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CONSTRUCTING A GREEN TRANSPORTATION POLICY: TRANSIT MODES AND INFRASTRUCTURE

HEARING

BEFORE THE

SELECT COMMITTEE ON
ENERGY INDEPENDENCE
AND GLOBAL WARMING
HOUSE OF REPRESENTATIVES

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CONSTRUCTING A GREEN TRANSPORTATION POLICY: TRANSIT MODES AND INFRASTRUCTURE

THURSDAY, MARCH 19, 2009

HOUSE OF REPRESENTATIVES,
SELECT COMMITTEE ON ENERGY INDEPENDENCE
AND GLOBAL WARMING,
Washington, DC.

The Committee met, pursuant to call, at 9:38 a.m., in room 2203 of the Rayburn House Office Building, Hon. Edward Markey (Chairman of the Committee) presiding.

Members present: Representatives Markey, Blumenauer, Inslee, Herseth Sandlin, Cleaver, Salazar, Speier, Sensenbrenner and Blackburn.

Staff present: Danielle Baussan.

The CHAIRMAN. Good morning, and welcome to the Select Committee on Energy Independence and Global Warming. Today our hearing is on a green transportation policy.

At the end of this year, the Nation's primary transportation legislation, the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users, will expire. Congressional reauthorization of a surface transportation bill will occur at a pivotal time for the country, for Congress and for the climate. As Congressional leadership and the Obama Administration continue to work towards goals of energy independence and fighting climate change, transportation's contribution to global warming and the potential to improve climate conditions cannot be ignored. This is underscored by the 89 percent of Americans who believe that transportation investments should support the goal of reducing energy use. The U.S. transportation sector is responsible for approximately one-third of our country's greenhouse gas emissions. About 60 percent of these emissions are from passenger vehicles. The United States has 4½ percent of the world's population and 30 percent of the world's automobiles. Seventy-seven percent of Americans use a single passenger car to commute.

There are signs that the United States is moving in a new direction. Studies show that we are now driving shorter distances and taking mass transit in record numbers. Transportation legislation should respond to this public demand and support mass transit as a way to reduce greenhouse gas emissions. Such legislation should also look at all modes of transit. This includes the often-overlooked vehicle of our own feet. Biking and pedestrian policies are thriving

in communities large and small, urban and suburban, and as my colleague, Mr. Blumenauer, will tell you, sunny and rainy.

A discussion of climate change legislation and transportation reauthorization would be incomplete without examining transportation infrastructure policies and practices. This includes the materials used in our roads and bridges, the machines that move them and the people who build them. Transportation emissions don't start at the end of the tailpipe. Supporting lower-energy manufacturing procedures and recycling for common transit materials can also reduce every ounce of CO_2 from the transportation sector along with fuel-efficient heavy-duty machinery. Renovating existing infrastructure to reflect low-impact design standards improves water runoff and can increase air quality.

Congress must reroute its approach to transportation policy. It must be acknowledge the indivisible link between transportation and climate change by giving the public choices in transit. People should drive because they want to, not because there is no sidewalk leading to the train station or because the city bus system does not expand into the suburbs. By doing this, transportation policy helps meet our President's environmental goal to reduce greenhouse gas emissions and put a stop to global warming. Congress can compound this environmental benefit by supporting low-carbon fuels, vehicle efficiency technologies and actions that reduce the emissions inherent in our transportation system.

In a few short months, a climate bill and a transportation bill will be presented to Congress. We must make sure that these bills reflect the transportation needs of the public and the environmental needs of the planet.

That concludes the opening statement of the chair.

[The statement follows:]

Statement of Rep. Edward J. Markey
"Constructing a Green Transportation Policy: Transit Modes and Infrastructure."
March 19, 2009

At the end of this year, the nation's primary transportation legislation, the *Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users* will expire. Congressional re-authorization of a surface transportation bill will occur at a pivotal time for the country, for Congress, and for climate. As Congressional leadership and the Obama administration continue to work toward goals of energy independence and fighting climate change, transportation's contributions to global warming and the potential to improve climate conditions cannot be ignored. This is underscored by the 89 percent of Americans who believe that transportation investments should support the goal of reducing energy use.

The U.S. transportation sector is responsible for approximately one-third of our country's greenhouse gas emissions. About 60 percent of these emissions are from passenger vehicles. The United States has four and a half percent of the world's population and 30 percent of the world's automobiles. 77 percent of Americans use a single passenger car to commute. But there are signs that the United States is moving in a new direction. Studies show that we are now driving shorter distances and taking mass transit in record numbers. Transportation legislation should respond to this public demand and support mass transit as a way to reduce greenhouse gas emissions. Such legislation should also look at all modes of transit. This includes the often-overlooked vehicle of our own feet. Biking and pedestrian policies are thriving in communities large

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Congress must re-route its approach to transportation policy. It must acknowledge the indivisible link between transportation and climate change by giving the public choices in transit. People should drive because they want to—not because there's no sidewalk leading to the train station, or because a city bus system does not expand to the suburbs. By doing this, transportation policy helps meet our President's environmental goal to reduce greenhouse gas emissions and put a stop to global warming. Congress can compound this environmental benefit by supporting low-carbon fuels, vehicle efficiency technologies, and actions that reduce the emissions inherent in our transportation materials.

In a few short months, a climate bill and a transportation bill will be presented to Congress. We must make sure that these bills reflect the transportation needs of the public and the environmental needs of the planet. Thank you.

The CHAIRMAN. We now turn and recognize the ranking member of the Select Committee, the gentleman from Wisconsin, Mr. Sensenbrenner.

Mr. SENSENBRENNER. Thank you very much, Mr. Chairman. At the beginning, let me apologize for leaving after my opening statement but the Judiciary Committee is having a hearing on ACORN's intimidation of voters and stuffing the ballot box, and fair elections, I think, are a capstone of democracy so I will be going there.

President Obama's budget blueprint recently estimated climate change revenues, which is taxes by any other name, of $646 billion by 2019. While this would represent one of the largest new taxes in our country's history, President Obama's estimates are likely low. A top White House economic advisor recently told Senate staff that the actual revenues could be two to three times higher. The global warming tax could reach nearly $2 trillion.

Today we will receive testimony on parts of one sector of our economy, transportation, that will come under the new regulations and taxes under the Administration's proposal. In assessing climate change legislation, I have repeatedly stated that there are four principles that I will use to assess it: impacts on the economy, environmental improvement, international inclusiveness and technological development. Today's hearing provides a great opportunity to focus on how technology can improve our transportation sector.

This January I wrote EPA Administrator Lisa Jackson to highlight a Duke University study that found that 75 percent of respondents misjudged relative fuel savings when efficiency was expressed in miles per gallon. By contract, 64 percent accurately judged savings when the efficiency was expressed in gallons per mile. For example, in over 10,000 miles of driving, an improvement from 10 to 20 miles per gallon saves substantially more fuel than an improvement from 20 to 40. An improvement from 10 to 11 miles per gallon saves nearly as much fuel as an improvement from 33 to 50. This means that the greatest fuel savings will come from improving the least-efficient vehicles. Thus, trucks are the low-hanging fruit in reducing fuel consumption. Despite this, federal policy has focused almost exclusively on promoting hybrid passenger cars. According to the Oshkosh Corporation, there are 90,000 refuge trucks in the United States, meaning garbage trucks. Replacing these trucks with hybrids would result in the same fuel savings as replacing 2½ million passenger cars. Ten thousand hybrid trucks would save 7.2 million gallons of diesel each year and would reduce emissions by 83,000 tons. This would be like taking every car in New York City off the road for 25 days. As today's witness, John Boesel, the president and CEO of CALSTART, wrote in his testimony, because of their high mileage and fuel use, medium- and heavy-duty vehicles alone make up 7 percent total greenhouse gas emissions.

To remedy this oversight in federal policy, I have introduced the Heavy-Duty Hybrid Truck Research, Development and Demonstration Act of 2009. The Hybrid Truck Act is a bipartisan bill that will create the federal government's first grant program exclusively designed to promote hybrid trucks. This bill can help truck manufacturers overcome technological hurdles and to reduce the economies

of scale. It will result in more hybrid trucks, less fuel consumption and lower emissions. The hidden tax will be added to our electric bills and into the cost of every product we buy and it represents a fundamentally different philosophy. While I am advocating a policy that spends wisely to simultaneously reduce emissions and spur economic activity, the President is advocating a staggering tax program that threatens to consumer spending and business.

I look forward to hearing from today's witnesses to identify other areas where federal policy can aid businesses in developing the technologies we need to combat climate change, and I thank the chair.

The CHAIRMAN. Great. I thank the gentleman.

I would also like to ask unanimous consent to introduce into the record a statement by BASF discussing the importance of preserving pavement. Without objection, it will be included.

The CHAIRMAN. The chair recognizes the gentleman from Oregon, Mr. Blumenauer.

Mr. BLUMENAUER. Thank you, Mr. Chairman.

I did appreciate what our ranking member said in terms of setting the context. There is a lot that we agree with. I hope at some point we can persuade him to look at the budget that Mr. Obama has suggested to show where the money goes from the cap and trade because it is not somehow disappearing into a black hole in space but to be made available to reduce the problems that average Americans face on an ongoing basis and to be able to advance the vision. Much of what he articulated I agree with.

Mr. Chairman, I appreciate deeply your scheduling this hearing and being able to deal with an important part of the climate change equation and the livability of our communities. As you pointed out, we are talking about a third of our greenhouse gas emissions. We are talking about where most Americans live, work and recreate. We have opportunities here, and we will hear it from our witnesses, to be able to tie the pieces together in a way that reduces greenhouse gases, that inspires new economic activity that provides more choices for Americans and leads us to a reduced carbon future. Despite some of the political posturing we have heard, I do believe at the end of the day we are going to find that there is a very significant consensus that is emerging with the American public, with people in business, labor, environment, the professions, because there are opportunities and there is lots of low-hanging fruit. Indeed, we will hear today about some things just talking about picking fruit up off the ground and they have in many cases multiple benefits in terms of improving health to the individual, new economic activities, not just saving the planet. I look forward to hearing from our witnesses, Mr. Chairman, and to be able to explore with you the big picture where we are looking at technology, economic development, strengthening the communities, solving multiple problems simultaneously. I am pleased that the President's budget blueprint provides an opportunity to finance it, to be able to encourage it and to be able at the same time to provide support for businesses and American families in a way that they will actually be better off not suffering from the consequences of carbon pollution and climate change.

Thank you, sir.

The CHAIRMAN. I thank the gentleman.

The chair recognizes the gentlelady from Tennessee, Ms. Blackburn.

Ms. BLACKBURN. Thank you, Mr. Chairman, and I want to welcome our witnesses. I also, as Mr. Sensenbrenner had mentioned, have to step out. I am going to have to step downstairs to see our air conditioning and heating manufacturers that are in a meeting down there on some similar subjects and then come back to join you, but I want to thank you for the hearing and I do want to welcome all of you.

As you can hear on this panel, we will disagree about the issue of global warming and climate change and the science that is involved there, but one of the things I think that we all agree on is that traffic congestion is a problem and that this is something that does need to be addressed, and I would say, I am one of those that says there is plenty that could be done and should be done other than investing billions of dollars in a high-speed rail from Los Angeles to Las Vegas but there are other ways, low-cost ways to address the situation. There was a study by the Texas Transportation Institute that included some really commonsense approaches to this issue, freeway ramp metering, traffic signal coordination, incident management, high-occupancy toll lanes. Taken together, these measures would reduce hundreds of millions of traffic hours, save billions of gallons of gas and eliminate thousands of tons of emissions, all of which are important to us.

So I think that investing highway money to correct inadequate bridges and increase road capacity coupled with a few simple improvements would significantly reduce emissions, reduce fuel wasted and traffic congestion and move us in a more commonsense approach along the way to solving the problem.

With that, I will yield back the balance of my time and look forward to the testimony. Thank you, Mr. Chairman.

The CHAIRMAN. I thank the gentlelady.

The chair recognizes the gentleman from Colorado, Mr. Salazar.

Mr. SALAZAR. Thank you, Mr. Chairman, and I will submit my full statement for the record, but I just wanted to briefly let the panel know that I am very interested in energy independence and trying to figure out where we go from here. I would like you to address the argument that a lot of people talk about, whether we should do maybe a carbon tax instead of a cap-and-trade system, if you would, but I also wanted to commend the second panel, John Deere. I am a farmer by trade, I run nothing but green tractors, and I want to commend you for your fuel efficiency efforts in that respect.

So thank you very much, Mr. Chairman. I yield back.

[The statement follows:]

Opening Statement
Congressman John T. Salazar
Select Committee on Energy Independence and Global Warming
'Constructing a Green Transportation Policy: Transit Modes and Infrastructure'
March 19, 2009

Thank you Mr. Chairman.

Good morning, I'm looking forward to hearing the testimony today.

We have a complex problem before us. We must address how to best meet the transportation needs of our constituents, while also addressing green house gases and other environmental concerns.

Colorado, and the 3rd Congressional district, faces unique challenges in transportation. As the only Coloradan on this committee I take my role in representing the diverse needs of our state very seriously.

I believe it is critical that we tackle the urban transportation matter before us today. We also don't want to neglect the critical role rural areas play. In recent years many of the communities in my district have seen mass transit ridership increase over 50% and population increases of 100% or more.

I'd like to hear your thoughts on how rural America can incorporate your suggestions as you present your testimony and answer questions.

We're all aware that the U.S. transportation sector is a major contributor to greenhouse gases. We need to change how we approach transportation.

Sturman Industries is an innovative company in Colorado that uses Apollo Space mission technology to address green house gases.

They develop equipment that can retrofit stationary power generation and new engines to meet renewable energy demands. They do this in an affordable manner. We need to support companies like these.

I understand that engineers have developed a variety of technologies that can be incorporated into the transportation infrastructure.

Technologies that contribute to controlling storm water and mitigating non-point source water pollution.

Many of these technologies have not been adopted in many jurisdictions, or by private entities. We need to

make these technologies accessible to industry in an economically feasible manner.

Advances have also been made in mass transit, smart communities, and bike and pedestrian friendly cities. We need to do more.

Implementing these innovations requires close cooperation between large groups of stakeholders.

Contractors, highway and environmental administrators at the federal, State, and local level need to work together. We need to make good laws to ensure this happens.

Thank you for your testimony and time today.

The CHAIRMAN. Great. Let me thank the gentleman.

The chair recognizes the gentleman from Missouri, Mr. Cleaver.

Mr. CLEAVER. Thank you, Mr. Chairman. I have an abbreviated statement.

I think we are at an unusual moment, and if you deny global warming, that is fine. We are the only people on the planet with a sizable group still saying that there is no climate change, but we do have an unusual moment here and nobody can argue that putting CO_2 in the atmosphere is good no matter what you believe. That just can't be good. I am trying to find somebody who thinks that we need to suck it up. It is not a good thing.

But some good things are happening. We are at a 52-year high with transit ridership, and I think that is a good thing. It was brought by two things: One, when we had the tremendous rise in the price of a barrel of oil, which ran gasoline prices up, and then the economy going down, people not able to buy new cars and so they go to transit. And so what I think we have got to do is figure out a way to create the most ecologically and environmentally sensitive system of mass transportation on the planet. Any nation who has a system superior to ours creates embarrassment to us, and so I am interested in hearing your ideas and suggestions and look forward to your comments.

I yield back the balance of my time.

The CHAIRMAN. Great. The gentleman's time has expired, and now we will move to our very distinguished witnesses, and our first witness this morning is Mr. Peter Varga, who is the CEO of the Interurban Transit Partnership. He is in charge of operating the urban transit system in Grand Rapids, Michigan called The Rapid. Grand Rapids has become a leader in green buildings, mass transit and other environmental initiatives. Mr. Varga previously worked in transit management and safety in Muskegon, Michigan, and Santa Cruz, California. We welcome you, sir.

STATEMENTS OF PETER VARGA, CEO, INTERURBAN TRANSIT PARTNERSHIP; ANDY CLARKE, EXECUTIVE DIRECTOR, LEAGUE OF AMERICAN BICYCLISTS; CHRIS ZIMMERMAN, BOARD MEMBER, ARLINGTON COUNTY BOARD; AND JOHN BOESEL, PRESIDENT AND CEO, CALSTART

STATEMENT OF PETER VARGA

Mr. VARGA. Good morning. Thank you, Chairman Markey and members of the Select Committee. This is really a great opportunity for me.

We are a transit system that is quite successful in the United States and growing and I think that is one of the reasons why I am here because I want to talk about how you can achieve 10 percent growth in transit, double the ridership in a decade. We started the Authority about nine years ago. We have expanded services over time and in fact, we are now transporting 9.1 million trips a year and that is double of the ridership that we had a decade ago.

The Grand Rapids region is quite well known for its greening efforts and its green transportation. We are part of a community sustainability partnership with cities, with businesspeople and with universities. Eighteen percent of all LEED projects in the United

States come from Grand Rapids metro region. We have the first rectory, the first church, the first public museum, the first LEED-certified hospital and we at The Rapid created the first LEED-certified public transit building in the United States. We never anticipated being first but we ended up being first, and being first, you can never change that so we tried to herald it.

We are very well known for our sustainable practices. In my testimony, I talk to your about central station project, which is LEED. We are going to start using the American Recovery and Reinvestment Act to expand our wealthy operations center, our maintenance facility, and it is intended to be a LEED facility as well. And because of our leadership in public transportation sustainable practices, we are designated by the Sierra Club in 2008 as a Cool City along with Denver and Minneapolis.

In my testimony I give you several examples of public environmental benefits of a public transit system but I wanted to highlight one thing. Currently, there are more than 10 billion trips taken yearly on public transportation. With each additional billion trips taken, oil consumption can be reduced by 420 million gallons and our carbon footprint reduced by 3.7 million metric tons. Let us assume the 10 percent growth we have done in Grand Rapids in public transportation trips. The United States could save 141.9 million metric tons of carbon emissions annually equal to 8 percent of total carbon emissions from transportation and also save 15.2 billion gallons of fuel per year. I don't know how we get from the Persian Gulf but if it equals that, that would be worth it, wouldn't it?

I have also put in some more statistics and information in my testimony talking about how individual actions impact the environment and how we can reduce carbon footprint. I am not going to go through them but I really wanted to talk to you about investment in public transit. With an average return of 6.1 percent in investment, we could create millions of American jobs, generate enormous public and private revenue and make the country more economically and environmentally efficient. At a time when our country has been calling for stimulus, sustaining a 5.5 percent growth in public transportation would support 5.3 million jobs and a 10 percent growth could support 8.9 million jobs.

So one of the things I did want to talk to you about is, I have in my testimony how Grand Rapids specifically has benefited from its public transit system. The highlights I would like to say is, we are starting to do a BRT project under Very Small Starts. We have completed a streetcar feasibility study that shows that it is feasible in the downtown area and we are trying to create a public-private partnership to develop it because currently under the New Starts program we are incapable of actually pushing streetcars forward. We have significantly improved transit services in the last decade and we doubled our ridership, as I said. The importance of this is that I do believe that the United States can double its ridership as well with the right kind of public investment. The primary reason why I am here today is to give you the how can Congress support local and regional public transit. You could increase the availability of funds for fixed projects like our proposed bus rapid transit project and others like light rail, commuter rail and streetcar. You can make available for funds for nonmotorized auctions such as

walking and bicycling. You can reduce the transportation cost for Americans through investment of——

The CHAIRMAN. If you could summarize, please?

Mr. VARGA. I will sum it. Sorry. In sum, I have indicated in my testimony that there are several ways that federal climate and transportation legislation can effect positive change and I encourage you to take each one of those measures that I have outlined and implement them because we don't have enough time as we are trying to save the earth.

[Statement of Mr. Varga follows:]

Select Committee on
Energy Independence and Global Warming
U.S. House of Representatives

March 19, 2009

Testimony from Peter Varga
Chief Executive Officer
Interurban Transit Partnership
Grand Rapids, Michigan

Good Morning Chairman Markey, Ranking Member Sensenbrenner, and Members of the Select Committee. Thank you for the opportunity to testify today on "Constructing a Green Transportation Policy". I am Peter Varga, the Chief Executive Officer of the Interurban Transit Partnership, (*The Rapid* as it is known locally). *The Rapid* operates 26 fixed bus routes and a variety of other mobility options, including paratransit service to people with disabilities and seniors, a vanpool program and manages a rideshare matching program for the six counties in the Grand Rapids metropolitan area. We transported 9.1 million rides in fiscal year 2008, which is 11% more than the previous year. We have doubled our ridership in the last ten years.

The Grand Rapids region is quite well known for its efforts in greening. A Community Sustainability Partnership has been formed that includes the major universities, the City of Grand Rapids and several corporate partners, to which *The Rapid* also belongs. Grand Rapids has been called by Fast Company Magazine as one of the "greenest" cities in the United States. Eighteen percent of LEED projects in the United States are in the greater Grand Rapids region. The first rectory, the first church, the first public museum and the first LEED certified hospital are among such projects. *The Rapid's* Central Station is the first LEED certified public transportation facility in the United States.

The Rapid is nationally known for following sustainable practices. Central Station's innovative design incorporates energy efficient technology, a living green roof, recycled materials, storm water retention and returning clean water into the storm sewer system, among other environmental elements. We have five hybrid electric buses in our fleet and are proposing to purchase 10 hybrid electric buses as part of the Bus Rapid Transit project that has been approved by the Federal Transit Administration to go into "project development". Using American Recovery and Reinvestment (ARRA) funds, we are beginning the design work on an expansion to our Wealthy Operations Center, the operations and maintenance facility. This too is intended to be a LEED certified facility. The facility is also being designed with sustainable management practices honed from the manufacturing community. Because of our leadership in public transportation sustainable practices, we were designated by the Sierra Club in 2008 as a "cool city" along with Denver and Minneapolis.

What are the public and environmental benefits of a public transit system?

Transportation is one of the largest and fastest growing elements of the United State's dependence on foreign oil and is also the largest contributor to carbon emissions. Currently foreign oil consumption is more than 58% of all U.S. consumption. Vehicle miles travelled is fast outpacing population growth on a four to one ratio. According to a 2006 report from the U.S. Department of Transportation, Bureau of

Transportation Statistics, since 1973 Americans are travelling 250% more miles per capita each year, and using over 36 percent more oil for transportation purposes. All efforts to reduce the oil consumed by transportation (68 to 70 percent of all oil in the United States) and the carbon footprint (33 percent of all carbon emissions) must include offering real choices in transportation that dramatically reduce vehicle miles travelled by cars. One course of action that can significantly change this pattern is the transfer of trips to public transportation. Each public transportation passenger mile added results into two vehicle miles less traveled. So let us assume that there can be an accelerated growth in public transportation annually in the United States. Currently, there are more than 10 billion trips taken yearly on public transportation. With every additional billion trips taken, oil consumption can be reduced by 420 million gallons, and our carbon footprint reduced by 3.7 million metric tons. Establishing a national goal to double ridership by 2020 could have significant effects. With an average "modest" growth rate of 5.5 percent, the United States could save another 4.5 billion gallons of fuel per year and an additional 46 million metric tons of carbon emissions per year. With a ten percent growth rate in public transportation trips, the United states could save 141.9 million metric tons of carbon emissions annually (equal to eight percent of total carbon emissions from transportation today) and also save 15.2 billion gallons of fuel per year. How much do we import from the Persian Gulf? If it is equivalent, would that not be worth it?

More and more people are aware of how their individual actions impact the environment and are taking steps to reduce their carbon footprint. A study, *Public Transportation's Contribution to U.S. Greenhouse Gas Reduction*, was prepared for the American Public Transportation Association by Science Applications International Corporation. The research shows that when compared to other household actions that limit carbon dioxide (CO_2), taking public transportation can be more than ten times greater in reducing this harmful greenhouse gas. For comparison:

- Home weatherizing and adjusting the thermostat for heating and cooling saves 2,847 pounds of carbon per year. Transit use saves almost twice the carbon.
- Replacing five incandescent bulbs to lower wattage compact fluorescent lamps saves 445 pounds of CO_2 per year. Transit use saves more than ten times the CO_2.
- Replacing an older refrigerator freezer with a high efficient one saves 335 pounds of CO_2 per year. Taking public transportation saves more than fourteen times the carbon.

Another public benefit of public transportation is the creation of jobs. According to a Federal Highway commissioned study of public transportation's economic impact, an annual capital and operating investment in transit of 1 percent of our Gross Domestic Product could maintain a 5.5 percent growth rate in public transit. Coming from a combination of federal, state and local resources and the private sector, to maintain an average growth rate of ten percent an investment of 1.6 percent of our GDP would be required. It could transform fuel consuming sectors, as well as create jobs. With an average return of 6:1, such an investment would create millions of American jobs, generate enormous public and private revenue and make the country more economically and environmentally efficient. At a time when our country has been calling for "stimulus", sustaining a 5.5 percent growth in public transportation could support 5.3 million jobs and a 10 percent growth rate could support 8.9 million jobs.

How has Grand Rapids specifically benefitted from its public transit system?

Until 2000, the Grand Rapids region was served by the Grand Rapids Area Transit Authority. In 1999, a new transit authority, the Interurban Transit Partnership, was formed by the six cities in the metro region and a property tax millage was passed for the first time to expand services and work to fulfill the elements of an approved long range plan called Metro Mobile 2020. This was the first regional authority

for the area and it assumed the responsibility for improving expanded transit services in the area. Also known as *The Rapid*, this authority then passed two additional property tax millages in 2003 and in 2007, in response to increasing service demands from the community. We are now preparing to pass a fourth millage to implement a 9.8 mile Bus Rapid Transit project called the "Silver Line" that has been approved for project development by the Federal Transit Administration under the New Starts Very Small Starts program. We have also completed a streetcar feasibility study that has shown that a downtown streetcar project would lead to economic development in Downtown Grand Rapids. We are proceeding with an effort to raise private funds for a public-private partnership to develop an initial 2-mile streetcar system. As I stated earlier, we have constructed the first LEED certified public transit facility in the United States, which has led to various new transit oriented developments in what used to be a largely abandoned industrial area. These include student apartments called Hopson Flats, Founders microbrewery and pub, and a dance studio and performance hall for the Grand Rapids Ballet, among other developments.

We have significantly improved transit services in the last decade and we have doubled our ridership in the period. As a consequence, from 1998 to 2009 ridership in the region has grown an average of 10% each year. I am here to tell you that transit growth of 10% in the United States is quite feasible; it has happened in Grand Rapids. Ridership growth in the United States was approximately 4% last year, and if we are to make an impact on reducing vehicle miles travelled and creating a successful mode shift to transit in the United States, additional investment and a federal policy change needs to occur.

How can Congress support local and regional public transit?

Congress can support local and regional public transit. Some of this has already occurred with the increase of investment in public transportation as evidenced by the American Recovery and Reinvestment Act and the Omnibus Bill that were recently passed by Congress. Congress can also develop other things to supplement current investment efforts. First, Congress can develop climate change legislation that helps to expand transit services in the nation. One example could be the auction or sale of emission allowances under a "cap and trade" system. Another could be an emission reduction program that would raise new revenues to fund operating and capital funds to help systems grow. A third could be passage of a bill that would raise revenues by a user fee on vehicle miles travelled that would create additional investment in public transportation infrastructure.

Congress could also increase the availability of funds for fixed guideway transit projects like our proposed Bus Rapid Transit project, and other modes like light rail, commuter rail, or streetcar systems. These fixed guideway projects create energy efficient land use patterns that reduce green house gas emissions, as well as provide for economic development with the growth of transit oriented development around stations. Transit oriented development creates new housing patterns that eliminate the need for cars for some people, resulting in an increased modal shift from car to bus.

Congress can also increase the availability of such funds for non-motorized options such as walking and bicycling. Most people walk to transit stops and some use bicycles to access public transportation. Any non-motorized form of transportation by virtue is a reduction of carbon emissions and an opportunity for public transit growth at the same time. Efficient land use has the potential to significantly change the way we live. Higher densities allow for closer proximity for housing, retail and employment, reduced driving distances and enable communities to plan for and support alternative travel plans. In many urban core areas, trips taken for shopping, dining or other purposes are often made on foot. Congress can, therefore, prioritize integrated transit modes that support the development of non-motorized

options while enhancing public transportation. Depending on several factors, including integrated land use and pedestrian-friendly design, compact development can reduce driving by 20 to 40 percent, according to the forthcoming book by the Urban Land Institute, *Growing Cooler: The Evidence on Urban Development and Climate Change.* Typically, Americans living in compact urban neighborhoods where cars are not the only transportation option drive a third fewer miles than those in automobile-oriented suburbs, the researchers found.

Congress could also reduce the transportation costs for Americans through an investment of public transportation. I invite Congress to look at two reports that are most helpful for identifying how much Americans are spending on transportation, depending on where they live.

> *Realizing the Potential: Expanding Housing Opportunities Near Transit,* by Reconnecting America's Center for Transit-Oriented Development for FTA and HUD – This new national study funded by the Federal Transit Administration and the U.S. Department of Housing and Urban Development shows that location matters a great deal when it comes to reducing household costs. While families who live in auto-dependent neighborhoods spend an average of 25 percent of their household budget on transportation, families who live in transit-rich neighborhoods spend just 9 percent, the study says. The report examines five case study regions – Boston, Charlotte, Denver, Minneapolis, and Portland – to better understand the proactive strategies being undertaken to create and preserve affordable housing near transit.
>
> *A Heavy Load: The Combined Housing & Transportation Burdens of Working Families,* Center for Housing Policy, 2006 – This is an excellent report that looks in particular at families making $20-50,000 annually. On average, the study found that working families in the 28 metropolitan areas spend about 57 percent of their incomes on the combined costs of housing and transportation, with roughly 28 percent of income going for housing and 29 percent going for transportation. While the share of income devoted to housing or transportation varies from area to area, the combined costs of the two expenses are surprisingly constant. In areas where families spend more on housing, they tend to spend less on transportation, and vice-versa. The report found that families spend even more on transportation than they do on housing in areas with no or few transportation options besides driving.

Congress can also provide 100% funding for the acquisition of alternatively fueled vehicles, or at least provide for the extra cost that it takes to provide such vehicles. It costs approximately $200,000 more for us to purchase hybrid electric vehicles compared to standard buses. Why not provide 100% of the funding for the upgrade. It will also stimulate the development of the manufacture of cleaner, greener public transportation vehicles.

Congress can also look at streamlining the funding for Very Small Starts projects. We started our BRT study more than five years ago. When and if we implement a Bus Rapid Transit Project in our area, it will take nine years. I am not advocating for the elimination of such things as environmental analysis, but I am advocating for looking at Very Small Starts as an effort to speed up development for projects that cost anywhere from $40 million to $75 million in investment, as long as the transit systems demonstrate a capacity for technical and financial capability to operate these smaller systems.

Lastly, I would encourage Congress to insure that smaller growing cities such as Grand Rapids can fairly compete in the development of fixed guideway transportation, and may get additional support if necessary to support the intensive transit growth in such communities.

How can public transit reduce overall greenhouse gas emissions from the transportation system?

Public transportation can help reduce greenhouse gas emissions – it can do it now, and it can do it by expanding America's mobility choices. Public transportation investment, as I have described, and energy efficient land use policies and other strategies that promote transportation choices, are proven ways to reduce emissions from the transportation sector. According to ICF International, in their 2008 study "The Broader Connection between Public Transportation, Energy Conservation and Greenhouse Gas Reductions", public transportation use currently reduces CO_2 emissions by more than 37 million metric tons every year in the United States by reducing travel and congestion and supporting more efficient land use patterns. Those who choose to ride public transit reduce their carbon footprint and conserve energy by eliminating travel that would occur in a car. People living near transit also have shorter trips when they drive to transit. In fact, households within close proximity to public transit drive an average of 4,400 fewer miles annually than those who have no access to public transportation. According to U.S. census data, however, only 54 percent of American households have access to any public transportation services.

This power of public transit to reduce greenhouse gases can only begin with a federal policy that expands transit availability and promotes efficient land use patterns and transit oriented development. Efficient land use combined with increased investment in improved and effective public transit service, especially fixed guideway projects, provides results that are far beyond the increased use of public transportation.

To sum, I have indicated in my testimony several ways in which federal climate and transportation legislation can effect positive change to promote energy independence and the reduction of greenhouse gases. These include increased support for regional efforts for transit such as demonstrated by the Interurban Transit Partnership, increase the investment in public transit, increase the availability of fixed guideway projects in the United States, increase the availability of funds for non-motorized transportation, promote transit oriented development strategies, encourage or incentivize the acquisition of alternatively fueled vehicles, streamline the Very Small Starts process, and assure that major transit investments promote energy efficient land use patterns and promote concentrated economic development or smart growth. Lastly, I encourage the promotion of climate change legislation that includes and expands funding for public transit apart from the traditional funding sources.

The CHAIRMAN. Thank you, Mr. Varga, very much.

I am going to allow the leading bicyclist advocate in the Congress to introduce our next witness.

Mr. BLUMENAUER. I wouldn't say that where Mr. Oberstar could hear you, but thank you, Mr. Chairman.

It is a pleasure today to have Andy Clarke. Andy is the executive director of the League of American Bicyclists. Last week he just hosted people from 47 States, several foreign countries, over 600 advocates who were in and around the Hill sporting our trademark bicycle pin. I first had an opportunity to become acquainted with Mr. Clarke when he was advising the Federal Highway Administration's Pedestrian and Bicycle Information Center. He is a tireless advocate, extraordinarily knowledgeable, and we are lucky to have him here today. Welcome.

STATEMENT OF ANDY CLARKE

Mr. CLARKE. Thank you, Mr. Chairman, thank you, Mr. Blumenauer and members of the committee for the opportunity to testify before you this morning on the important role that bicycling can play in reducing oil dependence and global warming.

Let me return the favor and acknowledge and thank Congressman Blumenauer for his leadership on bicycling and livable communities issues for passage last year of the bicycle commuter tax provision and for your leadership of the Congressional Bike Caucus, which I believe now boasts a majority of House members.

Last week as you kicked off our 9th National Bike Summit, we heard from the head of Copenhagen's bicycle program. Thirty-six percent of trips are made by bicycle in this northern tier city of 1 million people. Copenhagen is hosting the next round of climate change talks in December and we hope delegates from all over the world will see firsthand how a world-class city thrives with bicycling at its core. Our summit participants were obviously wired by the sheer numbers of cyclists and the infrastructure that accommodates them yet the one critical lesson we learned is that Copenhagen was not always a bicycling paradise. In the 1970s their city streets, their squares, their public spaces were overrun with cars. They chose a different path and have seen bicycle use increase dramatically and now have their sights set on a 50 percent mode share for bicycling by 2015.

Of course, there is a big difference between Copenhagen and U.S. cities. I mention it because they are actually changing people's behavior and I think that is the key. Bicycling is perhaps the ultimate zero-emission transport mode. We all know that getting more people to ride or walk instead of driving will help reduce emissions. The question is, will they actually do it. We have the answer here in the United States in many of our bicycle-friendly communities. For example, since 1991 Portland, Oregon, has seen a 490 percent increase in bicycle traffic as their bikeway network has grown from 60 miles to 280 miles. In practical terms, that means that more than 16,000 cyclists now cross Portland's downtown bridges every day instead of 2,500 in 1991. A green dividend has been calculated for Portland's integrated transport investment. The average Portlander drivers 4 miles less per day than the national average, saving 2.9 billion miles of vehicle travel and keeping more than $1

billion in the pockets of Portland residents. Other cities that I document in my testimony such as New York, San Francisco, Cambridge, Minneapolis and Washington, D.C., have seen phenomenal bicycle mode share increases in recent years because of the policies, programs and funding they have invested to improve conditions for bicyclists.

So how can the federal government support bicycle travel? Climate change legislation and the next transportation bill will direct hundreds of billions of dollars to transportation projects and it is essential that a significant percentage of that investment completes bicycling, walking and transit systems in our cities. A recent survey by the National Association of Realtors found that close to 90 percent of Americans agree with that approach. We must have a national complete streets policy to ensure that all those funds improve the safety and convenience of bicyclists, pedestrians, people with disabilities, transit users and yes, even motorists.

On that point, let me reiterate that bicycling, walking and transit rise and fall together. I am not pleading a special-interest case today for bicycle enthusiasts. I am suggesting that livable, sustainable communities are built on the ability of people to walk, ride a bike and take transit for many of their daily needs and that motorists and urban freight providers will benefit from having fewer cars on the road. Equally, I am not suggesting that everyone suddenly become a 60-mile round-trip Lycra-clad bicycle commuter. Our focus must be on the 40 percent of trips in this country that are just 2 miles or less. Ninety percent of those trips are today made by car. Those are the most polluting trips. These are the trips we must make easy and convenient to be made by bike. This is where the greatest potential lies to reduce climate emissions in the years ahead.

Today's focus is obviously on climate change and oil use and we support a greater emphasis on transit, more fuel-efficient vehicles and hybrids, but I would be remiss if I did not remind the committee as my colleague, Congressman Blumenauer, has done, that when you encourage bicycling and walking, you also help address the health, physical activity, air quality, congestion and economic challenges faced by individuals, communities and our Nation.

So thank you, and I would be happy to answer any questions.

[Statement of Mr. Clarke follows:]

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WRITTEN STATEMENT OF ANDY CLARKE
PRESIDENT
LEAGUE OF AMERICAN BICYCLISTS
SUBMITTED TO THE SELECT COMMITTEE ON ENERGY INDEPENDENCE AND GLOBAL WARMING
MARCH 19, 2009

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 get on 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.

How Popular is Bicycle Travel?

Every year in May, we celebrate national Bike to Work Day. Tens of thousands of people in communities across the country will bicycle to work, this year on May 15, and 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 64,000 lbs (32 tons) of carbon dioxide, 3,200 lbs (1.5 tons) of carbon monoxide and they would 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 D.C. Imagine that every day of the week, in every one of our 450 metropolitan areas across the country – that would amount to a reduction of 14,400 tons of carbon dioxide for that one day. According to the 2000 Census, there were 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%). Last year, the Census Bureau's annual American Community Survey reported that this number had grown to 650,000.

The Department of Transportation's National Household Travel Survey (NHTS), last completed in 2001, puts the percentage of all trips made by bike at just less than one percent. However, when combined with walking, the two non-motorized modes of travel account for almost one in ten (9.5%) of all trips.

Bicycling is also popular for non-work related travel, which the NHTS reports is now more than 80 percent of all trips by all modes. There were 3.3. billion bicycle trips in 2001, mostly for social, recreational and family trips, and for trips related to education. A study by the Bureau of Transportation Statistics the following year reported that 57 million adults rode a bicycle during the year. The Outdoor Industry Foundation reports that bicycling is the second most popular outdoor activity (after hiking) and that the activity has an annual economic impact in the United States of $131 billion.

Potential for Bicycle Travel to Grow

The NHTS also documents some important numbers that are often overlooked.

In our metropolitan areas, more than 40% of all 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 that 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 that are 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.

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 increase by 490% since 1991 as their bikeway network has grown by 250% from 60 miles to 275 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.

Last year alone, bicycle traffic in Portland grew by 28%. Cities across the country have seen rapid growth in levels of cycling since the 2000 Census – and not just because of higher gas prices.

- New York City reported a 35% increase in bicycle trips from 2007 to 2008.
- Minneapolis saw a 49% increase in ridership between 2006 and 2007 and the city now has 3.8 percent of trips being made by bike (Minneapolis is one of four pilot communities created by SAFETEA-LU to study the impact of concentrated investments in non-motorized travel.)
- Cambridge, Mass has seen their bicycle mode share increase from 3.9% in 2000 to 5.38% in 2006
- San Francisco bicycle use was 1% of trips in 1990; this doubled to 2% in 2000 continued to grow to 2.7% in 2007 according to the US Census bureau. Last year saw another 25% increase in bicycle use.
- Washington D.C. bicycle mode share grew from 1.1% in 2000 to 2.0% in 2006

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. The James L. Oberstar award for Safe Routes to School (SRTS) was presented just last week at the League's National Bike Summit to Bear Creek Elementary School in Boulder, Colorado where 70% of children now get to school by walking or biking. In just the first year of their SRTS program the school reduced car trips by 36%.

Potential for Bicycle Travel to Reduce Climate Emissions

The Rails to Trails Conservancy recently calculated that a "modest increase" in bicycling and walking could lead to an annual reduction of 70 billion miles of driving. A more aggressive increase in bicycle use and walking could avoid 200 billion miles. These shifts – which would see non-motorized mode share rides to 13% or 25% respectively – would cut oil dependence and climate pollution from passenger vehicles by 3 percent to 8 percent.

Such a change is possible. Portland's transportation improvements over recent years mean that the average Portlander commutes by car four miles per day less than the national average. This translates into 8 million miles of travel per day for the region, and 1.4 million tons of greenhouse gas emissions per year.

Research that is soon to be published in the World Transport Policy and Practice journal comparing sustainable transport policies in Germany and the United States notes that car-loving Germans walk, bike and take transit for 41% of their daily trips, almost four times the equivalent figure in the U.S. Authors John Pucher (Rutgers University) and Ralph Buehler (Virginia Tech) describe how German cities have managed to balance high levels of car ownership with safe, convenient transit, walking and cycling. That is what we must do in the United States.

How Can the Federal Government Support Bicycle Travel?

1. Establish measurable 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 should pass the Complete Streets Act of 2009 (H.R. 1443) and include such language in the successor legislation to SAFETEA-LU.

3. Congress should pass the Clean, Low-Emission Affordable, New Transportation Efficiency Act (H.R. 1329).

4. In the upcoming transportation authorization, ensure significantly increased funding for infrastructure, education, and encouragement programs that will increase levels of bicycling and walking to 20% of all trips by 2020. A new urban investment program should target the large number of short car trips – both commuting and non-commuting – that are the most polluting and also the easiest to shift to bicycling, walking and transit.

5. Climate change legislation proposed by this Select Committee should provide significant funding incentives for communities to implement comprehensive alternative transportation programs that include a major emphasis on increasing levels of bicycling, walking and transit.

6. Ensure that funding for bicycling, walking and transit reaches local government agencies directly, and that State Departments of Transportation are held accountable to invest funds for these modes in the way Congress intended. Even 18 years after the passage of the landmark ISTEA legislation, states actively look for ways to re-allocate Transportation Enhancement and other funding programs that are the primary source of funds for bicycling and walking improvements.

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 they are considered from the outset.

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 – that unlike any of the other options presented to you as we move forward 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.

Andy Clarke
Biographical information

Andy Clarke is President of the League of American Bicyclists, the nation's oldest national bicycling organization founded in 1880. Andy has been the chief staff officer of the League since his appointment as Executive Director in 2004, prior to that he served as the State and Local Advocacy Director – he was also the League's Government Relations Director from 1988 to 1990. Under Andy's leadership, the League's education program has grown to include 1,100 certified League Cycling Instructors; the Bicycle Friendly Community program has reviewed more than 250 applications and made 96 awards; and the League's membership stands at 25,000 individuals and more than 300,000 affiliated members in 600 local clubs and 150 advocacy organizations.

Prior to joining the League in 2003, Andy served as Executive Director of the Association of Pedestrian and Bicycle Professionals, and has worked for the Rails to Trails Conservancy and Bicycle Federation of America (now the National Center for Bicycling and Walking). While at APBP, Clarke worked on-site at the Federal Highway Administration as part of the Pedestrian and Bicycle Information Center team. He has served variously as Chair of the Transportation Research Board's Bicycle Transportation Committee, Chair of the America Bikes Coalition, and a founding steering committee member of the Safe Routes to School National Partnership and Complete Streets Coalition.

Andy grew up in the United Kingdom where he earned an undergraduate law degree from the University of Birmingham. He started his career in bicycle advocacy as the part-time bicycle campaigner for the environmental group Friends of the Earth, where he also served for three years as the Secretary General of the European Cyclists' Federation. Andy is a regular bicycle commuter and recreational rider.

The CHAIRMAN. Thank you, Mr. Clarke, very much.

Our next witness is Chris Zimmerman. He is a member of the Arlington County Board in Arlington, Virginia. He serves on the board of directors of the Washington Metropolitan Area Transit Authority. We welcome you, sir.

STATEMENT OF CHRIS ZIMMERMAN

Mr. ZIMMERMAN. Thank you, Mr. Chairman, members of the committee. Good morning and thank you for inviting me. I have submitted a statement for the record. I think to make best use of your time, I will just sum up a few of the things and will be happy to answer any questions at the conclusion of the statements.

Let me say first, Arlington, Virginia, right here across the river is a community with a legacy of what is now called smart growth, although when my predecessors started it, they didn't have that word, and it wasn't so described, but in 2002 when the EPA gave out the first award for smart growth, the first award for rural excellence was given to Arlington for the success in planning and implementing the Roslyn-Boston metro corridor, which has now become kind of a laboratory or something people are coming to study to see what you can do in what was not previously a real urban area but was kind of a declining suburb and has been revitalized as a result of the last generation and has now demonstrated that there is tremendous potential in a fairly high-income growing area to move people to alternative transportation, to reduce both car ownership and car usage and vehicle miles traveled to eliminate drive-only trips and single car occupancy at an impressive rate and to do that by choice because people are opting to live there. In fact, they have to pay a premium that has become actually our biggest concern. But we have also seen at a county-wide level not only in the areas where we have the tremendous investment represented by metro rail that it is possible to get more a transit-oriented, pedestrian-oriented lifestyle and that people want it. So throughout our country we have been approaching this in a similar fashion. We are a small jurisdiction geographically. We have 200,000 people but we are only 26 square miles, so we are comparatively dense. Our metro corridors are only about 10 percent of the land area of the county and that is where we have concentrated most of this development, but even in the other areas we are using things like better bus service, extensive bicycle network. We have been implementing bike lanes on street as well as bike trails, improving our sidewalk network. We have a complete streets approach that was described by the preceding speaker that has made it easier for people to get around and in fact people are choosing more and more to walk, to ride bicycle and so on. Just to give you a rough idea, between 1996 and 2008, our county added 13,000 housing units, over 1,300 hotel rooms, 5½ million square feet of office space, 1.3 million square feet of retail, over 23,000 residents and 11,000 workers. During that same period traffic trends were basically flat and transit ridership grew by 44 percent.

There are many other ways you can measure this. Just to give you one example, if you simply look at who drives alone, you know, how people get to work basically, if you look at how people get to work in the Washington metropolitan region, about three-quarters

or so drive alone. Under the most recent survey we have, which was 2006 before the big run-up of gas prices, a majority of our residents do not drive alone to work. Only 47 percent of them do that. That is county-wide, not just the metro corridors, whereas more than a quarter of them take the train, 12 percent take the bus, 6 percent walk, 3 percent bike. All those numbers are up since just 2000. In just the course of this decade we have been able to move more and more people. Again, they are doing it because they choose to do it because we have made it attractive and increasingly it is what people tell us they want to do.

I will say that the approach we have had is a comprehensive one. It centers first on land use and key decisions that have been made over the years in integrating transportation, but it includes other components as well including a commitment to alternative fuels, which we have, for instance, in our bus system, which are CNG, to a green building policy. We had the first green building policy in this region going back 10 years ago now when not a lot of people knew what LEED was, and we have approached it in little ways too with things like car sharing. We have car sharing available. I should say we somewhat copied Portland. We straight out stole your orange poles that you put on the street there. That seemed like a good idea. And so we have zip cars now, we have flex cars, and we will invite any provider at every one of our metro stations and in other places so that many Arlingtonians make that their second car, including my family, instead of owning two cars. You know, you don't need to pay the insurance on it but you have the second car when you need it. So there are a lot of little things you can do. We have a comprehensive transportation demand management policy that relates to all new development that promotes transit use, whether it is people working in an office building or multi-family residential, and I could go on but obviously time is limited.

Let me finally just say that I think there are a number of things the federal government could do that would be more helpful for this kind of policy including making transit investments easier. Obviously we could use more funding but it is also what you have to go through to get the funding and I will mention that outside of metro corridors one of the things we are trying to do is implement a streetcar like Portland's, and there are many obstacles by the current state of federal policy.

Thank you, Mr. Chairman.

[Statement of Mr. Zimmerman follows:]

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Testimony of Chris Zimmerman
Board Member
Arlington County, Virginia

Before the
Select Committee on Energy Independence and Global Warming
United States House of Representatives
2203 Rayburn House Office Building
March 19, 2009
9:30 a.m.

"Transportation Routes to Reduce Climate Change: Modes, Materials and Methodology"

Introduction
Good Morning Chairman Markey, Vice Chairman Blumenauer, Ranking Member Sensenbrenner, and Members of the Select Committee.

My name is Chris Zimmerman and I am a Member of the County Board in Arlington, Virginia. I also serve on the Board of Directors of the Washington Metropolitan Area Transit Authority, the Transportation Planning Board for the National Capital Region, the Northern Virginia Transportation Authority, the Northern Virginia Transportation Commission, and the Virginia Railway Express Operations Board.

I appreciate the opportunity to be with you today to discuss Arlington County's vision, efforts and plans to build a transportation system that is good for our citizens, our nation's energy security and our environment.

Transportation in Arlington: Multi-Modal Strategies and Investment
In Arlington, we have shown that individual communities can support increased economic activity, population and job growth while also reducing the reliance on automobile travel and associated vehicle miles traveled (VMT) growth. In fact, Arlington is one of the few places in the country that has managed to grow without significantly increasing traffic, benefiting not only the people who choose to walk, bike, or take transit, but also those who choose to drive.

Between 1996 and 2008, Arlington County added 13,000 housing units, over 1,300 hotel rooms, 5.5 million square feet of office space, over 1.3 million square feet of retail, over 23,000 residents and 11,000 workers. During that same period, traffic trends were flat and transit ridership grew by over 44%. While Arlington is small geographically, roughly one-third of all transit trips in the Commonwealth of Virginia either begin or end in Arlington, representing over 83 million trips per year. Our experience in Arlington has shown that when given a range of transportation choices, individuals will choose alternative modes that benefit the environment, the community, and their own quality of life.

To achieve this level of success, Arlington has focused our efforts and investments on providing and promoting affordable, convenient, and integrated transportation choices. In the area of road improvements, Arlington has focused on constructing and managing our street network to be "Complete Streets", making them safe and comfortable for pedestrians, bicyclists, transit riders, motorists, and other users. We have also invested heavily in expanding and completing the bikeway network with a focus on high-quality facilities, overcoming barriers, and facilitating overall connectivity, resulting in an increasing number of bicycle commuters. We have also worked with residential and commercial partners to provide and promote comprehensive travel information and transit encouragement through Arlington Transportation Partners, four commuter stores, and special initiatives such as BikeArlington and WalkArlington.

Additionally, as we are located in the core of a rapidly growing region and at the confluence of major regional transportation facilities, Arlington has sought to integrate our local facilities and services with those of neighboring jurisdictions to enhance regional connections wherever possible. For example, while WMATA operates the regional bus network, the fifth largest in the United States, Arlington has created Arlington Transit (ART) as the county's local bus service to provide service deeper into local neighborhoods. ART works with the region by operating under the Regional Fare Policy – charging the same fare as Metrobus, accepting Metrobus tokens and flash passes, as well as accepting transfers from all bus systems in the region. Through the extension of this bus network through complementary service, we have been enormously successful in attracting new riders to transit. From Fiscal Year 1999, when ART services were initiated, through Fiscal Year 2007, ridership has increased 632%, from just fewer than 145,000 passenger trips to just over 1,100,000 passenger trips annually.

Thankfully, we have moved beyond the question of how to get people to take public transportation – they are already doing it. To answer this demand, we must continue to invest more funding in public transportation and focus on how to move people, not simply move more cars.

Smart Growth

It is important to point out that although there are many short and mid-term actions that can be taken to increase transit ridership and reduce VMT, the most effective and complete way to address these issues requires long-term community planning centered on smart growth principles and transit oriented development. Arlington has been in the forefront of this for over 30 years.

During the creation of the Metro system, Arlington County argued successfully for the creation of an underground route along an old commercial corridor of the County as opposed to the original planned route along the median of I-66. The County then developed a general land use plan centered around these Metro corridors that focused on creating distinctive "urban villages" around each station area, with a mix of commercial and residential uses. By organizing community development and redevelopment around high quality and high capacity transit and designing and operating our transportation facilities to be compatible with this development, the County has worked to create distinct mixed-use neighborhoods where our residents can live, work and play.

The Federal Role

The most important actions that can be taken by the federal government in support of these policies are ones that you have heard many times over – increased funding, prioritization of transit and increased coordination. Currently, federal funding for transit programs accounts for only 20% of overall surface transportation funding. While I understand there are pressing needs in the area of highways and bridges, we cannot accomplish our transportation and environmental goals with this disproportionate level of investment in transit. The federal government must recalibrate its investments in the transportation sector in such a way as to invest more heavily in multimodal strategies. The resources are simply not available at the regional or local level to provide for transit operating expenses while at the same time making the appropriate capital investments to ensure our transportation networks have the coverage, integration, and reliability necessary not only keep up with current demand, but to provide a level of mobility and access that will make public transportation an attractive option for our citizens.

There are also coordination and organizational issues that hamper the effective application of federal programs and funding. Better coordination across organizations within the Department of Transportation as well as between departments, such as the Departments of Transportation, Energy, Housing and Urban Development and the Environmental Protection Agency will help establish a broader view of the role of transit in building sustainable communities.

From a policy standpoint, the Federal Transit Administration (FTA) has typically focused on short-sighted metrics such as new transit riders and travel time savings while overlooking integrated transportation networks and the importance of transit's role in focusing community development. Despite the promise of the Small Starts program when it was established by Congress, FTA has narrowly focused on cost effectiveness criteria as opposed to project effectiveness criteria, which would take into consideration the effectiveness of the project to reduce per capita travel demand in the project corridor, the ability of the project to double the density in the project corridor as compared to

density in the rest of urbanized area; and the potential for the project, when combined with appropriate land use and economic development actions, to reduce per capita greenhouse gas emissions. Likewise, the Federal Highway Administration also make changes, beginning with the prioritization of investments in areas that promote travel choice, such as complete streets. I was encouraged by the statements of Secretary LaHood and Secretary Donovan yesterday on the creation of the Sustainable Communities Task Force, and I believe this will go a long way to coordinating all issues related to sustainability.

Closing

Mr. Chairman, Arlington County applauds your leadership in convening this hearing and I thank you again for the opportunity to testify today.

We could not be having this discussion at a more important moment for the future of public transportation. The confluence of the important issues of global climate change, reducing our dependence on foreign oil, investing in our nation's infrastructure, and spurring long-term economic growth create the opportunity to fundamentally change the way people move for years to come. Never before have our citizens been as interested in and willing to use public transportation, and we must act now to make it more affordable, accessible and available in communities throughout the United States. This must be a joint effort among all levels of government and we look forward to being your partner.

I am pleased to answer any questions you may have.

The CHAIRMAN. Thank you, Mr. Zimmerman. Just so you know, Mr. Zimmerman, all the times that you mentioned Portland, this hearing is Mr. Blumenauer's idea so one more idea we have to run up the flagpole.

Our final witness is Mr. John Boesel, who is the president and CEO of CALSTART, which is a nonprofit organization based in California that works with public and private sectors to develop advanced transportation technologies. We welcome you, sir.

STATEMENT OF JOHN BOESEL

Mr. BOESEL. Thank you very much. I very much appreciate this opportunity today. My organization has been working to develop clean truck technology for the last 15 years. We are a fuel- and technology-neutral organization so we work with companies working on biofuels, natural gas, hybrid fuel cells, et cetera. While we are regional sounding in name, we are actually in this space working nationally. We have an office in Denver, and our chairman is Fred Hansen, the general manager of Trimet in Portland.

What is possible from the clean truck sector? I think the California AB–32 climate change goals are possible relative to this sector, meaning a 20 percent reduction below 1990 levels by 2020 and 80 percent below 1990 levels by 2050. I am a technology optimist. I do believe it is possible. Next slide, please. Actually the next slide after that.

[Slide.]

We have two key technologies that I think are ready and available to go today, our hybrid trucks. We have got a variety of different technologies, plug-in, hybrid electric and hydraulic hybrid. All are viable. These are U.S. companies producing these core technologies. We also have now three major manufacturers that are producing natural gas trucks and I think those are also ready to go and show a way to reduce our dependence on oil. Next slide, please.

[Slide.]

A key for natural gas, a key fuel that we ought to just be developing right away and doing what the Swedes are doing very effectively is biomethane. It is taking biomaterial, putting it in a digester, letting it cook for about 3 weeks, cleaning it up and putting it into the pipeline or directly into vehicles. The Swedes are doing this very effectively and they are in compliance with the Kyoto Accord and it is something that is there, low tech, ready to go. We should be doing it. Next slide.

[Slide.]

And this slide just shows that the potential between biofuels and hybrids is something we really ought to take advantage of. Florida Power and Light has taken one of our hybrid trucks, is running biodiesel-30 on it, and this truck today is getting a 70 percent reduction or displacement of oil between the hybrid technology and the biodiesel. So it is something that is here and ready to go. I think there should be continued support of both bio and renewable diesel as well as investment in the next generation, green diesel

technology, which companies like UOP and Amerus are developing. Next slide, please.

[Slide.]

I think there are going to be niche opportunities for pure electric trucks. FedEx is deploying these delivery vans in London, and I would say that one reason that they are doing it is because of the congestion pricing policy in London has reduced the cost of these trucks in the London area. Next slide, please.

[Slide.]

I would say that—let me just make a few more comments on technologies. Other viable approaches are fuel cells and hydrogen. I think they are a little more of the R&D phase and need additional investment in that area, and I would say that the Federal Transit Administration has done a very good job of helping develop that technology in buses. There is a very good robust program in the last T bill and hopefully there will be a low-carbon-bus R&D program in the next T bill. There are also opportunities to advance the core diesel technology. There is waste heat recovery, lighter weight materials, lots of different approaches that we can use to make even basic diesel technologies more viable and more efficient.

In summary, I just want to hit on some key policy recommendations. First of all, I think the high price of oil that we saw last year was the mother of all policies. It really helped drive efficiency and improve the business case for all the alternatives. It is clearly something in Europe and Japan they have figured out how to send a consistent price signal at the pump. On cap and trade, Congressman Salazar, to answer your question, we do not see this having a material impact on demand in the transportation sector. The price of carbon that we see coming out of cap and trade would not significantly affect the price at the pump, so we might see a 20- or 30-cent price increase as a result of cap and trade but we don't think it will materially impact demand. However, if there are auction allowances we would certainly hope that they could be used for transportation measures.

In the absence of a high price signal, I do think a new energy bill that would extend the existing tax credits for alternative fuel trucks and hybrid trucks is very important. On page 6 of my written testimony, we have laid out specific rebates that ought to be provided for hybrid trucks based on the amount of battery capabilities of each truck.

And then lastly, I just want to thank the U.S. Army and the Department of Energy and EPA for their programs in this area and hopefully we can have an integrated approach going forward.

One last point is that I think T. Boone Pickens has done a good job of helping to educate the Nation about the economic problems associated with importing oil each year. Depending on the price of oil, that price tag goes from $250 billion to $750 billion a year. We simply cannot keep affording that. We have got consumer debt that is out of control. We have got budget deficits that are out of control and our trade deficit, and imported oil is a huge portion of that problem and it is time to really address it. Thank you very much.

[Statement of Mr. Boesel follows:]

Testimony by
John Boesel, President and CEO of CALSTART
Before the Select Committee on
Energy Independence and Global Warming
On
Constructing a Green Transportation Policy:
Transit Modes and Infrastructure
March 19, 2009

Clean Transportation Technologies and Solutions

www.calstart.org

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Chairman Markey and Ranking Member Sensenbrenner, thank you for inviting me to testify before the Select Committee on Energy Independence and Global Warming this morning. This is a very timely hearing. We appreciate the opportunity to provide comments on the technologies and policies necessary to reduce emissions from medium- and heavy-duty vehicles.

After providing some background information on CALSTART, we will look at today's landscape and provide an overview of the leading technological solutions for this sector. Next, we will discuss the key policy drivers for this industry, including a look at incentive structures based on significant industry and fleet feedback. Finally, we will provide our vision of the framework of a bold and successful program to accelerate the development and deployment of clean, efficient, low-carbon medium- and heavy-duty vehicles.

In the midst of great economic and environmental challenges, we believe this vision can help America achieve significant benefits: increased competitiveness of our transportation companies and expanded green jobs; reduced costs and greater efficiency of our goods movement; significantly reduced dependence on foreign petroleum; and immediate and growing reductions of carbon from transportation, and world leadership in this arena.

What is CALSTART?
CALSTART is North America's leading advanced transportation technologies consortium. It is a fuel and technology neutral, participant-supported non-profit organization of more than 130 companies and agencies, dedicated to expanding and supporting a high-tech transportation industry that cleans the air, creates economic opportunity and reduces imported oil use and greenhouse gas emissions.

CALSTART serves as an unbiased, strategic broker to spur advanced transportation technologies, fuels, systems and the companies that make them. It works across four areas to expand and support this industry: operating technology development and demonstration programs with industry partners; consulting to ports, fleets and others on implementation of new fuels, vehicles and technologies; providing services to industry members to expand their capabilities; and supporting and guiding the creation of policies that increase the efficiency and reduce the emissions of U.S. transportation.

CALSTART plays a leading national role in facilitating the development of advanced propulsion systems and alternative fuels in the heavy-duty vehicle and transit industry. It helped create the capability for heavy-duty hybrid drive systems in transit buses in program partnerships with DARPA, and now leads efforts in advanced commercial vehicle hybrids, fuels cells, hydrogen and biofuels. Founded in 1992, CALSTART is headquartered in California but operates nationally and internationally in its programs.

Medium- and Heavy-Duty Vehicles: the Challenges and Opportunities
This is a critical time for the development and deployment of clean, low-carbon medium- and heavy-duty vehicle technologies in the United States and around the world. Warnings

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about climate change from the scientific community are growing more serious and frequent, and transportation sector emissions are one of the core challenges. Transportation contributes a third of greenhouse gas (GHG) emissions in the U.S., as high as nearly 50 percent in some regions such as California. And because of their high mileage and fuel use, medium- and heavy-duty vehicles alone make up 7 percent of total GHG emissions. Additionally, despite significant progress, criteria air pollution from transportation remains a serious concern driven partly by population growth, goods movement and sprawl. Petroleum consumption and related emissions are expected to continue increasing in developing economies such as China and India, increasing world demand and competition. The past several months have seen almost unprecedented volatility in oil prices, contributing to economic difficulties in petroleum-dependent societies.

These challenges have certainly spurred progress and the beginnings of early adoption of clean transportation technologies, including promising developments in medium- and heavy duty vehicles. However, low oil prices coupled with a global economic recession are now threatening to disrupt – and stall – the very movement toward cleaner, more efficient technologies in the medium- and heavy-duty vehicle sector we most need.

What are some of the technologies and fuels that can address needed reductions? There are extremely promising low carbon, high-efficiency solutions becoming available and making their first push into the truck and bus market from US companies. We've measured this progress from our on-the-ground work in these sectors and with the companies bringing them forward. We believe these solutions can grow and be the first of a new generation of technologies and fuels with a thoughtful, longer term policy and assistance structure. Some of the more promising options are outlined below:

- **Hybrid Trucks** – in electric, hydraulic and plug-in variants – are just entering first production in North America, thanks in part to our Hybrid Truck Users Forum (HTUF) program, a partnership with the US Army National Automotive Center (NAC) which accelerates commercialization and builds user and market demand. Four major American truck makers (Navistar, Peterbilt, Freightliner and Kenworth), several smaller truck providers and an array of driveline and component suppliers are in the early market stage. Hybrid vehicles have been validated in both lab and real-world testing to reduce fuel use – and carbon emissions – by 20-50 percent in medium and heavy-duty work truck duty cycles. US manufacturers currently lead the world in heavy hybrid technologies, unlike hybrids in passenger cars. The biggest barrier is low production volumes that lead to high incremental costs.

- **Natural Gas & Biomethane** are gaseous fuels that together can provide both immediate benefits and a pathway to steadily reduced greenhouse gas emissions without added vehicle and infrastructure changes in the future. Natural gas is a proven clean domestic fuel with carbon emissions as much as 20 percent less than conventional diesel. The first major truck companies are now adding natural gas engine offerings because of emission and climate concerns at port and urban regions. Biomethane is the renewable form of natural gas which can be produced from municipal solid waste, landfill gas, animal manure and other wastes. It can be significantly lower in climate impacts than natural gas, yet can be blended with and used in place of the fuel. Europe has been an early leader but the US has significant opportunities to make waste into fuel from urban and farm sources if the barriers to production can be reduced.

- **Biofuels** have been shown capable of both offsetting petroleum and reducing greenhouse gas emissions, with the level of benefits directly linked to what the biofuel is made from, and how it is made: feedstock and process are critical. While first stage biofuels provide in most cases meaningful greenhouse gas reductions, they are as

important as stepping stones to the next generation of biofuels which will utilize waste materials and more energy efficient production processes, contributing to significant cuts in GHG. US innovators are among the world leaders in the new biofuel technologies but run the risk of losing out to strategies more supportive of research and development and setting clearer market signals for high petroleum prices.

- **Hydrogen** progress in key early market segments, including promising opportunities in heavy urban transit buses, has been more pronounced than is often reported. Indeed, the heavier bus segment has offered a more realistic launch platform for development and steady improvement of fuel cell, blended-fuel engines and other systems using hydrogen. When derived from bio-based sources, including wind and solar generation, hydrogen has the ultimate potential to nearly eliminate carbon emissions and increase energy efficiency. The technology has moved beyond prototypes in the transit market and can grow from this initial niche, but still suffers from very high costs from the early stage technology, the need for continued operational improvement and the need for continued investment in the core systems.

- **Improving Conventional Engines and Vehicles** offers a rich area for steady carbon reductions over the next decade through increased thermal efficiency of engines, thermal energy recovery, advanced aerodynamics, lighter-weight materials, optimized powertrain designs, higher-efficiency components and auxiliaries and reduced operational idling. Medium and heavy-duty vehicles show the potential for 50 percent and greater reductions in fuel use and carbon emissions from this suite of improvements. However, current price signals, investments in development and regulatory goals are insufficient at present to drive these improvements.

Spurring Progress: The Crucial Role of Policy
The role of public policy in creating and sustaining the conditions necessary for the successful and widespread deployment of efficient, low-carbon medium- and heavy-duty vehicles cannot be overstated. With low oil prices and a struggling economy, the role of policy – and a suite of tools ranging from smart regulation and long term goals, incentives and investments – takes on even greater importance. Comprehensive and proactive public policies are necessary for the industry's growth and can help drive innovation and industry growth in these key ways:

- Creating a favorable business and investment environment and development certainty through clear and consistent regulations and goals
- Increasing market demand through standards, partnerships and purchase incentives
- Providing financial support through R&D funding, loan guarantees and project finance, direct investment, tax breaks, and other avenues

For now, the clean medium and heavy duty vehicle industry needs targeted assistance and policies to overcome market barriers. These policies should be technology neutral, rewarding high performance against goals, innovation, and efficiency. In time, given the right market conditions, the high-efficiency, low-carbon truck industry can be expected to pass through this initial transition period and to thrive without direct assistance. The United States has the opportunity to become a world leader in this sector. Missing out on this opportunity would be a significant loss to our economy and our environment.

Can Carbon Trading or Taxes Shift Transportation? Not Alone
At this point in the commercialization process, stable, long-term price and regulatory signals are absolutely essential. Companies and investors require stable incentives and regulatory signals to make the business case for developing new technologies, while consumers require long-term signals to alter their purchase decisions and permanently change their behavior. Short-term subsidies and overly flexible or short-lived regulations

do not provide the certainty necessary to justify large scale investments. Similarly, short-term incentives are unlikely to produce lasting change in consumer behavior.

The recent oil price fluctuations clearly illustrate the importance of price signals in driving investment decisions and consumer choices. High gas prices in 2007 and 2008 led to investments in alternative fuels, fueling infrastructure, and vehicles. Now, however, there is a real danger that low oil prices and a struggling economy will halt the progress being made on the clean transportation front. Technologies and investments that were promising to investors and attractive to consumers with diesel over $4.00 a gallon do not look as good with prices around $2.00. Without long term price signals for both investors and consumers, it will be difficult to transition the nation toward clean, low carbon fuels and vehicles.

It is vitally important that any comprehensive program to reduce carbon emissions include the transportation sector. If the federal government enacts a cap and trade program, transportation fuels should be included at the outset. This will help to create a partial price signal and provide an indication to the trucking industry that the country is moving toward cleaner, more efficient, lower-emitting vehicles. Similarly, a carbon tax could help send a partial signal to the marketplace, both users and manufacturers. Regardless of the actual mechanism chosen to reduce carbon emissions, the key is to put a price on carbon and to do it in a transparent manner. Providing information about both the end goal and the plan and schedule for getting there will allow companies, investors, and consumers to make long-term investment decisions.

However – and unfortunately - we do not expect climate legislation alone to be sufficient to drive transformational change in the transportation sector. The impact on fuel prices is expected to be relatively small at the outset and is not expected to influence purchase decisions and technology investments in the medium- and heavy-duty sector.

Complementary policies will be necessary. Some regulation-based policies have been suggested, are in operation elsewhere or are under development, such as low-carbon fuel standards, establishing strong national fuel economy rules and greenhouse gas tailpipe standards. All could be implemented alongside and support a carbon tax or cap and trade system. Beyond these regulatory frameworks, however, there remains a strong need for a comprehensive suite of policies, investments and strategies to move high efficiency, low carbon medium- and heavy-duty vehicles more quickly to the market.

Needed Key Incentives and Policies

The targeted and strategic use of public funds is necessary to accelerate the development and deployment of efficient, low-carbon vehicles, fuels, and infrastructure, and provides significant benefits to the nation in both spurring additional, early carbon reductions and growing US technology and "green" manufacturing jobs.

- Therefore: We believe auction revenues from a cap and trade system or tax receipts from a fuel or carbon tax should provide a significant and reliable source of funding reinvested into the next generation of transportation carbon reduction solutions. Medium- and heavy-duty transportation is often overlooked in policy structures such as these, but deserves investment both because of its contribution and its carbon reduction and economic benefits.

Additional investments are needed at all stages of the commercialization process, from basic research and development to demonstration and deployment. Recognizing the need for public investment in this space, CALSTART worked alongside other California stakeholders to enact a high tech and fuel investment program (Assembly Bill 118) that will invest $200M per year over seven years in new transportation technology and fuels at the state level. Replicating this program at the national level – with a commensurate

investment and over a similar time frame – would help reduce transportation-related carbon emissions while supporting the growth of high-quality "green jobs" in the United States.

R&D – development stage: There is a clear need to increase public investment in the development of clean and efficient vehicle and fuel technologies. The public sector has traditionally played a significant role in early stage technology development, and the need for this public investment is increasing as the financial crisis deepens and private companies cut back on risky long term investments. Specific needs for the medium- and heavy-duty sectors include:

- Improved system integration and manufacturability
- Reduced energy storage costs specific to commercial vehicle designs
- Electrified and advanced components (to enable even greater fuel economy gains in all trucks by reducing engine load and enabling start-stop operation)
- Improved thermal efficiency and thermal recovery
- Advanced aerodynamics
- Fuel-optimized and downsized engines, advanced combustion schemes, power generation, light-weight materials, and advanced control systems.

Demonstration and validation – pre-production stage: successful and transparent demonstrations can help to "unlock" the environmental and economic benefits of new vehicle and fuel technologies by proving their viability in real world situations and speed user feedback to more quickly design production systems. Public investment and partnerships can help to overcome this barrier and bring these technologies from lab to market. It is important that the demonstrations are public and that analysis of technology performance is shared. Pilot programs can be used for the demonstration and validation of vehicles and infrastructure. For example, CALSTART is working with a number of California transit properties to secure funding for the Zero emission Transit User Group (Z-TUG), which would provide valuable real world testing and analysis of zero-emission transit bus technologies. Other potential pilot programs include:

- Local designation where there is a high level of truck activity (near a port or transfer location):
- Farming region, with potential link to fuel source
- A designated "Clean Transportation Corridor" program
- Construction Equipment

Purchase incentives – early market stage: new technologies in the early stages of market deployment tend to cost more than the business case of fleet owners allow them to pay. Smart and targeted purchase incentives, aligned with policy goals, can help technologies get through this transition period by accelerating deployment and increasing demand. As demand and production volumes increase over time, and as the innovation cycle continues with process improvements and movement up the learning curve, purchase costs can be expected to come down and the need for incentives should disappear.

- Therefore: As a first step, we recommend extending and augmenting the existing but expiring tax credits for high-efficiency, low-carbon hybrid trucks. Current tax credits for such trucks sunset at the end of 2009. Their implementation was originally delayed by the IRS and now need to be extended by three years to match introduction timelines, and enhanced to change fleet purchase behavior.

- Additionally, we recommend a simple and streamlined rebate program going forward. Though tax credits are valuable in encouraging deployment, rebates can be even more direct and effective in the commercial vehicle market. An up-front rebate will encourage fleet purchase and ensure participation by state, county and municipal fleets that are currently excluded from tax-based programs.

CALSTART has worked with other industry stakeholders through the Hybrid Truck Users Forum (HTUF) to develop a simple, streamlined purchase incentive program for hybrid trucks. We envision extending this program to give purchasers of advanced high efficiency and low carbon medium and heavy duty vehicles rebates based on demonstrated increases in fuel efficiency. The rebates would be determined on a sliding scale based on the fuel efficiency gain of the particular model, as verified by EPA testing procedures (see Table 1). California's Air Resources Board is proposing a similar program, funded at $26 million dollars, as part of its funding plan under AB 118 for FY 2009-2010.

Table 1: Rebates to Purchasers of High-Efficiency Commercial Trucks (first year level)

Vehicle Weight	Demonstrated Fuel Efficiency Gain			
	20%	**30%**	**40%**	**50%**
8,500 – 10,000 lb	$5,000	$7,500	$10,000	$12,500
10,001 – 14,000 lb	$10,000	$15,000	$20,000	$25,000
14,001 – 33,000 lb	$15,000	$20,000	$25,000	$30,000
	10%	**20%**	**30%**	**40%**
>33,000 lb truck	$20,000	$27,500	$32,500	$40,000

Our experiences suggest that the best way to encourage the development and deployment of high-efficiency, low-carbon vehicle technologies in the medium- and heavy-duty sector is through a cooperative, comprehensive, multi-year investment program. The success of our Hybrid Truck Users Forum (HTUF) in accelerating the development and deployment of hybrid trucks demonstrates the value of this approach.

- For this reason, CALSTART also believes an increase in the budget for the Army's National Automotive Center (NAC) to allow it to continue and expand its leadership work in this HTUF effort is an effective tool to maintain innovation.

While HTUF has keenly focused for the past several years on hybrid truck technology, it is expanding its work to support high-efficiency trucks, particularly those overlapping areas of development and deployment that support both enhanced, improved hybrids and fundamentally improved conventional trucks. Additionally, the merger of high-efficiency trucks with low carbon fuels is a critical next step, providing a "multiplier" affect that increases the impact of both strategies immensely.

- Similarly, we believe that the National Fuel Cell Bus program should be continued and expanded under the oversight of the Federal Transit Administration, but guided with a more low carbon, technology-neutral focus.

The Next Step: A Bold and Coordinated Approach
We welcome and support all efforts to move these promising and vital technologies forward. But we also believe the most effective and rapid progress can come from a major, coordinated and targeted national program.

With support from key industry stakeholders such as Eaton, Navistar, Freightliner, ArvinMeritor, Azure Dynamics, Bosch Rexroth and FedEx, CALSTART has developed a framework for a U.S. High Efficiency Advanced Truck Technology (US HEATT) program to support the rapid adoption of new truck technologies that will provide multiple benefits for the nation. US HEATT calls for a significant multi-year year investment in purchase incentives and research, development, and demonstration. The US HEATT approach calls for a comprehensive, multi-year $1.5 billion program targeting aggressive outcomes for developing and deploying commercial vehicle products that significantly reduce carbon.

CALSTART

CALSTART believes the industry and the nation would benefit from a high profile program built on these parameters:

- First, a commitment to target, support and fund over a multi-year period the steps required to achieve commercialization: R&D; Demonstration and Validation; and Purchase Incentives. To get maximum effect, an integrated strategy encompassing all three is needed.
- Second, government's role and risk should be different at each stage, but a portfolio approach as to how much funding to apply to each stage, and a commitment to do so consistently over several years, would be most beneficial to the market. It would focus industry technology investments and engineering resource allocation as well as signal to private investors where to extend their investment into innovation in new technology. Such signals can often leverage as much private resource as direct governmental funding.
    - Research and development might rightly make up 15-20% of such a total government partnership portfolio, with pre-production demonstration, testing and validation an additional 5-10%. We see the need for meaningful purchase incentives, declining over time, making up as much as 70-75% of this overall portfolio.
- Third, it is highly important that research, development and demonstration activities be designed and operated to encourage competition, innovation and new players. Past efforts in some agencies have been closed to any but a handful of manufacturers and suppliers, a constraint unlikely to speed new approaches. Additionally, a commitment to spur action and achieve aggressive outcomes would add energy to the program. We can envision a multi-year commitment to achieve 40-50% fuel economy gains as an average across all new trucks as a starting point for discussion.
- Fourth, such a program structure would ideally be led by a partnership that sees the value of and desires action to occur. Given the likely growing concerns with reducing foreign oil imports for energy security, the need for greater fuel efficiency to save truck operators money and secure jobs, and the need for significant carbon reductions in the future, a multi-year program would be ideal as a clarion call to and a signal of commitment and action.
- Fifth, the level of investment should be commensurate with the needs and the challenge. This can serve as a framework for the effort needed to ensure U.S. manufacturing technology leadership and meeting its energy security and greenhouse gas emissions goals.

Environmental and Economic Benefits of Swift Action

The rapid development of a comprehensive program to support high efficiency, low carbon trucks would have multiple benefits

Keeping America Competitive: By moving ahead boldly now, domestic truck manufacturers and component suppliers can maintain their competitive advantage. Clearly, the nation's auto industry has been hurt by its failure to look to the future and strive for technological leadership. With this program, U.S. medium and heavy-duty manufacturers and suppliers could become global leaders in advanced truck technology, resulting in greater exports and an improved balance of trade.

Lowering Operating Costs for Trucking Fleets: American trucking fleets have been hard hit by increased oil prices. Incentive funding would help fleets purchase technology that will either reduce or eliminate their dependence on oil. Indeed, some fleets have had to use their capital purchase budgets to pay for the increase in their operational budgets because of fuel spikes. Ironically, this even further reduces their ability to buy the new technologies they need to save fuel – and reduce operational costs. Greater efficiency in this sector

will both ease the pain felt by the trucking industry and make U.S. industry more competitive as a whole.

Securing America's Future by Reducing Dependence on Oil: The commercial trucking sector uses more than 20 percent of the oil consumed in the transportation sector. It's an amount roughly equivalent to what's imported from the Middle East. Even before sales slowed greatly in the passenger car market, goods movement was the fast growing sector in the transportation field. Over a 10-year period, a well-designed program could result in a 30 percent or greater reduction of oil usage. This could result in savings of over $50 billion per year in payments for imported oil.

Cutting Greenhouse Gas Emissions and Setting a Positive Global Example: Lower carbon fuels and reduced oil consumption will result in fewer greenhouse gas emissions. The U.S. would be demonstrating global leadership by showing how advanced technology can cost-effectively reduce greenhouse gas emissions from the goods movement sector and spurring exports. Commercializing more efficient truck technology would be even more significant in other countries where the percentage of commercial vehicles is much greater than in the U.S. Commercial vehicles represent about 25 percent of the total U.S. vehicle population. In China, Brazil, and Mexico, commercial vehicles represent more than 50 percent of their vehicle populations.

We believe the time for action is now. We can build single year investments, driven by economic necessity, into a targeted, multi-year effort that sends strong and unambiguous signals to American industry, investors and vehicle users that improved efficiency and lower carbon are critical, provide assistance to that industry to build the new technologies needed on a faster pace than they can manage alone helping them stay or become world leaders, and grow the next generation of high quality "green technology" jobs the nation needs in the coming low carbon world.

Thank you for this opportunity to present our ideas and we would be pleased to answer questions and serve as a resource to the committee.

The CHAIRMAN. Thank you, Mr. Boesel, very much.

Let me recognize the gentleman from Oregon, Mr. Blumenauer.

Mr. BLUMENAUER. Thank you, Mr. Chairman, for your courtesy and for scheduling this hearing.

I am struck, Mr. Boesel, just talking about nuts-and-bolts things that are possible right now that are within the window of economic feasibility and with a little nudge might blossom to make a huge difference, and our ranking member did talk about the potential with trucking and we look forward to working with you on those elements.

I have two questions that I would like to put to the panel. One just deals with where my friend, the ranking member, left off. He talked about the pool of money that could potentially be generated, two thirds of a trillion dollars, perhaps double that, but then ignores what happens with the money. The President envisions that significant amounts of money would be available to further incent energy efficiency, be available for rebates for families to cope with challenges and to be invested in other ways, and I just wonder if you could briefly touch on ways that the money that may potentially be generated could be spent in a way that could reduce the carbon footprint. For instance, Mr. Zimmerman, you talked about struggling with FTA to try and get them to just administer existing laws so you can build streetcars and other things but what difference, what could you do with those resources to build on the admirable record of success that you have?

Mr. ZIMMERMAN. Congressman, we would have a long list, but, you know, to start, things like implementing obviously a streetcar is an example where a comparatively small investment can yield tremendous results in promoting not just transit use but the compact development pattern that you need that is really key to ultimately reducing greenhouse gas emissions, and the kind of smaller investments you can make—we did a transit center, for instance, for a few million dollars, much of which in fact was federal grant money through the CMAC program which provided a transit nub in a place called Shirlington which is actually right off a major highway, which is an example of a compact development where you don't have big, you know—you don't have a train but we are able in the area of about a quarter of a cloverleaf to pack in a community that is very desirable. People want to go to visit. There are now people living there, working there, restaurants, and we have a transit center that gets about 400 buses a day and carries several thousand people. That was a comparatively small investment, which, you know, a federal grant helped make possible. There are all kinds of things like that you can do, and again, I would stress also not just the money but how do you remove the obstacles that make it so difficult to get that you say well, for a few million dollars am I going to hold up my project for years in process. That is a tough question for us.

Mr. BLUMENAUER. We want to come back to you in terms of reauthorization. I want to just touch briefly with our other panelists, Mr. Clarke, Mr. Varga. There is nobody that puts a gun to the head of the people in Arlington or Grand Rapids that forces them on transit, forces them to walk to work, to bicycle. You have referenced in several ways the choices, making the choices more at-

tractive so that people can take advantage of them. Would you like to elaborate on that for a moment, Mr. Clarke, in terms of choice for our citizens?

Mr. CLARKE. Thank you. We often hear that one of the biggest challenges facing getting more people riding is Americans' love affair with their cars. I believe Americans have a love affair with their quickest, cheapest, most convenient way of getting around, which we have done a very good job of making driving recently. A soon-to-be-published report comparing the U.S. and German transport policies shows that Germans, who love their cars and fast cars as much as anyone, have a 41 percent mode share for biking, walking and transit. They have the choices, they have the options and they choose the easiest and most convenient way of getting around. In Copenhagen, again, the speaker at the National Bike Summit said that is the reason why Copenhagers ride their bikes. It is not because they are big environmentalists, it is not because it is in their genes, it is because cycling is the easiest, quickest, most convenient way of getting around. So I think that is part of the trick and to refer back to your last question, I took the precaution of talking to Roger Geller at the city of Portland yesterday and he says that for about the equivalent cost of 800 feet of the I–5 Columbia River Bridge replacement project, they could effect a Copenhagen-style transformation of Portland and achieve a significant mode shift and mode change over a 15- to 20-year period. That seems to me a wise and sensible use of resources that are there.

Mr. BLUMENAUER. Thank you.

Thank you, Mr. Chairman.

The CHAIRMAN. The gentleman's time is expired. The chair recognizes the gentleman from Colorado, Mr. Salazar.

Mr. SALAZAR. Thank you, Mr. Chairman.

I want to get back to my opening statement because the—could you address the argument of should we just put a carbon tax on this and utilize that money to develop new greener technologies and things like that or should we do the cap and trade? Any of you can answer.

Mr. VARGA. If I can address this, you should do anything you can whether it is cap and trade or a carbon tax or taxing vehicle miles traveled to get 250,000 cars off the road daily. Only 54 percent of people have access to public transit. You need to shift that so you need to use some of those revenues from those sources to deal with the problems rather than the current revenues that are available to increase public transportation. So I would encourage all of you to look at different kind of climate change legislation that uses those mechanisms to fund these alternative sources of transportation.

Mr. SALAZAR. Which one would you prefer? I mean, a simple carbon tax on emissions or——

Mr. VARGA. To me, a simple carbon tax and an assessment on vehicle miles traveled, a combination of those things so you reduce also the vehicle miles traveled.

Mr. SALAZAR. Anybody else?

Mr. ZIMMERMAN. Honestly, I think that any of these approaches would help in almost any combination. Essentially what Mr. Varga said is the most important thing, that you have to make the incen-

tives reflect the policy goals and I think you have to make the price to be paid reflect the social cost, and, you know, anything from raising the gas tax, you know, which would help a lot, or something more sophisticated like a vehicle miles traveled tax, which in some ways would be better but harder to do, but really I think any of these things would be better than where we have been and, you know, it is going to be a matter obviously of what you can make work on, you know, many of the levels. I wouldn't know how it would pick—in terms of how it affects me at the local level, any of these things I think would be helpful in getting the right outcomes.

Mr. SALAZAR. Anyone else?

Mr. CLARKE. I must say, we as an organization don't have a particular preference. We do know that as gas hit $4 a gallon last year, our phones were ringing off the hook. Our events were going crazy. In the Denver metro area, for example, their Bike to Work Day grew from a steady 15,000 people a year to over 25,000, almost 25,000 people because people were focused on the price point, and clearly the price of gas and is a big issue as to how people choose to travel. So whether that is the right mechanism, we don't really have a horse in the race, whether it is cap and trade, whether it is a carbon tax, but the price of carbon certainly needs to be raised so we can pay for any of these alternatives.

Mr. SALAZAR. Mr. Boesel.

Mr. BOESEL. I would just say that in general I don't know that a carbon tax is going to generate a higher price at the pump than cap-and-trade program would. I think they end up—when you see the proposals, they end up sort of having the same net impact. So in terms of demand, I don't know that there is a huge difference. I do think it is critical, you know, how the revenues get spent. I want to applaud Mr. Sensenbrenner for his bill talking about the need for additional funding for hybrid truck R&D. We have got to find a way to fund projects like that. And so I think that is critical. I will say that in California there is a proposal being put forth to a commission that is looking at how to revamp the State's funding system, and one of those is that there be a surcharge on gasoline and diesel, recognizing that a cap-and-trade program would not have a big impact.

Mr. SALAZAR. And briefly, Mr. Boesel, you talked about innovative technologies to create more efficiency, I believe, in some of the work you are doing. Are you aware of Sterman Industries in Colorado that uses an Apollo space mission technology that has been able to increase internal combustion engine efficiencies by as much as 40 percent?

Mr. BOESEL. We are quite aware of that very impressive firm, Mr. Salazar. I think they have got some very interesting technology, and they are one of the reasons why I am an optimist about what can be done to really cut oil use and carbon emissions from the truck sector because there are technical solutions out there. We just need the right kind of policies that encourage that they be used, and I am afraid that $2-a-gallon gasoline doesn't really do that.

Mr. SALAZAR. Thank you.

Thank you, Mr. Chairman.

The CHAIRMAN. I thank the gentleman.

The chair recognizes the gentlelady from California, Ms. Speier.

Ms. SPEIER. Thank you, Mr. Chairman, and thank you to all the panelists.

You know, I am struck by the statement I heard earlier today that Americans love their cars fast, heavy and big, which is all very true, and, you know, in California, where I am from, we are all very sensitive to the environment being energy efficient. We have got the AB–32 law on the books. But I go to my local dealerships and they tell me that overnight the popularity of hybrids dropped like a rock and the big, heavy SUVs were once again popular. We are trying to direct Detroit to build cleaner, more-energy-efficient cars and yet it is all about supply and demand, and how do we address that?

Mr. ZIMMERMAN. I will start. You know, I think again that it is a matter of what we are incentivizing. I think while there is undoubtedly some truth to the statement that this is what people want, I think that is overstated because we have essentially been subsidizing automobiles and penalizing other things. If you create communities in which the only way to get a quart of milk is to get in your car, then obviously you are going to create great preference in driving, especially for anybody who needs to be able to get a quart of milk. On the other hand, I think the evidence indicates when you look particularly at what has been happening in real estate over a period of time, people are opting for other things. They are paying a premium. You know, the biggest criticism that we get of my community is gee, it is too expensive, everybody would like to live there but, you know, that is telling you something. We don't have enough competition in this kind of thing.

Similarly, just on, you know, the straight-up question of cars versus other things, if we are making automobile travel easier because parking is free everywhere but you have to pay to ride transit, well, you know, you are clearly giving disadvantage. So I think that the overall incentive structure will have a big impact and I think that that is implicit in the point you were making that we saw a tremendous change in market demand based on a fluctuation in a short period of time in the price of fuel, so stabilizing the price of fuel at a more realistic level, which would frankly be higher, reflecting the other impacts of its consumption, would go a long way, I think, to generating the right demand and allowing both manufacturers to know not only of automobiles but of other products to know that it made sense to invest in them and bring the return and over time, you know, I think you are going to see the behavior change as well, and again, I don't know the best way to do that. If all you did was tax gasoline at a more sensible level and stabilize the price at a higher level, you would have tremendous effect on many of these other things we have worked too. Some of them might work better. But somehow you need a policy that does that. Otherwise I think we continue to get into this fluctuation that you were describing, and the complaint from people trying to do either policy at the local level or manufacturing goods saying, you know, I can't count on what is going to happen next.

Mr. VARGA. What I would like to say is that you should really incentivize public transportation, bicycling, walking versus using your car where you are putting your investment. If you are putting

your investment into making it easier for people to buy cars, use cars, then you are not creating the kind of land-use patterns that really help people move to communities where they can walk easily, take a bicycle, live in a neighborhood, use public transit, get rid of their car. It takes an adjustment. It took me an adjustment to get used to my hybrid car, you know, and we have to think about what is important. What is important is to save the earth. I mean, there were two shows last night that talked about global warming like we are still debating it yet we are dumping sand on the beaches nearby here because the sand is being eroded because of global warming. We are spending money the wrong way. We should be spending our money incentivizing a change in behavior and you have to change behavior.

Mr. BOESEL. Maybe just to add to that and say that I do think that the way we do our planning can really be improved, and in California there has been new legislation passed, S.B. 375, that will require metropolitan planning organizations to help come up with sort of a carbon footprint analysis and plan to reduce emissions in vehicle mile travel. I think Mr. Blumenauer is considering legislation along these lines that might also be helpful at a national level. If we start building in requirements that we reduce emissions through better planning, lower-carbon trucks and through the goods industry, then I think, you know, we can see some progress.

Ms. SPEIER. Let me just applaud that because it reminds me a lot of the housing element requirements in California that by virtue of requiring the housing element and having a percentage of low-income housing, communities were forced to develop those percentages. So it sounds like a good plan, Congressman.

Mr. BLUMENAUER [presiding]. We will talk. Thank you.

Mr. Inslee.

Mr. INSLEE. Thank you.

I am just wondering going forward, looking at our transportation funding, you know, we have a transportation bill coming up, we have all these great ideas for giving Americans multiple transportation choices, which I really think this is all about between single-occupancy cars, bikes, buses, trains, sidewalks, you name it. How we should think about the division of our financial resources between those? Has this group thought about what the target ought to be for modes that have the capacity to be safe, reliable and reduce, you know, our impact on the environment? Should there be a target in that regard regarding the disposition of our resources and how would that target relate to where we are right now?

Mr. CLARKE. I can't say that I have run this by my colleagues on the panel here but speaking for the American Bikes Coalition, which is a coalition of the national bicycling organizations, the numbers that we are commonly using are currently 13 percent of fatalities on our Nation's roads are bicyclists and pedestrians, about 10 percent of trips are made by foot and by bicycle, and we get currently between 1 and on a good day 1½ percent of federal transportation funds being spent on those modes, significantly less if you look just at the safety funds. So there is clearly an imbalance that we would like to see rectified. Our goal that we would like to see in this reauthorization is to find a mechanism to double the

percentage of trips that are made by foot and by bike to get us up to the levels enjoyed by many of our economic competitors around the world and to do that through everything from school programs which get people thinking the right way at an early age right the way through complete streets policies, which are supported by AARP and the Realtors and a variety of other groups along those lines. So that is the kind of balance that we would like to see more in the next transportation bill.

Mr. ZIMMERMAN. When you consider that something like 60 percent of transportation emissions are generated by passenger vehicles and that is about a fifth of the total of the U.S. greenhouse, at least CO_2 emissions, as I understand it, I think there is an argument for targeting other modes and trying to promote them but I would say it is not only a matter of funding those but of how policy overall winds up incentivizing what you do so for instance, you know, when you have tax policy that is promoting free parking, that is a factor, but you also have to consider how you give out whatever money you give out so that if you had a policy that was rewarding the kinds of investments not only in the modes you want but also rewarding the supportive policies that, for instance, we administer at the local level, I mean, most land-use policy is local policy. Some states, you know, govern it but mostly it is the most local thing done, and yet what you need to do if you want to get a project funded whether it is a road, transportation project or any of it, it doesn't really depend on a whole lot of that and the practices in the past have tended to be independent of that. In fact, they have tended to promote exactly the wrong kind of thing. So, you know, if somehow you were rewarded for the fact that you are investing in existing commercial areas that you have land-use policies that promote compact development and transit orientation not just transit adjacency, rather than rewarding people because they are going faster over longer distances solely, I think that that can have a really big impact.

Mr. INSLEE. So let me start at the beginning. If you don't have a goal, you don't get there. I guess the question is, should we have a goal for our transportation policy and appropriation coming up here this year of a given——

Mr. ZIMMERMAN. I would say yes.

Mr. CLARKE. Yes.

Mr. INSLEE. Everybody is saying yes. Let me ask the question first. It is a great panel. Of a given CO_2 emissions per mile traveled in America, everybody is saying yes to that, I assume. Is that——

Mr. ZIMMERMAN. I would say yes but my only concern would be when you try to set the goal nationally, you have to set it in a way that doesn't wind up being too low but on the other hand takes account of those areas that have already done some of the right things and how do you not punish them for having done so. I don't think it is an easy thing or a simple thing to do but with that qualification, then I think, yeah, you should set targets.

Mr. INSLEE. A quick question. I have been talking to the Better Place folks about establishing an electric infrastructure for charging electric cars. I just got a BlackBerry this morning about Spain moving in a very serious way to provide a public infrastructure for

charging electric cars. We are now looking at some permitting issues up in the State of Washington to allow that to move forward. Some people have expressed concern about that ending up being a monopoly, one company if they come in and provided all this infrastructure. I think that can be handled but I just wonder if you have any insights on how we provide this electric charging infrastructure.

Mr. BOESEL. That is a very timely question. I would say first of all that I am very excited about the number of electric vehicles or plug-in vehicles coming to the market. There are plug-in hybrids. There are pure electric vehicles that are coming. I think one of the real beauties of those cars is that people will be able to recharge at their home and people are finally looking at these cars as more urban city cars and not trying to make them do the exact same thing that your gasoline car could do. I think to a certain extent, the initial rollout of these vehicles will not be dependent on having a public infrastructure, and I think surveys show that people would love to be able to charge at home. But I do think that as we roll out this infrastructure, it is very important that there be a consensus within the industry, within utilities, car manufacturers, that we don't get into the beta versus VHS kind of debate and we did that in the 1990s and we ended up with two different types of charging plugs and now we still have those out there and those same plugs are not relevant to the next generation of plug-in vehicles. The good news is that the wiring is there.

Mr. INSLEE. With the chairman's permission, just one quick question. Should we try to strive for some uniformity in a charging system?

Mr. BOESEL. Yes, we definitely should, and I think that is a great role for government to really strive industry and get people to cooperate and talk to each other.

Mr. INSLEE. Thank you.

Mr. BLUMENAUER. Ms. Herseth Sandlin.

Ms. HERSETH SANDLIN. Thank you. I thank the witnesses for their testimony.

I represent rural America. I represent South Dakota, and I want to make sure that as we move toward a greener transportation system that our needs and opportunities aren't left out of the discussion. Our transit systems certainly may not have developed quite as far as urban transit systems to date but there are certainly challenges to overcome but opportunities as well. The miles that we put on vans and buses as most transit fleets offer services hundreds of miles away from base communities is something that needs to be addressed. Most towns in South Dakota have to compete with the cities for the incentive grants offered by the Federal Transit Administration and Federal Highway Administration to help upgrade to greener and more-fuel-efficient vehicles. But many folks that I hear from in South Dakota are excited to take part in the new green transit system and are certainly doing their part to reduce emissions, utilize homegrown clean biofuels and become more energy efficient. Moreover, many of our towns face the unique opportunity to be able to build up green fuel-efficient fleets from the very beginning. For example, River Cities Transit in the State's capital city of Pierre is at the forefront of our State in utilizing E85 vehi-

cles and other fuel-efficient vans and buses. They are also working to purchase the first hybrid van in the State to be able to used for public transit and they are excited to see if hybrid vehicles are a workable option in our State. Now, River Cities Transit is also working closely with many of the nine sovereign tribes in South Dakota to help them build up their fleets with similar vehicles and encouraging their leaders to make smart decisions now that will save both money and reduce emissions.

So I guess I am wondering to what extent your organizations or other organizations that you are familiar with have been reaching out to rural communities to share with them strategies for developing green transportation systems as well as anything that you are aware of in terms of organizations or initiatives to reach out to Native American tribes.

Mr. VARGA. I can talk a little bit about that. The issue here is that, let us look at Europe. In Europe, you have rural communities, you have urban communities, you have an integrated transportation system, and using alternative fueled vehicles in rural areas is really to an advantage but they have to connect to someplace so they can go someplace so they don't have to drive across the country to get somewhere. What we don't have is an integrated transportation system in this country that allows people to have choice. You take a smaller trip with a van or a bus or a car that is alternative fueled to some train station so you can get to a place, so you can go to the city and move around really easily. You really have to focus on investment across the country that gets you there. In rural areas, true, there has to be some increased focus of providing that support for transit to do that, and then in the cities you have to make sure that there is more fixed guideway systems in there so when you get there you can move around so you are not stuck thinking I am leaving Pierre, I have to use my car to get to Chicago.

Ms. HERSETH SANDLIN. I appreciate your points, and South Dakota does not have Amtrak service.

Mr. BOESEL. I just want to say, Congresswoman, that one of the programs we are really working hard to develop is a fuel called biomethane which is taken from biomass and it can be the Swedes—I am not sure if you were here earlier when I mentioned it but the Swedes are developing this fuel. It is a renewable form of methane just like the natural gas that we use today, and I think there is a tremendous opportunity for rural communities, particularly agricultural industries, to take advantage of that as a local fuel source. We would be very interested in working with the groups in your State to help develop that fuel.

Mr. CLARKE. If I may, four very quick points. Number one, one of our most favorite bicycle-friendly communities in the United States is the Tucson area, and when they applied for a designation as a bicycle-friendly community in 2006, they got a gold designation, and included in their application, two Indian Nations, the city, the county, the State DOT, the regional NPO, and it was a truly regional application and was one of the first times that that really had happened and all those different parties had worked together to put together a program like that. So we are beginning to be able to say yes, we can answer that question in the affirmative.

The second thing I would say is that in many rural communities they are an ideal size and setup, perhaps often with the exception of the U.S. highway or State highway that might run through the middle of them and be a significant barrier. They are an ideal size and makeup for bicycling and walking and we should not forget rural communities and small towns in the application of enhancement and other funds to make them more bicycle friendly and there are perfect examples like the Mickelson Trail which are not only great transportation corridors but a huge recreation opportunity, and studies from the province of Quebec to the Outer Banks of North Carolina to the city of Portland show enormous economic impact of cycling on a local economy and the national economy and some of that it is in my written testimony.

Ms. HERSETH SANDLIN. Thank you, Mr. Clarke, and just for the record, the Mickelson Trail is through the Black Hills of South Dakota and very popular recreation, named after our late Governor George Mickelson of South Dakota.

Mr. BLUMENAUER. I deeply appreciate your bringing back to the notion of how we are going to meet the needs of all of America. I have enjoyed our conversations about rural and small town and the point you raise is one that I hope we can pursue with the organizations that are represented here about scale of community that we don't count some people out just because there are artificial formulas or constructs where they don't qualify and the other thing is just the capacity that there are many communities that you represent where there may not be the institutional support to be able to navigate these things and being able to make them friendly is something and I appreciate your continually bringing us back to it, dramatic lack of attention to Native Americans where transit is awkward, but if you don't drive you are in trouble, and the application of technology, and I look forward to continuing that with you and subsequent efforts because I think this is a missing ingredient that doesn't get the attention and I appreciate your laser-like focus.

Ms. HERSETH SANDLIN. Well, thank you, Mr. Blumenauer. I too appreciate your genuine interest in addressing the infrastructure needs of communities large and small in every region of the country, particularly throughout the Great Plains region as we have discussed, both in farming and ranching communities and Native American communities, and not just developing new infrastructure but maintaining existing infrastructure with this focus on transportation today. I appreciate your sentiment. Thank you.

Mr. BLUMENAUER. Thank you.

Our chairman has a tradition of giving each witness 49 seconds to summarize their thoughts, if there is something they want to punctuate or something that was left off, and we just give each of you a quick minute to wrap up as you see fit. Mr. Varga.

Mr. VARGA. Thank you. One of the things that has not been mentioned much is streamlining the whole federal process of getting transportation dollars. It has taken us 9 years to build a BRT project that is $40 million in cost. How civilized is that? The other thing is, I think that land-use patterns must be incentivized and tied to public transportation, tied to all these forms of transportation. It is only use those energy-efficient land-use patterns tied

to transportation that is going to change what we are trying to achieve here, so thank you very much.

Mr. BLUMENAUER. Thank you.

Mr. Clarke.

Mr. CLARKE. I would go back to the one statistic that I think is perhaps the most surprising, which even I have to keep checking to make sure I am not making up, and that is that 40 percent of all the trips in U.S. metropolitan areas are 2 miles or less. Those are the trips that we can have some impact over, and I would close by saying that you may recall that in 1985 the World Bank famously issued a report on transport in China that failed to mention the world "bicycle." I would hate to come back 25 years from now and look at climate change legislation or a transportation bill passed in this Congress that fails to really adequately address bicycling and walking and transit.

Mr. BLUMENAUER. I think you are safe. Mr. Oberstar will make sure of that.

Mr. Zimmerman.

Mr. ZIMMERMAN. Thank you. I would just like to mention quickly three things, the first what Mr. Varga said, tying transportation to land-use policies I think is key, funding the right things that right now only about 20 percent, I think, of federal funding is transit, and making it easier to get that is key, and then adjusting the other policies that, you know, don't really make it possible to do. It is not only how hard it is to get the grant but it is also what is rewarded and taking into account things like housing costs and how they relate to the overall benefits and that kind of thing will make the biggest impact and ultimately allowing federal policy to promote the kind of behavior that you are looking to see at the local level that will really have an impact in this area.

Mr. BLUMENAUER. Super. Thank you.

Mr. Boesel.

Mr. BOESEL. Mr. Chairman, three last comments. One is that I want to just emphasize that I think transit has been an early adopter of clean, low-carbon, heavy-duty vehicle technology and it often gets tested out and proved there in transit because of the public funding of transit. Then it gets adopted later on by the trucking industry and then later on by the commercial construction equipment, and particularly as we look at greening construction, highway construction, building construction, there is a real opportunity to develop a lower-carbon off-road vehicles, construction equipment to do that but it starts I think with sort of a bus program, believe it or not. Secondly is under the next T bill we would love to see much like we have had the safe routes to school a low-carbon route to market for trucks, a demonstration program where we take a corridor and we say this is going to be a demonstration low-carbon goods moving corridor. And then lastly is, I think there is a huge opportunity if we do invest in this sector to be a world leader in terms of heavy-duty green technology. We can be exporting this product. In many countries, the biggest, fastest-growing countries, 50 percent of their vehicle population are commercial trucks and buses. They don't have the kind of per capita vehicle ownership that we have in this country. So if we develop this prod-

uct we get it down to a decent price, it can become an export product and can be a global solution.

Mr. BLUMENAUER. Super. Thank you very much for helping us build this record.

We are going to move to our second panel here. We are going to have people dropping in and out, and as you have noticed, this is broadcast, so there are people that are actually monitoring, so we want to just drive ahead and not wait for the chairman, so we will ask our second panel to come forward because the second part of the equation that we are concerned with deals with how we put these pieces together. There are so many elements that are involved with our built environment and the infrastructure that are profoundly affected by the carbon input of how we build it, how we manage it, what we build it from. We are pleased to have on our second panel representatives that speak to construction materials, people who can talk about how we actually—the practices in effecting the building, and last but not least, some of the equipment that is used by the materials and the people who build it.

Our first witness will be Erika Guerra, a manager of government affairs and corporate social responsibility at Holcim International, a leading global manufacturer of construction materials. She is here today from Waltham, Massachusetts, the chairman's home district, and has worked on corporate sustainable development strategies and worked throughout North and South America. We welcome you here today and invite you to proceed as you are ready.

STATEMENTS OF ERIKA GUERRA, MANAGER OF GOVERNMENT AFFAIRS AND CORPORATE SOCIAL RESPONSIBILITY, HOLCIM (US) INC.; DON WEAVER, HIGHWAY DIVISION CHAIRMAN, THE ASSOCIATED GENERAL CONTRACTORS OF AMERICA; AND DOMENIC RUCCOLO, SENIOR VICE PRESIDENT, SALES AND MARKETING, JOHN DEERE CONSTRUCTION AND FORESTRY COMPANY

STATEMENT OF ERIKA GUERRA

Ms. GUERRA. Well, thank you and I guess I will have a little bit of a different accent from Massachusetts, so bear with me with that, please.

Mr. BLUMENAUER. We often need an interpreter with our chairman.

Ms. GUERRA. Okay. So good morning and thank you for having me here. It is a privilege to appear before you today. As you said, I am responsible for government affairs and corporate social responsibility of Holcim. We are one of the largest producers of cement, and that is a substantial ingredient in concrete. I want to highlight the need for increasing the use of concrete to reduce the overall greenhouse gas emissions.

Innovation is key to reducing CO_2. Holcim invests heavily in research and development with a focus on optimizing our processes and creating products that provide better performance with fewer natural resources. Holcim is committed to reduce its net CO_2 emission per ton of cement. We have invested more than $2 billion over the last 5 years upgrading and expanding our facilities in the United States. I commend you for your leadership in promoting in-

novative solutions to reduce environment impact of infrastructure construction.

Headquartered in Waltham, Massachusetts, we are the leader in the U.S. cement industry, serving 44 States. For the last 3 consecutive years we have been recognized as the leader of the industry by the Dow Jones Sustainability Index. Holcim Limited is a global company with operations in 70 countries and we are engaged in the European emission trading system. We are working with the subcommittee as part of the Energy Intensive Manufacturer Group that appeared before this committee yesterday at yesterday's hearing.

Concrete is the foundation of any modern society and it is the second most used commodity in the world after water. Cement is a critical component of concrete and when combined with water and aggregate becomes the glue that binds the whole mixture together. Cement gives concrete its strength and durability. Nearly 50 percent of our product has an end use in the public sector in roads, airports, bridges, hospitals and schools. Cement is an energy-intensive material to manufacture. However, it only constitutes approximately 15 percent of concrete's volume. The first step in the manufacturing process of cement is heating the limestone at extremely high temperatures up to 2,000 degrees, which produces what we call clinker, and I am introducing a new term here. This is the energy-intensive part of manufacturing cement where 90 percent of our greenhouse gases are generated. In very general terms, there is a ton of CO_2 emitted for nearly every ton of cement produced. However, 50 percent of those emissions are the result of a chemical reaction in the process which are commonly referred to as process emissions. Another 40 percent are the result of the fuel combustion to maintain those high temperatures, and the remaining 10 percent is attributed to electricity use and transport. As a result, this immense sector accounts for 5 percent of global CO_2 emissions and it is forecast that the demand for the product will increase over the next 30 years. It grows with the population.

Holcim has identified three primary areas of opportunity to drive the reduction of greenhouse gases in cement production. First, capital investment, technology and process innovation can reduce the energy consumption of our facilities. Second, the use of waste-derived fuels like scrap tires, like biomass, like plastics, can reduce the CO_2 intensity by replacing fossil fuels like coal. And third, the use of other industries' byproducts as supplemental cementitious materials, second term, SCMs, can reduce the clinker content in cement. I would like to focus on this last opportunity.

As I explained, the production of clinker is a major source of CO_2 emissions from cement manufacturing. We should look for ways to reduce the amount of clinker in the mix. Unfortunately, we lag behind many countries by requiring inflexible recipes for cement instead of performance-based standards that adapt the needs of a project like in the rest of the world. Many projects can be done with a lower carbon footprint if performance-based standards are accepted. However, acceptance does not necessarily translate into use, especially when it comes to infrastructure projects.

Holcim encourages the development of a unified performance-based specification for cement with support from ASTM International that ensures that cement produced in the United States meets all technical requirements while affording producers the opportunity to innovate and develop new products. We believe that in order to be effective in the reduction of greenhouse gas emissions through the consumption of blended cements, national acceptance of performance-based standards and a preference for the use of these products needs to be led by federal and State governments.

I sincerely thank you for your time and I again appreciate this opportunity to speak about the linkages between infrastructure development and global challenges of climate change.

[Statement of Ms. Guerra follows:]

TESTIMONY BEFORE THE

UNITED STATES HOUSE OF REPRESENTATIVES
SELECT COMMITTEE ON ENERGY INDEPENDENCE AND GLOBAL WARMING

SUBMITTED BY

ERIKA GUERRA
GOVERNMENT AFFAIRS AND
CORPORATE SOCIAL RESPONSIBILITY MANAGER
HOLCIM (US) INC.

HEARING ON:

CONSTRUCTING A GREEN TRANSPORTATION POLICY: TRANSIT MODES AND INFRASTRUCTURE

MARCH 19, 2009

Good morning Chairman Markey, Ranking Member Sensenbrenner, and Members of the Committee. It is a privilege to appear before you today. My name is Erika Guerra, and I am responsible for Government Affairs and Corporate Social Responsibility at Holcim (US) Inc, a subsidiary of Holcim Ltd. Holcim (US), which has numerous facilities across the United States, produces cement -- the key ingredient that provides concrete with its unique properties, creating a durable and sustainable construction material.

I am here to testify to the benefits of increasing the use of concrete in reducing greenhouse gas emissions. Innovation is key to reducing CO_2 emissions. Holcim invests heavily in research and development with a focus on optimizing our processes and creating products that provide better performance with fewer natural resources. Holcim is committed to reducing its net CO_2 emissions per ton of cement on an ongoing basis.

I commend you Mr. Chairman, and the Committee, for your leadership in promoting innovative solutions to reduce the environmental impact of infrastructure construction by reducing domestic energy use and greenhouse gas (GHG) emissions.

Holcim as a Respected Leader in the Building Materials Industry

Headquartered in Waltham, Massachusetts, Holcim (US) Inc. is a leader in the US cement industry. Holcim produces and supplies more than 13.5 million tons of cement and cementitious products annually to 44 states. More than 3,000 Holcim (US) employees[1] generate over $1.5 billion in annual revenue. Over the last five years, we have invested in excess of $2 billion, upgrading and expanding our U.S. facilities, including the investment in our new plant in St. Genevieve County near St. Louis, Missouri.

Our parent company, Holcim Ltd is a global leader in the building materials sector, supplying over 150 million tons of cement and almost 200 million tons of aggregates annually, in more than 70 countries, on all continents. Holcim is considered a leader in sustainable development and for the last four years has been recognized as the "Leader of Industry" by the Dow Jones Sustainability Index for the building materials sector. Holcim seeks to minimize the environmental impact of its operations, and views its commitment to sustainable development as instrumental to its future prosperity. Specifically, Holcim is keenly aware of the specific challenges connected to climate change, and supports the social and political imperative for action on this pressing issue. In fact, Holcim Ltd is already engaged in mandatory greenhouse gas reduction regimes with 27 cement production facilities in 10 countries operating within the European Union Emission Trading System (EU-ETS).

[1] 2008 Figures

The Role of Cement and Concrete

Very little construction activity can be undertaken without the use of concrete. Having been used for millennia, it is quite literally the building block of modern society, and is the second most used commodity in the world after water.

Cement is the critical component of concrete, which is an environmentally responsible building product used to build and repair our country's vital infrastructure, the backbone of economic growth. When considering the lifetime environmental impact of a building material – extraction, production, construction, operation, demolition and recycling – concrete is an excellent choice. Because of the long useful life of structures and roads built of concrete, the energy consumption and GHG emissions related to its manufacture are significantly less than other construction materials. In addition, concrete pavements provide for significantly better vehicle fuel efficiency, and due to its light finished color, less electrical energy is needed for nighttime illumination. Nearly 50 percent of our product has an end use in the public sector in roads, airports, bridges, hospitals and schools.

It is important to distinguish cement from concrete. Concrete is the mixture we form into roads, bridges, buildings, and other structures. Cement is a powder that, when combined with water and aggregates, becomes the glue that binds the gravel and sand together and gives concrete its strength and rigidity. Cement is an energy-intensive material to manufacture. However, it only constitutes approximately 15 percent of concrete's volume. More importantly, concrete has eco-efficient properties that provide unparalleled sustainable benefits which overcome any drawbacks from the energy intensive manufacture of cement, the critical component of concrete.

The Portland Cement Association (PCA) expects that the combination of moderate economic and population growth will fuel an increase in cement demand over the next 20 years. Population in the United States is expected to grow by 63 million persons by 2030 compared to 2007 levels. The anticipated increase in domestic population will result in additional demand for housing, commercial buildings, public buildings and infrastructure – all boosting demand for cement consumption.[2] To meet this demand, further large-scale investment in cement supply must materialize to feed the United States' expected future consumption, either by means of further investment in domestic plants, import facilities or both.

Currently, there is no practical substitute for this versatile and durable construction material. As the key ingredient in concrete, cement is therefore a vital requirement of modern society, but its manufacture is a resource and energy-intensive process. Nevertheless, the sustainability of concrete can be further improved upon by mitigating the environmental impacts associated with cement manufacture. That is why eco-efficiency and sustainable development is at the core of our business, manufacturing more cement while using fewer resources and producing less waste and pollution per ton of product.

[2] Ed Sullivan (2008) Portland Cement Association Cement Forecast

Manufacture of Cement

Cement is produced from naturally available raw materials such as limestone, shale, clay and sand. Our plants are strategically located based on the local availability of these ingredients. These minerals are ground to a powder before being heated in large rotary kilns to temperatures as high as 3,400 degrees Fahrenheit. This intense heat fuses the materials into nodules of an intermediate product known as clinker, which when cooled is ground with a small amount of gypsum to produce the gray powder known as portland cement. Different types of portland cement are manufactured for different applications by making small adjustments to the chemical components.

The GHG emission profile of cement manufacturing is driven by two manufacturing reactions. Firstly, common to all cement production is the chemical reaction that occurs when the calcium carbonate ($CaCO_3$) in limestone is heated, breaking down into lime (CaO) and carbon dioxide (CO_2). This calcination process accounts for half of all the GHG emissions associated with cement production. As limestone is the key ingredient in cement manufacturing, and CO_2 is released in a fixed ratio with the quantity of limestone used, the majority of CO_2 emissions are a direct consequence of the chemical reaction that is fundamental to the cement manufacturing process. Secondly, the intense process temperatures required are achieved by the combustion of fuels, which along with indirect emissions associated with the electricity used, account for the remaining 50 percent of GHG emissions.[3] As a result, the cement sector is a tangible contributor to global GHG emissions, producing around 4% of global GHG emissions and 5% of global CO_2 emissions.[4]

There is no doubt that portland cement manufacturing uses substantial amounts of energy, both thermal and electrical. In fact, energy is the largest cost component, and the domestic cement industry is one of the largest industrial consumers of fossil fuels. Nevertheless, the fact remains that the process emissions are completely unrelated to energy use, and account for the greatest proportion of the overall GHG emissions profile of cement manufacture. Therefore, novel strategies, beyond energy efficiency and adoption of low-carbon energy sources, must be employed to significantly reduce the GHG emissions associated with the manufacture of cement.

[3] 40 percent of GHG emissions for the manufacture of cement are attributed to fuel combustion and 10 percent is due to electricity use and transport.
[4] Bradley et al (2007) Slicing the Pie: Sector based approaches to International Climate Agreements, World Resources Institute, Washington, D.C.

Mitigating the Environmental Footprint of Cement and Concrete

Holcim has identified three principal levers central to our organization's ability to meet the challenge of future regulation of greenhouse gases, namely:

- Increased thermal and electrical energy efficiency through capital investment and process innovation;
- Reduced thermal CO_2 intensity through the use of alternative fuels, such as waste-derived fuels and biomass, replacing traditional fossil fuels, and;
- Reduced percentage of clinker in cement through the addition of supplemental cementitious materials.

Each of these three levers has an important emission reduction potential when evaluated across Holcim's entire portfolio of capital assets.

In applying the latest technology, there is potential for substantial global emissions reductions to be achieved through a shift away from old technologies such as wet kilns and vertical shaft kilns. However, the domestic potential is limited as no vertical shaft kilns are in operation here in the United States, and the shift from wet kilns to dry kilns has been underway for several years as companies invest in the face of increased energy costs.

The use of alternative fuels in place of fossil-based fuels can also lead to substantial emissions reductions, although their use is limited by local availability and policy constraints.[5] There is a potential to reduce the CO_2 emissions profile by replacing traditional fossil fuels such as coal with alternative energy sources such as scrap tires, plastics, biomass, and other waste derived fuels. The International Energy Agency estimates that globally around 2% of fuel used for clinker production in 2005 was from such alternative sources and that increased use of those fuels could reduce CO_2 emissions by around 100Mt to 200Mt per year on a global basis.[6]

Similarly, the use of supplementary cementitious materials (SCMs) can be an effective means to reduce the emissions associated with cement manufacture. Blending clinker with other cementitious materials reduces the use of the emissions-intensive clinker. Depending on the local availability of these cementitious materials and local cement standards and building codes, the reductions can be significant.

While improved energy efficiency and increased thermal substitution are undeniably important strategies, the focus of my testimony today will be on the use of supplementary cementitious materials (SCMs). Holcim believes that this is the most effective means to reduce the

[5] Refer to U.S. EPA Draft Report "Cement Sector Trends in Beneficial Usa of Alternative Fuels and Raw Materials" for a thorough analysis of opportunities for increased utilization of beneficial use materials.
[6] J. Stephenson (2009). OECD General Secretariat. Roundtable on Sustainable Development. Post Kyoto Sectoral Agreements: A constructive o complicate way forward?

greenhouse gas footprint of cement, because, as SCM use increases in cement manufacturing, both process and fuel emissions are substantially reduced.

Current Situation on Specifications on SCM

The production of clinker is the major source of CO_2 emissions from cement manufacturing. In the United States, clinker makes up approximately 90 percent of Ordinary Portland Cement (OPC).[7] This high percentage of clinker in cement is not due to performance requirements, but rather prescriptive specifications for OPC which call for a minimum clinker content. The prevailing standards allow up to 5 percent clinker substitution with uncalcined limestone. However, by further substituting SCMs such as blast furnace slag, fly ash, natural pozzolans, or additional limestone for a greater portion of the clinker, a cement of equal performance characteristics can be made with a lower CO_2 footprint. This clinker substitution may occur at the cement plant by inter-grinding the supplemental cementitious materials (SCMs) with the clinker, as a direct replacement. Europe, Asia, and Latin America predominantly produce cements with lower percentages of clinker than in the United States, which reduces the GHG emission per ton of cement produced in those regions. However, obstacles exist in the United States that inhibit the domestic demand of blended cements.

Under direction from Section 6017(a) of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users, the United States Environment Protection Agency conducted "a study to determine the extent to which procurement requirements, when fully implemented . . . may realize energy savings and environmental benefits attainable with substitution of recovered mineral components in cement used in cement or concrete projects."[8]

In its subsequent analysis, the EPA, in conjunction with the U.S. Departments of Transportation and Energy, found that SCM use yields positive environmental benefits, including energy savings, through lower resource consumption. In fact, EPA's life cycle analysis indicated that substitution resulted in significant reduction in greenhouse gas emissions, criteria air pollutants, and energy and water use. Nevertheless, the EPA report also found the existence of significant barriers to increased use of SCMs and greater realization of energy savings and environmental benefits. Obstacles to the increased use of SCMs in cement and concrete projects include technical barriers; legal, regulatory, and contractual barriers; and economic barriers. These categories can include a range of specific issues that have the potential to limit the use of SCMs.

For example, regulatory barriers may include certain state and local-level regulations and procedures governing the use of SCMs in various applications. Technical issues that limit the use of SCMs include:

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[7] OPC – Ordinary Portland Cement as defined by standard by ASTM C-150

[8] USEPA in conjunction with USDOT and USDOE (2008). Study on Increasing the Usage of Recovered Mineral Components in Federally Funded Projects Involving Procurement of Cement or Concrete to Address the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users

- the variability of standards for use of SCMs in portland cement and concrete and operational constraints with materials not typically used as SCMs;
- variation in SCM properties; and
- the availability of consistent, high-quality materials.

Potential economic factors limiting SCM substitution include:
- the SCM value to the supplier,
- transportation costs,
- the market price of SCMs, and
- disposal costs.

I would like to highlight a handful of the findings from the EPA-led analysis; specifically, those barriers that Holcim has found to be the most problematic in our continued efforts to reduce the greenhouse gas intensity of cement manufacture through the effective use of SCMs.

Acceptance of Materials Specifications

One of the most significant technical barriers related to performance-based specifications is gaining their acceptance over existing prescriptive materials specifications. Domestic standard-setting bodies have given some consideration to performance-based specifications; for example, the relatively new ASTM C1157 standard allows for performance-based cement blends, allowing higher clinker substitution as long as all technical requirements are met. Nevertheless, these high quality cements that achieve comparable performance are not readily used. For example, many state departments of transportation (DOTs) do not accept performance-based specifications for transportation infrastructure even when these cements meet all technical requirements. However, performance-based specifications may be accepted for other applications, often within the same state. In addition, there are multiple standard setting bodies creating the possibility of differences between the standards developed by each entity. This leads to a lack of uniformity in the acceptance, specification, and utilization of SCMs among state DOTs, even in neighboring States.

Bidding Procedures and Contractual Constraints
There are other legal, regulatory and contractual barriers; one having a significant impact on the use of blended cements is the bidding procedure and contractual rigidity associated with procurement of portland cement and other SCM-related products. Contracts generally discourage changes in cement mix design. To counter these concerns and provide a consistent product, a contractor will usually default to a portland-only mix or one that contains less of the SCM.

We recognize the efforts from greenbuilding code specifications as well as the acceptance of certain state DOTs of performance based cements; however, acceptance does not necessarily translate to use in infrastructure projects. An effective GHG reduction method through the consumption of blended cement calls for national acceptance of performance-based standards, and a preference for the use of these products led by Federal and State Governments.

Reducing GHG through the implementation of performance-based cement standards

The use of supplemental cementitious materials has the potential to significantly reduce the carbon intensity of cement manufacture. The main barrier to the use of these materials in cement is the nature of prevailing technical standards which prescribe the composition of cement needed to achieve required performance. An alternative approach is to use technical standards which are less prescriptive and more reliant on the required performance (performance based standards). Holcim encourages the development of unified performance-based specifications, with support from ASTM and AASHTO that ensure cement produced in the United States meets all technical requirements while affording producers the opportunity to innovate and develop new products.

Conclusions

As one of the largest producers of cement in the United States, Holcim (US) Inc. offers the following recommendations as the Committee considers legislation to further enhance the sustainability of our nation's infrastructure by mitigating the environmental impacts associated with its construction and repair:

- Public Policy should encourage the development of novel strategies beyond energy efficiency and traditional fuel substitution are needed to significantly reduce the greenhouse gas emissions associated with the manufacture of cement, an essential construction material vital to infrastructure development.
- The use of supplementary cementitious materials in cement production is a recognized GHG reduction strategy in Europe and Latin America, having been found to yield significant positive environmental benefits. New policy should explicitly encourage the use of SCMs.
- Future policy should direct that performance-based specifications be adopted to facilitate product innovation within the cement sector. New products, such as blended cements that incorporate supplementary cementitious materials, reduce the environmental impacts associated with concrete use while ensuring high performance and durability.

I sincerely thank you, Mr. Chairman, Ranking Member Sensenbrenner and Members of the Committee for your time, and I again appreciate this opportunity to speak about the linkages between infrastructure development and the global challenge of climate change.

Erika Guerra
Manager, Government Affairs and Corporate Social Responsibility
Holcim (US) Inc.

Mr. BLUMENAUER. Thank you. We appreciate your adding your voice. It is something that I don't think is appreciated in this broader conversation, and I appreciate your being part of our hearing today.

Mr. Weaver, what do you do with all this cement?

Mr. WEAVER. We are concrete pavers so that——

Mr. BLUMENAUER. I guess I should introduce Mr. Weaver as the Highway Division chairman at Associated General Contractors. As we all know, AGC is a leading advocate for infrastructure investment at the federal level and I would say at the State and local level as well. Mr. Weaver is vice president of Weaver-Bailey Contractors of El Paso, Arkansas, and we deeply appreciate your joining us today and the leadership that AGC has been exhibiting on so many of these interrelated problems.

STATEMENT OF DON WEAVER

Mr. WEAVER. Thank you, and I do follow Scott Williams from your district. He was chairman last year. And I will have another accent that you haven't heard today. I will skip my first paragraph.

AGC is the oldest construction association in the United States representing contractors that build all forms of infrastructure. Construction is the delivery system for a cleaner, healthier and safer environment. Studies show that improving our highway transportation infrastructure to allow vehicles to move freely through existing bottlenecks will significantly reduce greenhouse gas emissions. Also, increasing transit ridership, which we have transit members that build transit, by improving existing systems and constructing new ones in congested urban areas will also have positive impacts on reducing greenhouse gas emissions.

As important as providing these needed infrastructure improvements is the way these improvements are made. Our industry has a long history of developing construction techniques and practices that enhance the environment. The federal government can assist in these practices by offering appropriate incentives but it is important that we learn from the lessons of the past and not try to mandate one-size-fits-all solutions. In many cases recycling and reuse of construction debris as cost-effective and would decrease the amount of waste sent to landfills, may reduce transportation costs, lower energy use and thereby reducing greenhouse gas emissions. My own company, Weaver-Bailey Contractors, on three jobs in the urban Little Rock area recycled over 500,000 square yards of original interstate concrete pavement into 276,000 tons of base course that was put back underneath the highways and reused. We estimate that that saved 18,400 loads of virgin materials that would have been hauled to the jobsite from a quarry up to 30 miles away, which caused a savings of 100,000 gallons of diesel fuel and it lowered the emissions caused by the job. Similarly, recycled asphalt pavement allows contractors to add milled asphalt to new mixes, lowering the asphalt content of the new material, which saves oil, lowers cost and reduces greenhouse gas emissions. Every ton of recycled asphalt from construction which uses the millings that you see the milling machine results in elimination of .03 tons of CO_2 emissions. Some States are resistant to using wrap and AGC believes incentives would help these States overcome their reluctance.

Soil modification is another green practice that we use in the highway business. In many construction situations, onsite soils are not acceptable as sub-base materials. This requires the material to be dug up and replaced so instead of removing unsuitable material and putting it somewhere and digging up new suitable material and replacing it, which causes scars on the land, a variety of additives can be used—cement, lime, fly ash and other chemicals—and this saves fuel and reduces the emissions by the need to haul things off and haul things back in and it also helps the traveling public with the decrease in traffic.

It is important to note the construction industry is not in itself a significant source of greenhouse gas. According to EPA estimates, equipment used in construction generates only .86 percent of total U.S. greenhouse gas emissions due to the combustion of fossil fuel. AGC opposes government mandates to modify equipment already in use or to replace such equipment via regulation or contractual requirement. Such retroactive requirements place a financial burden of a largely public benefit exclusively on the private contractor. They also have the potential to render a company's fleet prematurely obsolete and wipe out its net worth, which is how we are able to find jobs. However, improvements in greenhouse gas emissions could be achieved by replacing older equipment with newer and more efficient equipment. AGC recommends the creation of an investment tax credit to encourage contractors to replace older equipment with new models. Newer equipment is extremely more energy efficient, it is operator friendly and safer and the new engines are designed to have a lot lower emissions of particulate matter and NO_X Reducing particulate matter and NO_X and black carbon can have a positive impact on global warming.

In addition to the environmental benefits from replacing old equipment, there would be an economic benefit as well. With the downturn in the construction market, contractors are purchasing less equipment both for the current workload and the future because our future market is uncertain. U.S. equipment manufacturers have been forced to lay off a significant number of workers because of the decrease of new equipment purchases. While the recently enacted stimulus program provides significant infrastructure investment, it does not create long-term market opportunities. Until we have a full economic recovery and we see what the new highway bill will be, a tax credit would offer an incentive for contractors right now to buy new equipment.

In conclusion, AGC believes that the efforts to further the use of construction techniques and practices that have a positive environmental impact should be encouraged. AGC cautions against creating mandates that attempt to impose specific construction practices. AGC believes that a partnership approach will better results for achieving the national goals. Opportunities will be available when surface transportation reauthorization legislation is considered later this year. AGC is evaluating proposals thus far including the CLEAN TEA Act, and we look forward to working with this committee in the future in trying to enhance our transportation system and our environment. Thank you.

[Statement of Mr. Weaver follows:]

AGC of America
THE ASSOCIATED GENERAL CONTRACTORS OF AMERICA
Quality People. Quality Projects.

Testimony of

Don Weaver
Weaver-Bailey Contractors
El Paso, Arkansas

on behalf of
The Associated General Contractors of America

presented to the

Select Committee on
Energy Independence and Global Warming

on the topic of

Constructing a Green transportation Policy

March 19, 2009

The Associated General Contractors of America (AGC) is the largest and oldest national construction trade association in the United States. AGC represents more than 33,000 firms, including 7,500 of America's leading general contractors, and over 12,500 specialty-contracting firms. More than 13,000 service providers and suppliers are associated with AGC through a nationwide network of chapters. Visit the AGC Web site at www.agc.org.

THE ASSOCIATED GENERAL CONTRACTORS OF AMERICA
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Mr. Chairman and Members of the Select Committee thank you for the opportunity to present testimony on "Constructing a Green Transportation Policy: Transit Modes and Infrastructure." I am Don Weaver, Weaver-Bailey Contractors, El Paso, Arkansas representing the Associated General Contractors of America. This year I am serving as the Chair of AGC's Highway and Transportation Division. AGC is the oldest construction association in the country representing contractors that build all forms of infrastructure, including: highways, bridges, transit systems, railways, airport terminals and runways, water and wastewater treatment facilities, underground utilities, public buildings, multi-family housing, office buildings, military facilities, water resource projects, energy production and conservation, and the many other structures that are the backbone of the US economy and provide and ensure US Citizens' quality of life.

Construction is the delivery system for a cleaner, healthier and safer environment. As important as providing the needed infrastructure improvements, is the way in which these improvements are made. The industry has a long history of developing construction techniques and practices that enhance our environment and AGC and its member firms continue to develop environmentally responsible construction methods. The federal government can assist in these practices by offering appropriate incentives but it is important that we learn from the lessons of the past and not try to mandate one –size- fits all solutions.

Create Incentives to Employ Recycling and Other Green Construction Practices

AGC is committed to facilitating our members' efforts to recycle or reuse construction and demolition debris. AGC works with the Environmental Protection Agency (EPA) to ensure that contractors have the resources they need to recycle construction and demolition debris, where feasible and practicable. There are opportunities for materials recycling or reuse in transportation and other construction activities, and incentives should be created to encourage and expand the use of recycled products.

In many cases, recycling of this debris is cost-effective and energy efficient. Recycling and reuse of construction and demolition debris would decrease the amount of waste sent to landfills, may reduce transportation costs, lower energy use and thereby reduce related Green House Gas (GHG) emissions. In addition, recycling and reuse practices promote conservation of virgin materials. Energy is expended and GHGs are released during the manufacturing and transportation of construction materials. When materials are reused or recycled, the associated emissions that would have occurred during virgin material manufacturing are avoided.
My own company, Weaver-Bailey Contractors has recycled over 500,000 Square Yards of concrete pavement into 276,000 tons of aggregate base course on three major projects over the past five years. This reusable material was utilized on three jobs which saved 18,400 loads of material from being hauled to the job site from up to thirty miles away, which in turn saved approximately 100,000 gallons of diesel fuel, lowering the emissions attributable to the job. When Weaver-Bailey constructed the $63-million Interstate 40 project, the largest job in Arkansas history, hardly anything went into the landfills. Completed in 2006, the three-year project expanded the highway from four to six lanes and built three new overpasses. Incentives would encourage and expand the use of recycled products.

Similarly, recycled asphalt pavement (RAP) allows contractors to add milled asphalt to new mixes, lowering the asphalt cement content of the new material, saving oil, lowering costs and reducing GHG emissions. Every ton of asphalt recycled from construction results in the elimination of 0.03 tons of CO2 emissions. An estimated 139 million tons/year of asphalt are

recycled in the United States, resulting in 4.2 million tons of CO2 emissions avoided. Fuel usage and emissions again are reduced because of the decrease in transportation for putting new material in place. However, some states are reluctant to use recycled asphalt pavements. Again incentives should be created to further expand the use of this easily recycled material.

Soil Modification is another green construction technique that states should be given incentives to further encourage its use. In many construction situations on-site soils are not acceptable as base material, requiring the material to be dug up and replaced. Instead of removing the old material and digging up new material to replace it, a variety of additives can be used to modify it. This saves fuel and reduces emissions by eliminating the need to haul off the unsuitable material and to haul in the replacement material. Soil modification also keeps contractors from having to open up disposal areas for the stripped materials and borrow pits for the suitable materials, thereby limiting the impact on the land. This practice also helps keep dump trucks off of the roads, lowering emissions and wear and tear on the existing roads. Fly ash - a by-product of coal fired generating plants - is often used in the soil modification process. Use of Fly ash in this way provides a safe method of disposal for this waste this product thereby producing additional environmental benefits.

AGC recommends that Congress encourage the use of local materials when appropriate, available and that meet design requirements. Urging agencies to use materials from the area where the construction is taking place saves fuel and lowers emissions because transport distances are reduced and fuel is conserved.

Equipment/Fuel Strategies for Reducing the Construction Industry's Carbon Footprint

According to EPA, the transportation sector is responsible for approximately one-quarter of total domestic GHG emissions. More than half of these "transportation-related" GHG emissions come from the consumption of gasoline. "Non-road sources" accounts for just 16 percent of all U.S. transportation related GHG emissions – and that category includes not just construction equipment, but also aircraft, boats, ships, rail, and pipelines. Accordingly, the impact of off road construction equipment has a negligible impact on GHG emissions.

With diesel's superior engine efficiency and the fuel's higher energy content, diesel equipment can do the same amount of work while burning less fuel than their gasoline counterparts, typically resulting in a notable reduction in GHG emissions. What is more, many construction professionals are voluntarily taking steps to decrease their fuel consumption – through reduced equipment idling, equipment maintenance, and operator training – which further reduces energy consumption and GHG emissions. Some contractors are even opting to use alternative low-carbon fuels (like biodiesel and ethanol) that may significantly reduce GHG and other emissions when compared to petroleum diesel.

It is important to note, the construction industry, residential and nonresidential building as well as transportation-related, is not itself a significant source of GHG emissions. Construction is a large industry (between 700-750,000 firms) with hundreds of thousands of small companies emitting small amounts of GHG emissions. According to EPA estimates, equipment used in construction generates only 0.86 percent of total U.S. GHG emissions, due to the combustion of fossil fuel. (U.S. EPA, *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990 – 2004*, EPA 430-R-06-002, Annex Table A-104, April 2006) A recent draft report from EPA estimates the combined emissions of construction equipment and energy use to be 1.89 percent of U.S.

GHG emissions. Without itself being a large contributor of GHG emissions, contractors are an essential partner in the Nation's efforts to reduce GHG emissions related to existing and future buildings and transportation-related infrastructure.

AGC collaborated with EPA's Sector Strategies Program and the Office of Transportation and Air Quality (OTAQ) back in 2007 to document the costs and benefits of using lower-cost equipment operating practices – such as reduced idling, improved preventive maintenance and operator training – finding that these strategies will produce both business and environmental benefits. Subsequently, AGC provided industry input and direction on a second EPA report that focuses solely on the potential for these same strategies to reduce GHG emissions. (See *Cleaner Diesels: Low Cost Ways to Reduce Emissions from Construction Equipment* – March 2007 and *Potential for Reducing Greenhouse Gas Emissions in the Construction Sector* – Feb. 2009 online at http://www.epa.gov/sectors/construction.)

In addition, installing diesel particulate filters on diesel engines can reduce diesel particulate and black carbon emissions. National experts have identified black carbon emissions second only to carbon dioxide (CO2) in causing global warming, and may have as much as 60 percent of the global warming effect of CO2. Black carbon adds 2-3 orders of magnitude more energy to the climate system than an equivalent mass of CO2. (*Testimony for the Hearing on Black Carbon and Climate Change. House Committee on Oversight and Government Reform. US House of Representatives, October 18, 2007.)* Unlike CO2 which remains in the atmosphere for several decades, black carbon remains in the atmosphere for ten days to two weeks. As a result, contractors can see immediate climate protection benefits when they employ diesel emission reduction practices (i.e., "retrofit" technologies). Similarly, the process of replacing an older diesel engine with a newer one (i.e., "repowering") can improve a machine's fuel economy and reduce its overall emissions.

However, for the construction industry, the costs of retrofitting equipment are prohibitive, and financial assistance is therefore needed to facilitate such an initiative. AGC urges Congress to provide financial and technical assistance to construction equipment owners and operators, encouraging these firms to install emissions control technologies on their diesel engines. AGC worked closely with Senator Jim Inhofe and then Senator Hillary Clinton to craft Section 1808 of SAFETEA-LU, which allows states (and other recipients of federal-aid highway funding) to use CMAQ funds to pay for the retrofit of off-road diesel equipment needed to construct projects funded under Title 23 of the United States Code. AGC encourages more states and local recipients to use CMAQ funds to assist contractors in retro-fitting, repowering or replacing off-road equipment.

AGC also played a key role in the development and passage of the Diesel Emissions Reduction Act ("DERA"), which became part of the Energy Policy Act of 2005. As the bill was originally written, it did not ensure that qualified private fleets could apply for the public funds set aside for retrofitting equipment. Today, AGC continues to urge Congress for full funding of EPA's new Diesel Emissions Reduction Program, which was created under DERA. Unfortunately, DERA funds cannot be used in states where there is a mandate for contractors to reduce emissions from their off road vehicles. This is shortsighted and reverts to the old command and control method of implementing national goals. AGC believes that a collaborative approach will produce better results.

AGC opposes government mandates to modify equipment already in use, or to replace such equipment (via either regulation or contractual requirement). Such "retroactive" requirements place the financial burden of a largely public benefit exclusively on private contractors. They also have the potential to render a company's fleet prematurely obsolete, and wipe out much of its net worth. Such dramatic action deprives a company of its ability to bond or bid work, or to borrow money. All have a very negative impact on the construction industry, and particularly the small and often minority businesses that dominate this key industry.

AGC recommends the creation of a federal investment tax credit to provide a financial incentive for contractors to replace their existing diesel powered equipment. Implementing a targeted investment tax credit would encourage contractors to upgrade their equipment to the current engine technology, i.e. a credit for retiring Tier 0 equipment and upgrading to Tier 3 or higher when available. This higher tiered equipment will operate more efficiently and thereby require less fuel. In addition, new equipment would help in reducing diesel particulate and black carbon emissions.

In addition to the environmental benefits from replacing old equipment there would be also be an economic benefit as well. With the downturn in the construction market, contractors are purchasing less equipment both because the current work load is reduced and future market is uncertain. US construction equipment manufacturers have been forced to lay-off a significant number of workers being of the decrease in new equipment purchases. While the recently enacted American Recovery and Reinvestment Act provides significant infrastructure investment, it will not create the type of long term market opportunities until there is full economic recovery which would encourage contractors to invest significant amounts in new equipment. A tax credit would offer a new enticement for equipment investment.

Stormwater Management Requirements Must Be Adjustable to Site Conditions

In accordance with all applicable federal, state and local laws, construction contractors currently implement erosion and sediment controls on their project sites. However, the exact controls that are used in each instance depend on a number of factors, including site location and characteristics, rainfall expectations, timing/length of project, project details, market demand, contractual obligations, etc. AGC maintains that the flexibility to select Best Management Practices (BMPs) to fit the conditions of the site is critical to any effective stormwater management program. A site-specific, control-measure approach is known and understood by the regulated community, it is cost-effective, and it promotes the use of innovative technologies on construction sites.

AGC has urged EPA to continue to build upon the significant environmental progress made to date by ensuring that all construction sites follow the principles/practices that are recognized and accepted as "effective" erosion and sediment controls. AGC has urged EPA to strengthen education and enforcement of BMP-based stormwater permitting programs and not to burden state regulators, construction firms, and the public with rigid and inflexible new requirements. EPA has proposed the use of numeric effluent limits for stromwater runoff from construction sites that could go so far as to set a strict and extremely low compliance limit on the amount of sediment that may lawfully be present from stormwater runoff. Construction site operators would need to monitor their site runoff and use active chemical treatment and filtration systems (ATS) at considerable expense. AGC believes these standards would create excessive and unreasonable burdens and not produce the desired result. New erosion control techniques using

local, available materials are being used. These include creative use of hay bales, rock ditch checks and solid sod to slow the water runoff. AGC urges Congress to provide incentives for developing new and improved erosion and sediment control BMPs that are practical, consistent with existing state and local permit requirements, and proven effective in protecting water quality.

Green Worker Training Grants

The Energy Independence and Security Act of 2007 included a provision, known as the Green Jobs Act that establishes a grant program in the Department of Labor for energy and renewable energy worker training programs. The Green Jobs Act limits the training grant funding to only entities that coordinate with labor organizations. AGC is supportive of the creation of such a grant program as part of an effort to create an efficient and renewable energy skilled workforce. However, it is our belief that the opportunity to qualify for such grants should be open to all contractors, both union and open shop, that have accredited training programs. AGC is hoping to see this program open to all construction workers prior to any grant funding being made available.

Reduce Congestion

Construction is needed to solve transportation problems. Adding transit and highway capacity will help to reduce emissions from cars that are running inefficiently because they are stuck in traffic. A transportation system that runs smoothly is the cleanest most energy efficient way for people to conduct their daily lives. AGC would also like to point out that construction can assist in reducing GHG emissions by improving the transportation system so that it operates efficiently. One of the leading causes of GHGs is not transportation itself, but congestion. In 2004, a study of the nation's most severely congested highways highlighted the fact that significant reductions in emissions require a reduction in vehicle time traveled, not vehicle miles traveled. The study concluded that modest improvements to traffic flow at 233 bottlenecks would reduce carbon dioxide emissions by as much as 77 percent and conserve more than 40 billion gallons of fuel over a 20-year period.

Restricting transportation improvements that significantly reduce congestion would impair our country's ability to cut both harmful emissions and save billions of gallons in wasted motor fuel caused by traffic congestion. As the debate over how to address climate change continues, Congress should adhere to the following principles:

- Future legislation should recognize the progress of the transportation sector in achieving cleaner air and take into account future reductions from current regulations not yet fully implemented, such as measures concerning heavy-duty engine emissions and fuel standards.
- Increased federal highway investment is necessary to reduce congestion throughout the transportation network. Similarly, efforts to further divert needed highway revenues from transportation improvements should be opposed.
- Legislative or regulatory strategies that force more areas of the nation into "nonattainment" status are self-defeating in terms of battling a growing congestion problem. Nonattainment designations should be focused on prioritizing congestion elimination, not putting federal transportation funding at risk.

In conclusion, AGC believes that efforts to further the use of construction techniques and practices that have a positive environmental impact should be encouraged. AGC cautions against creating mandates that attempt to impose specific construction practices. Mandates of this type have been tried in the past and have resulted in abject failure. AGC believes that a collaborative approach will produce better results for achieving National goals. Opportunities will be available when surface transportation reauthorization legislation is considered later this year. AGC is evaluating proposals presented thus far, including the "Clean, Low-Emission, Affordable, New Transportation Efficiency Act." We look forward to working with this committee in furthering our shared objectives of improving transportation while enhancing the environment.

Mr. BLUMENAUER. Super. Thank you.

Our final witness is Mr. Domenic Ruccolo, senior vice president at John Deere, the green equipment that our friend, Mr. Salazar mentioned. He is responsible for sales and marketing in the Worldwide Construction and Forestry Division. He has previously worked in wholesale finance and directed the Hitachi Construction and Mining Division. John Deere is a leading provider of products and services for agriculture and forestry, and we deeply appreciate your joining us today and look forward to your testimony when you are ready.

STATEMENT OF DOMENIC RUCCOLO

Mr. RUCCOLO. Thank you very much. On behalf of John Deere, I would like to thank the distinguished members of the committee for the opportunity to testify today on constructing a green transportation policy.

I also would like to go on the record for thanking Mr. Salazar for his kind comments about our products and company as well.

For 171 years, John Deere has enabled human flourishing by offering solutions to those who produce food, fiber and food, beautify and protect our environment and build and maintain our homes and critical infrastructure. During this period, Deere has invented, manufactured and sold worldwide hundreds of models of construction equipment as well as the engines powering them. Deere created these tools with a consistent purpose: improving and efficiency. Just as productivity and efficiency drive Deere's product innovation, we suggest that it should also drive our Nation's infrastructure policy. America's infrastructure directly affects economic, social and environmental well-being. Every day we all rely upon our roads, bridges, transit, rail and other infrastructure to survive and thrive. Despite our dependence on it, the Nation has taken infrastructure for granted and permitted it to fall into disrepair without concern for its sustainability.

The Nation's current infrastructure has suffered from the absence of a national vision premised on both robust funding as well as the pursuit of the most productive and effective projects. Actions in recent weeks reflect Congressional leadership in creating this vision for infrastructure. It is clear you appreciate something as significant as our infrastructure requires significant funding. We also must make sure this and future money is spent wisely and to do so we need to incorporate principles of environmental sustainability into our infrastructure policy.

John Deere believes one way to make infrastructure projects greener is through the use of productive, efficient construction equipment. The construction equipment marketplace has consistently demanded machine productivity and efficiency because fuel consumption is a primary operating cost for our customers. In response, John Deere and other construction equipment manufacturers expend substantial resources to ensure their customers can get the most work out of every gallon of fuel used. The federal government can take many steps to support further efforts in the construction equipment industry to improve equipment productivity and efficiency and reduce environmental impacts. Collaboration between the public and private sectors is needed to investigate and

fund the research and development of new standards and technologies to further improve equipment productivity and efficiency. By recognizing the essential road, non-road equipment will play in transforming the transportation and other sectors of the economy to achieve ambitious and necessary greenhouse gas reductions, we can see that appropriate investment by the federal government in the non-road technologies would create substantial environmental returns. For example, creating modal shifts from road transport to rail and public transportation systems is one way to help offset the growth in greenhouse gas emissions.

We strongly recommend that the federal government also take steps to ensure construction equipment owners can more easily purchase new technologies that excel in productivity, efficiency and environmental sustainability and thereby build infrastructure to the demand that the Nation demands. A single piece of large construction equipment can cost several hundreds of thousands of dollars. The development of tax incentives and funding specific to the purchase of new equipment will remove uncertainty for equipment owners who today face a risk that inconsistent environmental and other regulations created by States and locally may make equipment obsolete well before the end of its useful life. On a larger scale, the federal government can support greener construction practices and techniques by incorporating environmental considerations into infrastructure planning and funding decisions.

As a member of the United States Climate Action Partnership, John Deere supports incorporating greenhouse gas measurement and accounting in transportation, infrastructure funding and planning. Incorporating such considerations, however, needs to be coupled with an improvement to the infrastructure project development and approval process. Transportation projects often become bogged down for years in inefficient and redundant processes, thereby increasing the project costs and undermining the ability to improve the environmental impact on our transportation system. An efficient transportation system also provides many indirect benefits. For example, improving our infrastructure, we will improve the environmental sustainability of many green industries critical to rural America including renewable energy specifically.

I would like to especially thank committee member Herseth Sandlin for her support of woody biomass energy. Woody biomass is a prime example of rural renewable resources that can help meet our energy needs, address the challenges of climate change, revitalize our rural communities and improve the health of forests. Congress is in a position to unlock the enormous potential of woody biomass by supporting not only the creation of a market for it but also the creation of an infrastructure system that enables its ready and cost-effective transportation.

In concluding my remarks, I would be remiss if I failed to mention another critical benefit Congress should consider in its infrastructure policy debate and that is job creation. John Deere witnesses firsthand the dramatic impact of the current financial crisis on its workforce, dealers and customers. The financial crisis has hit the construction industry very hard with 21.4 percent unemployment and over 2 million construction workers without jobs. The impact of the financial crisis extends well beyond the construction in-

dustry to those skilled and hardworking Americans who manufacture our vital construction equipment. John Deere and others in the construction equipment industry have been forced to lay off many employees as a result of the plunging demand for construction equipment caused by the financial crisis.

I want to thank you again for the opportunity to testify and I am happy to answer any questions that the committee may have.

[The prepared statement of Mr. Ruccolo follows:]

Testimony of Domenic G. Ruccolo

Senior Vice President, Sales & Marketing

Worldwide Construction & Forestry Division, Deere & Company

Before the House Select Committee on Energy Independence and Global Warming

Hearing on "Constructing a Green Transportation Policy:

Transit Modes and Infrastructure"

March 19, 2009

Chairman Markey, Ranking Member Sensenbrenner, and distinguished Members of the Committee, my name is Domenic Ruccolo, and I am the Senior Vice President of Sales & Marketing for the Worldwide Construction & Forestry Division of Deere & Company. On behalf of John Deere, thank you for the opportunity to testify today on constructing a green transportation policy.

For 171 years, John Deere has enabled human flourishing by offering solutions to those who produce our food, fiber, and fuel, beautify and protect our environment, and build and maintain our homes and critical infrastructure. Over this period, Deere has invented, manufactured, and sold worldwide thousands of models of agricultural, construction, forestry, lawn and turf care, and landscaping equipment, as well as the engines powering them. Deere created all of these tools with a consistent purpose – improving productivity and efficiency.

Just as productivity and efficiency drive Deere's product innovation, we suggest they should also drive our Nation's infrastructure policy. Indeed, product innovation alone cannot help us transition to a greener transportation system if the system itself and the processes by which it is developed are unusable or wasteful. America's infrastructure directly affects our

economic, social, and environmental wellbeing. Every day we all rely upon our roads, bridges, transit, rail, and other infrastructure to survive and thrive. Despite our dependence on it, the Nation has taken our infrastructure for granted and permitted it to fall into disrepair without concern for its sustainability. The Nation's current infrastructure – to which the American Society of Civil Engineers recently gave a "D" grade – has suffered from the absence of a national vision for a 21st-century infrastructure premised on both robust funding as well as the pursuit of the most productive and effective projects.

Action in recent weeks reflects Congressional leadership in creating such a new vision for infrastructure. From the enactment of the American Recovery and Reinvestment Act, to the passage in the House of Representatives of the Water Quality Investment Act, it is clear you appreciate something as significant as our infrastructure requires significant funding. We also must make sure this and future money is spent wisely, and to do so we need to incorporate principles of environmental sustainability into our infrastructure policy.

As one of the world's leading manufacturers of construction equipment, John Deere believes one way to make infrastructure projects greener is through the use of productive and efficient construction equipment. The construction equipment marketplace has consistently demanded machine productivity and efficiency because fuel consumption is a primary operating cost for our customers. In response, John Deere and other construction equipment manufacturers expend substantial resources to ensure their customers can get the most work out of every gallon of fuel used. For example, when comparing the 2008 John Deere 744K Four-Wheel Drive Loader to its 1997 predecessor, Deere was able to reduce fuel consumption by 32% despite increasing machine weight and engine power. This effort is not limited to one machine, but extends to our entire line of construction products.

The Federal government can take many steps to support further efforts in the construction equipment industry to improve equipment productivity and efficiency and reduce environmental impacts. Collaboration and cooperation between the public and private sectors are needed to investigate and fund the research and development of new standards and technologies to further improve equipment productivity and efficiency. The Federal government has not consistently assisted the nonroad equipment industry in the past on such an effort, concentrating instead upon the onroad sector. However, by recognizing the essential role nonroad equipment will play in transforming the transportation and other sectors of the economy to achieve ambitious and necessary greenhouse gas reductions, we can see that appropriate investment by the Federal government into nonroad technologies would create substantial environmental returns. For example, the National Surface Transportation Policy and Revenue Study Commission – a commission charged by Congress to examine the future needs of the Nation's transportation system – recognized in its report, *Transportation for Tomorrow,* that creating modal shifts from road transport to rail and public transportation systems is one way to help offset the growth in greenhouse gas emissions. Only construction equipment can build and maintain the infrastructure foundation for these modal shifts. By supporting the nonroad equipment industry to make machines more productive and efficient, the Nation will be able to achieve these shifts and realize the environmental benefits more quickly and with less cost. Further, Federal funding will permit John Deere and other construction equipment manufacturers increased flexibility to quickly invent, manufacture, and produce new and different forms of equipment needed for innovative infrastructure created in the years to come.

We strongly recommend that the Federal government also take steps to ensure construction equipment owners can more easily purchase new technologies that excel in productivity, efficiency, and environmental sustainability, and thereby build the infrastructure the Nation demands. A single piece of large construction equipment can cost several hundred thousand dollars. The development of tax incentives and funding specific to the purchase of new equipment will, among other things, remove uncertainty for equipment owners, who today are concerned about making such a substantial investment when there is a risk that inconsistent environmental and other regulations created by the States and locally may make equipment obsolete well before their end of useful life.

On a larger scale, the Federal government can support greener construction practices and techniques by incorporating environmental considerations into infrastructure planning and funding decisions. As a member of the United States Climate Action Partnership, John Deere recognizes that reducing carbon-intensive travel and enhancing the efficiency of transportation infrastructure is essential to reducing greenhouse gas emissions. As stated in its recent *Blueprint for Legislative Action*, USCAP supports incorporating greenhouse gas measurement and accounting in transportation infrastructure funding and planning. Further, we believe it is vital that national infrastructure policy be systematically reviewed and modified as needed to help meet national goals of greenhouse gas emissions reductions.

Incorporating greenhouse gas measurement and accounting into infrastructure funding and planning, however, needs to be coupled with improvements to the infrastructure project development and approval process. As was observed by the National Surface Transportation Policy and Revenue Study Commission, transportation projects often become bogged down for years in inefficient or redundant processes, thereby increasing project cost and

undermining the ability to improve the efficiency and environmental impact of our transportation system. Therefore, as Congress drives to create a vision for a productive and efficient infrastructure, you need to transform the processes of the Federal government and its agencies to ensure that they are similarly productive and efficient.

Beyond the considerable direct environmental benefits an efficient transportation system provides, many indirect benefits accrue, which Congress should consider when promoting green transit modes and infrastructure. For example, by improving our infrastructure, we will improve the environmental sustainability of many green industries critical to rural America. As the Midwestern Governors Association recently recognized in its report, *Surface Transportation Recommendations*, rural America is the home for much of our green economy, including renewable energy specifically. The success and growth of renewable energy hinges on access to a safe, convenient, reliable, and affordable transportation system.

At this point I would like to especially thank Committee Member Herseth Sandlin for her support of woody biomass energy through the recent re-introduction of the Renewable Biofuels Facilitation Act. Woody biomass is a prime example of a rural renewable resource that can help meet our energy needs, address the challenges of climate change, foster energy independence and diversity, revitalize our rural communities, and improve the health of forests. Congress is in a position to unlock the enormous potential of woody biomass by supporting not only the creation of a market for it, but also the creation of an infrastructure system that enables its ready and cost-effective transportation.

In concluding my remarks, I would be remiss if I failed to mention another critical benefit Congress should consider in its infrastructure policy debate – job creation. John Deere witnesses firsthand the dramatic impact of the current financial crisis on its workforce, dealers,

and customers. As the Members of the Committee certainly learned during their work on the American Recovery and Reinvestment Act, the financial crisis has hit the construction industry very hard. The Bureau of Labor Statistics recently reported the unemployment rate for the construction industry in February was 21.4%. This statistic means there are over 2 million construction industry workers currently without jobs.

The impact of the financial crisis extends beyond the construction industry to those skilled and hardworking Americans who manufacture our vital construction equipment. John Deere and others in the construction equipment industry have been forced to lay off many employees as a result of the plunging demand for construction equipment caused by the financial crisis.

In my role as Senior Vice President of Sales & Marketing for the Worldwide Construction & Forestry Division, it is my job to regularly interact with Deere's employees, dealers, and customers. Without a doubt, we are all ready, willing, and able to get back to work for the Nation to help rebuild its economy and create the environmentally sound infrastructure system it deserves. Predictable, adequate, and effective use of program funding to achieve these ends should be a policy priority. As Congress looks ahead to the next Highway and Transit Bill, please trust your national experts regarding financial requirements to accomplish this task – the National Surface Transportation Policy and Revenue Study Commission estimates this transformation will require at least $225 billion from all sources annually. Despite recent attention to infrastructure funding and programs, the need remains great for both increasing overall infrastructure funding and improving the processes by which infrastructure projects are planned and built. We are confident that in the coming years and decades, John Deere, its employees, dealers, and customers will deliver an infrastructure that

excels in every aspect including environmental sustainability as we move our Nation towards a lower carbon economy.

Thank you again for the opportunity to testify, and I am happy to answer any questions the Committee may have.

Mr. BLUMENAUER. Super. Thank you very much.

Ms. Herseth Sandlin.

Ms. HERSETH SANDLIN. Thank you, Mr. Blumenauer.

Mr. Ruccolo, thank you for your testimony. I thank the other witnesses as well but my questions go to you as it relates to the Renewable Biofuels Facilitation Act. I appreciate John Deere's support of this legislation that I have reintroduced with Mr. Greg Walden of Oregon. We believe that a key to fulfilling the renewable fuels standard that we passed in 2007 is to ensure that cellulosic biofuels can be produced from the greatest possible diversity of feedstocks in communities across the Nation. This particularly affects any region of the country with significant tracts of forestland, as you indicated, including the Midwest, the Northwest, the Northeast and the South.

Now, I know your company has developed specialized equipment to collect woody biomass in forests and I hope that you can share more about that with the committee, but I also know that the company has been very active in South Dakota in testing new farm machinery that is going to make it easier to gather for producers, agricultural producers to gather and process corn stover and other farm byproducts that can be used for cellulosic ethanol production. So if you could expand on those initiatives and elaborate on the necessity of these projects if we are going to have greener fuel sources in the future, and if you could also speak to some of the challenges you are currently facing as you assist efforts to expand the diversity of feedstocks for biofuels.

Mr. RUCCOLO. Certainly I will try to hit on all of those things. There were a number of topics in your question and I will be glad to address that.

Relative to woody biomass, yes, we do have a product essentially referred to as an energy bundler, if you will. It goes about collecting residue off the forest floors, if you will, either after a logging operation or just that it naturally exists, and actually promotes the health of the forest, if you will, also reduces certain risks, as you know, of forest fires and essentially takes this residue and compresses it in a way that creates kind of bundles of material that can be used in cogen plants and so on as an alternative form of energy and certainly one that is renewable. So on the forestry front, that is the purpose of the wood biomass in particular.

In terms of biomass that comes from either corn stover or other forms of agricultural products, we have several projects underway there in terms of really developing the technologies associated with turning agricultural residue, if you will, into other forms of energy, be it fuels or otherwise, and being with the construction and forestry division and not the expert necessarily on agricultural biomass efforts but would certainly if there are more specific questions more than glad to take those questions back and get back to the committee with those specific answers.

Ms. HERSETH SANDLIN. Thank you. And also for the record, just as Mr. Salazar mentioned his familiarity with John Deere's equipment, I too spent many hours in my youth on the green machines there on the family farm. Thank you for your testimony. Thank you to our entire panel.

Thank you, Mr. Chairman.

Mr. BLUMENAUER. Well, we are reaching the wrap-up here but I would like to pose to each of our panelists an opportunity to maybe drill down for a moment about the incentives, the government standards that were referenced and opportunities to change the process. Part of what we have heard from our witnesses so far is a little frustration at a time when it can get a little complex. Mr. Zimmerman referenced his frustration with not being able to actually get a project through the federal process, which ends up providing delay, driving up costs. Mr. Weaver, I think you referenced it. I am curious if you would like to just start first talking about what the government specs should be, how the federal government—we are dealing with reauthorization now, the Surface Transportation Act, which expires in 6 months and I think will be reauthorized by this Congress. If you want to touch on how specifically you think we can help by driving some different standards and opportunities not just for pilot projects but maybe something that is performance based that would enable us to make it easier to use the new processes that you reference and to make it easier to not have to jump through hurdles to be able to incent some of the State or local governments to take some of the innovations not just to be able to recycle but you are saving landfill and energy. Would each panelist make a brief comment about the specification issue?

Ms. GUERRA. Thank you for the question, and it is certainly a complex issue that this legislation will be addressing on greenhouse gases and I think one of the first points is to look at this legislation in a holistic way and really trying to link in our case, you know, the intensity of cement and producing greenhouse gases but with the benefits of concrete as an efficient material when it comes to highway infrastructure.

In terms of the specs, I think there is lot that government, federal government can do. There are specs for blended cements or performance-based standards. The problem is that they are not utilized across the board. There is only a handful of States that recommend on their projects these performance-based standards so I think there is an opportunity to mitigate the impact of greenhouse gases by the usage of blended cements if it is a federal mandate for performance-based standards rather than just a recipe or a prescription of cement. We don't need the same strength on our driveways that we need on our highways and that will drive a lot of innovation on our industry and the entire sector.

Mr. BLUMENAUER. Super.

Mr. Weaver.

Mr. WEAVER. Yes. I would like to see the Department of Transportation coordinate across all of their entities, federal transit, federal highways, FAA, their specifications to be a little more uniform on the use of recycled material and locally available material rather than specking some exotic things that has to be transported great distances like the FAA specs and the federal highway specs are totally different. According to her, the minimal cement content, the end result spec, let us do our own mix designs on asphalt, concrete. We got to guarantee it. Let us come up with what we think will work and prove it rather than the State or the federal agency telling us what we have to use.

Mr. BLUMENAUER. But making it performance based. As long as it does the job——

Mr. WEAVER. Yes. I would call it end result rather than performance, but end result—if they want 3,500-pound concrete that is going to last 50 years, instead of telling us how much cement to put in it, we can substitute maybe some rock or some sand, some locally available materials and make it denser and better than what they specify.

Mr. BLUMENAUER. Thank you.

Mr. RUCCOLO. Getting back to the part of your question in terms of maybe some of the frustration you sensed here, especially in terms of the creation of incentives or some of the inconsistencies in regulations from State to State or municipality to municipality when it comes to some of the requirements associated with equipment, I think one of the things is that there has been some consistency in terms of what the EPA has come out with where it kind of gets extrapolated, if you will, at the State or local level I think is what causes a lot of the uncertainty that Mr. Weaver expressed as well in his opening statement and I think that into itself, finding some mechanisms that do incentivize construction contractors, if you will, construction equipment owners to acquire new pieces that will move the needle, if you will, relative to greenhouse gas and emissions and remove some of the fear in terms of obsolescence that a lot of these new regulations are causing I think is one that would be a great step forward moving forward. And relative to the highway bill in particular and the whole topic of infrastructure and where do we take the infrastructure going forward for the Nation is certainly one that is complex and I think the previous panel hit on a few issues of where it has to be balanced. The infrastructure requirements in rural America are certainly different than they are in more-urban areas and it is going to be certainly a difficult task in terms of achieving a balanced approach that addresses and at least touches on the needs of all Americans.

Mr. BLUMENAUER. Well, let me just express my deep appreciation for your patience here with us today and laying out a very strong case for an element that doesn't get appropriate attention in our climate change discussion. A ton of carbon being generated to create a ton of concrete is something that I think people find sort of staggering if they are not equipped with it, and I have been very impressed with what your industry has done to try and develop a greener, lighter carbon footprint and the construction industry, the leadership that is being exhibited at some of the State and local level is really remarkable. Your point about equipment manufacturing, which is essential to all of this, we have got a lot of equipment out there that actually does generate a tremendous amount of pollution and is inefficient, but as Mr. Weaver points out is an important part of the net worth of a lot of small- and medium-size businesspeople and they are going to need some help in the transition, and I think across the board you are uncovering a series of elements that are very, very important for us to consider in climate change, in reauthorization, in what is going to happen in the next round of economic stimulus because I don't think the economy is going to rebound quickly, and transportation finance. So you have really set the table here in an underappreciated part of the com-

mittee's work and I appreciate deeply your helping us build the record here today.

I wonder if we haven't exhausted your time and patience if each of you might have a minute that you would like to offer up to just kind of punctuate one item as we conclude the hearing.

Ms. GUERRA. Yes, just to reiterate that the energy-intensive part and the ton of CO_2 generated in cement, it can really be upset by all the benefits of concrete usage. Cement is an energy-intensive product but it is only 15 percent of concrete, so there is a lot of opportunities to really work on both ways to reduce our carbon footprint.

Mr. BLUMENAUER. Super.

Mr. WEAVER. I want to help Mr. John Deere. We think that an incentive, a tax incentive, whether it is targeted tax credit or whatever to replace new equipment. With the money flowing to the States now to rebuild the highways, a lot of contractors will take old equipment, as I did this winter—I rebuilt a 24-year-old piece of equipment and I didn't bring it up to current standards but it is going to be good enough to last another 10 or 12 years. Had there been some kind of incentive there, I wouldn't have rebuilt that, I would have went and bought a new one for $300,000. But this money is coming and I think it is time that people have a plan to replace their older equipment.

You know, on a personal note, Little Rock has over 60 miles of bicycle pedestrian trails starting at the Clinton Library and the centerpiece of it is the longest pedestrian bicycle bridge in the United States and, excuse me, but it is named the Big Dam Bridge. It goes over a dam.

Mr. BLUMENAUER. And Congressman Snyder is shamelessly promoting it, that along with your streetcar. We appreciate that. Thank you, Mr. Weaver.

Mr. RUCCOLO. I would like to conclude by just saying the topic of infrastructure spending is a tough one. It is one that is extremely expensive. We fully understand and appreciate that. We also I think all need to come to the realization the cost of our failure to do so has got a tremendous cost as well that maybe is not one that can be as easily defined, if you will.

To Congressman Salazar's initial question about cap and trade just to share Deere's view on that, our view is we are very much in favor of a cap-and-trade system for the simple reasons that it allows for greater flexibility but I think will drive greater innovation and get us to the kinds of greenhouse gas levels that are going to be necessary going forward.

Mr. BLUMENAUER. That is a great note on which to conclude the hearing.

For the last 30 months I have been having conversations with a variety of stakeholders including representatives of each of your industries about how we should be rebuilding and renewing America, what sort of vision we have going forward, not just another transportation bill but the big picture that each of you have referenced, and I must say that meeting with 250 stakeholders now over 2½ years and having a series of conferences around the country—we will be in Atlanta again this Monday—I am struck by the pockets of innovation that people aren't aware of, the flexibility that is not

maybe necessarily associated with various sectors of the economy and the potential of bringing people together. You may have noticed that occasionally is a little controversial around there. There is a little controversy, a little debate but what we are seeing starting at the grass roots and as evidenced by your testimony today that there are broad areas of consensus that can bring people together to help solve economic problems, saving the planet and making the quality of life improved for all Americans, and we really appreciate your contributions for advancing that debate and look forward to working with you and the committee as we move forward. Thank you very much.

We are adjourned.

[Whereupon, at 11:28 a.m., the Committee was adjourned.]

Date: June 1, 2009

To: Ali Brodsky, Chief Clerk, Select Committee on Energy Independence and Global Warming

From: Peter Varga, CEO, Interurban Transit Partnership

Subject: Follow-up Questions

Following my testimony to front of the Select Committee on Energy Independence and Global Warming, members of the committee submitted additional questions. I have answered those below:

1. How would unilateral U.S. restrictions on carbon emissions affect the international competitiveness of our transportation sector? Do you believe that major emitters, specifically China and India, must be a part of an international system that limits carbon emissions?

   I would say that the United States is the largest emitter of greenhouse gas emissions in the world and among the few industrialized countries that have not adopted the Kyoto Accords. If we fail to act until others do so, we risk exacerbating the impact on the environment and the level of investment necessary to respond to the global challenge of greenhouse gas emissions. It is important to act now by having US policy capture the full costs, including externalities such as the impact of pollution on the nation's health and natural resources, and benefits, such as livable communities and a sustainable economy that will position the United States to be more competitive in the future while improving the quality of life for citizens.

   An international system would be preferred so all major emitters are included, but I will assert that as the largest emitters now we should take responsibility for addressing the issue here at home, in the United States.

2. How much funding did the Rapid receive from the ARRA? What is the timeline to complete the projects associated with the stimulus?

   The Rapid received $10,603,305 in Federal Transit Administration formula funds. The project is essentially a $35,525,261 project to be built in four phases. We already had $7,604,713 in funds allocated to the project and plan to complete it using funding programmed in our FY 2009 FTA 5307 grant application, and also funds we plan to use from our FY 2010 and FY 2011 Federal Transit Administration 5307 formula allocations. We already had an architectural firm that could work on the designs, so that construction designs could be prepared and that the full amount ($10,603,305) of stimulus funds could

be awarded to a construction management firm by August 2009. We therefore plan to obligate 100% of the funds allocated to us by September 1. The schedule for construction itself begins December 2009 and the project will be completed by December 2011.

ARRA funds allowed us to advance this project by two years!

3. How much does constructing a LEED certified facility add to the baseline cost of construction? Considering the current economic situation facing many state and local municipalities, shouldn't projects focus first and foremost on the most efficient use of available funds?

In our experience that reaching the certified level of LEED usually takes 1-2% of the overall project cost. There are many factors that play into this, including site selection and credit selection that will help determine the true cost.

We have constructed one facility, Rapid Central Station as a LEED-certified building. The cost of LEED-certification at Central Station was approximately $450,000 or about 2% of the overall project cost. The total project cost was $23.6 million.

Because the Wealthy Operations Center is still in the design phase, we have some flexibility. As we have designed the building currently, that number is $1,422,000 or about 4% of the overall project cost. However, we have designed into the building more points than are required for baseline LEED-certification. If we pulled out some of the more expensive credits (rain water collection, green roof), we most likely would still become certified, and the cost would drop to around $620,000 or about 2% of the overall project cost. As with the construction of the Rapid Central Station the decision to include these features can be made while construction is underway. If there are no unforeseen contingencies that add to the baseline construction budget, we will implement them.

In all these cases, the dollar amounts declared assume the inclusion of design fees.

Asking about the incremental cost to the baseline of a project only looks at the capital side of the equation. First, there are the operating savings to be achieved with LEED projects over time. The Central Station roof would have to be replaced in about 25 years, except that we have made it a green roof that reduces the ultraviolet degradation of the roof. It is now anticipated that the roof will last seventy years. There are also the reduced operating costs of a facility that is energy efficient in its design. Day light views reduce our lighting costs and, use of alternative lighting reduces it further. We also save on heating and cooling costs not only because of the green roof but also because of the way the building was commissioned. Economic considerations are not only for the present but also for the future. A second issue for us is meeting the expectations of a community that strongly believes in sustainability. Eighteen (18) percent of all LEED-certified projects in the United States are to be found in the Grand Rapids region. Commitment to

sustainability looks beyond purely economic issues. For example, what is the value of releasing absolutely clean storm water discharge from our Central Station into the sewers that end up in the Grand River? Our agency believes that we must develop and implement environmental, social and economic sustainability strategies. The question of cost then becomes a more complex decision. In the long run we still see an economic benefit. In the short term it is an incremental cost but well within justification.

4. Did Grand Rapids pass the additional property tax mileages via referendum? What is the total additional tax burden per capita as a result of the 2003 and 2007 increases?

   The Interurban Transit Partnership, an authority formed by the six cities of East Grand Rapids, Grand Rapids, Grandville, Kentwood, Walker and Wyoming, passed their first property tax millage in 2000 via referendum. That was .75 mills request that generated $6,885,999 in revenues. In 2004 we passed another referendum with an increase to .95 mills. The incremental tax burden per capita was increased by $3.42 for a new per capita yield of $18.64. In 2007 we increased the millage to a total of 1.12 mills. The additional total per capita tax burden was increased by $3.24. With the increases in taxable valuation in the intervening years, the total tax burden per capita currently is now $25.34.

5. You propose a user fee on vehicle miles traveled to fund investment in public transportation infrastructure. How much do you think this tax should be? How would mileage be reported? Would someone in rural Wisconsin pay the same tax per mile as an individual who lives in Manhattan? Would a vehicle miles traveled tax replace the per gallon gas tax or be in addition to existing taxes?

   The vehicle miles tax (VMT) has been tested in the state of Oregon. The technology is available. The nation has a good handle on the cost to maintain the nation's infrastructure through the DOT's Annual Conditions and Needs Report. Implementation of a VMT tax will require time to implement due to the need to establish the infrastructure to capture the necessary information and establish the mechanism to assess the tax. However, as vehicles become more fuel efficient a VMT tax becomes a better measure of the impact on the nation's transportation system than the gasoline tax. Thus, there is need to move quickly in the direction of implementing this tax to be consistent with the goals established for CAFE standards for vehicles. The decision on whether rural areas or farm related equipment are treated differently than vehicles operating in a more urbanized area is a policy choice to be made by Congress. I believe that there will have to be a transition from gallon per tax to VMT tax over time. The important aspect to keep in mind is the financial impact of the transition to make sure that transportation infrastructure funding is keeping pace with cost.

6. How much would "100% funding for the acquisition of alternatively fueled vehicles" cost? Where would Congress find the funding for this program?

   Currently a standard 40 foot low floor bus costs approximately $230,000. To purchase the same bus as a hybrid electric bus has an incremental cost of approximately $200,000. It is this incremental cost that should be funded by Congress. This could be done with an additional grant, perhaps from climate change bills or clean air funds or DOE grants (if Federal Transit Administration dollars are not used) for those systems that already have FTA grant funds to purchase standard buses. Hypothetically, if a system has funds to purchase five buses, then a special grant could be made for $1 million to pay for the upgrade to hybrid electric. As with other advances in technology costs tend to come down over time. I believe the differential cost will drop over time reducing the need for supplemental funding.

7. As Congress examines funding for public transportation projects, what factors should be considered? How can Congress balance funding between the most high-use systems with the largest ridership and municipalities that have minimal ridership?

   It is my opinion that the New Starts/Small Starts program attempts to create a balance between high use systems and smaller urban areas that want to create mass transit alternatives such as Bus Rapid Transit for fixed guideway projects. Congress could look at using streamlined methods with lower funding thresholds to support for smaller urban areas. With ridership at record levels and gasoline prices likely to increase in the future, demands for more transit are likely to increase. There is huge need for transit to provide transportation alternatives for citizens in all communities, both rural and urban. Our transit system has had an average growth in ridership of about 10 percent a year. We have doubled our ridership since 2000. Aside from ridership growth, other factors to consider should be the contribution to economic development and improved energy efficient land use as I suggested in my testimony. The overall impact to a community should be considered especially as it relates to smaller systems.

Answers to Additional Questions of Domenic G. Ruccolo

Senior Vice President, Sales & Marketing

Worldwide Construction & Forestry Division, Deere & Company

Before the House Select Committee on Energy Independence and Global Warming

Hearing on "Constructing a Green Transportation Policy:

Transit Modes and Infrastructure"

March 19, 2009

Chairman Markey, Ranking Member Sensenbrenner, and distinguished Members of the Committee, it is my privilege to respond on behalf of Deere & Company to the additional questions raised following my testimony on "Constructing a Green Transportation Policy: Transit Modes and Infrastructure." In the pages below, I will answer each of the Committee's questions. In answering the questions, I will specifically refer to and comment upon the climate change and energy policies set forth in H.R. 2454, the American Clean Energy and Security Act (ACES), developed after my testimony.

1. **How would unilateral U.S. restrictions on carbon emissions affect the international competitiveness of our transportation sector? Do you believe that major emitters, specifically China and India, must be a part of an international system that limits carbon emissions?**

Unilateral U.S. restrictions on carbon emissions might negatively affect the international competitiveness of many sectors of our Nation's economy including not only transportation, but also manufacturing and agriculture, because they are closely linked to energy intensive industries, such as cement, iron and steel, and chemicals. Compliance with carbon restrictions might create higher costs for these domestic sectors. These costs would not exist for

international firms, thereby providing them with numerous competitive advantages, ranging from increased investment flexibility to improved pricing of goods and services. These pricing changes might lead to significant and compounding negative economic impacts if the costs of compliance encourage domestic industries to relocate operations abroad. With such a transfer, unilateral U.S. restrictions on carbon emissions might both negatively impact the Nation's economy as well as undermine the ultimate goal of achieving meaningful reductions in global greenhouse gas (GHG) emissions by simply shifting emissions sources elsewhere. See Regulating Greenhouse Gas Emissions Under the Clean Air Act, 73 Fed. Reg. 44,354, 44,376 (July 30, 2008) (setting forth competitiveness concerns of the U.S. Department of Commerce).

As a manufacturer of nonroad vehicles and engines sold around the world, Deere witnesses firsthand the economic impact of disparate or inconsistent regulatory requirements. For example, the U.S., the European Union (E.U.), and Japan have adopted stringent emissions regulations for new nonroad diesel vehicles and engines. These emissions regulations, including specifically the U.S. Environmental Protection Agency's (EPA) Tier 4 standards, require domestic nonroad vehicle and engine manufacturers to expend considerable sums to research, test, and manufacture technologies required for compliance. See Control of Emissions of Air Pollution From Nonroad Diesel Engines and Fuel, 69 Fed. Reg. 38,958 (June 29, 2004) (setting forth Interim and Final Tier 4 standards). The adoption of Interim and Final Tier 4 technologies will likely increase the market price of nonroad vehicles and engines by several percent despite the industry's best efforts – far more than predicted by regulators when adopting these standards. This will significantly increase the price of equipment already regularly sold for $200,000 or more, and customers who are now

economically ravaged by the recession will be expected to shoulder much of this additional expense.

While the harmonization of U.S., E.U., and Japanese emissions regulations has provided Deere and other manufacturers of nonroad vehicles and engines with some certainty and competitive parity in terms of research and development and manufacturing, this harmony is being overwhelmed. Most other countries – particularly those like China and India experiencing extraordinary growth both in terms of nonroad vehicle and engine manufacturing capacity as well as demand for their nonroad products – do not have these stringent emission restrictions. As such, international competitors from these countries can avoid the costs imposed by emissions compliance and instead focus their research, development, and manufacturing efforts on improving product features or reducing costs. Deere, CNH America LLC, and Caterpillar, Inc., have all experienced the economic impact of this regulatory disparity when attempting to compete in less regulated markets, and recently provided a joint statement on this topic to the House Science and Technology Committee, Subcommittee on Energy and Environment, for its hearing, "Examining Vehicle Technology Research and Development Programs," held on March 24, 2009. (Attached please find a copy of this statement.)

While unilateral U.S. restrictions on carbon emissions might negatively impact international competitiveness and undermine GHG reduction goals, particularly if China and India are not engaged, such an impact is by no means inevitable if policies are developed to minimize or offset this risk. For example, ACES employs a number of useful strategies to minimize potential negative impacts. For instance, the cap and trade system provides domestic emitters with a wide variety of options to reduce their emissions at the lowest cost, including borrowing or banking emission allowances or purchasing offsets. In addition, ACES

provides transitional financial assistance in the form of emission allowance rebates for certain trade-exposed, energy intensive industries. Moreover, ACES stresses that the most effective means of preventing any negative impact on international competitiveness is through agreements negotiated between the United States and foreign countries – particularly those "major greenhouse gas emitting nations" like China and India – committing them to contribute equitably to the reduction of GHG emissions. Thus, while Deere is concerned about the possibility that unilateral U.S. restrictions on carbon emissions might negatively affect international competitiveness, Deere believes that well crafted climate change policy can minimize this risk.

2. ***You note the efficiency gains John Deere has made in response to customer demand. Is there a necessity for the government to legislate further regulations to improve efficiency? Isn't improving efficiency good business?***

Improving productivity and efficiency is not simply good business; it is essential to Deere's business. Over its 172 year history, Deere has invented, manufactured, and sold worldwide thousands of models of agricultural, construction, forestry, lawn and turf care, and landscaping equipment. As Deere detailed in its response to EPA's Advance Notice of Proposed Rulemaking, Regulating Greenhouse Gas Emissions Under the Clean Air Act, 73 Fed. Reg. 44,354 (July 30, 2008), the nonroad marketplace has consistently demanded machine productivity and efficiency improvements because fuel consumption is a primary operating cost and concern for its customers. (Attached please find a copy of Deere's response.) The resulting productivity and efficiency gains have been significant, helping to keep non-road transportation mobile sources a minor contributor to our Nation's total GHG emissions. Non-road transportation mobile sources account for less than three (3) percent of

our Nation's total GHG emissions and less than nine (9) percent of the GHG emissions from all mobile sources according to EPA's most recent Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2007 (Apr. 2009).

Because of its drive for efficiency and minimal contribution to total GHG emissions, Deere does not believe regulation of the nonroad sector is necessary at this point. Further obviating the need to regulate GHG emissions from the nonroad sector is the massive effort and expense already mentioned by nonroad vehicle and engine manufacturers to meet Tier 4 emissions regulations. With Tier 4 regulations set to take effect through 2015, nonroad vehicle and engine manufacturers will require several years of sufficient leadtime after 2015 to prepare for any GHG standards, thus making GHG standards cost-prohibitive until 2019 at the earliest. As such, Deere acknowledges the efforts in ACES to define for EPA when it is appropriate to regulate GHG emissions from nonroad vehicles and engines – for those classes of nonroad vehicles and engines with significant emissions *and* the potential for significant and cost-effective reduction – as well as to postpone the effective date of any GHG standards until manufacturers like Deere have sufficient time to develop and apply necessary technologies.

Deere urges Congress and the Administration to consider alternatives before legislating regulations as a means of improving efficiency. As Deere set forth in its aforementioned response to EPA's Advance Notice of Proposed Rulemaking, public-private collaborations like EPA's SmartWay Transport Partnership can achieve a number of benefits including not only significant emissions reductions, but also provide the necessary foundation upon which future regulations can be based. Such a collaboration would be particularly valuable in the nonroad context because it could lead to a better understanding of the diversity of nonroad vehicle and engine forms and uses; the pathways (e.g. engine, equipment, operational, fuel, etc.) by which

productivity and efficiency gains can possibly be achieved; and the most appropriate metrics by which to evaluate GHG emissions. Deere welcomes the opportunity to participate in such a program to help determine whether any regulation is warranted.

3. ***How have previous changes in the equipment depreciation schedule influenced the purchase of new construction machines? How would you change the existing depreciation schedule to stimulate investment in construction machinery?***

From Deere's experience, the extension of bonus depreciation such as is present in Pub. L. No. 111-5 (H.R. 1), the American Recovery and Reinvestment Act, is a helpful policy tool in generating customer interest in purchasing new construction machines. However, the extent to which bonus depreciation creates a strong incentive to purchase new construction machines is difficult to gauge and dependent upon many factors, including specifically the individual tax profile of the possible customer. This is especially true during times of recession – such as the present – when customers have likely experienced significant losses. Further, to the extent that bonus depreciation becomes a long-term solution or is considered standard, its stimulative impact on costumer investment may be somewhat diluted. Since the creation of bonus depreciation in 2002, there have been several studies calling into question the efficacy of bonus depreciation for these and other reasons. See Statement of Peter R. Orszag Before the Committee on Finance, United States Senate, "Options for Responding to Short-Term Economic Weakness," at 14-15 (Jan. 22, 2008).

Deere recommends Congress consider providing in addition to bonus depreciation a supplemental tax credit for the purchase of new construction vehicles and engines. Tax credits are widely used to incentivize the purchase of cutting-edge technologies, such as hybrid cars, and may help drive the purchase of new construction vehicles and engines

adopting current and future tier emissions technologies. As already noted, Interim and Final Tier 4 technologies will be more expensive, and a tax credit could help offset these costs. Further, a tax credit will help ensure that costumers do not "buy-ahead" of looming emissions regulations because of increased costs. By minimizing a "buy-ahead," we can help bring new and cleaner technologies to the market, while also providing increased certainty and security in production levels for nonroad vehicles and engines during a time of technological change.

4. **On average, how much time is required to complete Environmental Impact Statements and other regulatory permits prior to beginning new transportation-related construction? How can this process be streamlined to shorten the project timeline?**

As the manufacturer of nonroad vehicles and engines used in transportation-related construction, Deere does not experience firsthand the time required to complete Environmental Impact Statements and other regulatory permits. However, it does not take firsthand experience to be aware of the widespread criticism regarding the lack of efficiency of current transportation project approval processes. For example, in the recent report, Transportation for Tomorrow, the National Surface Transportation Policy and Revenue Study Commission – a commission created by Congress to examine the condition and future needs of the Nation's surface transportation system – concluded, "[T]he Commission believes that it takes too long and costs too much to deliver transportation projects, and that waste due to delay in the form of administrative and planning costs, inflation, and lost opportunities for alternative use of the capital hinder us from achieving the very goals our communities set." The Commission noted that major highway projects take upwards of thirteen (13) years to complete, with a substantial portion of that time being taken up by the Environmental Impact Statement process, which may

take as long as eighty (80) months. The Commission provides a number of recommendations to streamline this process, including simply improving coordination among Federal agencies reviewing transportation project permits by establishing time limits for review. Deere urges the Committee to strongly consider the input of experts such as those on the Commission.

5. **USCAP advocates "a significant portion of allowances should be distributed free to capped entities" despite claims and European experience that free allocation will create windfall profits for firms. What is John Deere's position on allocation vs. auctioning of permits? How would John Deere spend the revenue that would be associated with a free allocation of emission credits?**

USCAP's recommendations regarding allowance allocation to regulated entities are meant to ensure that costs to consumers are mitigated. Initially, E.U. policymakers overestimated their actual and projected emissions, which resulted in caps that were higher than actual emission levels and therefore generated excess allowances. The E.U. has worked to improve their emissions trading market based on experiences in the early phases of the E.U. Emission Trading System – lessons that USCAP recommendations also take into account. USCAP recommendations call for allowance allocations to regulated electric and gas companies, and the relevant oversight agencies for these sectors can determine how best to utilize the allowance value for the benefit of consumers.

As a purchaser of a significant amount of electricity, Deere supports USCAP's recommendations to provide allowance allocation to the power sector free of cost initially, to help mitigate cost impacts and gradually transition the sector to a lower carbon fuel mix. Further, Deere supports allowance allocation to other regulated entities that are energy intensive and subject to competition internationally to ensure an appropriate transition to a cap

and trade system with allowance auctions. Deere is a relatively minor GHG emitter, and as such will not likely be allocated a significant number of allowances. However, as noted above, our suppliers – including utilities that power our factories and suppliers of raw materials used in our products – will benefit from initial free allocation to their sectors, which can help mitigate costs to all consumers, including manufacturers such as Deere and our ultimate customers.

6. **Regardless of greenhouse gas emissions, do you believe that the existing transportation infrastructure needs investment? How do you propose to generate the revenue to pay for projects?**

Deere strongly believes the Nation's existing transportation and all other types of critical infrastructure – including aviation, dams, drinking water, hazardous waste, wastewater, solid waste, and energy – demand our immediate attention and investment. We need look no further than the conclusion of the National Surface Transportation Policy and Revenue Study Commission regarding the severity of the need for transportation infrastructure investment: "We need to invest at least $225 billion annually from all sources for the next 50 years to upgrade our existing system to a state of good repair and create a more advanced surface transportation system to sustain and ensure strong economic growth for our families. We are spending less than 40 percent of this amount today."

Just as consideration of international competitiveness is critical in crafting climate change policy, we must also consider international competitiveness when developing infrastructure policy. For example, China will invest under its recent economic stimulus plan $586 billion over the next two years alone in infrastructure. By contrast, the U.S. economic stimulus package, the American Recovery and Reinvestment Act, provides approximately $150 billion in infrastructure funding over the next several years. To remain competitive

internationally, Congress and the Administration need to regain an appreciation for our infrastructure as a tool essential to the economic wellbeing of the world's largest national economy, and must fund it at levels that reflect and protect this status. Further, by including in our vision for infrastructure notions of environmental sustainability, we can create an infrastructure that not only facilitates our economy but also one that facilitates our climate change and energy goals.

Deere contends such a significant and prolonged level of investment will require significant innovation and flexibility regarding funding. One innovative solution linking increased infrastructure funding to the cap and trade system set forth in ACES would be through the use of allowance auction revenues to fund infrastructure investment. With recent Congressional Budget Office (CBO) estimates projecting that the ACES cap and trade system will increase Federal revenues by $845.6 billion between 2010 and 2019 largely as a result of allowance auctioning, such additional revenues can play a significant role in filling our Nation's infrastructure funding shortage. See CBO Cost Estimate, H.R. 2454, American Clean Energy and Security Act of 2009, at 10 (June 5, 2009). And by using allowance revenues for projects that help reduce transportation-related GHG emissions, the value of allowance revenues can be multiplied many times over by protecting and creating new jobs, improving our economy's efficiency, and addressing climate change.

Joint Statement of

CNH America LLC.
Caterpillar, Inc.
Deere & Company

Submitted to the
House Science and Technology
Committee
Subcommittee on Energy and
Environment

Hearing Examining Vehicle Technology
Research and Development Programs

March 24, 2009

We applaud the Subcommittee for holding this important hearing to examine vehicle technology research and development programs. The U.S. Department of Energy's (DOE) Vehicle Technologies Program (VTP) is designed to strengthen our nation's energy security, economic vitality, and environmental quality through public private partnerships. These public private partnerships have enhanced vehicle productivity and efficiency through the development and deployment of advanced technologies. Program activities have included research, development, demonstration, testing, and education.

As successful as the VTP has been at improving productivity and efficiency in on-highway applications, it has not thus far supported advancements in the important non-road market segments of construction, agriculture, forestry, mining, and lawn/turf care. Overall, relatively scant DOE resources have been devoted to funding nonroad engine and equipment research and development aimed at improving productivity and decreasing fuel consumption. We believe the creation of a new non-road program focused on these areas within the DOE VTP would help spur investments in, and the development and deployment of, new advanced technologies to improve total machine and job site, or 'operational', productivity and efficiency.

On May 11, 2004, the U.S. Environmental Protection Agency (EPA) finalized a comprehensive rule to reduce emissions from non-road diesel engines by integrating new engine and fuel controls as a system to achieve significant emissions reductions. Accordingly, we have been required to design, produce and use non-road engines with advanced emission-control technologies similar to those used for new on-highway trucks. The new emissions standards apply to diesel engines used in construction, mining, industrial, agricultural, forestry, and lawn and turf care equipment. The standards took effect for new engines beginning in 2008 and will be phased in through 2015.

Applying on-highway emissions reductions technologies to non-road engines, and engineering these engines into non-road equipment, is proving to be a significant engineering challenge, and is requiring an enormous investment. Complicating matters is the fact these technologies must be installed in equipment subject to exceptionally harsh operating environments where space is often very limited and where the installation must be done in a manner that will not interfere with the functionality of the equipment. This is resulting in the need for costly and complex equipment redesign. We and other non-road engine and equipment manufacturers are investing millions of dollars daily to meet EPA emissions standards.

Furthermore, while global harmonization in emission standards was largely achieved through EPA's leadership in the Tier 4 development, significant lack of global alignment in non-road emission regulation implementation remains. As a result of different regulatory timelines between the U.S., Europe, and Japan for non-road emissions regulations, we are facing additional complexity and cost.

The lack of alignment between these key regulated markets is exacerbated by the international nature of the non-road segments extending into far less regulated markets. This results in a grossly uneven playing field in the world marketplace and increases the complexity of manufacturing, marketing, distribution and servicing of products. As manufacturers compete in highly regulated markets, we must invest in the technology required for these markets, while our competitors serving less regulated markets focus their development spending on product features that contribute to direct customer buying motivations, thereby disadvantaging manufacturers serving highly regulated markets. Aggravating this challenge is the reality that the strongest growth and the greatest export opportunities lie in less regulated markets where competition is becoming more intense and the global playing field is becoming more divided.

The research and development dollars, along with other major investments, being dedicated in these difficult economic times to meet the Tier 4 standards significantly reduces our ability to robustly fund the development of new breakthrough technologies that would improve overall non-road machine and job site productivity and efficiency. It is this type of machine and operational technology research and development that would fit well within the existing VTP.

Diesel engines and equipment are the backbone of the American economy, contributing billions of dollars each year to our domestic growth. Their importance will surely expand, as they are an important tool used to accomplish the massive national efforts critical to the future success of our economy. Rebuilding a safe and efficient infrastructure upon which we can all rely; producing affordable and sustainable food, fiber, and fuel; and otherwise protecting and improving the world around us requires diesel engines and equipment. And, while criteria pollutant emission levels from diesel engines used in non-road equipment are approaching near zero levels, it is likely that peak thermal efficiency will not significantly exceed 50% in the next twenty years. Accordingly, there are other components within non-road equipment systems that can yield greater overall efficiency benefits in performing these critical tasks at a much better cost-to-benefit ratio.

There are a number of non-road engine, machine component, and system areas where technology research and development through a new program within the VTP could yield promising results. Candidates include:

Engine Prime Power and Hybridization
Absence of ram air-cooling, combustion, fuel injection, charge air handling, heat recovery, materials, optimized operation regimes, and hydraulic and electric hybrids;

Aftertreatment Systems and Control
NOx, Particulate matter, hydrocarbons, materials, subsystems and integration, and alternatives to SCR;

Power Electronics
Lightweight, reliability, durability, and control capability; standard for class B voltage systems on non-road machines;

Energy Storage
Battery and ultracapacitor technologies that can meet requirements for use in non-road applications;

Prime Power Energy Transmission
Transmission technologies for hybridization, electric drive, continuously variable transmission, and controls;

Fuels
Ultra-low sulphur diesel, low carbon, alternative, biomass derived, and renewable fuel performance and technological compatibility;

Analytical Modeling
Computer analysis for component and powertrain system optimization, application specific off-road conditions, climate and weather conditions;

Advanced Materials
Recyclability, durability, and life cycle analysis;

Fluid and Thermal Management
Friction, parasitics, advanced waste heat recovery, cooling system optimization, and system energy management;

Systems Integration
Fuel efficiency, productivity, and metrics harmonization;

Automation/Autonomy
Site/Fleet efficiencies, operator productivity, safety, utilization, information management, and GPS, remote sensing, and other telematics;

Energy Conversion
Auxiliary power and thermoelectrics.

In addition to research and technology development into various components and systems within the non-road machine, there are also promising opportunities to gain further efficiencies by improving the way these machines fit and work within the overall job/work site. There are numerous and significant efficiency gains to be had through further development of new breakthrough technologies that seek to garner reduced fuel consumption and minimize machine wear and tear by improving overall machine and operational efficiencies.

A total systems approach to productivity and efficiency is focused on the integration of the machine with the operations. In the case of non-road machines, research and development partnerships to deliver the best overall machine system solution will significantly reduce fuel consumption, as well as improve overall job site efficiency.

Again, thank you for holding this hearing to examine this important program. Although gains have been made through this program in the on-highway market segment, there are significant opportunities in the non-road markets. These untapped market segments would significantly benefit from a new non-road program within the VTP, and the goals of the program would be more fully realized. We look forward to working with the subcommittee on this important matter.

RECEIVED 11/21/2008 Ken Paull

JOHN DEERE

Deere & Company
One John Deere Place, Moline, IL 61265 USA

20 November 2008

Air and Radiation Docket and Information Center
United States Environmental Protection Agency
Mailcode: 2822T
1200 Pennsylvania Ave., NW
Washington, DC 20460

Re: Docket ID No. EPA-HQ-OAR-2008-0318

Dear Honorable Stephen L. Johnson, Administrator,

Deere & Company (Deere) is pleased to offer comments to the United States Environmental Protection Agency's (EPA) Advance Notice of Proposed Rulemaking, *Regulating Greenhouse Gas Emissions Under the Clean Air Act* (ANPR).[1] In its comments, Deere addresses how to most effectively and appropriately reduce greenhouse gas (GHG) emissions from nonroad engines and equipment.[2] Deere welcomes the opportunity to join with other interested stakeholders in advancing the public debate on global climate change and to work with them in the rulemaking process and beyond.

Executive Summary

Reducing GHG emissions is a global challenge requiring innovative public policy solutions such as a mandatory, economy-wide cap-and-trade program harmonized both within the United States and abroad. Existing statutes, such as the Clean Air Act (CAA), cannot effectively and appropriately reduce GHG emissions.

Reducing GHG emissions from nonroad engines and equipment requires innovative technologies. Driven by customer demands for fuel efficiency and equipment productivity, nonroad manufacturers have continuously improved their engines, equipment systems, equipment operation, and other features. Manufacturers must retain the flexibility to use any and all technological pathways to achieve further GHG emission reductions.

Reducing GHG emissions from nonroad engines and equipment lastly requires innovative partnerships. The imposition of GHG emission standards is not warranted in the near term given that the nonroad sector is efficiency-driven; emits less GHG than other mobile sources; is essential to GHG mitigation; is technologically diverse; and is undergoing Interim and Final Tier 4 development and implementation. Instead, Deere recommends EPA and other stakeholders collaborate with the nonroad sector to create a program promoting technological innovations to reduce GHG emissions, along with acceptable emissions metrics, thereby setting the stage for effective and appropriate emissions standards if needed in the future.

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[1] 73 Fed. Reg. 44,354 (July 30, 2008).

[2] *Id.* at 44,462-66.

Background

For 171 years Deere has enabled human flourishing by offering solutions to those who produce our food, fiber and fuel, build our homes and infrastructure, and beautify and protect our environment. Deere has invented, manufactured, and sold worldwide thousands of models of agricultural, construction, forestry, lawn and turf care, and landscaping equipment, and the engines powering them. Deere created all of these tools with a consistent purpose – improving productivity and efficiency.[3]

Wherever Deere does business, it also aims to minimize environmental impacts.[4] From Deere's early endorsement of soil conservation in the 1930s,[5] to its development of advanced water conservation technologies today, Deere has strived to reduce its customers' impact on the environment. Deere also creates environmentally beneficial opportunities for its customers by investing in wind energy and woody biomass technologies that clean the air, reduce GHG emissions, and help sustain their communities.

Deere also rigorously applies environmental stewardship to itself. From Deere's adoption of its corporate environmental policy in the 1960s,[6] to its continued efforts today in energy efficiency, water and air quality, and occupational health and safety, Deere has remained committed to environmental protection.

Consistent with these principles, Deere now seeks to work with EPA and others to reduce GHG emissions from nonroad engines and equipment.[7] GHG emissions are a global challenge – according to the Intergovernmental Panel on Climate Change (IPCC) Deere's customers around the world may face potential physical risks associated with climate change such as reduced water availability and regional changes in agricultural productivity.[8]

Deere believes these risks require leadership in and by the United States. As such, Deere has already joined dozens of businesses and environmental groups in the United States Climate Action Partnership (USCAP). USCAP endorses prompt enactment of a mandatory, economy-wide system based on cap-and-trade to regulate and reduce United States GHG emissions. Market-based programs premised on compliance flexibility to achieve emissions reductions like cap-and-trade have worked in the past and hold the greatest promise to

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[3] Deere, *Deere & Company 2007 Global Citizenship Report* 5 (Apr. 1, 2008).

[4] *Id.* at 4.

[5] *See, e.g.*, Deere Advertisement, *Moisture and Soil Conservation with John Deere Damming Equipment* (1937) ("An Improved Tillage Practice ... Saves Rainfall for Your Crops, Controls Surface Run-Off, and Reduces Soil Blowing").

[6] Deere, *Environment, Health & Safety Milestones*, http://www.deere.com/en_US/compinfo/envtsafety/milestones/index.html.

[7] Deere has collaborated in the past with EPA and other stakeholders to address environmental issues, such as reducing particulate matter and nitrogen oxide emissions from nonroad diesel engines. *See, e.g.*, *Control of Emissions of Air Pollution From Nonroad Diesel Engines and Fuel*, 69 Fed. Reg. 38,958 (June 29, 2004).

[8] Deere, *Carbon Disclosure Project 6 Greenhouse Gas Emissions Questionnaire Response*, Question 1(a)(ii) (2008).

slow, stop, and reverse GHG emissions. Cap-and-trade also has the potential to not only harmonize State efforts to reduce GHG emissions, but also harmonize with similar programs already in place and under consideration globally. As such, *new* legislation and international agreements are needed to address GHG emissions in the United States and worldwide.

Simply stated, the CAA would not be as effective in addressing *global* GHG emissions.[9] While the CAA is able to regulate local pollutants through discrete mitigation measures, GHG emissions – particularly carbon dioxide (CO_2) – are emitted in large volumes and are atmospherically well distributed. By encompassing only a limited number of GHG sources in the United States, the CAA would create a competitive disadvantage for those regulated when compared to the many and growing significant GHG sources abroad.[10] The CAA would also fail to encourage innovation to reduce emissions beyond its reach through critical projects such as emissions mitigation programs in agriculture, forestry, greenscaping, and other areas.

Putting aside Deere's interest in a comprehensive climate change solution and its concern about the efficacy of the CAA in providing one, in order to evaluate how to most effectively and appropriately reduce GHG emissions from nonroad engines and equipment, it is first necessary to gain a proper understanding of the nonroad sector.

Nonroad Engines & Equipment

Nonroad engine and equipment manufacturers have always been concerned with productivity and efficiency.

The nonroad equipment marketplace has consistently demanded machine productivity and efficiency improvements because fuel consumption is a primary operating cost and concern for customers.[11] There are many examples of how customer concern for fuel drives Deere to design and produce fuel efficient and productive equipment across its diverse product line.

In 2005, Deere unveiled the most fuel efficient agricultural tractor ever tested – the 8430 Tractor.[12] The demand for fuel economy has driven the entire nonroad industry to make fuel

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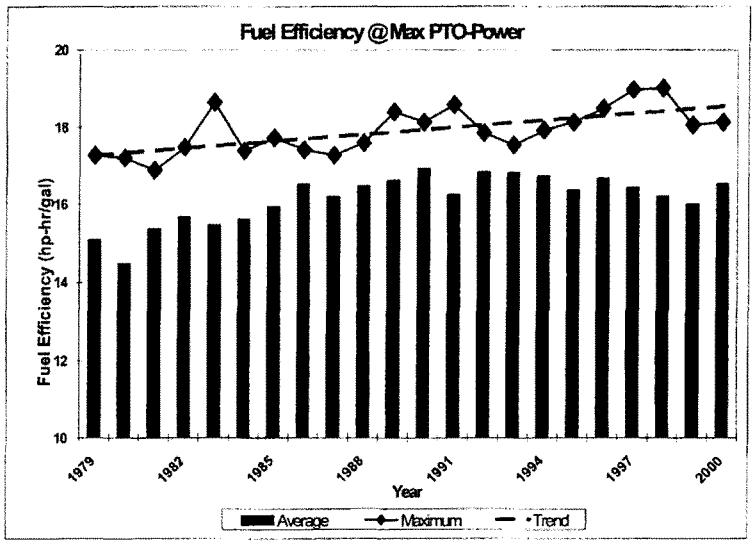
[9] *See, e.g.,* Staff of H. Comm. on Energy & Commerce, 110th Cong., *Getting the Most Greenhouse Gas Reductions for Our Money* 17 (May 27, 2008) ("[U]sing traditional regulatory approaches as the cornerstone of a comprehensive climate change program could pose a number of downsides and is less likely to result in the lowest cost reductions.").

[10] *See, e.g.,* 73 Fed. Reg. 44,354, 44,376 (citing United States Department of Commerce: "Regulation of GHG emissions through the CAA would ... put U.S. firms at a competitive disadvantage by raising their input costs compared to foreign competitors, likely resulting in emissions leakage outside of the United States. ... Such an outcome would not be beneficial to the environment or the U.S. economy.").

[11] *Compare* Deere Advertisement, *John Deere Model "D" Tractor* (1938) ("Fuel is, always has been, and probably always will be the biggest expense item in tractor operation."), *with* 73 Fed. Red. 44,354, 44,463 ("To date, improving fuel usage in many nonroad applications has not been of great concern to equipment users and therefore to designers.").

[12] *See* Deere, *Deere & Company 2006 Global Citizenship Report* 25 (Apr. 1, 2007) ("The John Deere 8430 Tractor set a record for lowest specific fuel consumption ... at the University of Nebraska Tractor Test Laboratory, the officially designated tractor testing station for the United States."); *see*

economy improvements throughout its history. For example, from 1980 until 2000 agricultural tractors have improved fuel efficiency by 10 to 15 percent.[13]



Deere has also decreased the energy required by its equipment by improving equipment productivity.[14] For example, from 1970 through 2002 the average annual yields of major

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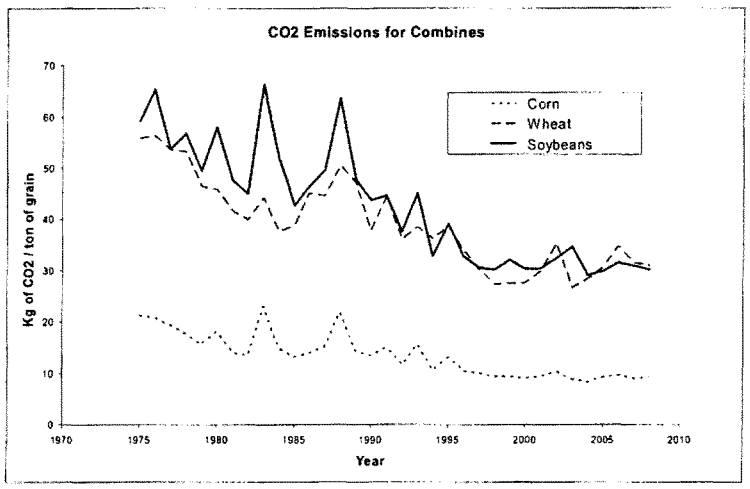
also Univ. of Neb., *Nebraska Tractor Test No. 1873: John Deere 8430 Diesel* (Aug. 7, 2006).

[13] Robert Grisso, *Nebraska Tractor Test Data Shows Current Models Are 10-15% More Efficient* ("Your tractor is likely more efficient than models bought 20 years ago. ... Bobby Grisso ... found that models tested in 2000 averaged 16.5 horsepower-hours per gallon compared to an average of 14.5 for models tested in 1980."); *see* Robert Grisso et al., *Predicting Tractor Fuel Consumption*, 20 Applied Engineering in Agric. 553, 558 (2004) ("During the past 20 years of tractor testing, improved fuel efficiency from NTTL reports was shown. A 4.8% decrease in average annual specific volumetric fuel consumption, for the data used in the *ASAE Standards*, was estimated."); Noel D. Uri & Kelly Day, *Energy Efficiency, Technological Change and the Dieselization of Agriculture in the United States*, 16 Transp. Planning & Tech. 221, 224-25 (1992) ("Beginning in 1975, there is an identifiable improvement in diesel fuel powered equipment energy efficiency. Using annual data ... from the Nebraska Tractor Tests ... significant trends in energy efficiency across horsepower categories are apparent.").

[14] *Compare* John A. Miranowski, *Energy Demand and Capacity to Adjust in U.S. Agricultural Production*, Presented at Agricultural Outlook Forum 2005, at 5 (Feb. 24, 2005) ("US agriculture became more energy-efficient. The sustained productivity growth in the agricultural sector combined with reductions in energy and other input use, led to significant improvements in energy efficiency."), *with* 73 Fed. Red. 44,354, 44,462 ("[I]n the past energy consumption has been less of a focus in the nonroad sector....").

crops increased significantly.[15] In response, Deere's customers demanded higher productivity and reduced input costs for more efficient harvesting. This demand spurred technological developments favoring large, high capacity, and very energy efficient combine harvesters. In 1970, an estimated 500,000 combines harvested grain crops in the United States. By 2007, the number had dropped to approximately 165,000, even though the average corn combine harvested approximately 7 times that of its predecessor in 1970. Taken together, these productivity improvements to combine harvesters reduced the average energy required to harvest one ton of grain by one-half. Based on Deere's calculations, this has resulted in an approximate doubling of combine harvester efficiency in terms of CO_2 emissions per ton of grain harvested.



Over the last 11 years, Deere has made steady improvements to its four-wheel-drive loaders. When comparing the 2008 744K to the 1997 744H, Deere reduced transport fuel consumption by 32 percent despite increasing machine weight and engine power. The improved performance and efficiency allows the new machine to climb grade 15 to 25 percent faster without increasing fuel consumption.[16]

Economic challenges experienced by the forestry industry have made reducing fuel costs particularly critical. Deere's 748H Grapple Skidder – appropriately nicknamed the "Miser" – consumes 14 percent less fuel per hour than a competitive machine. At the same time, it hauls 28 percent more tons of wood per hour making it almost 50 percent more energy efficient in terms of tons of wood hauled per gallon of fuel consumed.[17]

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[15] *See, e.g.,* USDA, *Crop Production Historical Track Records* 26-27 (Apr. 2008) (tracking annual corn yield increases).

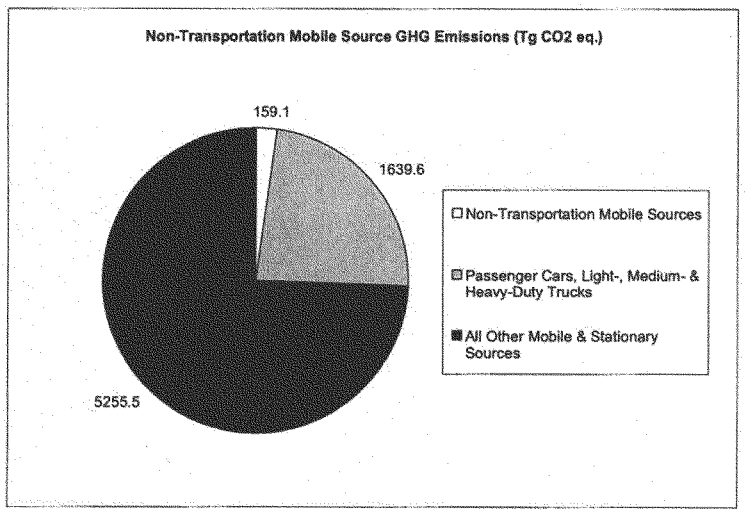
[16] *See* Deere Brochure, *K Loaders* 12 (2008) ("Optional 5-speed transmission with torque converter lockup in gears 2–5 increases acceleration, speeds cycles, and optimizes power and fuel efficiency during transport, roading, and ramp climbing.")

[17] *See* Deere Advertisement, *"Miser"* (2008) ("It starts stashing money away its first day on the job.").

Deere's 2500E Hybrid Riding Greens Mower, the first hybrid greens mower in the industry, uses an electric reel motor in place of hydraulics to power the cutting units. Compared to a standard diesel-hydraulic greens mower, this provides approximately 10 percent better fuel economy.[18]

Nonroad engines and equipment emit significantly less GHG than other mobile sources.

The nonroad sector emits a small portion of the United States' total GHG emission when compared to other mobile sources. EPA estimates total United States GHG emissions in 2006 were 7,054.2 terragrams of carbon dioxide equivalent (Tg CO_2 eq.)[19] That year "non-transportation mobile sources" – defined by EPA to include agricultural equipment, construction/mining equipment, snowmobiles and other recreational equipment, logging equipment, lawn and garden equipment, railroad equipment, airport equipment, commercial equipment, and industrial equipment – accounted for only 159.1 Tg CO_2 eq. or 2.26 percent of total United States GHG emissions.[20] By contrast, major onroad sources accounted for 1,639.6 Tg CO_2 eq. or 23.24 percent of the total emissions.[21]



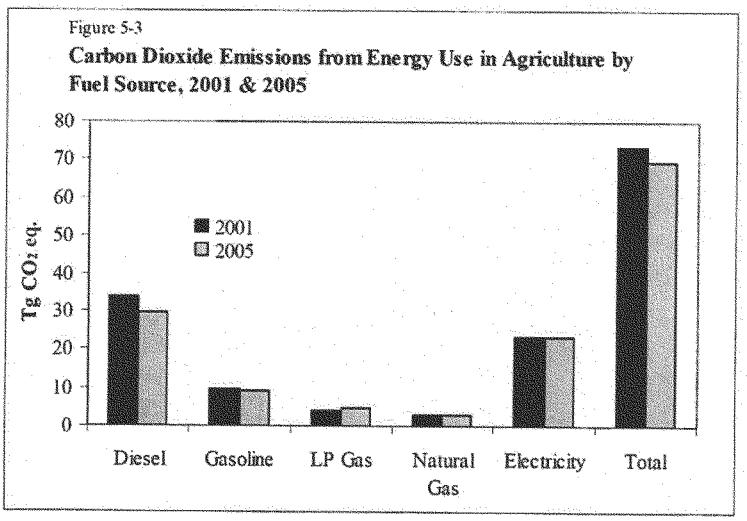
[18] *See* Deere, *Deere & Company Environmental, Health & Safety 2005 Annual Report* 5 (2005) ("The reel system … delivers an additional bonus: improved fuel efficiency. This type of operation can reduce fuel consumption by an average of 10 percent.").

[19] EPA, *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2006*, at ES-3 (Apr. 2008).

[20] *Id.* at A-125 to A-128.

[21] *Id.* at A-127 (passenger cars: 678.4 Tg CO_2 eq.; light-duty trucks: 556.6 Tg CO_2 eq.; medium- and heavy-duty trucks: 404.6 Tg CO_2 eq.)

Further, GHG emissions from the nonroad sector have been shown to be declining. The United States Department of Agriculture (USDA) recently found CO_2 emissions from diesel fuel use in agriculture has declined from 2001 to 2005.[22]



While this decline does not appear to be reflected in EPA's GHG estimates[23] or the justifications favoring regulation,[24] it highlights the need to base GHG reduction policies on an accurate understanding of nonroad equipment, their emissions, and their use. For example, according to USDA, overall farm energy use, including diesel fuel use, is below levels experienced in the 1970s, while at the same time "energy production, energy output per unit of energy input, has increased significantly."[25] The decrease in overall farm direct energy use – estimated to be approximately 30 percent between 1978 and 2002 – coupled with the increase in energy productivity is attributed in part to more productive, more efficient machines.[26]

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[22] USDA, *U.S. Agriculture and Forestry Greenhouse Gas Inventory: 1990-2005*, Tech. Bull. No. 1921, at 86 (Aug. 2008).

[23] *See* EPA, *supra* note 19, at A-128 (noting increase in "Agricultural Equipment" emissions from 2001 to 2005).

[24] *See* 73 Fed. Reg. 44,354, 44,461 ("Petitioners cite various reports documenting national GHG emissions from a broad range of nonroad categories which, they contend, provide evidence that nonroad GHG emissions are already substantial, and will continue to increase in the future.").

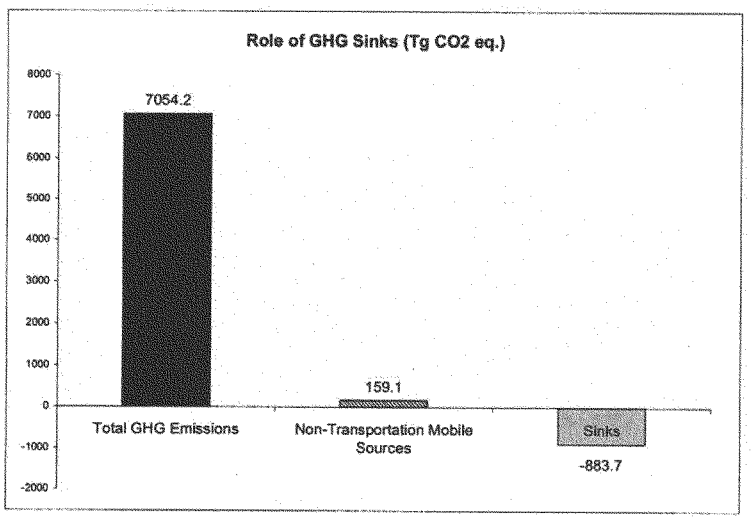
[25] USDA, *supra* note 22, at 82.

[26] Miranowski, *supra* note 14, at 2-5; *see* Keith O. Fuglie et. al., USDA, *Productivity Growth in U.S. Agriculture*, Econ. Brief No. 9, at 6 (Sept. 2007) ("One way this transformation has occurred is by the improvement in the quality of inputs such as machinery….").

Nonroad engines and equipment are essential for tasks aimed at significantly reducing atmospheric levels of CO_2.

EPA recognizes that a number of practices requiring the use of nonroad equipment help to reduce and sequester significant GHG emissions. These practices include the intensification of crop production by limiting the use of bare-summer fallow in semi-arid regions, increased hay production, adoption of conservation tillage, improved forest and timber management practices, and the further use of wood products resulting in the long-term storage of carbon.[27]

In 2006, these and other practices created a carbon sink for 883.7 Tg CO_2 eq., partially offsetting the 7,054.2 Tg CO_2 eq. emitted by the United States that year.[28] When compared to the total emissions from non-transportation mobile sources, this carbon sink offsets them by more than 5 times.



IPCC also recognizes GHG emissions can be significantly mitigated through the substitution of fossil fuels by "energy production from agricultural feedstocks" and "bioenergy from forestry." These feedstocks require nonroad engines and equipment to grow and harvest. While IPCC stresses that converting agricultural feedstock energy into GHG mitigation is "not straightforward," it estimates global mitigation could range between 70 and 2,320 Tg CO_2 eq. annually.[29] For forestry bioenergy, IPCC estimates global GHG mitigation from

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[27] EPA, *supra* note 19, at 7-13 to 7-14, 7-26.

[28] *Id.* at 7-1 to 7-2.

[29] *See* Pete Smith et al., IPCC, *Agriculture in Climate Change 2007: Mitigation. Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* 498, 520 (Bert Metz et al. eds., Cambridge Univ. Press 2007) ("For achieving long-term

between 400 and 4,400 Tg CO_2 eq. annually.[30] The impact of these positive efforts at GHG mitigation on a global basis could reach 6,720 Tg CO_2 eq. annually. The magnitude of this mitigation, dependent upon nonroad engines and equipment, places into important perspective efforts to reduce the 159.1 Tg CO_2 eq. emitted annually from United States nonroad engines and equipment.

Other nonroad equipment, such as construction equipment, play a significant role in helping to reduce GHG emissions. As recently noted by IPCC, a key component to reducing future GHG emissions will be to create modal shifts from road transport to rail and mass transport systems.[31] Infrastructure projects dependent on productive nonroad equipment will not only lead to reduced GHG emissions from other sectors, including onroad, it will reduce pollution, traffic congestion, and oil use.[32] The National Surface Transportation Policy and Revenue Study Commission recently embraced IPCC's comments in recommending that the United States' surface transportation system "be transitioned away from fossil fuels, and that planners incorporate transportation into thoughtfully planned, efficient, and environmentally sustainable communities."[33] To build such a transportation system, we must have productive nonroad engines and equipment tailored to the projects at hand.

Nonroad engines and equipment are extraordinarily diverse and require different GHG emissions solutions than onroad.

While there are opportunities for further GHG reductions from nonroad engines and equipment, these opportunities do not readily or easily derive from the onroad sector – nonroad engines and equipment are far too diverse.[34] Nonroad equipment performs a far

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climate stabilization targets, the competitive cost-effective mitigation potential of biomass energy (primarily from agriculture) in 2030 is estimated to be 70 to 1260 $MtCO_2$-eq/yr (0-13 EJ/yr) at up to 20 US$/t CO_2-eq, and 560-2320 $MtCO_2$-eq/yr (0-21 EJ/yr) at up to 50 US$/t$CO_2$-eq."). One megaton of CO_2 equivalent ($MtCO_2$ eq.) is equal to one terragram of CO_2 eq. (Tg CO_2 eq.).

[30] *See* Gert-Jan Nabuurs et al., IPCC, *Forestry in Climate Change 2007: Mitigation. Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* 541, 543 (Bert Metz et al. eds., Cambridge Univ. Press 2007) ("Biomass from forestry can contribute 12-74 EJ/yr to energy consumption, with a mitigation potential roughly equal to 0.4-4.4 $GtCO_2$/yr depending on the assumption whether biomass replaces coal or gas in power plants."). One gigaton of CO_2 equivalent ($GtCO_2$ eq.) is equal to 1000 megatons of CO_2 equivalent ($MtCO_2$ eq.).

[31] Suzana Kahn Ribeiro et al., IPCC, *Transport and its infrastructure in Climate Change 2007: Mitigation. Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* 323, 348-49 (Bert Metz et al. eds., Cambridge Univ. Press 2007).

[32] *Id.* at 366.

[33] Nat'l Surface Transp. Policy & Revenue Study Comm'n, *Transportation for Tomorrow: Report of the National Surface Transportation Policy and Revenue Study Commission* at 8 (Dec. 2007) (the Commission is charged by the United States Congress to examine the condition and future needs of the Nation's surface transportation system).

[34] *See* 73 Fed. Reg. 44,354, 44,462 ("The opportunity for GHG reductions from the nonroad sector closely parallels the highway sector...."); *id.* at 44,463 ("There is potential for technology now fairly commonplace in the highway sector ... to become part of an overall strategy for GHG emissions reductions in nonroad....").

wider array of tasks in a far wider range of settings than onroad vehicles. For example, Deere engines and equipment provide power to implements such as balers, planters, seeders, plows, and scrapers; they load, haul, push, dig, grade, rake, apply a wide variety of materials, harvest, haul, cut, and process grass, crops, and trees. In total, Deere manufactures well over 100 different machine forms with over 1000 applications. This variability in nonroad application prevents onroad technologies from transferring directly to nonroad equipment without significant development work, if transferrable at all.

In addition, nonroad equipment performs tasks far differently than onroad. For example, compared to onroad the amount of time in the "transport" mission varies significantly by nonroad product form. Some nonroad machines, such as hydraulic excavators and backhoes, do much of their work with the drivetrain in a stationary state, delivering all of their engine's power to the machine's working hydraulics. Other nonroad machines, such as four-wheel-drive loaders and combine harvesters, have systems in addition to the drivetrain that consume significant amounts of engine power. Also, because transport or distance traveled is not a primary concern for the vast majority of nonroad applications, efficiency and performance metrics developed for the onroad sector, such as miles per gallon, are completely incompatible with the nonroad sector.

Further, nonroad equipment is typically not designed to attain speeds of onroad equipment, largely a result of the terrain encountered by nonroad machines and their size. As such, aerodynamics – while significant in some onroad applications – is not a design consideration for nonroad equipment. Similarly, nonroad equipment in many cases requires sufficient machine mass to develop enough traction and to provide counterweight to accomplish work. Nonroad equipment forms typically span a much wider range of size and engine power than on-road machine forms. For example, Deere's excavator product line ranges from the 15 horsepower, 4,200-pound 17D Compact Excavator to the 532 horsepower, 186,000-pound 850D Excavator. Onroad machines have the relative luxury of running on asphalt or concrete, therefore requiring less machine weight to develop sufficient traction to accelerate. Reducing machine weight in many nonroad machine forms will adversely impact productivity.

Finally, nonroad engines and equipment have lower production volumes per product line and per model than onroad. Lower production volumes make the adoption of new technologies far costlier and more risky. For example, Deere's Construction & Forestry Division alone markets 20 significantly different product forms, none of which produce more than 10,000 machines per year, 8 of which produce less than 500 machines per year. Moreover, within most product lines there are several different models with different major components. The result is far fewer machines and equipment across which to amortize capital and development expense.

Nonroad engine and equipment policies must be closely coordinated with Interim and Final Tier 4.

Since the early 1990s, EPA has promulgated five "Tiers" of emissions regulations for nonroad diesel engines: Tier 1, Tier 2, Tier 3, Interim Tier 4, and Final Tier 4 regulations to control ground-level ozone and particulate matter emissions.[35] The magnitude and

[35] *Control of Emissions of Air Pollution From Nonroad Diesel Engines and Fuel*, 69 Fed. Reg. 38,958 (June 29, 2004) (Interim & Final Tier 4); *Control of Emissions of Air Pollution from Nonroad Diesel Engines*, 63 Fed. Reg. 56,968 (Oct. 23, 1998) (Tiers 2 and 3); *Control of Air Pollution; Determination*

complexity of the engine and equipment changes have become successively greater with each new Tier. The Tier 4 regulations take effect from 2011 to 2015 and have already required nonroad engine and equipment manufacturers to identify and expend significant engineering manpower, facility, and capital resources to implement, with further expenditures certain. Deere spends a considerable portion of its almost $2 million daily investment in research and development to meet these challenges.[36]

Efforts to control GHG emissions from nonroad engines and equipment must, therefore, be carefully coordinated with existing regulatory programs for Interim and Final Tier 4. For instance, when crafting emission regulations, EPA has been mindful of the following significant variables prior to imposing additional or new compliance obligations demanding significant technological developments and investments:

- Leadtime - advanced notice afforded engine and equipment manufacturers prior to the implementation of a new standard;
- Stability - time between changes in standards that an engine and equipment manufacturer requires to recoup its investment in product design changes;
- Staggered implementation - setting of different emissions standards reflecting different emissions capabilities either in terms of the types of technologies that are available or the cost-effectiveness of those technologies; and
- Technology transfer - the time permitted for the transfer of applicable technologies from other sources.

In addition, EPA should be mindful that the massive efforts of nonroad engine and equipment manufacturers to meet Interim and Final Tier 4 may offer some climate change benefits by reducing nitrogen oxide and particulate matter emissions.[37]

Reducing Nonroad GHG Emissions

With these nonroad considerations in mind – historical efficiency, low GHG emissions, high GHG mitigation benefits, unique technology, and existing regulatory obligations – EPA and other policymakers can achieve further efficiency and emissions reductions by allowing improvements to nonroad engines, equipment, operation, fuels, and other features.

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of Significance for Nonroad Sources & Emissions Standards for New Nonroad Compression-Ignition Engines at or Above 37 Kilowatts, 59 Fed. Reg. 31,306 (June 17, 1994) (Tier 1).

[36] Deere, *supra* note 3, at 5.

[37] *See* 73 Fed. Reg. 44,354, 44,425 (discussing the uncertainty associated with the "warming effect" of black carbon, but noting, "[T]hese emissions are expected to decline substantially over the coming decades due to recently promulgated EPA regulations targeting $PM_{2.5}$ emissions from … off-road diesel vehicles….").

Engine Pathway

EPA's engine pathway looks to engine technology alone for GHG reductions.[38] This pathway is likely easier to implement than EPA's other pathways because EPA could use existing emissions certification test cycles and equipment. However, the engine pathway will not yield GHG reductions of the levels contemplated by broad climate change proposals that seek to reduce GHG emissions 60 to 80 percent below 2005 levels by 2050.[39]

Upon evaluating fuel efficiency improvements for current nonroad diesel engines, one possible approach is to develop a menu of engine features that all engines must incorporate. This approach could achieve quick and cost-effective GHG reductions by upgrading relatively "low tech" nonroad engines to "high tech." Additional GHG emissions reductions could be obtained by making the "high tech" engines even "higher tech."

That being said, the potential for fuel efficiency gains from an engine pathway, particularly as Deere strives to implement Interim and Final Tier 4, is increasingly limited. Deere estimates that an additional 15 percent fuel efficiency gain is conceivable over time for its "high tech" engines through various improvements. Examples include improvements to the air, combustion, and fuel systems, adoption of exhaust heat recovery, engine friction reductions, and cylinder deactivation. However, these "higher tech" improvements are not significant or cost effective when compared to reductions achievable through other pathways.

Equipment Pathway

The equipment pathway goes beyond the engine to the entire piece of equipment. Deere fully agrees with EPA's statement, "[I]t may prove more effective to achieve GHG reductions by redesigning the equipment or vehicle that the engine powers so that the nonroad application accomplishes its task while expending less energy."[40] Redesigning equipment to optimize efficiency by improving equipment system performance and improving overall productivity has been a cornerstone for Deere's product improvements, and is evident from the equipment examples already listed:[41]

- The fuel efficiency of the 8430 Tractor was not simply a product of Deere's PowerTech Plus 9.0L engine, but also required Deere's Power Shift transmission and Vari-Cool cooling system to realize the full fuel efficiency gains.

- The 744K Four-Wheel-Drive Loader includes an on-demand hydraulic fan drive,

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[38] *Id.* at 44,465.

[39] *See, e.g.,* America's Climate Security Act, S. 2191, 110th Cong. (as reported by Comm. on Env't & Pub. Works, May 20, 2008).

[40] 73 Fed. Reg. 44,354, 44,462.

[41] *See* Wayne G. Broehl, *John Deere's Company: A History of Deere & Company and Its Times* 589 (Doubleday & Co. 1984) ("[F]armers continued to press for refinements in existing tractors. They wanted better steering control, an independent power takeoff, increased hydraulic power for operating integral equipment ..., more fuel efficiency, added horsepower for heavier jobs, and, at the same time, more flexible shift-up, throttle-back, fuel efficient ways of doing lighter work. ... This always commanded great amounts of engineering and product planning time.").

an auto-idle and auto-shutdown system to reduce idle fuel consumption, and a new optional 5-speed transmission with lock-up torque converter to improve fuel efficiency.

- Deere's combine harvester energy efficiency improvement is the result of a massive array of technologies, including wider cutting platforms to gather more grain while reducing field passes; grain threshing and handling technologies to improve harvesting efficiency; and powertrain technologies such as diesel engines, turbocharging, air-to-air intercooling, and hydrostatic propulsion drives to enable significant increases in power without the addition of excessive equipment weight.

Beyond these current technologies, Deere sees future opportunities for many other technologies to improve equipment efficiency and reduce GHG emissions. For example, more complex transmission technologies and improved electronic controls will permit engines to run more efficiently over a range of vehicle speeds.[42] The electrification and hybridization of drivetrains to decouple engine speed from ground speed will improve overall efficiency by allowing the engine to run in a higher efficiency operating range more often. Electrification and hybridization also allow for the elimination of torque converters and the potential reduction in engine displacement in some applications.[43] In addition, electric motors and on-board energy storage may assist equipment efficiency by supplementing diesel engine torque at very low engine speeds, where diesel engine efficiency is not optimum.[44] Similarly, technologies may enable the recovery and storage of the potential energy from hydraulic systems that demand a significant portion of available engine power. These and other technologies hold greater promise for significant further reductions in GHG emissions than an engine-only approach.

Beyond improving current equipment forms, Deere may achieve significant GHG reductions by creating entirely new equipment forms or systems – a special opportunity for the nonroad sector. One particularly useful example is Deere's 7760 Cotton Picker. In standard cotton harvesting operations, five pieces of equipment are required – each modern cotton picker requires the support of a boll buggy, a boll buggy tractor, a module builder, and module builder tractor.[45] Deere's 7760 Cotton Picker greatly simplifies this cotton harvesting model by incorporating into a single, one-of-a-kind machine, a high-volume cotton accumulator, round module builder, and round module handler. With this new technology, the number of pieces of support equipment is reduced significantly – two Deere 7760 Cotton Pickers can be supported by a single module handler and tractor. By reducing the number of machines needed for cotton harvesting, the Deere 7760 Cotton Picker – which some describe as "the biggest advance in harvesting" since the invention of the self-propelled cotton picker – significantly reduces fuel usage and GHG emissions.[46]

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[42] *See* 73 Fed. Reg. 44,354, 44,463 (discussing transmission technologies).

[43] *See id.* (discussing electrification and hybridization).

[44] *See id.* (discussing regenerative energy technologies).

[45] *See* Deere, *Cotton Harvesting*, http://www.deere.com/en_US/ProductCatalog/FR/category /FR_CHARVESTING.html (follow "7760 Cotton Picker" hyperlink; then follow "Harvest Economics" hyperlink).

[46] *See* Michael Arndt, *Deere's Revolution on Wheels*, Business Week, July 2, 2007, at 78 ("The machine – a high tech, intelligent factory on wheels that was a decade in the making – is the biggest

Similarly, Deere's "cut-to-length" forestry system has the potential to reduce a typical logging jobsite machine count from five machines in a "full-tree" logging operation to four.[47] Typical full-tree operations include one feller-buncher to fell the tree, two skidders to drag the felled trees to the processing site, and two knuckle-boom loaders to pick the trees off the ground, de-limb the trees, and load them onto trucks to haul to the mill. A cut-to-length operation with similar productivity includes two wheeled harvesters that fell, de-limb, and cut the trees to the selected log length, and two wheeled forwarders that pick the logs off the ground, stack them onto its wood bunk, and haul them away. The forwarder can haul more wood per trip than the skidder, without the tractive resistance caused by dragging limbed trees through the woods. As a result of reduced machine count and more efficient hauling, jobsite fuel consumption of the cut-to-length operation can be 15 percent less than the full-tree operation with comparable productivity.

Despite acknowledging the efficacy of an equipment-based approach in reducing GHG emissions, EPA raises concerns about such an approach, stating, "[T]he diversity of tasks performed by the hundreds of nonroad applications would lead to a diverse array of standard work units and measurement techniques in such a nonroad GHG program built on equipment-based standards."[48] While creating appropriate metrics for equipment-based standards will be challenging in light of the wide array of nonroad equipment, this is by no means insurmountable. In fact, steps are already being taken in the nonroad industry to develop equipment-based standards for classes of higher volume nonroad equipment. The International Standards Organization (ISO), ISO 11152 Development Workgroup, is currently reviewing fuel consumption test procedures for wheel loaders, hydraulic excavators, and tractor-dozers. This review is in its infancy and has not yet progressed through the ISO approval process. However, this work – in addition to demonstrating the ongoing concern of nonroad equipment designers for fuel efficiency – reveals opportunities and industry willingness to develop equipment-based energy efficiency standards for higher volume nonroad vehicles. Deere is committed to collaborating with EPA, policymakers, and other stakeholders to develop appropriate metrics for equipment-based standards related to equipment work and productivity.

Operational Pathway

The operational pathway is based on EPA's recognition that GHG emission reductions in the nonroad sector are achievable by "altering the way in which the equipment is used."[49] Equipment usage is an important component to overall equipment efficiency, and Deere has developed extensive operational technologies currently used to increase efficiency and productivity of Deere's products. For example, precision farming technologies have resulted in significant operational efficiency of agricultural equipment. Historically, 5 to 10 percent

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advance in harvesting since Deere introduced its first self-propelled cotton picker in 1949. 'It's a great leap forward,' says Von D. Kimball, resident of Bingham Brothers inc., a farm-equipment maker in Lubbock, Texas. 'Saves labor, saves fuel – that's the name of the game in agriculture.'").

[47] *See* Deere, *Logging, At What Length?*, http://www.deere.com/en_US/cfd/forestry/deere_forestry/info_center/feature_stories/what-length.html ("A lighter footprint. Cleaner wood. Less equipment. Higher production. Less wood handling. These are some of the advantages of Cut to Length logging versus Full Tree.").

[48] 73 Fed. Reg. 44,354, 44,465.

[49] *Id.*

pass-to-pass overlaps were common for agricultural field operations. A row-crop tractor armed with global positioning technology and other reference points ensures high efficiency by not only eliminating these overlaps – thereby saving fuel – but also reducing the amount of fertilizers and pesticides used.

Because of the significant GHG reductions achieved by operational technologies such as global positioning, they should be "part of a nonroad GHG control program and could be calculated and assigned using the same 'with and without' approach to credit generation described above for equipment-based changes."[50] While the EPA is justified in its concern that the "human element" may negatively impact the efficacy of the operational measures, there are technologies such as global positioning, anti-idling, or other automatic functions that will ensure the credibility of the reductions.

Fuels Pathway

In addition to the engine, equipment, and operational pathways, Deere shares the view of many of those seeking to reduce GHG emissions in the nonroad sector that the increased use of fuels with lower GHG content such as biofuels and renewable fuels is another critical pathway to realize the greatest reduction in mobile source GHG emissions.[51] Fuels policies must take into careful account engine technologies and infrastructure to ensure the full potential of GHG reductions is achieved while ensuring continued engine and equipment performance and reliability. Also, a thorough scientific understanding of the myriad impacts associated with fuels production, transportation, and use is also required to develop appropriate methodologies to assess the GHG impacts of renewable fuels. Deere strongly believes that continual increases in agricultural productivity as well as significant research and development into next-generation fuel technologies will enable significant use of biofuels and renewable fuels resulting in equally significant GHG emissions reductions.

Credit Flexibility

Lastly, in addition to allowing nonroad engine and equipment manufacturers to use any and all of the aforementioned pathways to most effectively reduce GHG emissions, nonroad engine and equipment manufacturers should be permitted to bank, average, and trade credits for the reductions they achieve under any GHG emission mandates.[52] Such flexibility promotes innovation and also provides manufacturers with the ability to generate the greatest total nonroad sector GHG emission reductions in the most cost-effective manner possible. Further, because of the global nature of GHG and their lack of association to any specific products or sources, the strongest consideration should be given to enabling the broadest possible trading of emissions credits among not only the full range of regulated mobile sources but to other regulated sources, including stationary, as well.[53] It is critical to

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[50] *Id.* at 44,466.

[51] *See id.* at 44,461-62 (identifying the "use of low carbon fuels" as one of the "currently available" technologies listed by petitioners urging nonroad GHG emissions standards).

[52] *See id.* at 44,465 ("EPA is interested in considering the incorporation of banking, averaging, and/or credit trading into the regulatory options discussed below.").

[53] *See id.* at 44,439 ("Given the global nature of the major GHGs, we request comment on whether new provisions could be used to allow broad trading of CO_2-equivalent emission credits among the full range of mobile sources, and if so, how they could be designed, including highway and nonroad vehicles and engines as well as mobile source fuels.").

recognize that this creation of a market for GHG emissions reductions could effectively complement comprehensive cap-and-trade legislation.

Developing a Nonroad Program

While Deere does not believe nonroad GHG regulations are advisable at this point, Deere believes steps should be taken now to build a foundation for potential future regulation. To build this foundation, Deere recommends EPA create a voluntary nonroad-specific, cooperative program to investigate technologies and incentivize further GHG reductions in the nonroad sector. EPA's SmartWay program provides a perfect framework. SmartWay is a voluntary public-private initiative to promote and use environmentally cleaner, more fuel efficient onroad transportation options. According to EPA, the SmartWay Transport Partnership will "cut carbon dioxide (CO_2) emissions by 33 to 66 million metric tons per year" by 2012.[54] The program achieves these reductions in a variety of ways including "[a] testing and verification program designed to quantify emissions reductions and fuel savings and allow companies to assess environmental performance of products" and "[a]n innovative financial strategy that helps companies acquire fuel-efficient, low-pollution technologies through creative financial mechanisms such as low-interest loans."[55] These methods could apply to the nonroad sector.

Apart from achieving measurable reductions, programs like SmartWay provide EPA with the necessary factual foundation on which to design complementary regulations for comprehensive climate change legislation.[56] For example, as already noted, EPA raises concerns in the ANPR about determining the appropriate standards for measuring and reducing GHG emissions from diverse nonroad equipment.[57] However, EPA uses SmartWay to create fuel efficiency testing procedures for diverse applications including tractor-trailer combination trucks, single unit commercial trucks, heavy duty vocational trucks, and buses used in inter-city transit applications, with the intent of developing tests for new categories and drive cycles.[58] These testing procedures tailored to specific pieces of equipment can eventually serve as the basis for regulating GHG emissions from them. EPA could develop testing and standards for higher volume nonroad equipment in the same way.

Moreover, SmartWay has impact and benefits outside of the United States, as is apparent by the interest in developing programs based on SmartWay in other countries. Not only

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[54] EPA, *SmartWay Transport Partnership: Frequently Asked Questions* 1 (Feb. 2004).

[55] EPA, *SmartWay Transport 2005 Annual Report* 3 (June 2006).

[56] *See* Staff of H. Comm. on Energy & Commerce, *supra* note 9, at 3 ("Additional, complementary measures (beyond the cap-and-trade program) must be reviewed to determine whether they reduce or raise the cost of achieving the necessary greenhouse gas reductions. Measures such as appliance efficiency standards ... might achieve economically beneficial or low-cost greenhouse gas emissions that would not otherwise be achieved solely through the cap-and-trade program.").

[57] 73 Fed. Reg. 44,354, 44,465 ([W]e are concerned that there may be significant drawbacks to widespread adoption of [an] application-specific standards-setting approach. ... [T]he diversity of tasks performed by the hundreds of nonroad applications would lead to a diverse array of standard work units and measurement techniques....").

[58] EPA, *SmartWay Fuel Efficiency Test Protocol for Medium and Heavy Duty Vehicles: Working Draft* 6 (Nov. 2007).

does SmartWay achieve GHG reductions and drive innovation elsewhere, but it may provide for consistent international approaches in testing and standardizing emissions. The certainty of internationally consistent emissions standards is critical to Deere and increases security in investing in and adopting new technologies.

Finally, programs like SmartWay extend their GHG reduction benefits to equipment dealers and customers in addition to manufacturers. As Deere's comments indicate, nonroad engine and equipment manufacturers have strived to be "intertwined" with their customers to make sure that their specific needs and demands and met.[59] A voluntary program that incorporates training programs and certifications for equipment operators will maximize GHG pathway improvements and eliminate operator variability. Deere welcomes the opportunity to aid EPA and others in designing such a voluntary program.

Conclusion

Deere is committed to helping address the challenge of global GHG emissions. Through innovative public policies, innovative technologies, and innovative partnerships this challenge can and will be met. Thank you for the opportunity to comment on this critical issue.

Regards,

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[59] *See* Broehl, *supra* note 41, at 647 (citing Forbes: "'Part of Deere's success, too, unquestionably is due to its long and careful study of the farmer, for the farmer's lot and Deere's are intertwined in a way which broader-based companies are not.'")

UNITED STATES HOUSE OF REPRESENTATIVES

SELECT COMMITTEE ON ENERGY INDEPENDENCE

AND GLOBAL WARMING

HEARING

"CONSTRUCTING A GREEN TRANSPORTATION POLICY: TRANSIT MODES AND INFRASTRUCTURE"

STATEMENT OF THE PAVEMENT PRESERVATION TASK FORCE

WASHINGTON, DC

MARCH 19, 2009

Introduction

The Pavement Preservation Task Force welcomes this opportunity to present its views with regard to constructing a green transportation policy before the House Select Committee on Energy Independence and Global Warming.

Pavement Preservation has been defined by the Federal Highway Administration (FHWA) as "a program employing a network level, long-term strategy that enhances pavement performance by using an integrated, cost-effective set of practices that extend pavement life, improve safety and meet motorist expectations."[1] The National Center for Pavement Preservation defines Pavement Preservation as using "The right treatment for the right road at the right time."[2]

The Importance of Improving and Maintaining Highway Infrastructure

The United States system of roads and highways -- valued at over $1.75 trillion – has been steadily deteriorating. The American Society of Civil Engineers (ASCE) 2009 Report Card for America's Infrastructure assigns a grade of D- for the nation's roads.[3] ASCE estimates the total cost of repairs and needed upgrades at $2.2 trillion – an increase of $600 million over the 2005 cost.[4]

The nation's economic vitality depends on its highways to move people, goods, and services 24 hours a day, 7 days a week. In fact, a healthy and well-connected highway system has been the primary infrastructure investment that has driven our strong national economy.

A New Way of Thinking about Infrastructure

In the current economic climate, there have been many references to the Great Depression. There is merit in revisiting the mindset of previous generations and applying their principles to how we approach infrastructure construction, maintenance and repair. We, as a society have gradually moved toward a "disposable" way of thinking – we no longer repair shoes or electronics, but purchase new ones. As a result of the recent trying economic times, people are increasingly returning to the traditional mindset of repairing and preserving what they already have in an effort to stretch tight economic resources.

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[1] Federal Highway Administration Memorandum, "ACTION Pavement Preservation Definitions," September 12, 2005. http://www.fhwa.dot.gov/pavement/preservation/091205.cfm

[2] National Center for Pavement Preservation at Michigan State University, http://www.pavementpreservation.org/

[3] http://www.asce.org/reportcard/2009/

[4] Ibid.

That same approach would serve our policymakers well when it comes to addressing spending needs for infrastructure.

Traditionally, road preservation has not been considered a priority by highway users, primarily because roadway deterioration occurs almost imperceptibly over time – until it is too late. While most people practice preventive maintenance in an effort to preserve the value of such major assets as their homes, furnaces, and automobiles, drivers tend to think of infrastructure maintenance only after a tragic road or bridge failure occurs, producing disruptions to service and shocked reactions of disbelief.

Most states and localities have historically dedicated maintenance resources to the most deteriorated roads, usually devoting costly repairs only to pavements that have suffered distress. Prioritizing maintenance in a "worst first" manner does nothing to extend the capital lives of such pavements. Under a Pavement Preservation approach, however, roadways could be maintained and roadway life-spans extended well beyond antiquated expectations – leading to lower maintenance costs over the long term.

Environmental and Economic Benefits of Pavement Preservation

Adopting a Pavement Preservation approach will enable America to sustain its highway system and to increase our national security. Pavement Preservation will accelerate job creation, stimulate economic growth, and safeguard our environment for future generations.

For every dollar invested in pavement preservation, significant benefits accrue to the taxpayer and the highway user. These benefits include:

- **Environmental Sustainability.** Pavement preservation is socially responsible and eco-friendly. It utilizes 80%[5] fewer of the earth's non-renewable resources than highway rehabilitation and reconstruction programs. Pavement preservation advances a "green" environment by minimizing transportation's environmental impact. The cumulative environmental expense of not only demolishing, hauling, and disposing existing pavement, but also of manufacturing new pavement is substantial. A Pavement Preservation approach diminishes the demand on natural resources and reduces the production of greenhouse gases by emphasizing a selective philosophy of using the "right treatment for the right road at the right time."
- **Impact on Motorists.** Pavement preservation reduces traffic delays by using techniques that can be completed faster with less traffic disruptions. It also offers reduced user costs by maintaining entire pavement networks in better overall condition. Reducing the time that motorists spend in traffic delays due

[5] Comparison of emulsion and slurry surface treatment v. asphalt milling and disposal and new paving with asphalt overlay.

to roadway construction reduces overall emissions from motor vehicles. Pavement Preservation improves the surface characteristics of the roadway, thereby improving user safety.

- **Bang for the Buck – More Roads per $$.** Pavement Preservation is a more economical and prudent approach to maintaining the entire road network, based on a Life-Cycle Cost Analysis of the Net Present Value per Square Yard or Lane Mile.

- **Cost Savings for Taxpayers.** Pavement Preservation expenditures will extend pavement life and defer the need for costly rehabilitation / reconstruction. Every $1.00 spent on preservation will save from $6.00 to $10.00 or more in rehabilitation / reconstruction costs. Pavement Preservation forestalls the ultimately more expensive, time consuming and disruptive need for reconstruction.

- **Employment**. The Federal Aid Highway Program supports approximately 38,000 full-time jobs per $1 billion of investment. On average, pavement preservation projects support approximately 25% more jobs compared with new construction or rehabilitation projects. Pavement preservation projects are uncomplicated, ready to implement, labor-intensive, and can put Americans back to work immediately.

A shift from the prevalence of "worst-first" road maintenance practices to a pavement preservation mindset will take a very special commitment and a real understanding of the vast potential benefits to be gained for our nation's economy and environment. The expenditure of limited maintenance funds on carefully chosen and timed preservation projects will yield reconstruction savings substantially in excess of the preservation expenses.[6]

However, states have widely interpreted federal funding eligibility criteria in the SAFETEA-LU legislation to preclude using federal funding for pavement preservation practices.

States receiving federal transportation investment funds could dedicate a larger share of funding to Pavement Preservation if the SAFETEA-LU reauthorization legislation includes a working definition of Pavement Preservation, thus allowing for innovative preventative maintenance and rehabilitation practices to be eligible for federal funding.

While the current law is interpreted to permit either hot mixed asphalt (HMA) thin-lift overlays or 'mill & overlay' treatments, the industry has developed an array of proven alternative methods that extend remaining service life in a more cost effective and

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[6] Larry Galehouse, James S Moulthrop, R. Gary Hicks, "Principles of Pavement Preservation – Definitions, Benefits, Issues, and Barriers," *TR News*, September-October 2003, page 8, figure 2.

environmentally sensitive fashion.

Conclusion

Adopting the Pavement Preservation approach of using the right treatment for the right road at the right time will yield significant environmental and economic benefits. By explicitly recognizing the benefits of Pavement Preservation and by directing recipients of federal highway funds to give full consideration to utilizing Pavement Preservation techniques, Congress can in the upcoming SAFETEA-LU reauthorization encourage recipients of federal transportation dollars to treat more lane miles, at a lower cost, and put more people to work, compared with implementing traditional construction methods exclusively. Pavement Preservation practices will, over the long term, extend the useful life of roadways, reduce the impact of road maintenance on motorists and the environment, and extend funding further across the road network.

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About the Pavement Preservation Task Force

The Pavement Preservation Task Force is a collaborative effort of independent contractors and supplier members of The Asphalt Emulsion Manufacturers Association (AEMA), the Asphalt Recycling & Reclaiming Association (ARRA), and the International Slurry Surfacing Association (ISSA). We are committed to working together to conduct nationwide education and outreach on Pavement Preservation activities and to ensure that SAFETEA-LU reauthorization legislation facilitates a Pavement Preservation approach to help recipients effectively maximize federal highway funding.