways,' thereby taking trucks off the interstates and reducing air pollution. AAPA wishes to commend Chairman Oberstar and Subcommittee Chair Cummings for their leadership in introducing H.R. 1499. We urge the Ways and Means Committee to act quickly on this bill.

Port Industry Steps to Improve Environmental Performance

In addition to work being done at individual ports to reduce air emissions, the U.S. port industry is taking steps to help its members be more environmentally pro-active. Led by the Port of Seattle, AAPA adopted a resolution last fall in support of alternative fuels. Citing the recognition that alternative fuels can increase energy security and that diesel engines are generators of air pollutants and greenhouse gases, the Association resolved to "encourage member ports to use alternative and substantially cleaner conventional fuels, equipment with advanced pollution control technologies, efficiency improvements, and other strategies to increase energy independence, reduce air pollution, and contribute to domestic economic vitality where feasible and practicable."

The port industry is also taking steps to define and implement sustainability. Recognizing that ports need to ensure the natural resources, human capital and financial means for the future, AAPA has formed a Port Sustainability Task Force to define the issue for the industry and develop a plan to help ports enact sustainability policies and practices that protect the coastal

environment, their relationships with the communities in which they operate and their financial health.

Conclusion

AAPA and its member ports recognize that the movement of cargo by water, while more energy- and cost-efficient than by air or by land, has an environmental impact on port communities while bringing with it tremendous economic benefits. But U.S. ports are taking steps, collectively and individually along with their tenants and customers, to reduce air emissions for the benefit of their communities, workers and regions. The federal government can help the port industry by enacting legislation to implement MARPOL Annex VI, which will address emissions from oceangoing vessels, and by fully funding the Diesel Emission Reduction Act, which will help port authorities voluntarily reduce emissions from legacy diesel engines on the landside of operations.

I want to add a Port of Seattle request before I close. The older trucks coming into our terminals are one of the biggest barriers to even more emissions reductions. I would like to work with the committee on a program that would allow these older, more polluting trucks to obtain retrofit assistance. The Port of Seattle intends to work with AAPA on creating a formal legislative proposal.

Thank you for the opportunity to testify today, and I look forward to answering any questions you may have.

STATEMENT FOR THE RECORD

BY

ALLAN McARTOR
CHAIRMAN, AIRBUS NORTH AMERICA

House Transportation and Infrastructure Committee
Hearing on Transportation Climate and Energy Issues

May 16, 2007

Thank you, Mr. Chairman, for holding this hearing on issues of critical importance to both the United States and the world. I am pleased to submit this statement for the record detailing Airbus' commitment to protecting the environment and improving energy efficiency in the production and operation of our aircraft.

The protection of the environment is one the greatest challenges of this century. Airbus is committed to dramatically enhancing energy efficiency and minimizing the environmental impact of our aircraft and our production processes. This is not just a matter of altruism, Mr. Chairman. Indeed, Airbus management has made it abundantly clear that the future of this industry and our company is linked to the achievement of these twin goals.

To quote the President and Chief Executive Office of Airbus, Louis Gallois, *"The integration of environmental considerations in our decisions is vital to ensure the sustainable development of our business. Since its creation, Airbus has been striving to optimize the environmental performance of its products and processes... Continuing and intensifying our efforts is a matter of responsibility. The environmental challenge is also an opportunity to foster innovation, enhance competitiveness and develop business by closely addressing the expectations of the aerospace and global communities to foster innovation, enhance competitiveness and develop the business."*

Airbus' commitment to environmental excellence is embodied in policy through of our Environment, Health and Safety (A03) program. The implementation of the Airbus Environmental Management System, EMS, which encompasses site activities and products through a life-cycle approach, has made considerable progress in the last two years.

We thought the Committee might benefit from a brief review of Airbus' efforts to improve the energy efficiency of our aircraft, production facilities and processes. More information can be found on our website, at www.Airbus.com.

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Airplane energy efficiency improvements:

Airbus supports the Vision 2020 of the Advisory Council for Aeronautics Research in Europe (ACARE), which addresses the environmental research challenges faced by the aerospace industry. Airbus is fully committed to achieving the ambitious environmental objectives, which are:

- 50 percent reduction in fuel consumption and associated carbon dioxide emissions
- 80 percent reduction in nitrogen oxide emissions
- 50 percent reduction in perceived noise

Indeed, Airbus is well on its way to meeting these critical objectives by the 2020 deadline. Airbus' newest aircraft, the A380, which enters service later this year, will be the most environmentally friendly large passenger aircraft on the market. It will:

- Reduce per seat fuel burn by 17 percent over the Boeing 747-400
- Reduce the emissions of hydrocarbons by 39 percent over the Boeing 747-400
- Reduce the emissions of carbon monoxide by 23 percent over the Boeing 747-400
- Reduce the emissions of nitrogen oxide by 14 percent over the Boeing 747-400

The Airbus A380 is the first long-haul aircraft that will average more than 80 miles per passenger per gallon of fuel. That is equivalent to the amount of fuel per mile used by a Ford Taurus with three people on board.

Not only will the A380 use significantly less fuel and emit significantly fewer emissions than its closest competitor, it also will significantly reduce noise pollution. The noise contour surface, or the area around an airport that hears an airplane taking off, is 37 percent smaller for an A380 than a 747-400. This reduction will dramatically improve the lives of the communities surrounding the world's busiest airports.

I have included with my testimony a series of slides that detail the environmental benefits of the Airbus A380.

Airbus will continue to strive to be an industry leader in this area, producing the quietest and most energy efficient airplanes on the market. The A380 sets the benchmark for fuel efficiency and low noise levels. We expect our future aircraft will push the envelope even further.

Environmentally Friendly Production Facilities

Airbus has voluntarily set challenging targets for the reduction of the environmental impact of its operations, and in particular, for resources, materials and hazardous substances used.

In an aerospace industry first, Airbus received the International Organization for Standardization (ISO) 14001 environmental certification in December 2006, which covers the entirety of the company's 16 production sites, as well as all of its airliner products throughout their lifecycle.

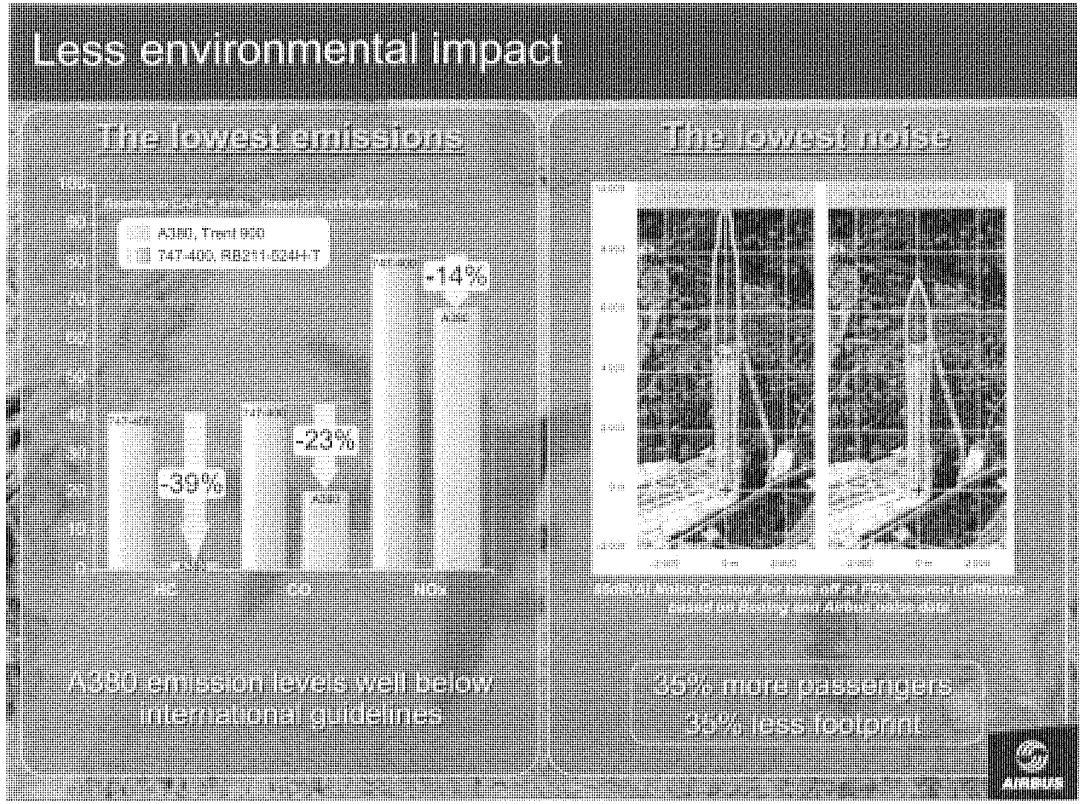
The highly respected Det Norske Veritas (DNV) Company issued this certification following an Airbus-wide audit. In so doing, DNV recognized Airbus' application of a robust environmental management system (EMS) to continually monitor and minimize the environmental impact of its production processes and the company's products throughout their lifecycle. The life cycle covers design, procurement, manufacturing, transport, and in-service operations including maintenance, aircraft end-of-life and recycling.

Environmental innovations pursued by Airbus in the production process include the pioneering use of a greener, chemical-free milling process for fuselage panels; more environmentally friendly painting processes; and steps to minimize energy and water consumption during the production cycle.

Airbus has been steadily increasing aircraft production rates over the last several years, from 378 in 2005 to 420 last year. Our production is projected to rise to 450-60 this year. Still, through effective EMS management, we will continue to improve our environmental performance.

Again, Mr. Chairman, Clearly, competition and self-preservation are extremely important motivators, driving us to improve our products and processes. We thank you for bringing needed focus on these issues. I hope you and the members of the Committee would contact me should you have any questions regarding Airbus's commitment to achieving lasting gains in energy efficiency and environmental control.

A380 less fuel burn per passenger
The lowest fuel burn per seat
Operator
A380
B747
A340
B744
-17%
-26%
Based on manufacturer's data
Flight time: 7h
Payload: 40 passengers
Fuel burn: 10 tonnes
Fuel burn per passenger: 250 kg
Fuel burn per passenger: 6.25 litres
Fuel burn per passenger per 100 km: 2.5 litres
Fuel burn per passenger per 100 km: 2.5 litres
AIRBUS A380
5


Less environmental impact
The lowest emissions
A380, Trent 900
747-400, RB211-524H-T
-39%
-23%
-14%
HC
CO
NOx
A380 emission levels well below international guidelines
The lowest noise
35% more passengers
35% less footprint
AIRBUS