AUTHENTICATED
U.S. GOVERNMENT
INFORMATION
GPO

THE AMERICAN ENERGY INITIATIVE, PART 6: CHALLENGES AND OPPORTUNITIES FOR ALTERNATIVE TRANSPORTATION FUELS AND VEHICLES

HEARING

BEFORE THE

SUBCOMMITTEE ON ENERGY AND POWER

OF THE

COMMITTEE ON ENERGY AND COMMERCE

HOUSE OF REPRESENTATIVES

ONE HUNDRED TWELFTH CONGRESS

FIRST SESSION

MAY 5, 2011

Serial No. 112–45

Printed for the use of the Committee on Energy and Commerce

energycommerce.house.gov

U.S. GOVERNMENT PRINTING OFFICE

70–930 PDF WASHINGTON : 2011

For sale by the Superintendent of Documents, U.S. Government Printing Office
Internet: bookstore.gpo.gov Phone: toll free (866) 512–1800; DC area (202) 512–1800
Fax: (202) 512–2104 Mail: Stop IDCC, Washington, DC 20402–0001

COMMITTEE ON ENERGY AND COMMERCE

FRED UPTON, Michigan
Chairman

JOE BARTON, Texas
Chairman Emeritus
CLIFF STEARNS, Florida
ED WHITFIELD, Kentucky
JOHN SHIMKUS, Illinois
JOSEPH R. PITTS, Pennsylvania
MARY BONO MACK, California
GREG WALDEN, Oregon
LEE TERRY, Nebraska
MIKE ROGERS, Michigan
SUE WILKINS MYRICK, North Carolina
Vice Chair
JOHN SULLIVAN, Oklahoma
TIM MURPHY, Pennsylvania
MICHAEL C. BURGESS, Texas
MARSHA BLACKBURN, Tennessee
BRIAN P. BILBRAY, California
CHARLES F. BASS, New Hampshire
PHIL GINGREY, Georgia
STEVE SCALISE, Louisiana
ROBERT E. LATTA, Ohio
CATHY MCMORRIS RODGERS, Washington
GREGG HARPER, Mississippi
LEONARD LANCE, New Jersey
BILL CASSIDY, Louisiana
BRETT GUTHRIE, Kentucky
PETE OLSON, Texas
DAVID B. MCKINLEY, West Virginia
CORY GARDNER, Colorado
MIKE POMPEO, Kansas
ADAM KINZINGER, Illinois
H. MORGAN GRIFFITH, Virginia

HENRY A. WAXMAN, California
Ranking Member
JOHN D. DINGELL, Michigan
Chairman Emeritus
EDWARD J. MARKEY, Massachusetts
EDOLPHUS TOWNS, New York
FRANK PALLONE, JR., New Jersey
BOBBY L. RUSH, Illinois
MICHAEL F. DOYLE, Pennsylvania
ANNA G. ESHOO, California
ELIOT L. ENGEL, New York
GENE GREEN, Texas
DIANA DEGETTE, Colorado
LOIS CAPPS, California
JANICE D. SCHAKOWSKY, Illinois
CHARLES A. GONZALEZ, Texas
JAY INSLEE, Washington
TAMMY BALDWIN, Wisconsin
MIKE ROSS, Arkansas
ANTHONY D. WEINER, New York
JIM MATHESON, Utah
G.K. BUTTERFIELD, North Carolina
JOHN BARROW, Georgia
DORIS O. MATSUI, California
DONNA M. CHRISTENSEN, Virgin Islands

SUBCOMMITTEE ON ENERGY AND POWER

ED WHITFIELD, Kentucky
Chairman

JOHN SULLIVAN, Oklahoma
Vice Chairman
JOHN SHIMKUS, Illinois
GREG WALDEN, Oregon
LEE TERRY, Nebraska
MICHAEL C. BURGESS, Texas
BRIAN P. BILBRAY, California
STEVE SCALISE, Louisiana
CATHY MCMORRIS RODGERS, Washington
PETE OLSON, Texas
DAVID B. MCKINLEY, West Virginia
CORY GARDNER, Colorado
MIKE POMPEO, Kansas
H. MORGAN GRIFFITH, Virginia
JOE BARTON, Texas
FRED UPTON, Michigan *(ex officio)*

BOBBY L. RUSH, Illinois
Ranking Member
JAY INSLEE, Washington
JIM MATHESON, Utah
JOHN D. DINGELL, Michigan
EDWARD J. MARKEY, Massachusetts
ELIOT L. ENGEL, New York
GENE GREEN, Texas
LOIS CAPPS, California
MICHAEL F. DOYLE, Pennsylvania
CHARLES A. GONZALEZ, Texas
HENRY A. WAXMAN, California *(ex officio)*

C O N T E N T S

	Page
Hon. Ed Whitfield, a Representative in Congress from the Commonwealth of Kentucky, opening statement	1
Prepared statement	3
Hon. Henry A. Waxman, a Representative in Congress from the State of California, opening statement	5
Hon. John Sullivan, a Representative in Congress from the State of Oklahoma, opening statement	6
Hon. Bobby L. Rush, a Representative in Congress from the State of Illinois, opening statement	7
Hon. Joe Barton, a Representative in Congress from the State of Texas, prepared statement	179

WITNESSES

Howard K. Gruenspecht, Deputy Administrator, Energy Information Administration	8
Prepared statement	11
Insert for the record	55
Answers to submitted questions	181
Patrick Davis, Program Manager, Vehicle Technologies Program, Department of Energy	25
Prepared statement	27
Margo T. Oge, Director, Office of Transportation and Air Quality, Environmental Protection Agency	33
Prepared statement	35
Answers to submitted questions	184
James T. Bartis, Senior Policy Researcher, Rand Corporation	88
Prepared statement	90
Lucian Pugliaresi, President, Energy Policy Research Foundation, Inc.	102
Prepared statement	105
Jeffrey G. Miller, Chairman of the Board, National Association of Convenience Stores	115
Prepared statement	117
Diarmuid O'Connell, Vice President of Business Development, Tesla Motors	124
Prepared statement	126
Richard Kolodziej, President, NGVAmerica	134
Prepared statement	136
Michael J. McAdams, President, Advanced Biofuels Association	143
Prepared statement	145
Robert Dinneen, President and Chief Executive Officer, Renewable Fuels Association	153
Prepared statement	155
Answers to submitted questions	192

SUBMITTED MATERIAL

Letter, dated May 3, 2011, from Dave McCurdy, President and CEO, American Gas Association, to subcommittee leadership, submitted by Mr. Sullivan	41
Statement, dated May 5, 2011, of the National Petrochemical and Refiners Association, submitted by Mr. Sullivan	44
"Economic Impact of Methanol Economy," undated report, Methanol Institute, submitted by Mr. Shimkus	70
Testimony of Admiral Dennis Blair, U.S. Navy, Retired, submitted by Mr. Shimkus	73

Page

Letter, dated May 5, 2011, from Matt Horton, CEO, Propel Fuels, Inc., to subcommittee leadership, submitted by Mr. Shimkus 83

THE AMERICAN ENERGY INITIATIVE, PART 6: CHALLENGES AND OPPORTUNITIES FOR ALTERNATIVE TRANSPORTATION FUELS AND VEHICLES

Thursday, May 5, 2011

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON ENERGY AND POWER,
COMMITTEE ON ENERGY AND COMMERCE,
Washington, DC.

The subcommittee met, pursuant to call, at 9:37 a.m., in room 2322 of the Rayburn House Office Building, Hon. Ed Whitfield (chairman of the subcommittee) presiding.

Members present: Representatives Whitfield, Sullivan, Shimkus, Walden, Terry, Burgess, Olson, McKinley, Gardner, Pompeo, Griffith, Barton, Rush, Inslee, Green, Capps, Doyle, and Waxman (ex officio).

Staff present: Charlotte Baker, Press Secretary; Jim Barnette; General Counsel; Maryam Brown, Chief Counsel, Energy and Power; Patrick Currier, Counsel, Energy and Power; Garrett Golding, Legislative Analyst, Energy; Cory Hicks, Policy Coordinator, Energy and Power; Heidi King, Chief Economist; Ben Lieberman, Counsel, Energy and Power; Dave McCarthy, Chief Counsel, Environment/Economy; Alex Yergin, Legislative Clerk; Greg Dotson, Democratic Energy and Environment Staff Director; Caitlin Haberman, Democratic Policy Analyst; and Alexandra Teitz, Democratic Senior Counsel, Environment and Energy.

OPENING STATEMENT OF HON. ED WHITFIELD, A REPRESENTATIVE IN CONGRESS FROM THE COMMONWEALTH OF KENTUCKY

Mr. WHITFIELD. I would like to call this hearing to order this morning. This is our sixth of a multi-day hearing entitled the American Energy Initiative. The topic today is focusing on the challenges and opportunities for alternative transportation, fuels, and vehicles. With gasoline prices exceeding $4.00 a gallon in many parts of the country, it is timely that we look at alternatives to petroleum derived fuels for the transportation sector. Efforts to diversify away from reliance on oil for cars and trucks have been underway for a number of years and we know that it has been a goal of the U.S. Government to be less dependent upon foreign oil for many, many, many years. And so the purpose of today's hearing is to provide an overview of these alternative opportunities. We need

to know where we stand today and where we would like to be in the years ahead as it relates to alternative fuels and vehicles.

Most notably we have now more than 5 years of experience with the renewable fuel standard which was first put into place in the 2005 Energy Bill and was expanded in the 2007 Energy Bill. The targets for 2011 call for 12.6 billion gallons of corn ethanol and additional amounts of other biofuels such as cellulosic ethanol, biodiesel, and algae based fuels. I should stress that many aspects of the ethanol mandate are going very well. Nonetheless there are issues facing regulators as they translate the law into workable arrangements as well as challenges facing refiners and incorporating increasing amounts of ethanol into the existing supply chain.

Biofuels, I might add, are but one of the alternative fuels in vehicles in the works. Vehicles that run on natural gas continues to make inroads especially in the heavy duty sector, propane vehicles are also seeing increased use. Progress continues on electric vehicles and even coal to liquids is another possible non-petroleum source of transportation fuel. Each alternative fuel and vehicle has its unique mix of attributes and more than one will play a constructive role it the vehicles of the future.

However, as I indicated earlier there are obstacles to overcome before new fuels and vehicles and technology can take significant market share away from petroleum. Not only must the alternative fuel in the vehicles be economically and technologically up to the task, but the fueling infrastructure must also be in place. As we are learning with ethanol, we can get there but it is not always an easy path. The good news is we have a host of alternatives that show promise and are the subject of federal research and development tax incentives and loan guarantees.

But the fact that there have been so many false starts since the federal government first got involved in alternative fuels in vehicles in the 1970s is a sobering reminder that we need to carefully review our efforts. So developing cost effective alternatives will take time and in no way should serve as a substitute for taking steps to reduce gasoline prices. We need to do both. For this reason, the American Energy Initiative will pursue efforts to unlock America's vast untapped oil potential along with other efforts.

So we also will have I think two panels of witnesses today and we look forward to the testimony to all of you and we do appreciate your taking time to be with us because your testimony will be vitally important to help us get a better understanding of where we are on this important subject.

[The prepared statement of Mr. Whitfield follows:]

Statement of the Honorable Ed Whitfield
Chairman, Subcommittee on Energy and Power
May 5, 2011
Hearing on "The American Energy Initiative – Focus on Challenges and Opportunities for Alternative Transportation Fuels and Vehicles"
***** As Prepared for Delivery *****

I would like to call this hearing to order. This is our sixth of a multi-day hearing entitled "The American Energy Initiative." With gasoline prices nearing $4.00 a gallon amidst ongoing turmoil in the Middle East, it is especially timely that we look at alternatives to petroleum-derived fuels for the transportation sector. Efforts to diversify away from reliance on oil for our cars and trucks have been underway for a number of years, and the purpose of today's hearing is to provide an overview of them. We need to know where we stand today, and where we would like to be in the years ahead as regards alternative fuels and vehicles.

Most notably, we now have more than 5 years of experience with the renewable fuels standard (RFS), which was first put into place in the 2005 energy bill and was expanded in the 2007 energy bill. The targets for 2011 call for 12.6 billion gallons of corn ethanol and additional amounts of other biofuels, such as cellulosic ethanol, biodiesel, and algae-based fuels.

I supported the RFS then, and I consider the program to be a success. But that is not to say that there isn't room for improvement.

Again, I should stress that many aspects of the ethanol mandate are going well. For example, our domestic ethanol producers have met the challenge of producing much more corn ethanol than before the mandate, and the ethanol industry has created thousands of new jobs in recent years. These are domestic jobs producing domestic energy. Nonetheless, there are issues facing regulators as they translate the law into workable arrangements, as well as challenges facing refiners incorporating increasing amounts of ethanol into the existing supply chain.

Biofuels are but one of the alternative fuels and vehicles in the works. Vehicles that run on natural gas continue to make inroads, especially in the heavy duty sector. Propane vehicles are also seeing increased use. Progress continues on electric vehicles, and I should add that many other hearings before this subcommittee raised concerns about the sufficiency of future supplies of electricity in the face of a train wreck of regulations. We need to resolve these impediments to increased supplies of affordable electricity if we are to use more electricity in the transportation sector.

Coal-to-liquids is another possible non-petroleum source of transportation fuels. Coal is the energy source America possesses in greatest abundance, and our standard of living depends on it. A big part of the American Energy Initiative involves streamlining the regulations that threaten the continued use of the coal that provides affordable electricity for our homes and businesses. But we could also be using some of that coal to make fuel for our cars and trucks, and we should be doing all we can to explore the potential benefits of doing so.

Each alternative fuel and vehicle has its unique mix of attributes, and more than one will play a constructive role in the vehicles of the future.

However, there are obstacles to overcome before new fuels and vehicles can take significant market share away from petroleum. Not only must the alternative fuels and the vehicles be economically and technologically up to the task, but the fueling infrastructure must also be in place. As we are learning with ethanol, we can get there but it is not always easy.

The good news is that there are a host of alternatives that show promise and are the subject of federal research and development, tax incentives, and loan guarantees. But the fact that there have been so many false starts since the federal government first got involved in alternative fuels and vehicles in the 1970s, is a sobering reminder that we need to carefully review our efforts.

Developing cost effective alternatives will take time, and in no way should serve as a substitute for taking steps to reduce gasoline prices - we need to do both. For this reason, the American Energy Initiative will pursue efforts to unlock America's vast untapped oil potential along with efforts to use alternatives to oil.

There is no shortage of alternative fuels and vehicles that could catch on if gas prices continue to go through the roof. But we want to develop alternatives that could compete even if they don't. How to get there, and the proper role for the federal government, is the topic of today's hearing.

I now yield the balence of my time to Mr. Sullivan.

Mr. WHITFIELD. And at this time I would like to recognize the gentleman from California, Mr. Waxman, for his 5-minute opening statement.

OPENING STATEMENT OF HON. HENRY A. WAXMAN, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF CALIFORNIA

Mr. WAXMAN. Thank you very much, Mr. Chairman. You are correct that this hearing on alternative fuels in vehicles is a very timely one. With gasoline prices over $4.00 a gallon in some cities, the cost of our dependence on oil is glaringly apparent to consumers.

For decades the Energy Information Administration projected that U.S. oil consumption would grow year after year. And it did.

In 2005, nearly 60 percent of U.S. fuels were imported. And the future looked bleak: higher oil consumption and more imports far into the future. Republicans claimed then—just as they do now—that the solution was to produce more oil domestically.

Production has increased dramatically since that time. Our domestic crude oil production has increased by nearly 300,000 barrels a day. We have increased our crude oil production to the point that we are producing more oil today than we have at any time in the last 7 years.

And yet, gasoline prices are still climbing. And the money we spend on oil abroad continues to conflict with our foreign policy goals and national security.

The fact is, more U.S. production is never going to be enough to appreciably reduce global oil prices or U.S. imports of foreign oil. We use 25 percent of the world's oil, but we only have 2 percent of the world's oil reserves. So we could double or even triple domestic production and it is simply not going to affect global oil prices all that much.

In fact, this subcommittee has received testimony that increasing domestic production, as has been proposed, would increase production by just two-tenths of one percent a decade from now. The effect that would have on gasoline prices would be negligible.

The key to making progress is to reduce, and to focus on how much oil we use. And reducing our share of global oil consumption from 25 percent can have a real impact both on global oil prices and on imports.

The new motor vehicle standards promulgated by the Obama administration illustrate the benefits of greater efficiency. These carbon pollution tailpipe standards have had a remarkable impact. They are projected to save 1.8 billion barrels of oil. They are expected to yield net savings to consumers of roughly $130 to $180 per year, and $3,000 over the life of a vehicle.

And being able to bring efficient vehicles to the market has greatly assisted domestic auto makers. General Motors had a 27 percent gain in American sales, led by strong demand for its new compact sedan and more fuel-efficient sport utility vehicles. Ford earned $2.5 billion last quarter, up 22 percent from last year, as its sales have shifted to more fuel-efficient cars.

Most remarkable is the impact of these standards on U.S. oil imports and consumption. The Energy Information Administration

now projects that we will be importing less oil in the future than we did in 2007, reversing decades of increasing reliance on foreign oil.

And in a fundamental and historic shift, overall U.S. consumption of oil is predicted to stop growing. By requiring improvements in how efficiently we use oil, the administration has reversed a dangerous trend.

The administration wants to build on their success with stronger standards after model year 2016. It is also working on standards for trucks and other commercial vehicles. Those standards could save even more money at the pump while further reducing our dependence on foreign oil.

At the same time, we need to continue our push toward alternative-fueled vehicles, whether they are plug-in electric-drive commuter vehicles, long-haul natural gas trucks, or renewable fuels used in various vehicles. The Obama administration has made real progress on the seemingly intractable problem. We are finally heading in the right direction.

I look forward to hearing from today's witnesses about how we can continue and build on this progress. Thank you, Mr. Chairman. Yield back my time.

Mr. WHITFIELD. Thank you, and at this time recognize the gentleman from Oklahoma, Mr. Sullivan, for 5 minutes.

OPENING STATEMENT OF HON. JOHN SULLIVAN, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF OKLAHOMA

Mr. SULLIVAN. Thank you, Chairman Whitfield and thank you for holding this important hearing today on challenges and opportunities for alternative transportation fuels and vehicles. With the price of oil over $110 a barrel, it is vital that we look at alternative transportation options to give consumers and businesses—excuse me—options at the pump. Our national and energy security demand it. And given the fact that 69 percent of the oil consumed in America is used for transportation, two-thirds of which we import from foreign nations, we are spending $2 billion per day importing foreign oil. This is the largest transfer of wealth in the history of mankind.

The U.S. has enough natural gas reserves to last us more than 125 years. By diversifying our fleet—our vehicle fleets, heavy duty trucks, and utilizing natural gas as a transportation fuel we can significantly reduce U.S. demand for foreign oil and begin doing that immediately. Almost a month ago I introduced bipartisan legislation, The Natural Gas Act, a common sense bill that makes real world solutions to this major national security issue. Today I am proud to announce that we have over 180 cosponsors on this bill including 22 from this committee alone.

The NAT Gas Act is designed to be a short term 5 year market driving program to allow the economies of scale to work with the production of natural gas vehicles and fueling infrastructure. The bill calls for private capital investment not by the Federal Government in the production and use of natural gas fueled vehicles. The bill is consistent with the goals of the National Energy Policy that

would encourage the use of clean burning domestically produced fuel without the heavy hand of government mandates.

All told, this legislation will create over 500,000 jobs. As Congress debates energy solutions and many options are offered up, but at the end of the day these options give American consumers few real choices today. In the near term, natural gas is the best present day alternative to imported oil, one that can be put in place virtually overnight with the support of the Nation behind it. And Mr. Chairman, I yield back the balance of my time.

Mr. WHITFIELD. Thank you, Mr. Sullivan. At this time I recognize the gentleman from Illinois for the purpose of making an opening statement.

OPENING STATEMENT OF HON. BOBBY L. RUSH, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF ILLINOIS

Mr. RUSH. I want to thank you, Mr. Chairman. And I want to thank the—all the guests for their participation and for being here this morning. Today's hearing is timely, as prices at the pump climb to $4.00 a gallon for regular gasoline. It is extremely important that this committee identify short- and long-term strategies and objectives for developing alternative fuels for vehicles so 5 and 10 years from now we won't be having the same debates over rising gas prices due to unrest in the Middle East.

For far too long, we have been seeing widely fluctuating gas prices here in this country due to a lack of comprehensive policies to move us away from imported oil and petroleum. And every American—and every year or two we are back in the same place exactly doing the same thing that we find ourselves doing at this moment, discussing extremely high gas prices at the pump but no closer to solving this issue, which has had such a devastating effect on the budgets of American families, both lower and middle-income families who must once again choose between putting food on the table or filling up their car in order to go to work.

I look forward to today's hearing to discuss both the opportunities and the challenges that we face as we attempt to transition to alternative fuels to power our cars and to power our trucks. Americans love their cars and we love to drive, so it only makes sense that we provide direction for the American people and move our country away from its heavy dependence on foreign sources of oil. As a Representative from the corn-growing State of Illinois, I look forward to learning more about the impact that corn ethanol has had on the alternative fuel debate.

A few years ago, it was thought that relying solely on corn ethanol was the win-win alternative to diesel and petroleum fuels. Since that time, my office has met with several constituents and groups that have informed us of the impact of using corn ethanol for fuel and its subsequent effect on increased prices for feedstock and the overall fuel supply. So I am very interested to hear from the experts here today on not only the impact of corn ethanol, but also the opportunities for additional alternative fuel sources for transportation, including biofuels, electricity, natural gas, coal-to-liquids, and many others.

I believe if we are prudent and we work together, both sides of the aisle, we can develop a policy for alternative fuel production

that would be to the benefit of all of our constituents and the American people as a whole. Mr. Chairman, I sincerely hope that this can be an issue that we can find common ground on and we can—that we can work together on the issues for the good of this entire Nation. If we are willing to provide direction and funding to develop alternative fuel supplies, we can provide economical and practical benefits to Americans by decreasing the amount of oil we import while also eventually decreasing the price our families pay at the pump.

Mr. Chairman, however, we all understand that before we are able to enjoy the benefits that will ultimately come from alternative fuels we must first invest in research and development of these supplies. And even if we are able to come together on a comprehensive policy to develop these fuels, we must also invest in the infrastructure to support these fuels as well. So we have our work cut out for us, and I am pleased today that we are taking our first step in understanding where we are and what we need to do to move forward. With that, I yield back the balance of my time.

Mr. WHITFIELD. Thank you, Mr. Rush. At this time I would like to introduce the first panel. We have with us this morning Dr. Howard K. Gruenspecht, who is the Deputy Administrator of the U.S. Energy Information Administration. We have Mr. Patrick Davis, who is the Program Manager for Vehicle Technologies Program at the U.S. Department of Energy. And we have Ms. Margo Oge, who is the Director of the Office of Transportation and Air Quality at the U.S. Environmental Protection Agency. Thank you once again for being with us, and I am going to recognize each one of you for 5 minutes for your opening statement and there is a little instrument on the table there that will show red when your time is up. So—but we do look forward to your testimony and what you have to say. So, Mr. Gruenspecht, I will recognize you for your opening statement.

STATEMENTS OF HOWARD K. GRUENSPECHT, DEPUTY ADMINISTRATOR, U.S. ENERGY INFORMATION ADMINISTRATION; PATRICK DAVIS, PROGRAM MANAGER, VEHICLE TECHNOLOGIES PROGRAM, U.S. DEPARTMENT OF ENERGY; AND MARGO T. OGE, DIRECTOR, OFFICE OF TRANSPORTATION AND AIR QUALITY, U.S. ENVIRONMENTAL PROTECTION AGENCY

STATEMENT OF HOWARD K. GRUENSPECHT

Mr. GRUENSPECHT. Mr. Chairman and members of the subcommittee, I appreciate the opportunity to appear before you today. The Energy Information Administration is a statistical and analytical agency within the Department of Energy. EIA does not promote or take positions on policy issues and has independence with respect to the information and analysis that we provide. Therefore, our view should not be construed as representing those of the Department or other federal agencies.

The transportation sector and petroleum use are tightly linked. In 2009, 72 percent of total U.S. petroleum use occurred in transportation while petroleum products provided about 94 percent of transportation energy. Light-duty vehicles, including both pas-

senger cars and light trucks, accounted for 63 percent of total transportation energy use in 2009. In that year, gasoline vehicles had an 85 percent market share out of 9.8 million new light-duty vehicles sold. Flex fuel vehicles that could use gasoline up to E–85, hybrid electric, and diesel vehicles held 11 percent, 3 percent, and 2 percent shares, respectively.

Looking forward, EIA's Annual Energy Outlook provides projections for the U.S. energy system through 2035. Our reference case is a business-as-usual trend estimate using known technology and technological and demographic trends on the assumption that current laws and regulations including any applicable sunset dates remain unchanged. We expect vehicles other than those that can only be fueled with gasoline to play a growing role in the reference case due to both policies and rising fuel prices. And their share would grow to 42 percent of projected sales in 2035. Flex fuel vehicles represent the largest share of those vehicles, with sales of electric and hybrid vehicles that use stored electric energy also growing considerably as do sales of diesel vehicles.

Nonetheless, gasoline-only vehicles maintain a projected 58 percent sales share by 2035 because they are able to incorporate technology such as lightweight materials and advanced engine and transmission components that improve fuel economy. Although growth in the number of drivers and vehicle miles per driver results in a projected growth of 50 percent in light-duty vehicle travel between 2009 and 2035, overall light-duty vehicle energy use increases by only 10 percent due to improved fuel economy. And projected light-duty vehicle petroleum use is about 8.2 million barrels per day in 2035, the same level as in 2009, because there is a shift away from petroleum toward other fuels in the transportation mix.

There are really four key areas of uncertainty in this projection: fuel prices, technology costs, consumer acceptance, and potential changes in policies, which are your business, not mine. In the high oil price case—and I know many people think oil prices are high enough, but we have one where oil prices double in real terms by 2035—we would expect overall light-duty vehicle fuel consumption to grow by only one and a half percent between 2009 and 2035, and petroleum use in 2035 would be only 6.6 million barrels for light-duty vehicles, a million and a half barrels below the current level.

Vehicle cost is another factor that will play a critical role in determining the success or failure of unconventional vehicles in the future. For example, plug-in hybrid and plug-in electric vehicle incremental cost is heavily dependent on the cost of a battery. Just how much more these vehicles will cost the consumer depends on future technology breakthroughs or lack thereof, and my colleagues will discuss that.

Consumer acceptance is the third critical uncertainty, and I think some of the opening statements mentioned that regarding the success of unconventional vehicles and alternative fuels. As discussed in my written testimony, attributes such as cost and performance, as well as refueling infrastructure availability, are essential to acceptance.

And finally, the future regulatory environment is also uncertain. Fuel economy standards are currently set through 2016. We do assume that they are raised at least through model year 2020 to re-

flect the requirements of the Energy Independence and Security Act. But additional fuel efficiency requirements that may be promulgated under existing authority could also have a very significant impact. Our Annual Energy Outlook includes two fuel economy sensitivity cases, one assuming a 3 percent annual increase through 2025, the other assuming a 6 percent annual increase.

Again, in these cases we find sales of unconventional vehicles grow dramatically to 70 percent of total sales in the 3 percent case and nearly 90 percent of total sales in the 6 percent case compared with 40 percent in the reference case. And in addition we would likely slow the rate of vehicle stock turnover relative to the reference case. But overall light-duty vehicle energy consumption and petroleum use decline relative to their 2009 level.

This concludes my statement, Mr. Chairman, and I would be happy answer any questions you or the other Members may have.

[The prepared statement of Mr. Gruenspecht follows:]

STATEMENT OF HOWARD GRUENSPECHT

DEPUTY ADMINISTRATOR

ENERGY INFORMATION ADMINISTRATION

U.S. DEPARTMENT OF ENERGY

before the

SUBCOMMITTEE ON ENERGY AND POWER

COMMITTEE ON ENERGY AND COMMERCE

U. S. HOUSE OF REPRESENTATIVES

May 5, 2011

Mr. Chairman and Members of the Subcommittee, I appreciate the opportunity to appear before you today to address the outlook for light duty vehicles and the fuels used in those vehicles.

The Energy Information Administration (EIA) is the statistical and analytical agency within the U.S. Department of Energy. EIA collects, analyzes, and disseminates independent and impartial energy information to promote sound policymaking, efficient markets, and public understanding regarding energy and its interaction with the economy and the environment. EIA is the Nation's premier source of energy information and, by law, its data, analyses, and forecasts are independent of approval by any other officer or employee of the United States Government. The views expressed herein should therefore not be construed as representing those of the Department of Energy or other federal agencies.

Petroleum dominates energy use in transportation

The transportation sector and the use of petroleum fuels are tightly linked. In 2009, 72 percent of total U.S. petroleum consumption occurred in the transportation sector, while petroleum products provided about 94 percent of total transportation energy. Light-duty vehicles (LDVs), including both passenger cars and light-duty trucks, accounted for 63 percent of total transportation energy use in 2009. Freight trucks and buses together used 17 percent of transportation energy, followed by aircraft, marine, pipeline, and rail with shares of 10, 5, 3, and 2 percent in total transportation energy use, respectively.

LDVs are almost entirely fueled by petroleum, with the petroleum content of motor gasoline accounting for 92 percent (8.0 million barrels per day (mmbd)) of energy use and diesel fuel representing another 3 percent (0.2 mmbd). Biofuels account for essentially all remaining LDV energy use. For heavy-duty trucks, petroleum is even more central to meeting energy needs, with diesel accounting for about 91 percent of consumption (1.9 mmbd), gasoline about 7 percent (0.2 mmbd), and the remainder divided between liquefied petroleum gas, biofuels, and natural gas. Of the remaining transportation modes, aircraft (1.3 mmbd) and marine (0.6 mmbd) are entirely dependent on petroleum and rail energy consumption is 96 percent diesel (0.3 mmbd) and 4 percent electricity.

The *Annual Energy Outlook 2011*

EIA recently released the *Annual Energy Outlook 2011* (*AEO2011*), which presents projections for the U.S. energy system through 2035. The *AEO2011* Reference case is a business-as-usual trend estimate, using known technology and technological and demographic trends, and is prepared under the assumption that current laws and regulations remain unchanged throughout the projection period. The large share of U.S. energy and petroleum use by LDVs has made them a focal point for legislation, regulation, and tax policies to both improve fuel economy and promote the sale of alternatively-fueled vehicles and alternative fuels. Higher fuel economy standards reduce both petroleum and energy consumption, while alternatively-fueled vehicles and fuels displace the use of petroleum without necessarily reducing overall energy use.

The *AEO2011* Reference case includes model year (MY) 2011 Corporate Average Fuel Economy (CAFE) standards enacted by the National Highway Traffic Safety Administration (NHTSA) for light-duty vehicles, as well as the jointly issued CAFE and LDV greenhouse gas emissions standards for MYs 2012 to 2016 promulgated by NHTSA and the Environmental Protection Agency (EPA). It also assumes a further increase in CAFE standards to 35 miles per gallon by MY 2020, as required by the Energy Independence and Security Act of 2007. In addition, the Reference case incorporates other provisions impacting the transportation sector, such as the Renewable Fuels Standard (RFS) for biofuels, waivers allowing the use of E15 in MY 2001 and newer vehicles, existing emissions standards for conventional criteria pollutants from LDVs, and existing tax credits for alternative/advanced vehicles and fuels. Tax credits for vehicles and fuels are assumed to sunset at the dates specified by laws in effect as of the start of 2011.

Although sales of unconventional vehicles (those that use, diesel, alternative fuels, and/or hybrid electric systems) have increased in recent years, conventional gasoline vehicles have maintained a dominant share of new LDV sales. In 2009, conventional gasoline vehicles had an 85 percent market share out of 9.8 million new LDVs sold, followed by flex fuel, hybrid electric, and diesel vehicles at 11, 3, and 2 percent, respectively (**Figure 1**). However, unconventional vehicles are projected to play a growing role in the *AEO2011* Reference case, due both to policy and rising fuel prices, growing to 42 percent of the projected new LDV sales in 2035.

Flex-fuel vehicles (FFVs), which can use ethanol in blends of up to 85 percent, represent the largest share of projected unconventional vehicle sales by 2035, at 19 percent of total new LDV sales. Manufacturers selling FFVs currently receive incentives in the form of fuel economy credits earned for CAFE compliance through MY 2016. FFVs also play a critical role in accommodating the RFS mandate for increased use of biofuels.

Sales of electric and hybrid vehicles that use stored electric energy also grow considerably in the Reference case. Micro hybrids used in conventional gasoline, diesel, and flex-fuel vehicles, which use start/stop technology to manage engine operation when the vehicle is stopped, are projected to account for 11 percent of all LDV sales by 2035. Hybrid vehicles, a category pioneered by the Toyota Prius more than a decade ago, account for 5 percent of projected light-duty vehicle sales in 2035, and plug-in and all-electric hybrid vehicles account for 2 and 1 percent of LDV sales, respectively.

Sales of diesel vehicles, which have fuel economy advantages relative to comparable conventional gasoline vehicles and also offer torque benefits valued by some users, also increase in the Reference case, accounting for 5 percent of total LDV sales in 2035. However, natural gas or fuel cell vehicles are not expected to capture a significant share of new LDV sales in 2035.

In the *AEO2011* Reference case, conventional gasoline vehicles maintain a projected 58 percent share of new LDV sales by 2035 because they are able to incorporate technology such as lightweight materials and advanced engine and transmission technologies that

improve fuel economy and allow manufacturers to meet the CAFE standards. In the Reference case, conventional gasoline passenger car fuel economy improves from 30.9 miles per gallon to 37.3 miles per gallon between 2008 and 2035, while conventional gasoline light-duty truck fuel economy improves from 23.9 miles per gallon to 29.1 miles per gallon over the same time period.

The changing mix of LDV sales is reflected over time in the composition of the LDV fleet. By 2035, about 30 percent of total LDVs are unconventional vehicles, which contribute to higher efficiency or provide a capability for increased use of fuels other than petroleum. Growth in the number of drivers and vehicle miles per driver results in a projected growth of 50 percent in total LDV vehicle miles of travel between 2009 and 2035 in the *AEO2011* Reference case (**Figure 2**). However, due to rising fuel economy, overall LDV energy consumption is projected to increase by only 10 percent, or 1.7 quadrillion Btu, between 2009 and 2035 despite rising travel demand. Projected LDV petroleum use in 2035 is about 8.2 mmbd, the same level as in 2009, reflecting both changes in the fuel mix and improved fuel economy.

Petroleum products remain the dominant LDV fuel, with the motor gasoline (excluding ethanol) share falling to 82 percent (from 92 percent currently) but diesel rising to nearly 5 percent (from 3 percent) by 2035. Biofuels play a growing role and are projected to provide almost 14 percent of energy used by LDVs by 2035, up from 5 percent. Electricity usage begins to grow but remains small at about 0.2 percent while natural gas

accounts for less than 0.1 percent (**Figure 3**). This is due partially to the fact that electric vehicles are very efficient and for the same amount of travel use significantly less fuel.

Projected total energy and petroleum use by LDVs grows at a much slower rate (10 percent) than in other parts of the transport sector, where total energy use and petroleum use are projected to grow by 32 percent and 18 percent respectively between 2009 and 2035. (**Figure 4**).

Uncertainty in the *AEO2011* projections for the LDV vehicle mix and fuel use

The *AEO2011* Reference case projections for LDVs and their fuel use are inherently uncertain. This section discusses four key areas of uncertainty: fuel prices, technology costs, consumer acceptance, and potential changes in policies.

First, all vehicle types face uncertainty regarding future fuel prices. Higher or lower fuel prices can change the relative attractiveness of all vehicle types, either making more fuel-efficient vehicles more attractive to consumers in a high oil price case or less attractive in a low oil price case. For example, in the *AEO2011* High Oil Price case, the conventional gasoline vehicle sales share declines to about 50 percent in 2035 compared to 58 percent in the Reference case, while in the Low Oil Price case, the conventional gasoline share falls only to about 60 percent. Higher or lower fuel prices also affect projected vehicle efficiencies and growth in travel, which also affect the fuel mix and the level of fuel use. In the *AEO2011* High Oil price case, overall LDV fuel consumption increases by only 1.5

percent between 2009 and 2035, while LDV petroleum use in 2035 is 6.6 mmbd, 1.5 mmbd below its 2009 level.

Second, future vehicle cost will play a critical role in determining the success or failure of unconventional vehicles in the future. For example, plug-in hybrid and plug-in electric vehicle incremental cost is dependent primarily on the cost of its battery. There is uncertainty today about what battery chemistry will be used in the future and what these batteries will cost. In addition to plug-in vehicles, diesel, natural gas, hybrid, and micro hybrids are all more expensive than a conventional gasoline counterpart. Just how much more these vehicles will cost a consumer depends on future technology breakthroughs, or lack thereof.

Third, consumer acceptance is also a critical area of uncertainty regarding future market success of unconventional vehicles and alternative fuels. Vehicle attributes, such as cost and performance, as well as alternative fuel prices and availability, will play key roles in the future success of these alternatives. Further, infrastructure availability is essential to consumer acceptance. Currently, there are fewer than 1,000 compressed or liquefied natural gas refueling facilities in the United States, many of which are private. Although consumers can purchase a home natural gas refueling system the limited range of natural gas LDVs on a single refueling can be a significant deterrent for many potential buyers. Unless more natural gas vehicles enter the market, there is little incentive to build out public refueling infrastructure. The lack of a dense public charging infrastructure and the resultant "range anxiety" could also be a significant concern for many potential buyers of

plug-in all-electric vehicles. Plug-in *hybrid* electric vehicles would not suffer from the range anxiety constraint, since the vehicle is also equipped with an internal combustion engine, which extends the range. Hydrogen vehicles probably face the greatest issues with respect to fueling and range anxiety given the absence of both a viable home refueling option and the high cost of establishing hydrogen refueling infrastructure.

Finally, the future regulatory environment is also uncertain. The possible effect of changes in fuel economy standards are perhaps the most important uncertainty affecting projections of the LDV vehicle mix and fuel use in the *AEO2011*. CAFE and greenhouse gas emissions standards for LDVs are currently set in final rule form only through MY 2016. While the *AEO2011* assumes that standards are raised through MY 2020 to meet the requirements of the Energy Independence and Security Act of 2007, additional fuel efficiency requirements that may be promulgated under existing legal authority could have a very significant impact on the LDV sales mix and projected fuel use by LDVs. In this regard, NHTSA and EPA have issued a Notice of Intent that outlines plans to formally propose more stringent fuel economy and greenhouse gas emissions standards for LDVs in MYs 2017 through 2025.

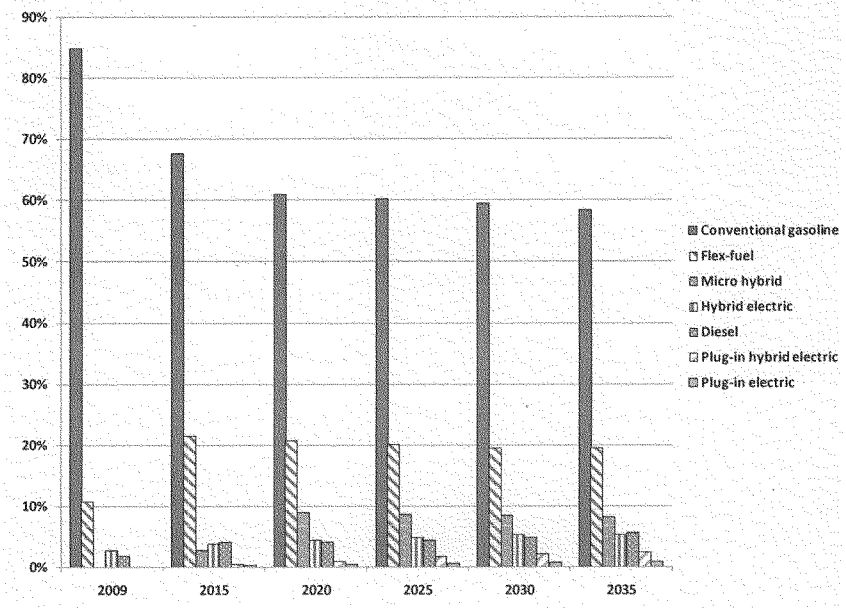
The *AEO2011* includes two sensitivity cases analyzing the impacts of more stringent greenhouse gas emissions and CAFE standards for LDVs in MYs 2017 through 2025. One case analyzes a 3-percent annual increase in standards over this period, resulting in a 46.1 miles-per-gallon standard by MY 2025. The other case assumes a 6-percent annual increase in standards over this period, resulting in a 59.3 miles-per-gallon standard by

MY 2025. These sensitivity cases are intended to illustrate possible outcomes rather than definitively identify impacts of hard-to-foresee changes 6 to 14 years into the future that are likely to challenge the financial, engineering, and production capabilities of the automotive industry and interact in complex ways with the uncertainties previously discussed.

Compliance with the more stringent CAFE standards cases would require a rapid increase in sales of unconventional vehicles and significant improvement in the fuel economy of conventional gasoline vehicles. Sales of unconventional vehicles are projected to grow to 70 percent of total new LDV sales in 2025 in the 3-percent case and nearly 90 percent in the 6-percent case, as compared with 40 percent in the Reference case. In addition to changing the LDV sales mix, increased costs for vehicles that employ technologies unfamiliar to consumers would likely slow the rate of vehicle stock turnover relative to the Reference case. In the two CAFE sensitivity cases, more stringent fuel economy standards lead to reductions in both total LDV energy use and LDV petroleum use. In the 3-percent case, overall LDV energy consumption declines by 10 percent (1.7 quadrillion Btu) between 2009 and 2035, while projected LDV petroleum use in 2035 is 6.5 mmbd, 1.7 mmbd below its 2009 level. In the 6-percent case, overall LDV energy consumption declines by 19 percent (3.2 quadrillion Btu) between 2009 and 2035, while projected LDV petroleum use in 2035 is 4.7 mmbd, 3.5 mmbd below its 2009 level.

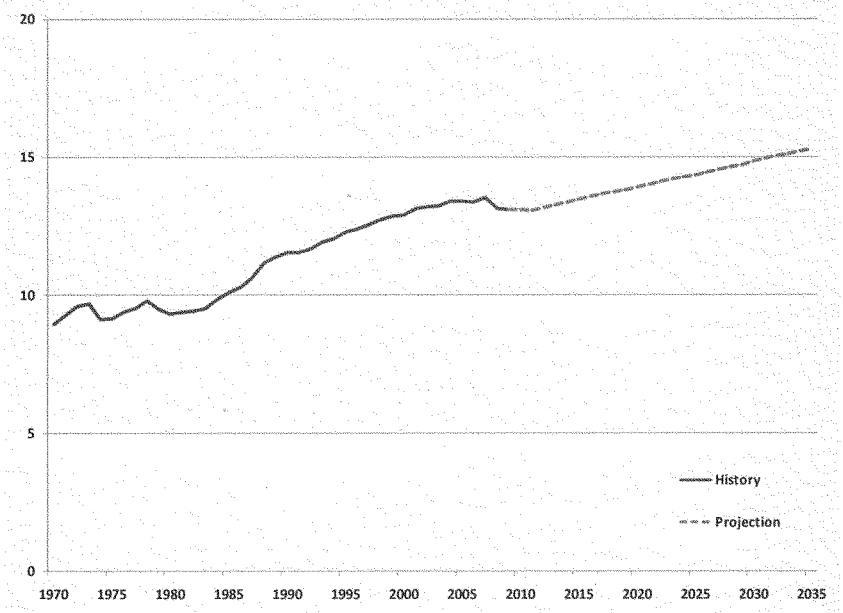
This concludes my statement, Mr. Chairman, and I will be happy to answer any questions you and the other Members may have.

Figure 1. Light-duty vehicle technology market share



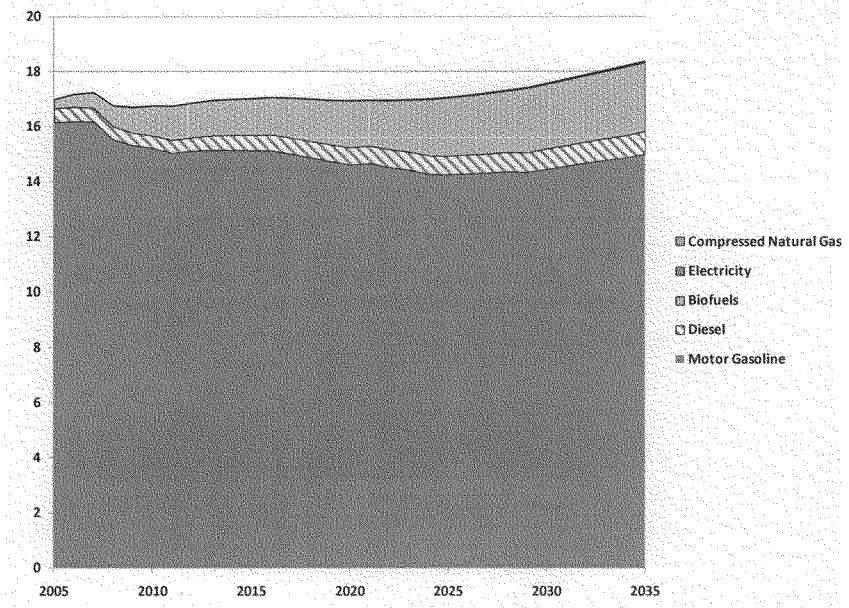
Source: EIA *Annual Energy Outlook 2011*, Reference case run d020911a

Figure 2. Vehicle miles traveled per licensed driver, 1970 to 2035 (thousand miles)



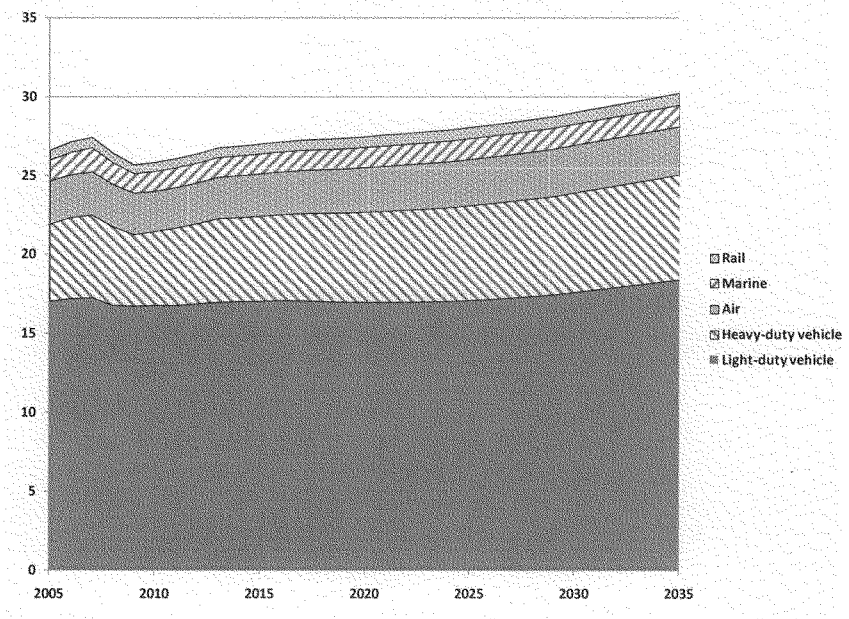
Source: History: Federal Highway Statistics 2008, Projection: EIA *Annual Energy Outlook 2011*, Reference case run d020911a

Figure 3. Light-duty vehicle energy use by fuel in the *AEO 2011* Reference case (quadrillion Btu)



Source: EIA *Annual Energy Outlook 2011*, Reference case run d020911a

Figure 4. Transportation energy demand by mode (quadrillion Btu)



Source: EIA *Annual Energy Outlook 2011*, Reference case run d020911a

Mr. WHITFIELD. Thank you very much. And Mr. Davis, you are recognized for 5 minutes.

STATEMENT OF PATRICK DAVIS

Mr. DAVIS. Good morning, Chairman Whitfield, Ranking Member Rush, and members of the subcommittee, and thank you for the opportunity to testify here today. I am Pat Davis, Program Manager of the Vehicle Technologies Program at the U.S. Department of Energy.

The transportation sector accounts for approximately two-thirds of the U.S. oil consumption. Closer, you say, thank you. Maybe two—there you go. After housing, transportation is the second biggest monthly expense for most American families. The President recently outlined a portfolio of actions which taken together could cut U.S. oil imports by a third by 2025 and these include programs that would put one million electric vehicles on the road by 2015, increase the fuel economy of our cars and trucks, and expand biofuels market and commercialized new biofuels technologies. Viewing these past, present, and future investments are critical to reducing costs for American families while reducing our dependence on oil and enhancing our national, economic, and environmental security.

Making our cars and trucks more efficient is one of the easiest and most direct ways to limit our petroleum consumption and save consumers money. And while the Department continues to work on improving existing engine technology, today I will focus on alternative fuels technologies.

As noted, the administration's goal is to put a million electric vehicles on the road by 2015. In 2009, the U.S. had only two relatively small battery manufacturing facilities manufacturing advanced batteries for vehicles. Over the next few years, thanks to Recovery Act investments, the U.S. will be able to produce enough batteries and components to support 500,000 plug-in and electric vehicles per year and simultaneously create over 6,200 jobs. At the same time, DOE projects a drop in battery costs of 50 percent by 2013 compared to a 2009 baseline.

To make electric vehicles even more affordable, the President proposes transforming the existing $7,500 tax credit into a point-of-sale rebate, and our fiscal year 2012 budget also proposes a new Energy Innovation Hub, energy storage research hub, and competitive programs to encourage communities to invest in electric vehicle infrastructure.

Domestically produced biomass can provide a cost-effective alternative to oil while creating business opportunities and jobs in the U.S., especially in rural areas. U.S. DOE develops programs that both increase the current use of biomass technologies and support research development and demonstration on the next generation of biomass technology.

DOE's efforts to increase the use of biofuels have been strengthened by the expansion of the Environmental Protection Agency's Renewable Fuels Standard program and DOE's work with EPA to understand the potential impact of E–15 on compliance with vehicle and emissions standards.

DOE is also making investments in next-generation biofuels technologies from a variety of feedstocks such as corn stover, wood waste, algae, and other materials, and we are exploring ways of converting corn and cellulose to cost-competitive drop-in substitutes for gasoline, diesel, or jet fuel.

Recovery Act funding also enabled us to invest in 29 integrated biorefinery projects to validate first-of-a-kind technologies at the pilot, demonstration, and commercial scales which will further reduce risk to investment. These projects are expected to generate at least 170 million gallons of advanced biofuels annually, and bringing more commercial biorefineries online will help us meet the Nation's ambitious renewable fuels standard goals.

In summary, DOE's transportation portfolio will save consumers money, reduce our dependence on foreign oil, lower our environmental impact, and keep America on the cutting edge of clean energy technologies enabling us to build a 21st century clean energy economy. Thank you again for the opportunity to discuss these issues and I welcome any questions you may have.

[The prepared statement of Mr. Davis follows:]

STATEMENT OF

MR. PATRICK DAVIS

PROGRAM DIRECTOR, VEHICLE TECHNOLOGIES PROGRAM

OFFICE OF ENERGY EFFICIENCY AND RENEWABLE ENERGY

U.S. DEPARTMENT OF ENERGY

BEFORE THE

COMMITTEE ON ENERGY AND COMMERCE

SUBCOMMITTEE ON ENERGY AND POWER

UNITED STATES HOUSE OF REPRESENTATIVES

MAY 5, 2011

Chairman Whitfield, Ranking Member Rush and Members of the Subcommittee, thank you for the opportunity to discuss the Department of Energy's transportation portfolio – specifically our alternative fuels and vehicles programs.

The transportation sector accounts for approximately two-thirds of the United States' oil consumption and contributes to one-third of the Nation's greenhouse gas (GHG) emissions.[1] After housing, transportation is the second biggest monthly expense for most American families.[2] As the President said in his recent energy speech, "In an economy that relies so heavily on oil, rising prices at the pump affect everybody." Emphasizing that "there are no quick fixes," the President outlined a portfolio of actions which, taken together, could cut U.S. oil imports by a third by 2025. These include programs that would put one million electric vehicles on the road by 2015; increase the fuel economy of our cars and trucks; as well as expand the biofuels market and commercialize new biofuels technologies, including cellulosic and other advanced biofuels.

The Office of Energy Efficiency and Renewable Energy's (EERE's) Vehicle Technologies Program (VTP) develops and promotes energy-efficient, environmentally-friendly transportation technologies that will reduce petroleum consumption and lower GHG emissions while meeting drivers' expectations of vehicle performance. VTP's activities promote energy security, environmental, and economic benefits in both the near- and long-term.

Few technologies hold greater promise for reducing our dependence on oil than electric vehicles. In his 2011 State of the Union address, the President spoke of his goal to have the United States become the first country with a million electric vehicles on the road by 2015. Meeting this goal will help the United States become a leader in the clean energy economy, while capitalizing on the ingenuity of American industry. Manufacturing products needed for the clean energy economy will generate long term economic strength in the U.S., creating jobs across the country while reducing air pollution and greenhouse gas emissions.

EERE investments past, present, and future are critical to achieving this goal. In 2009, the U.S. had only two, relatively small, factories manufacturing advanced vehicle batteries, and produced less than two percent of the world's hybrid vehicle batteries.[3] But over the next few years, thanks to investments from the American Recovery and Reinvestment Act of 2009 (Recovery Act) in battery and electric drive component manufacturing, and electric drive demonstration and infrastructure, the U.S. will be able to produce enough batteries and components to support 500,000 plug-in and electric vehicles per year. High volume manufacturing, coupled with battery technology advances, design optimization, and material cost reductions, could lead to a drop in battery costs of 50 percent by 2013 compared to 2009, which will lower the cost of electric vehicles, making them accessible to more consumers.

Further policies and research are needed to build on the work under the Recovery Act. In order to make electric vehicles even more affordable for American consumers, the President's FY 2012 Budget request would transform the existing $7,500 tax credit for purchasers into a

[1] http://www1.eere.energy.gov/vehiclesandfuels/pdfs/vehicles_fs.pdf
[2] http://www.bls.gov/news.release/cesan.nr0.htm
[3] http://www.whitehouse.gov/sites/default/files/blueprint_secure_energy_future.pdf

credit for the seller or the person financing the sale. The credit would be passed through to consumers giving them the ability to receive the benefit of the credit at the point of sale.[4] Economic incentives for early adopters of cutting edge technologies like electric vehicles are necessary for two reasons. One, although the life-cycle energy costs of owning an electric vehicle are lower than those for a conventional vehicle, the upfront costs may be slightly higher, discouraging cash-strapped consumers from purchasing them. And two, as demand for electric vehicles grow, manufacturers will be able to take advantage of economies of scale to lower their prices.

More broadly, increased investments in R&D will be critical to the deployment of new technology. This year's Budget will significantly broaden R&D investments in technologies like batteries and electric drives – including an over 30 percent increase in support for vehicle technology R&D and a new Energy Innovation Hub within the Office of Science devoted to improving batteries and energy storage for vehicles and beyond. The Batteries and Energy Storage Hub will provide an interdisciplinary, research framework for energy storage research, bringing fundamental and applied research teams together to foster materials discovery and ensure progress towards commercialization of new energy storage technologies. In addition, the FY 2012 request would create competitive programs to encourage communities to invest in electric vehicle infrastructure – an idea based on a bipartisan legislative proposal. Subject to appropriations, these programs within EERE would include funding for battery and electric vehicle R&D and a new $200 million competitive program to help communities become early adopters of electric vehicles through a number of activities, including regulatory streamlining, infrastructure investments, and vehicle fleet conversions. These programs would build on EERE's Clean Cities program, which supports local-level petroleum-reducing practices in the transportation sector. Since its inception in 1993, Clean Cities and its partners have displaced nearly three billion gallons of petroleum.[5]

DOE's work on advanced vehicle technologies will enable continued improvement of the fuel economy of new vehicles. Making our cars and trucks more efficient is one of the easiest, most direct ways to limit our petroleum consumption and save consumers money. To help increase the fuel economy of the vehicle fleet, DOE is investing not only in electric vehicles, but also in higher efficiency combustion engines, vehicle light-weighting, ethanol and biodiesel deployment, fuel cell electric vehicles, battery and electric drive manufacturing, and vehicle electrification deployment and infrastructure development.

The FY 2012 Budget also provides for new areas of activity, including non- and off-highway activities to reduce petroleum use and GHG emissions in rail and off-highway transportation modes; and a Vehicle Miles Traveled Reduction and Legacy Fleet Improvement activity to support the more efficient use of existing light-duty vehicle stock. These new programs are intended to provide new opportunities to reduce oil consumption, increase the Nation's energy security, reduce GHG emissions, and save consumers money.

---

[4] The existing tax credit is for both hybrid- and battery-electric plug-in vehicles with a battery that has a capacity of at least 4 kilowatt hours and is capable of being recharged from an external source. The base credit is $2,500, with an additional $417 per additional kilowatt-hour battery capacity, up to a maximum of $7,500. These credits will begin to be phased out after a manufacturer sells 200,000 qualified vehicles.

[5] http://www1.eere.energy.gov/cleancities/mission.html

DOE's Biomass Program within EERE focuses on the development and transformation of domestic, renewable, and abundant biomass resources into cost-competitive, high performance biofuels, biopower, and bioproducts through targeted planning, research, development and demonstration leveraging public and private partnerships.

Domestically produced biomass can provide a cost-effective alternative to oil imports while creating business opportunities and jobs in the U.S. – especially in rural areas. DOE's efforts to displace petroleum in the transportation sector have been underscored and strengthened by passage of new and ambitious targets for the Environmental Protection Agency's (EPA's) Renewable Fuels Standard (RFS) program across four categories of biofuels: conventional biofuels, biomass-based diesel, cellulosic biofuel, and other advanced biofuels. Increased use of fuels from biomass resources also contributes to national and economic security by insulating our economy from damaging fluctuations in international petroleum prices. Additionally, biomass use for fuels, products, and power creates wealth in rural America and contributes to national environmental goals by displacing petroleum and thereby reducing GHG emissions.

DOE's efforts to remove barriers to expanding the market for biofuels in the near term include—

- First, to move toward meeting existing statutory requirements, we assisted EPA in assessing the impacts of higher ethanol fuel blends on automobile engines and emissions, as part of EPA's their rulemaking activities that considered increasing the amount of ethanol that can be sold in gasoline blends.
- Second, we are working to ensure that existing fuel dispensers can dispense higher ethanol blends.
- Finally, we are engaged in a multi-faceted research strategy that has the potential to commercialize a variety of bio-based fuels derived from several different technological pathways.

DOE not only supports increasing the use of today's biomass fuel, it also undertakes RD&D programs to facilitate use of a variety of different biomass feedstocks and produce a variety of fuels and other products. Domestic biofuels production increased from less than four billion gallons per year in 2005 to nearly 13 billion gallons per year in 2010, a more than threefold increase in production in just five years.[6] Yet there is still much work to be done.

Prior to October 2010, the amount of ethanol that could be blended in gasoline for use in standard vehicle engines without modification was limited to 10 percent ethanol by volume (E10). DOE worked closely with EPA to provide data needed to determine the potential impact of gasoline containing up to 15% ethanol by volume (E15) on compliance with vehicle and engine emission standards established under the Clean Air Act. Using DOE and other test data EPA ultimately determined that E15 may be introduced into commerce for use in model year 2001 and newer passenger vehicles once several conditions are met. This means that EPA has

[6] http://www1.eere.energy.gov/biomass/pdfs/biomass_mypp_november2010.pdf

approved the use of E15 for about 62 percent of the passenger vehicles on the road, vehicles that account for more than 70 percent of the miles driven.

DOE is also working with stakeholders to broaden the market for higher ethanol blends. DOE estimates approximately 3 percent (8 million out of approximately 240 million) of passenger vehicles on the road today are already manufactured to be compatible with blends up to 85 percent ethanol. Roughly 15 percent of total new vehicle sales are also E85-compatible. Domestic manufacturers have pledged to offer half of their vehicle models as flexible fuel vehicles (FFVs, vehicles designed to run on either gasoline or ethanol blends up to E85) by model year 2012, bringing FFV sales to about 20 percent of total sales.[7] DOE estimates that the incremental cost of manufacturing vehicles to be E85-compatible is in the range of $50-$100/vehicle.

DOE is also working with pump manufacturers to accelerate deployment of pumps that can operate with E15 and higher ethanol blends. While pumps capable of dispensing very high ethanol blends such as E85 currently cost 1.6 times as much as conventional pumps (conventional pumps cost $10,000-$15,000, while E85 pumps cost about $20,000-$25,000) DOE analysis suggests that the cost differential could be driven down to a few hundred dollars if the high-blend pumps were manufactured in volume. DOE is working with pump manufacturers to develop and market retrofit kits to upgrade existing pumps to be compatible with E15. DOE currently estimates that modifying fuel pumps to make them compatible with E15 should also be relatively inexpensive ($1,000 or less per pump, depending on several different pump-specific variables).[8] In addition, DOE is working with states, which are able to use State Energy Program funds and funding from the Recovery Act, to upgrade existing fuel pumps to be compatible with higher ethanol blends. DOE will continue to work with USDA, EPA, and other agencies to facilitate these modifications, which will allow more ethanol to enter the market.

DOE is also making investments in next-generation biofuels technologies, primarily through the Biomass Program. This work focuses on technologies that can convert a variety of feedstocks – such as corn stover, wood waste, algae and other materials – into a variety of fuels and products, as well as power. We are supporting research on two main pathways to convert these materials into cost-competitive, drop-in substitutes for gasoline, diesel, and jet fuel: (1) thermochemical conversion, based on pyrolysis or gasification, and (2) biochemical conversion using enzymes, fermentation, and other mechanisms. Advanced research continues to focus on meeting technical targets and reducing costs through these routes. We are also working on cutting the cost of collecting, transporting and storing cellulosic biomass materials by exploring strategies for increasing the density of the materials and converting raw material into a standardized format.

Recovery Act funding accelerated our R&D investment in drop-in substitutes and diversified our overall portfolio of integrated biorefineries in terms of feedstocks and technologies used, regions represented, facility sizes, and types of fuels and products being

[7] See, for example, http://media.gm.com/content/media/us/en/news/news_detail.brand_buick.html/content/Pages/news/us/en/2011/Feb/0221_regalturbo.

[8] Based on discussion with industry and on DOE calculations.

generated. DOE's 29 integrated biorefinery projects aim to validate first-of-a-kind technologies at pilot, demonstration, and commercial scales to reduce risk of further investment. These demonstrations help to overcome key technical and economic barriers for producing advanced biofuels and better enable future scale up and replication of biorefineries by the private sector. Most of these projects are either in construction or will be by the end of 2011. These projects aim to collectively generate at least 170 million gallons of advanced biofuels. The President has also announced a goal to break ground on at least four commercial-scale cellulosic or advanced biorefineries over the next two years. As these and other biorefineries come online throughout the United States, more and more petroleum will be displaced.

In order to help defray the cost of cellulosic biofuel production, the President's FY 2012 Budget proposes funding a technology-neutral reverse auction incentive program. DOE would solicit bids from potential producers of cellulosic ethanol and other advanced biofuels, and those producers submitting the lowest bids would be awarded the production incentives that would allow their production costs to be competitive with conventional fuel production costs. This reverse auction would reduce the perceived risk of investment for these facilities.

Bringing more commercial biorefineries producing advanced biofuels on line will help us meet the nation's ambitious goals for biomass energy through the RFS, support the Navy's goal for renewable fuels to comprise 50 percent of its transportation fuel consumption by 2020; and respond to substantial renewable fuels demand in the commercial aviation industry.

In sum, the Department's transportation portfolio will save consumers money, reduce our dependence on oil, lower our environmental impact, and keep America on the cutting edge of clean energy technologies, enabling us to build a 21st century clean energy economy. Thank you again for the opportunity to discuss these issues, and I welcome any questions you may have.

Mr. WHITFIELD. Thank you, Mr. Davis. Ms. Oge, you are recognized for 5 minutes.

STATEMENT OF MARGO T. OGE

Ms. OGE. Chairman Whitfield, Ranking Member Rush, and members of the committee, good morning. I really appreciate the opportunity to appear before you today.

Biofuels can play a very important role in reducing our dependence on foreign oil, decreasing greenhouse gas emissions, and improving the world economies. A year ago in compliance with the Energy Independence and Security Act, EPA finalized the Renewable Fuel Program commonly known as RFS Program. This program established an annual volume standards for renewable fuels of 36 billion gallons in 2022. This includes 21 billion gallons of advance biofuels for that timeframe.

When fully implemented, biofuels required by the RFS would displace about 13.6 billion gallons of petroleum-based gasoline in diesel fuel. That is approximately 7 percent of the expected annual gasoline and diesel consumption in 2022. This will decrease all imports by $14.5 billion and provide additional energy security of $2.6 billion annually.

It should also reduce greenhouse gas emissions by an average of 138 million metric tons of CO_2 equivalent. This is approximately the emissions created by 27 million vehicles on an annual basis. EPA strongly supports expanded use of advanced biofuels especially cellulosic biofuels. When Congress enacted ESA, it recognized that cellulosic targets are very indeed aggressive. It included provisions directing EPA to reduce the mandated levels set in the statute if cellulosic ethanol production were lower than the statutory requirements. Simply put, Congress did not require refiners to use more cellulosic ethanol than would be produced on an annual basis when they set those annual standards.

Unfortunately, the cellulosic industry is not developing as quickly as Congress anticipated and we have had to lower the cellulosic mandate for the 2011 timeframe in 2010. For 2010 and 2011, we set the cellulosic standard at about 6.5 million gallons which is substantially below the initial targets of 100 to 250 million gallons for those years. Although EPA has the discretion to reduce the total advance and total renewable fuel standards, we did not do so mainly because we expect sufficient volume of other advance biofuels would be available in 2011 time frame.

We set the standards in a very transparent rule making process based on the evaluation of the cellulosic industry including discussions, one on one discussions with each producers working with the Department of Agriculture, the Department of Energy, and the Energy Information Administration. We intend to propose the 2012 standards early this summer and to finalize them by end of November 2011.

The biofuel sector is a dynamic one. It is important for us to evaluate and qualify new fuels where possible for use in the RFS Program, corn and advanced and cellulosic biofuels approved for the RFS include biodiesel and renewable diesel from certain feedstocks, ethanol from sugar cane, biodiesel, and renewable diesel

from algae oil, ethanol and diesel from approved cellulosic feedstocks in jet fuel and heating oil from certain feedstocks.

We have also a process of evaluating new biofuels. Last year we successfully evaluated canola based biodiesel as an approved pathway. Lastly, I would like to briefly highlight steps that we have taken to remove barriers from the production of alternative fuels and vehicles in the auto sector. Essentially EPA announced a new regulation that would streamline and simplify the process by which manufacturers of clean alternative fuel conversions systems made them with said compliance where at the same time they can maintain the mission control standards required for those vehicles and engines.

In closing, EPA is currently working to successfully implement the RFS Program both by following the specific direction established in ESA and by recognizing that the statute's strong intent is to replace conventional petroleum derived fuels with advanced biofuels. I want to say that we are currently witnessing a period of great innovation in our country with respect to the development and introduction, not just of the new fuels but also of new vehicle technologies. We at EPA strongly supports this innovation and we believe that the result in new fuels and new vehicle technologies hold a tremendous potential to reduce independence on foreign oil, save consumer dollars, and clean the environment.

Thank you for the opportunity. I look forward to your questions.

[The prepared statement of Ms. Oge follows:]

Margo T. Oge
Director
Office of Transportation and Air Quality
Office of Air and Radiation
U.S. Environmental Protection Agency

Subcommittee on Energy and Power
Committee on Energy and Commerce
U.S. House of Representatives
May 5, 2011

Written Statement

Mr. Chairman, members of the Subcommittee, I appreciate the opportunity to come before you today to testify on the subject of alternative fuels and advanced technology vehicles.

Under the President's leadership, EPA has been and will continue to be a strong supporter of alternative fuels and new technologies for vehicles. The development of such technologies and fuels holds the potential to improve national energy security, save consumers money and protect the environment.

Alternative transportation fuels are also important for growing jobs in the United States. For example, rural communities across the country are benefiting from the bio-refineries that have been built to supply ethanol to meet the renewable fuels standard. Electrification of vehicles is bringing much-needed jobs to Michigan and other states. Sixteen advanced battery companies established ongoing projects in Michigan between August 2009 and August 2010.[1]

Biofuels are a critical part of the evolving alternative fuel landscape. On March 26, 2010, in direct response to the Energy Independence and Security Act (EISA), EPA took final action and set forth the regulations to implement revisions to the national renewable fuel standard program, commonly called the RFS program. These provisions established new year-by-year specific volume standards for renewable fuel reaching a total of 36 billion gallons by 2022. This total includes 21 billion gallons of total advanced biofuels, comprised of 16 billion gallons of cellulosic biofuel, 4 billion gallons of "other" advanced biofuels, and a minimum of 1 billion gallons of biomass-based diesel, that must generally be used in transportation fuel. The revised statutory requirements also include new definitions and criteria for both renewable fuels and the feedstocks used to produce them, including new greenhouse gas emission (GHG) thresholds. The regulatory requirements went into effect on July 1, 2010 and apply to domestic and foreign producers and importers of gasoline and diesel for renewable fuel used in the U.S.

The RFS program will provide both energy security and environmental benefits. We estimate that the greater volumes of biofuels required by EISA will displace about 7 percent of expected annual gasoline and diesel consumption in 2022, decrease oil imports by $41.5 billion dollars, and result in additional energy security benefits of $2.6 billion. The RFS should also

[1] Governor Jennifer Granholm. 2010. Press Release: Governor Granholm Says Nation Must Secure Its Clean Energy Manufacturing Future. http://www.michigan.gov/granholm/0,1607,7-168-23442_21974-245659--,00.html

reduce GHG emissions from the transportation sector by an average of 138 million metric tons of CO2 equivalent per year when the program is fully implemented—equivalent to annual emissions produced by 27 million vehicles.

EPA strongly supports expanded use of advanced biofuels, especially cellulosic biofuels, which under EISA must achieve at least a 60 percent reduction in lifecycle greenhouse gases compared to the 2005 baseline average gasoline or diesel fuel that it replaces. Each year, EPA is required to publish the annual standards for total, advanced, bio-mass based diesel, and cellulosic renewable fuels. In doing so, EPA must determine the projected volume of cellulosic biofuel production for the following year, and if that number is less than the volume specified in the statute, EPA must lower the standard accordingly.

Before proposing annual volume standards, we conduct a thorough review of the cellulosic industry, including one-on-one discussions with each producer to determine their individual production capacities. EPA also consults directly with the Department of Agriculture, the Energy Information Administration (EIA), the Department of Energy's Office of Biomass, and the interagency Biomass Research and Development Board to determine the status of production capacity and capabilities of the cellulosic sector. Since these evaluations are based on evolving information about emerging segments of the biofuels industry, and may result in the applicable volumes differing from those in the statute, we propose the annual volume standard through a transparent rulemaking process, allowing for public review and comment, prior to finalizing the standards. This process ensures the most robust determination possible at the time the standards are set.

In 2010 and 2011, as a result of limited production capacity, we found it necessary to reduce the cellulosic standard to about 6.5 million gallons, substantially below the EISA targets of 100 and 250 million gallons for those years. Under the statute, when the standard for cellulosic is lowered EPA has the discretion to maintain or reduce the total advanced and total renewable fuel standards. In 2010 and 2011, we did not reduce these standards because we expect sufficient volume of other advanced biofuels will be available.

The biofuels sector is a dynamic one, and we frequently hear from companies who are in various stages of developing fuels based on innovative new production techniques or different types of feedstocks. We recognize the importance of evaluating and qualifying such new biofuels, where possible, for use in the RFS program. We already have a strong list of qualified advanced and cellulosic biofuels approved in the current RFS, such as biodiesel and renewable diesel from certain feedstocks; ethanol from sugarcane; biodiesel and renewable diesel from algal oil; ethanol and diesel from approved cellulosic feedstocks; and jet fuel and heating oil from certain feedstocks.

We have also established a process to evaluate new biofuels for approved use in the RFS program, including analysis of GHG impacts that are based on the best available science. Last year we successfully added canola-based biodiesel as an approved pathway, and have approved a number of other new technology-based pathways. Beyond that, we have a number of additional petitions requesting evaluation of new biofuel production processes and new feedstock pathways. We are currently in the process of evaluating each of these requests, working in coordination

with USDA and DOE, and are moving as quickly as practicable to complete and issue final determinations. Many of these offer potential to qualify as advanced or cellulosic biofuels.

EPA also worked closely with industry on a sophisticated enhanced data system designed to accommodate the new EISA standards. This progressive new system is referred to as the EPA Moderated Transaction System, or EMTS. This system supports real time submission of information, accounting and validation of renewable volumes, and close monitoring of many of the program requirements. Since last July, this system has helped manage transactions for billions of gallons of renewable fuels.

Turning from renewable fuels for a moment, I would like to highlight steps EPA has taken to remove barriers to the further development and introduction of alternative fuels and vehicles into the auto sector. Just recently, we finalized an "alternative fuel conversion" rulemaking designed to accomplish that objective.

While the vast majority of vehicles in the United States are designed to operate on gasoline or diesel fuel, clean alternative fuel conversion systems allow gasoline or diesel vehicles to operate on alternative fuels such as natural gas, propane, alcohol, or electricity. EPA supports innovation and encourages the development of clean aftermarket technologies that enable broader transportation fuel choices. At the same time, EPA is responsible for ensuring that all vehicles and engines sold in the United States, including clean alternative fuel conversions, meet emission standards.

EPA is adopting a new approach that simplifies and streamlines the process by which manufacturers of clean alternative fuel conversion systems may demonstrate compliance with these vehicle and engine emissions requirements. The new options will reduce some economic and procedural impediments to clean alternative fuel conversions while maintaining environmental safeguards to ensure that acceptable emission levels from converted vehicles and engines are sustained.

In closing, EPA is currently working to successfully implement the RFS program, both by following the specific direction established in EISA and by recognizing the statute's strong intent to replace conventional petroleum-derived fuels with advanced biofuels. The program today contains several innovative elements that together help incentivize the advanced and cellulosic biofuel sector. We are currently witnessing a period of unprecedented innovation with respect to the development and introduction of new fuels and new vehicle technologies. EPA strongly supports such innovation, and believes the resulting new fuels and technologies hold the potential to reduce our dependence on foreign oil, save consumer dollars, and clean the environment. Thank you for the opportunity to testify today.

Mr. WHITFIELD. Thank you, Ms. Oge. I will recognize myself for 5 minutes of questions. And once again we appreciate your being here. Mr. Davis, you mentioned in your testimony that by 2015, the goal was to have one million electric vehicles on the roads. How many electric vehicles are out there right now, or do you know?

Mr. DAVIS. A few hundred.

Mr. WHITFIELD. A few hundred.

Well, you know this renewable fuel standard obviously is very important and I think it is also important that we not look through rose-colored glasses as we try to anticipate the future. I was reading an article—two articles recently. One was in the New York Times. This was the 1917 issue of the New York Times, front page and it said electric vehicles are the cars of the future. And then I read an article about a company in California called DC Green that was formed a few years ago to go out and remodel service stations to provide electrical outlets and so forth, and they are now in bankruptcy. So I was just—would you elaborate? And it is my understanding that the Volt electric car for example costs like $42,000. So would you elaborate a little bit on why you are as optimistic as having a million cars by 2015?

Mr. DAVIS. Sure. Thank you very much for the question. First of all, let me say a million vehicles by 2015 is not the end point. It is a milestone. We want to get to a million vehicles by 2015. We want to go beyond a million vehicles to get to five million, 10 million, and even tens of millions and we are really pretty confident that that milestone is obtainable. And I would suggest that the situation today is much different than in the '70s or any other previous time.

We believe that the pieces are in place to achieve this goal. First of all, the Recovery Act, battery manufacturing facilities are in place to support the widespread production of electric drive vehicles. Two billion in batteries and electric drive component funding that was matched by industry for a total of 4 billion in manufacturing facilities that are supporting——

Mr. WHITFIELD. So how many manufacturing facilities are there out there now with an advanced battery production?

Mr. DAVIS. Well, the Recovery Act is supporting a total of 20——

Mr. WHITFIELD. Twenty.

Mr. DAVIS [continuing]. And that is an entire supply chain from the component level, anodes, cathodes, electrolytes, to cell production, the battery manufacturing and assembly, and even to recycling. In addition to the Recovery Act projects, there is the tax incentive of $7,500. We are bringing the cost of batteries down very quickly. We are highly confident that we are going to meet our goal in 2015—the middle of this decade—to get to $300 per kilowatt hour. There is the ATVM, the Advanced Technology Vehicle Manufacturing Loan Program, supporting manufacturers of advanced vehicles. In addition to that, the manufacturers have announced production capacities that when you look at the total production and the ramp-up rates, total over one million vehicles through 2015. Now, that is announced production capacity. It doesn't indicate consumer acceptance or that consumers will buy those vehicles. But we are very confident that the production capacity will be there to meet that goal.

Mr. WHITFIELD. Yes, you also mentioned that you want to move from a $7,500 tax credit to a point-of-sale rebate. How would that rebate be determined?

Mr. DAVIS. Well, the—of course, the details of that are still being worked out, but the concept is that a consumer who goes in to buy a vehicle will be much more incentivized by an immediate $7,500 benefit off the cost of a vehicle versus having to pay the entire price of the vehicle with the hope——

Mr. WHITFIELD. Right.

Mr. DAVIS [continuing]. Of getting $7,500 back when they do their taxes some, you know, perhaps 12 months later.

Mr. WHITFIELD. Mr. Gruenspecht, not too long ago we heard people talking all the time about hydrogen fuel cell technology and I don't really hear a lot about that today. Or Mr. Davis, maybe I should ask you that question. What is happening on the hydrogen fuel cell technology?

Mr. DAVIS. Well, the fuel cell technology office is making great progress. They reduced the cost of fuel cell systems from about $275 per kilowatt in 2002 to $51 per kilowatt today. That is a high-volume production cost, and their ultimate goal is $30 per kilowatt. So we are getting very close to where we need to be on cost. Infrastructure and hydrogen production is—remains the most serious challenge, along with storage of hydrogen.

Mr. WHITFIELD. OK. All right, my time is expired. Mr. Rush, I recognize you for 5 minutes.

Mr. RUSH. Thank you, Mr. Chairman. I think I will ask Mr. Gruenspecht these questions. The Energy Security and Independence Act once passed out of Full Committee and to the House in '07 contained a renewable fuel standard with the goal of reaching 36 billion gallons of renewable fuels by the year 2022. Question is where are we? Are we currently on pace to meet that goal and if not why not? What additional steps are needed in order to make sure that we are on pace to meet that objective?

Mr. GRUENSPECHT. Thank you for that question. I guess from the—soon after passage of the Energy Independence and Security Act, EIA as part of its duty needs to put out a projection, and I think in the projections issued in 2008 and since that time we have not been showing the 36 billion gallon target being met. In large part the issue involves cellulosic ethanol. As was specified by my colleague, that industry is coming along somewhat more slowly than had been anticipated by the framers of that legislation. There is waiver authority, and in our projection that waiver authority is used to reduce that cellulosic mandate. But over time we expect the use of renewable fuels to exceed that 36 billion gallon level. So it is really a matter of the speed with which the cellulosic ethanol—or cellulosic biofuels more generally, because it is not just ethanol, you can make other biofuels out of cellulosic material—can be ramped up.

Mr. RUSH. Mr. Davis, on the discussion on cellulosic biofuels, we have heard a lot of discussion about the greens and the impact that this type of alternative fuel may have some day in meeting our war on energy needs reducing our carbon footprint and decreasing the price of gas at the pump. Are there any—what are the most promising types of cellulosic biofuels currently and when will this type

of alternative fuel realistically have an impact on a commercial scale? And are there any additional policies that can help us move this process forward at a quicker pace in order to go from a good idea to a better idea to best idea to reality?

Mr. DAVIS. Well, thank you very much for your question. There is quite a lot built in there so let me just try to touch on a couple things. You know first of all, the biomass program within DUE has invested more than a billion dollars in 29 integrated biorefineries. So these are projects that are at the pilot scale, the demonstration scale, and even at the commercial scale. And we—that $1 billion investment has been matched by industry with $1.7 billion and these plants in total would be able to produce about 170 million gallons annually. And these are projects that are—you know there are many different types of projects represented in those 29 biorefineries. But they represent mostly cellulosic projects converting cellulosic resources into biofuels.

I would say you mentioned what kind of other things could you do. One thing that could be done is a proposed in our budget for—to support a reverse auction which would support these commercial scale facilities becoming more cost effective in the very near term. And could enable more than 50 million gallons annual biofuel production by 2014. So that is one thing. And I would say in general our R&D program is continuing to lower the cost of these biofuels to be directly competitive with conventional fuels in the long term.

Mr. WHITFIELD. Your time is up, yes. Mr. Sullivan you are recognized for 5 minutes.

Mr. SULLIVAN. Thank you, Mr. Chairman. And before I start my questioning I would like to ask unanimous consent to submit two statements for the record.

Mr. WHITFIELD. What are the statements?

Mr. SULLIVAN. The first one is from the American Gas Association supporting my legislation H.R. 1380 the NAT Gas Act and the natural gas vehicles in general.

Mr. WHITFIELD. OK.

Mr. SULLIVAN. And the second is the one I would like to submit is a written statement for the record from the National Petrochemical and Refiners Association outlining their concerns with the renewable fuels mandate.

Mr. WHITFIELD. Without objection.

[The information follows:]

American Gas Association

DAVE MCCURDY
President & CEO

May 3, 2011

The Honorable Ed Whitfield
Chair
House Energy & Commerce Committee
Subcommittee on Energy & Power
2125 Rayburn House Office Building
Washington, D.C. 20515

The Honorable Bobby Rush
Ranking Member
House Energy & Commerce Committee
Subcommittee on Energy & Power
2125 Rayburn House Office Building
Washington, D.C. 20525

RE: May 5, 2011 Hearing: The American Energy Initiative: Challenges and Opportunities for Alternative Transportation Fuels and Vehicles
Support for H.R. 1380, NAT GAS Act

Dear Mr. Chairman and Ranking Member:

The American Gas Association, founded in 1918, represents 199 local energy companies that deliver clean, domestically abundant natural gas throughout the United States. There are more than 70 million residential, commercial and industrial natural gas customers in the United States, of which 91 percent — more than 64 million customers — receive their gas from AGA members. AGA is an advocate for natural gas utility companies and their customers and provides a broad range of programs and services for member natural gas pipelines, marketers, gatherers, international natural gas companies and industry associates. Today, natural gas meets almost one-fourth of the United States' energy needs.

AGA strongly supports efforts to increase the use of natural gas as a transportation fuel. AGA urges Congress to enact the "New Alternative Transportation to Give Americans Solutions Act," H.R. 1380 (referred to as the NAT GAS Act). This legislation would significantly expand and extend incentives for the natural gas vehicle (NGV) market. It would reduce America's dependence on imported oil, reduce our foreign trade imbalance, reduce vehicle emissions and relieve some of the price pressure on gasoline and diesel fuel.

AGA respectfully submits the following statement for the record:

> Increasing the use of domestic natural gas as a transportation fuel will decrease America's reliance on foreign energy sources. America imports more than 60 percent of its transportation fuel and in 2010 spent more than $250 billion on imported oil. In contrast, it is estimated that NGVs consumed about 33 billion cubic feet of natural gas in 2010. That is the equivalent of 260 million gallons of gasoline derived from imported crude oil. While a modest number, it highlights the fact that an incentive to further build

400 North Capitol St., NW, Washington, DC 20001 ■ Telephone 202-824-7111, Fax 202-824-7098 ■ Web Site http://www.aga.org

out the NGV market could significantly reduce our dependence on foreign oil markets, while increasing both our energy and national security. An added benefit of focusing on the NGV market would be the creation of badly needed American jobs that could help stimulate the economy.

As we hold this hearing, the price of gasoline and diesel at the pump is approximately $4.00 per gallon, and expected to rise. The gasoline-gallon equivalent price of natural gas averages just over $2.00. Clearly, demand for petroleum-based transportation fuels is a major factor that is driving prices higher. There is no silver bullet to address the high prices of petroleum-based transportation fuels, but encouraging the transportation market to shift to domestic, non-petroleum based fuels will reduce demand for gasoline and diesel, and ultimately provide some needed price relief at the pump.

NGVs are the cleanest combustion engine vehicles on the road. The increased use of NGVs can reduce emissions of greenhouse gases as well as NOx, volatile organic compounds and particulates. NGVs produce 25 percent less carbon dioxide than comparable diesel and gasoline vehicles.

NGVs are here and now. The technology is readily available to deliver its multiple benefits, which is an important reason to increase the incentives to build new NGVs, convert existing fleet vehicles to NGVs, and expand the delivery infrastructure to broadly use it as a transportation fuel. While research, development and demonstration (RD&D) can be conducted to improve specific areas, NGVs are ready to help achieve America's public policy goals now.

Natural gas is domestically abundant. The proven reserves of natural gas in the United States have increased by nearly 40 percent in recent years. We have more than 100 years of supply using conservative estimates. This is due to the development of new production technologies to unlock natural gas from shale formations, which are abundant throughout the country. Congress should act on this knowledge and advance energy policies that leverage America's clean natural gas resources to meet our current and future challenges.

AGA member companies have made significant commitments to support the growth of the NGV market and plan to invest millions of dollars in the near future. For example, Questar, the natural gas utility in Salt Lake City, Utah, has installed 30 refueling stations in its service territory. In 2010, Questar built the first liquefied natural gas (LNG) station in Utah. The company's development of fueling stations on interstate highways has allowed drivers to travel from Denver to Los Angeles on compressed natural gas (CNG). In California, there are approximately 150 CNG refueling stations and five LNG stations. They support a variety of fleet vehicles, from transit buses to school buses, to street cleaning and refuse collection trucks. In Georgia, AGL Resources has requested approval from its public utility commission to invest $12 million to build 10 new refueling stations in its service territory.

Congress also should authorize significant additional funds for NGV research and development (R&D). While NGVs are on the road, R&D is necessary to expand the types of vehicles that are available so that additional market segments can be served. R&D is also necessary to improve the refueling infrastructure. A well-funded R&D program would ensure that NGVs continue to deliver the benefits of energy security, efficiency and environmental performance.

In addition to the tax incentives proposed in H.R. 1380, AGA also encourages Congress to:

1. Monitor developments at EPA and NHTSA to ensure that NGVs are properly evaluated in terms of fuel economy and greenhouse gas emissions;
2. Fund the full additional cost of NGVs under the Clean Cities Program; and
3. Include NGVs in the administration's alternative vehicle program.

Thank you for the opportunity to present AGA's position. We would welcome the opportunity to respond to any questions or comments you may have on NGVs. Should you have either, please contact Charles Fritts, vice president, government relations, at 202-824-7220.

Sincerely,

WRITTEN STATEMENT OF THE

NATIONAL PETROCHEMICAL & REFINERS ASSOCIATION (NPRA)

AS SUBMITTED TO THE

SUBCOMMITTEE ON ENERGY AND POWER OF THE HOUSE ENERGY AND COMMERCE COMITEE

FOR A HEARING ENTITLED:

"THE AMERICAN ENERGY INITIATIVE: CHALLENGES AND OPPORTUNITIES FOR ALTERNATIVE TRANSPORTATION FUELS AND VEHICLES"

MAY 5, 2011

NPRA, the National Petrochemical & Refiners Association, appreciates the opportunity to submit this statement on alternative transportation fuels and vehicles.

NPRA is a trade association representing high-tech American manufacturers of virtually the entire U.S. supply of gasoline, diesel, jet fuel, other fuels and home heating oil, as well as the petrochemicals used as building blocks for thousands of vital products in daily life. NPRA members make modern life possible and keep America moving and growing as they meet the needs of our nation and local communities, strengthen economic and national security, and provide jobs directly and indirectly for more than 2 million Americans.

Our nation's domestic petroleum refiners are committed to manufacturing safe, reliable and clean transportation fuels. NPRA supports the safe use and integration of alternative fuels into the marketplace. However, we oppose any actions that could endanger the safety of the American families, farmers and truckers we serve every day. We take the confidence Americans place in our products – demonstrated by the millions of times each day that consumers purchase gasoline and diesel fuel – very seriously.

NPRA opposes the mandated use of alternative fuels and supports the sensible and workable integration of alternative fuels into the marketplace based on market principles. Energy policy based on mandates is not a recipe for success. There is no free market if every gallon of biofuels – including those that do not exist – is mandated. Mandates distort markets and result in stifled competition and innovation.

A broad range of groups including environmentalists, anti-hunger groups, auto manufacturers, outdoor power equipment manufacturers, boaters, snowmobilers, motorcyclists, cattle and poultry producers, grocery manufacturers and others have raised many serious concerns about the structure of and regulatory decisions surrounding the current renewable fuels mandate.

All of above groups can speak for themselves, so NPRA will use this statement to discuss the problems that the Renewable Fuel Standard (RFS) and the use of increased ethanol in gasoline could create in the years ahead not just for the American fuel manufacturers we represent but for the American motorists our members have served for more than 100 years. No industry could stay in business that long if excellent customer service was not its central focus.

For us, the primary problems with the RFS come down to questions about consumer protection. We want to do everything possible to ensure that we provide the highest quality fuel to the families, farmers and truckers who rely on our products. We want to avoid being forced to create fuel blends that could damage the gasoline engines our customers own in their vehicles, outdoor power equipment and other products.

We believe the RFS as currently structured is flawed and in need of revision to respond to numerous problems that stand in the way of transforming it from an attractive idea into a practical reality. We ask this committee to carefully reexamine and then revise the RFS to best serve the interests of the American people.

The Energy Independence and Security Act (EISA) of 2007 calls for annual increases in the RFS beginning in 2008 and reaching 36 billion gallons of biofuels in 2022. The act also established a subset of the RFS labeled advanced biofuel beginning in 2009. In addition, EISA created a complicated mix of submandates for specific classes of renewable fuels. But legislation cannot mandate scientific discoveries or alter the laws of chemistry, biology or physics. Despite good intentions, mandated increases in the production of cellulosic biofuels and other second-generation biofuels have not been achieved for a long list of reasons.

Ethanol is currently blended into about 85 to 90 percent of all gasoline sold in the United States, generally a level of 10 percent, known as E10. If the RFS is not changed, even if all gasoline sold in our country was E10 only a little over 14 billion gallons of ethanol would be consumed in 2012 – less than 15 billion gallons of corn ethanol allowed by the RFS beginning in 2015. This limit at ethanol used under the E10 standard is known as the "blend wall" and poses significant challenges to RFS compliance in future years.

Once the fuel supply has reached its limit in relation to E10, the only other existing option for compliance would be for refiners to rely on ethanol credits from the use of E85, a fuel made up of 85 percent ethanol. However, consumers have rejected E85 because it cuts fuel economy by more than 25 percent compared with regular gasoline. Due to this severe energy content loss, the AAA's Fuel Gauge Report has shown the on an energy content basis, E85 has consistently been MORE expensive than regular gasoline over the last several years. This past Wednesday, AAA's publication listed the average national BTU adjusted price for E85 as $4.40 per gallon, compared with an average national gasoline price of $3.98.[1] The previously mentioned compliance problems could lead to a situation where refiners end up in fierce competition for scarce ethanol credits as the amount of ethanol that consumers will accept in the fuel supply reaches its limit. If such a situation were to occur, it could lead to a situation where the market places significant upward pressure on RIN costs. Both refiners and consumers would end up bearing the brunt of these costs.

The ethanol industry has mounted increasing pressure on the Environmental Protection Agency to approve higher amounts of ethanol in gasoline as a way to address compliance challenges of the RFS mandate and crash through the blend wall. EPA recently approved the sale of gasoline containing 15 percent ethanol – known as E15 – for cars manufactured since 2001. Use of E15 instead of E10 increases the amount of ethanol in gasoline by 50 percent. Ethanol boosters are also seeking to mandate that automakers produce more flex-fuel vehicles, which can run on E85, even though E85 is not popular with consumers. Since it takes 40 percent of the corn produced in America to produce E10 fuel for most vehicles, if every car was fueled with E85 all the corn currently produced in the nation wouldn't be enough to meet the nation's biofuels needs.

NPRA has nothing against ethanol. Our members blend it and sell it every day at the E10 level. It is a good fuel additive. However, the RFS mandate as currently structured is bound to lead to consumer confusion and economic problems on a number of fronts. NPRA opposes EPA's decision to approve a partial waiver for E15. EPA does not have authority under the

---

[1] AAA's Fuel Gauge Report found at:
http://fuelgaugereport.aaa.com/?redirectto=http://fuelgaugereport.opisnet.com/index.asphttp://fuelgaugereport.aaa.com/?redirectto=http://fuelgaugereport.opisnet.com/index.asp

Clean Air Act to approve a partial waiver that allows the use of E15 in some engines but not in others. In addition, EPA based its first partial waiver decision on new data submitted to the public rulemaking docket on the day before the agency announced the partial waiver, providing no time for the stakeholder review or meaningful public comment required under the Administrative Procedure Act.

More importantly than questions about EPA's authority, NPRA is very concerned about misfueling and the potential consequences, including possible injuries to consumers and damage to engines. If E15 comes into widespread use, it will find its way into older vehicles, small engines and boats with potential consequences for personal safety, irreversible engine damage, consumer confusion, operational problems, a loss of a manufacturer's reputation, and warranty arguments. Questions about liability for these potential consumer incidents will lead to a litigation lottery in our courts. Consumers rely upon their government to ensure that the products offered are safe for the intended use. EPA's partial waiver decision ignores this responsibility and allows a product to be placed into the stream of commerce, based on EPA's assurances that a dispenser label is ample warning when prior history proves that a label alone is not enough.

Instead of approving E15 for use in newer-model vehicles, EPA should have required additional objective research and analysis to follow the science and determine if E15 is safe and if its use is in the best interests of the American people and our environment. In reexamining the RFS, Congress should also examine how to introduce more ethanol into the fuel supply in a way that addresses consumer protection through measures that will effectively combat potential misfueling.

A key principle to follow in developing policy recommendations is "do no harm." Policymakers should carefully consider the potential impact of policies on the environment, energy security, and consumers. Unfortunately, well-intentioned regulations or legislation can create harmful unintended consequences. In relation to the RFS, many of these unintended consequences are coming to fruition. NPRA is concerned that if the RFS is not reconsidered, these problems will only get worse to the detriment of our economy and consumers.

NPRA members are dedicated to working cooperatively at all levels to ensure an adequate supply of clean, reliable and affordable transportation fuels. We stand ready to work with Congress to ensure a stable and effective fuels policy that utilizes a diversity of resources to improve our national security, assist our consumers and protect our environment. The RFS creates several problems in the fuels marketplace – many of which may be insurmountable. In addition to consumer impacts, backlash from potential negative impacts of this law could ultimately end up threatening the availability of alternative fuels in the marketplace. Congress should revisit the renewable fuels mandate and address these important issues.

Mr. SULLIVAN. Thank you, Mr. Chairman. Mr. Davis, in your testimony you don't make any mention of the role of natural gas vehicles—that natural gas vehicles contain our nation's transportation portfolio. I hear Secretary Chu talk about electric vehicles all the time but he hardly every mentions natural gas vehicles. This is perplexing given the massive amounts of natural gas resources that we have in this country and the fact that natural gas vehicles help reduce all types of pollution. What is DOE's position of the role of natural gas vehicles or what is their position on the role natural gas vehicles will play especially in the heavy duty market? Why don't natural gas vehicles have a primary place in DOE's strategy?

Mr. DAVIS. Thank you so much for the question, Mr. Congressman. You know, actually natural gas does play an important role in our strategy. We supported natural gas vehicles and the implementation of natural gas fueling infrastructure for 17 years through our Clean Cities Program, most recently, through the Recovery Act, placing thousands of natural gas vehicles on the road along with the infrastructure that supports them.

I would say that the Vehicle Technologies Program, being primarily a research organization, does struggle sometimes with the fact that natural gas is a pretty mature technology. It is really more about deployment than it is about R&D. We know how to build natural gas engines. We know how to build natural gas vehicles, and that is why we have concentrated our efforts on natural gas through the Clean Cities Program, the deployment arm of the Vehicle Technologies Program.

Mr. SULLIVAN. Well, again this year the administration's budget request had no R&D funding for natural gas vehicles. Why does DOE always seem to be promoting alternative fuels of a distant future, stuff that is 15, 20, 50 years or more—years away from possibly being commercial to the exclusion of proven, cleaner, domestically available fuels and technologies like natural gas vehicles which could make a real difference tomorrow? Natural gas vehicle technology is readily available and widely used throughout Europe, South America, and Asia. There are over 12.5 million natural gas vehicles worldwide, and we only have 150,000 here in the United States. Can you elaborate on that?

Mr. DAVIS. Yes, thank you for your question. Well, I would say that first of all in fiscal year 2010 we put in place some natural gas engine development projects, and those projects are underway this year, in which we leveraged $5 million in funding for a total of over $15 million in engine development funds supporting new natural gas engines that could be used in a variety of vehicles, mainly medium-duty to heavy-duty-type vehicles. That said, once again our effort has been focused on deployment, and although you might note that in FY '12, we don't request any direct funds for R&D in natural gas, we continually support natural gas vehicles through the Clean Cities Program, our deployment arm, and we will continue to do so, both vehicles and infrastructure.

Mr. SULLIVAN. Thank you, Mr. Chairman. I yield back.

Mr. WHITFIELD. Thank you, Mr. Sullivan. Mr. Doyle, you are recognized for 5 minutes.

Mr. DOYLE. Thank you, Mr. Chairman. Thanks for holding this hearing today. You know I—it seems like we repeat this cycle in

this country and here in Washington decade after decade. Gasoline prices get high and there is great interest in all these alternative fuels and vehicles. And there is this great effort to move forward and then all of a sudden the OPEC ministers get together, or the speculators stop speculating, or—and gasoline prices come down, and we get lulled back in this complacency that everything is oK now and we can go back to our big SUV's and just keep putting gasoline in cars. And it is— you just wonder how many times you let the board hit you in the face before you duck. And we just seem to not be good at that.

We have to not only put money into R&D, but we have to sustain an effort in this country to create a situation here where we can mass produce vehicles that don't use gasoline. That is the future of the country. When I bought my first hybrid I used to complain to the Detroit people all the time why don't we have an American SUV hybrid? And why is it that other countries developed this technology before ours did? Well, I got a call one day from the Ford guy who said Ford was coming out with a Ford Escape hybrid. And I says I want one. He says well they are putting a waiting list together. So I said put my name on the list. About 7 months later I got a call that my car was here in Washington. I forgot I ordered it.

And so I went down to the dealer to pick up that car and I remember the sticker price on the car was $29,000 and I had never paid sticker for a car in my life. I didn't think that was un-American somehow and I said to the dealer how much do you want for the car? He says $29,000. And I says that is the sticker price of the car. You don't think—do I look stupid to you? I am not paying $29,000 for this car. And he said sir, he says these cars are going for not only sticker price; some dealers are selling them for sticker plus, the start of the hybrid cars.

But you know I thought I had this American hybrid car. Of course that battery came from Japan because we didn't make those batteries in the United States of America. I am glad to see we used some stimulus money and one of the factories by the way is in Pennsylvania that is doing this new battery technology. As we start to develop this battery technology, institutions like Carnegie Mellon in Pittsburgh are doing lots of research on how to make batteries that will allow cars to go further and further and further. This is the key to the future and once we can mass produce them, the cost goes down.

Everybody remembers what that first flat screen TV cost. It cost a cazillion dollars. Right now you can pick one up for practically nothing. Why? The technology gets better, people start to buy the product, they mass produce it, the price comes down. It is going to be the same with batteries in automobiles in the future once we put—but we need to build them here in this country. You have to develop an infrastructure in the United States of America that allows us to do this not just when gasoline prices are high, but to do this once and for all and finally relieve ourselves of this constant trap we fall into with these oil prices. And you know we could drill every oil well in America and that doesn't mean these oil companies are going to sell us the oil any cheaper because it comes out of the ground in America than it does in any other place in the

world. There is no discount for oil that comes out of the ground in United States of America. It is a world commodity. So we got to learn to duck. We have got to learn to start building these facilities in the United States of America. That takes commitment and R&D. We got to put money in R&D. The first thing that gets cut when we get tight budgets are the R&D budgets. That is what gets cut in this country. It is stupid. We need to not do that. We need to do more to get more of this research in there.

Let me just ask about incentives. Everybody thinks there is some magic bullet to bring gasoline prices down here in the United States in the next six months or a year. I mean it is complete fantasy that this Congress can do anything that would reduce gasoline prices in the very short term. But I do think I want to see how we can incentivize consumers to maybe drive vehicles that let them go a little bit further on that gasoline so that they get more miles for their dollar. I know we subsidize I think just three cars right now: the Chevy Volt, the Honda Civic, and the Nissan Leaf. I want to ask the three of you just to comment would the marketplace see more innovation in a wider spectrum of fuel efficient vehicles if we simply rewarded vehicles for overall fuel savings regardless of the technology? In other words, we become technology neutral and say let's just get the most fuel efficient vehicles out there. Do you think that is a better idea? And how do we incentivize consumers in the short term over the next 3 to 5 years, say, not 6 months to a year. That is just fantasy talk here in Washington, D.C. But realistically how do we incentivize consumers to start driving more fuel efficient vehicles? And I will let all three. You can just go in order and give your opinions. You notice I ended my question just in time for the guys to answer. That is the technique here. Go ahead.

Mr. GRUENSPECHT. I feel the board hitting me in the face. No, you know, I think in some sense just, again, casual observation, it is one of the things we don't like, but the—I think the price of gasoline is having an effect on what people buy in the way of vehicles. There are various—there are fuel economy standards as one possibility, policy instrument. Another one that has been discussed in the academic literature are fee-bates to—you know, so there are a number of options that have been proposed. Again, given EIA's role, I wouldn't really want to—we would analyze them for you, but I don't really want to express a preference.

Mr. DAVIS. Well, thank you so much for your remarks. And thank you for East Penn Manufacturing in Pennsylvania, who is manufacturing some critical battery technology that will be excellent application to start/stop hybrids.

You know, we have been doing—I personally have been doing this for 18 years, the Department has been doing it for decades to try and reduce our dependence on petroleum and raise the fuel economy of vehicles and reduce our dependence on petroleum. So pretty much most of what you said we are in violent agreement on. I would just echo my colleague's remark that we would be pleased to work with you on policy instruments that could be less technology-specific. He mentioned one, fee-bates, which are similar to the French Bonus Malus Program, and we would be pleased to talk to you more in depth about that.

Ms. OGE. You ask like the million or $10 million questions. If we can stay here for the whole day and we can do a brainstorming session—but clearly gasoline prices are playing a very important role. As we are seeing right now in talking to the OEMs, small cars and most recently GM and Ford announce making profits from selling small cars something pretty unique for this companies and for the country. So gasoline price is very important. But also what is very important is the continuing development of all technologies. There is a huge opportunity to improve the conventional gasoline engine significantly. And we are seeing that. All the OEMs that we are talking to because we are in the process of setting the new standards for 2017 to 2025 for fuel economy and greenhouse gas emissions working with the Department of Transportation in California. All the OEMs are investing and they are introducing cleaner, more efficient gasoline engines. Anywhere from reducing the size of the engine with different sizing, you know fuel injection systems, stop and start, very mild hybrids. As they introducing these technologies in the marketplace in bigger numbers including hybrids and electric supply kits, the cost will come down. So at least we at EPA we are very optimistic that the efforts that we are seeing right now in our country to improve the fuel efficiency, reducing the greenhouse gas emissions from the transportation sector as a whole—both cars and trucks, if it continues we are going to find ourselves in a tremendous place in the history of this country.

Also what I want to mention is that there is a program that EPA and DOT announced last year setting the first set of greenhouse gas standards and fuel economy standards from 2010 to 2016. By 2016 we are going to have on an average the fleet; the new fleet sold in the United States at 35.5 mpg is pretty historic. And we start seeing these new fuel efficient vehicles introduced in the marketplace today. The program costs about $900 on an average in 2016, but the consumer because of the fuel savings will get $3,000 back for that $900 investment just in fuel savings.

Mr. WHITFIELD. Ms. Oge, thank you. Thank you. Mr. Barton, you are recognized for 5 minutes.

Mr. BARTON. Thank you, Mr. Chairman. I want to tell my good friend Mr. Doyle when he is ready for another hybrid, come see me. They make—we make the Chevy Tahoe hybrid in my district with United Auto Workers union employees and I will bring you down to Arlington, Texas, and you can pick it out. And within the confines of the ethics rules that we operate under we will make you a deal. I will make you the best deal that it is possible for you and I to accept under the laws that we have to operate.

Mr. DOYLE. All right.

Mr. BARTON. And I am not opposed to the Ford, but we make the Chevy hybrid in my district and it is a good—I drive one. It is a good product. It is a good product.

We welcome our witnesses. I want to associate my remarks with Mr. Sullivan. I am a cosponsor of the natural gas bill that Mr. Sullivan is the chief sponsor of. We think it is a fuel that has some real opportunity for transportation. I want to direct my questions to the representative of the EPA. In your testimony, you talk about the cellulosic standard which under the law that was passed several years ago was supposed to be somewhere between 100 million

and 250 million gallons for this year and next year. And in a very understated way said because of the ability to actually produce that product they had to reduce it to 6.5 million gallons. To put that into perspective—just doing some back of the envelope calculations, 6.5 million gallons is about 20 minutes of fuel consumption for the United States. Twenty million—about 20 minutes. So my question, Madame, is at what point in time do you expect the cellulosic biofuels industry to become viable enough that volumes are actually commercial and substantial enough to make an impact?

Ms. OGE. We are also disappointed to see that the cellulosic industry was not able to meet the 250 million gallons this year. But clearly Congress did recognize that this is a new industry. That there would be uncertainties, especially the early years to meet those volumes. And it has given the authority to EPA to access that volume. And that is what we did for 2011. We are in the process of setting the cellulosic volumes for 2012. The proposal will be coming out sometime in early summer. And our evaluation we give for 2012 is based in having one on one discussions with all the major players in the cellulosic industry along with USDA and EIA. The industry's facing two major challenges right now. One is the opportunity to raise capital to invest in this new technologies, or rather on this technological challenges to move from pilot to commercial levels. However, we remain optimistic that those levels will be met. There are some significant number of companies and significant companies in the oil industry that are investing in this area so we remain optimistic that these goals will be met.

Mr. BARTON. OK. I want to ask the gentleman from EIA is—what is the fuel used for transportation on a daily basis in the United States right now?

Mr. GRUENSPECHT. That is about 70 percent of overall consumption, so 70 percent of 19—18—19 million barrels a day probably this year.

Mr. BARTON. The number that I use is 12 million.

Mr. GRUENSPECHT. Yes, that would be pretty good.

Mr. BARTON. OK.

Mr. GRUENSPECHT. Close enough.

Mr. BARTON. Yes, that is barrels. That is just to put in perspective we are using 12 million barrels a day cellulosic we got 6.5 million gallons last year for the whole year. So I mean the curve needs to go up fairly rapidly. I am—my time is expired, Mr. Chairman, and I yield back.

Mr. WHITFIELD. Thank you. Ms. Capps, you are recognized for 5 minutes.

Mrs. CAPPS. Thank you very much. And thank you for holding this hearing. It is a great topic and further, our witnesses. Some would argue—we hear repeatedly here in Congress that the best way to address high gasoline prices is with more offshore drilling. Mr. Gruenspecht, EIA can bring an analytic perspective of this discussion. In your recent annual energy outlook—excuse me, EIA begins with a reference case. This scenario assumes that our laws remain unchanged and that there are only conservative adjustments in our expectations regarding technology improvements and the resource base. Is this correct?

Mr. GRUENSPECHT. Correct.

Mrs. CAPPS. Close enough?

Mr. GRUENSPECHT. Close enough.

Mrs. CAPPS. However, EIA also examined a hypothetical scenario called the High OCS Resource case. This scenario assumes that offshore oil and natural gas resources in undeveloped areas of the Pacific, of the Eastern Gulf of Mexico and the Atlantic, and Alaska are much higher—would be much higher than currently expected and are developed in the coming years. This is hypothetical. This is the assumption in the High OCS Resource case also assumes that oil and gasoline resources in these areas to be three times higher than in the reference case. So far so good? OK. If one were a strong advocate for offshore drilling the High OCS Resource case would be just about our best case scenario. Right?

Mr. GRUENSPECHT. It would be a good scenario.

Mrs. CAPPS. It would be a good scenario. As part of your analysis of this scenario EIA examined the effects of these increased resources and the production in oil prices and their influence on oil prices. The impact appears almost negligible. In 2025, increased offshore production under this High OCS Resource case would result in oil costing $117.12 per barrel instead of $117.54 per barrel. That is a difference of $.42 per barrel or just one penny per gallon of crude oil, according to this scenario as I read it. Mr. Gruenspecht, can you tell us why changes in domestic oil production tend to have such a small impact on crude oil and petroleum product prices?

Mr. GRUENSPECHT. Well, I guess the fundamental point would be that the oil market is a global market. I also think that another aspect of this is that there is a lot of time involved in bringing particularly deep water resources into production so you would have a geophysical and geological evaluation; could be a couple years for a deep water prospect. You have exploratory drilling; could be up to four years for a deep water prospect. Development after a confirmed discovery could be seven years. So it takes a long time to get going on these things and in fact in that case, if you look further out, there is again a larger impact on production and a larger impact on price but it is still relatively modest. We are talking about a world market that by that time is 100 million barrels a day. It is about 88 million barrels a day now. I guess the idea is that no one measure is going to have a massive effect on world oil prices. I think it is really adding up a series of actions that affect both demand and supply rather than viewing actions as alternatives to each other that matter a lot. Again, I think the development of improved production technologies for either oil or for alternative fuels can lead to higher production not only in the U.S. but throughout the world because it is a global production. That matters. Similarly, improvements in efficiency in the U.S.—and that can be translated throughout the world—can have an effect on global demand. And so really you go to move both I think demand and supply if you want to have a significant impact on prices. Fuel flexibility probably helps a lot also.

Mrs. CAPPS. Thank you. Maybe just—there are only 40 seconds but if the other two of you would like to comment on this scenario and how you interpret it?

Mr. DAVIS. Actually, I think my colleague handled it extremely well.

Mrs. CAPPS. So then I would just I guess finally I will ask one quick question. Have you translated what a penny per gallon difference in crude oil would translate for consumers at the gasoline pump?

Mr. GRUENSPECHT. I think it was more than a penny per gallon difference in crude oil.

Mrs. CAPPS. It—that a 42 cents per barrel or just one penny per gallon of crude oil in your High Resource case—OCS case.

Mr. GRUENSPECHT. If you drive 12—drive 20,000 miles a year and the vehicle gets—and in your household the vehicle gets 20 miles per gallon on the road, you are talking about 1,000 gallons a year. So a penny per gallon would be $10.00, I imagine. That is just off the cuff. Instant analysis is about as good as instant coffee, so maybe I will give you a better answer for the record.

[The information follows:]

COMMITTEE: HOUSE ENERGY AND COMMERCE, SUBCOMMITTEE ON ENERGY AND POWER

HEARING DATE: MAY 5, 2011

WITNESS: HOWARD GRUENSPECHT
PAGE: 14, LINE: 5-7

INSERT FOR THE RECORD

Have you translated what a penny per gallon difference in crude oil would translate for consumers at the gasoline pump?

The most current available data indicates that each licensed driver traveled an average of 13,100 miles per year, and that the average on-the-road fuel economy of light duty vehicles was 20.8 miles per gallon. Together, these data imply annual fuel use of 630 gallons per licensed driver. A penny-per gallon increase in the price of crude oil would be fully passed through into retail gasoline prices with a brief lag, resulting in a $6.30 per year increase in annual gasoline costs per licensed driver, or about $11.30 per year for each U.S. household, as there are about 1.8 licensed drivers per household.

Mrs. CAPPS. That is all right. That is good enough for me for now. Thank you. I will yield.

Mr. WHITFIELD. Yes, we were really impressed with that.

Mrs. CAPPS. How fast he did it, right?

Mr. WHITFIELD. We have two votes on the House floor. So we are going to recess. We will be back here about 11:10. So and then we will resume with this panel. Thank you.

[Recess.]

Mr. WHITFIELD. We will call the hearing back to order and we will renew our questioning period for the first panel. At this time I will recognize Mr. Terry for 5 minutes.

Mr. TERRY. All right, I appreciate that, Ms. Oge. I can barely see you but on cellulosic biofuels you had mentioned in your opening statement a little bit. I couldn't get all with Joe Barton, but I was off part—very much part of those discussions when the RFP came out. And the history of the mandated sub-mandate on cellulosic was part of the food versus fuel capping corn as ethanol. And also the secondary is really to force the markets, the research, and the development into the cellulosic.

And Mr. Davis, you could help me on this so this question is really for you. As a supporter of biofuels and cellulosic fuels, it is frustrating because it doesn't seem like in the five years since that bill has passed that we have made a lot of progress. I don't see the cellulosic plants. There may be pilots out there, small pilots, but I would have expected mass production today.

So the overall question and I want to start with Ms. Oge, why aren't we there? What is the holdup? What is the problem here? It seems like we are spending money on research, but we are not getting there. Is it the feedstock? What is our holdup?

Ms. OGE. Based on the discussions, you know when we set the 2011 standard for the 6.6 million gallons, our team was actually was in touch with over 100 companies that had some form or another of investments on advanced biofuels. You know from different feedstocks, different processes. This year we talked about 15 to 20 companies that they continue to have significant investments. And as I said in my testimony that I really—two things that are going on and I would dare to say it is not—something it was to have expected because indeed it is an extraordinary new industry. And there are different ways to get there as far as a commercialized volume that is cost effective and can compete with fossil fuels.

And it has to do with—notice with the feedstocks the type of feedstock. But those are the type of process they used. What we have seen—and I cannot—you know, a lot of the information is company by company, plus it is confidential. We see there are two things going on. One is that companies don't have—some of the companies don't have sufficient capital investment to proceed based on the original plans that they had. And second is technology challenges that companies are finding as they are doing these pilot projects, make corrections, and then coming back to invest more and do more. So my personal view and this is completely my personal opinion is that we will be able to catch up on these volumes but it is too early to say the timeframe.

Mr. TERRY. OK. Well, I want to give Mr. Davis some time here to answer the question.

Mr. DAVIS. Well, actually my colleague from EPA really hit the highlights very well. I would just add that ,we started 29 integrated biorefineries. Those projects were initially started, and some of them as early as 2007, 2008, right before the economic downturn. This is an emerging industry and what—their access to capital was very constrained in that timeframe, and so what you are really seeing as we emerge from that downturn are these projects starting to get started on a more rapid basis. And we also have to recognize when you are talking about building a plant that could cost tens or even $100 million, it takes time to build that plant. Once you have the capital to do it, you are still looking at a 24-month build schedule. So I would agree. We, like you, would like to see this grow faster. And certainly the economic downturn has hurt us, but I think we are going to start picking up pretty quickly now.

Mr. TERRY. Yes, I would hope so because I think we are losing credibility frankly the longer it takes. I yield back.

Mr. WHITFIELD. Thank you, Mr. Terry. Mr. McKinley, you are recognized for 5 minutes.

Mr. MCKINLEY. Thank you, Mr. Chairman.

Mr. WHITFIELD. Mr. McKinley, excuse me just one minute.

Mr. MCKINLEY. As a new member to Congress I have a—I have admired Mr. Doyle's comments a minute ago about the analogous groundhog day. He didn't use that term but it just—we seem to be hearing this one over the years. That is all I have ever heard. We are just—we keep working in cycles that we are going to have another gas increase and we are going to worry about it and do nothing. And then we are going to do it again in a couple of years and we will do it again. I mean, I think the technology here—excuse me, the—I thought the goal was to use less energy. We want to be energy independent, but then I think that is as admirable as it is—but that is not what this administration is doing with the National Energy Technology Lab, he slashed the budget for fossil fuel research, the EPA's overregulation, and causing instability in the private sector.

The assertions that coal is a subsidized industry and I would ask any of you to please—all I keep hearing answers from you when I ask this question—we will get back to you. And 120 days later no one has gotten back to me. I want to know what subsidy is going to coal. If you could please get back to me. OK? The—so I think it is a false assertion that we have demonized our large, multi-national corporations.

We have no—as Sullivan said there is no funding here for natural gas vehicles. We don't have an energy policy. We have an environmental policy and I am just frustrated. I am frustrated that when I go home on the weekends with people talking about how the price of gasoline has gone up $2.00 a gallon in the last 2 years, I have looked at the—I read a book the other day and it talked about how we industrialized America without subsidies when Henry Ford and Auto Denzler developed not only the engine, but implemented the—that wasn't a subsidized industry. Thomas Edison developing the light and other—it wasn't subsidized. He did this all without federal subsidies. Westinghouse developing the A/C motor. No subsidies. Charles Lindbergh flew across the Atlantic

Ocean with aerospace technology of the time just simply to win a prize. That—we use that of—what was it, $20,000? There was no subsidy with that.

I guess I am just skeptical that I don't think there is a real hunger here for us to solve anything. Congress seems to want and the research group just to continue the debate. We have the technology right now to deal with coal liquefaction, gas liquefaction, using natural gas vehicles, battery powered. Why don't we just stay on the ones that we are close to achieving and finish the job instead of taking on new things and diverting, dispersing our energies so that we don't accomplish anything? Or is this—we are simply just trying to have a full employment bill for researchers across this country? Why don't we just finish the job? Dr.—Mr. Gruenspecht?

Mr. GRUENSPECHT. Well, I would say that with respect to your issue about energy subsidies EIA has put out a couple of reports, three reports on that issue. I think the most recent one in response to a request from Senator Alexander that——

Mr. MCKINLEY. I am sorry, could you?

Mr. GRUENSPECHT. Yes, we had put out a report on energy subsidies that we update fairly regularly so that might be of use to you now.

Mr. MCKINLEY. Can you tell me one coal company that is being subsidized? Because I hear it from this side all the time and I am getting pretty irritated about it that coal is a subsidized industry. That is why we have to find something else. I would like to find one coal company that is being subsidized and everyone says they are going to get back to me.

Mr. GRUENSPECHT. Well, I—we do not talk about specific companies, but I think you will find the information in the report responsive to your request.

Mr. MCKINLEY. OK.

Mr. GRUENSPECHT. Let me just leave it there. Thank you.

Mr. MCKINLEY. The—are we on the wrong track here? What do we have to do to finish a job? Why are we continuing to take on other things instead of—if we truly want to be energy independent we know how to be energy independent, but yet we start new projects whether it is cellulosity, Biomet, whatever those are? Those are all fine. I have want to support those in a way, but why don't we just finish the job that we started with the ones that we are closest to if we really want to accomplish it instead of taking on spending new money when industry over the years has worked without these subsidies. Why are—why is—is it just simply the full employment of research? Is that what this is about? Because if it is, I just need to understand. I can play by the game, but I am getting irritated that we don't solve anything. Mr. Davis?

Mr. DAVIS. Well, I appreciate your question and I also appreciate your frustration. This is a very difficult problem to solve. We have 240 million vehicles on the road today. We only sell about 12 million per year. It takes 20 years to turn——

Mr. MCKINLEY. Can we liquefy gas?

Mr. DAVIS. It takes 20 years——

Mr. MCKINLEY. Can we liquefy gas?

Mr. DAVIS. Of course we can liquefy——

Mr. MCKINLEY. I am sorry?

Mr. DAVIS. Of course we can liquefy gas.

Mr. MCKINLEY. Why aren't we doing it?

Mr. DAVIS. So I think, yes, natural gas is growing in momentum. Electric vehicles are growing in momentum.

Mr. MCKINLEY. Why is there no—nothing in the budget for natural gas vehicles? I am sorry—run out of time.

Mr. WHITFIELD. Sorry, Mr. McKinley. Mr. Green, you are recognized for 5 minutes.

Mr. GREEN. Thank you, Mr. Chairman, and I don't come from a coal area, but I come from an oil and gas, and we were always hit about our subsidies. But a lot of them are actually manufacturing subsidies, but Mr. Davis, the—you discussed the impact. Can you discuss the impact of E–10 and potentially higher levels of—we have on non-rogue, small, and older engines and material durability?

Mr. DAVIS. Are you specifically asking about E–10 or E–15?

Mr. GREEN. E–15, I guess. E–10, we have E–10 now because of our smog problems. In our area we have had it since the early '90s. And typically 10 percent of our fuels—well, it was MTB, but now it is ethanol, so.

Mr. DAVIS. So as you may know, I'm sure you know, the EPA recently issued a rulemaking that would allow sale of E–15, and I am sure our colleague from EPA can speak to that. We, in support of that rulemaking, conducted a fairly large test program, a program costing about $45 million involving over 100 vehicles and over—almost 30 models on the effects of E–15 on the long-term durability of those vehicles. That data was turned over to the EPA for their consideration in their rulemaking and ultimately did lead to the positive rulemaking to allow E–15 for sale, basically indicating that the effect of E–15 on those vehicles was minor, was minimal.

Mr. GREEN. Ms. Oge, the—I would like to talk about corn based ethanol and air quality. Corn production takes a lot of fuel to produce the crop, but you have to clear the fields to get the corn to produce the ethanol. And it seems like there is air quality benefits is maybe even worse than what we do using fuel from oil. The promotion of this type seems contrary to the administration's clean air goals, but we see that with—you know because it is an alternative, domestically produced fuel. But is it really a benefit for our air quality when you look at the corn ethanol—ethanol based on corn. Is it—you do from gasoline based on oil?

Mr. OGE. The law that Congress passed in 2007 has mandated 36 billion gallons of renewable fuel to be used by 2022. Also the same law requires that EPA evaluates to what extent there maybe any increases of air quality as a result of the use of the 36 billion gallons. It requires EPA to take actions to address these potential increases. As part of the—too, EPA concluded that renewable fuels, the 36 billion gallons mandate would reduce greenhouse gas emissions significantly. But also we have determined that there is some small increase in nitrogen oxides particularly in particular matter. So we are in the process right now to evaluate those increases then taking appropriate steps to address these through biofuel quality and reductions from new vehicles.

Mr. GREEN. OK. I also have a concern as my question of Mr. Davis is the misfueling of the first few years of E–15. If you have

an older car, you know to make sure that E–15 could damage your engine. Is the EPA mandating that kind of information on the pump? I know we have now on our pumps at least in the Houston area it is you know this contains ethanol. And folks know that but what about somebody that has a 6 or 7 year old vehicle and they go up and decide they are going to fill up with an E–15? Could the damage that could happen to their engine—is there enough consumer information available?

Ms. OGE. Is it for me?

Mr. GREEN. Yes, well either of you.

Ms. OGE. Of my colleague from the Department of Energy since we are doing this work. So you are absolutely right. Last October the agency based a significant technical data would give a waiver to 50 ethanol producers to allow E–15 to be introduced in the marketplace for 2007 in newer vehicles. In last January we give a second waiver for 2001 and newer vehicles. However, based on limited data for older cars and off road equipment as you suggested and engineering concerns that we have we are in the process of requiring labeling of pumps so we can educate the consumer about the appropriate fuel that they need to use. So there is a regulatory proposal that we are going to finalize early summer that would put those steps in place because we do recognize the importance to reduce the events of misfueling with E–15.

Mr. GREEN. OK. Thank you, Mr. Chairman. I appreciate. I have some questions I would like to submit to the panel.

Mr. WHITFIELD. Yes, the record will be open for 10 days on that. Mr. Pompeo, you are recognized for 5 minutes.

Mr. POMPEO. Thank you, Mr. Chairman. You know it has been interesting to sit here and listen this morning to the discussion. Lots of smart people, many of whom think they know what the next great energy technology is. I don't think any of us know. I have been in Congress now for four months, a little bit more. I—full disclosure, I came from the natural gas industry. I sold the equipment to independent producers all over the world. I think natural gas holds tremendous promise. I come from a State where ethanol is very important. It has made some real progress, too, so I cannot understand for the life of me why were are here talking about all these subsidies, all these handouts, all this taxpayer money going to help these industries as if we know best which technology will ultimately be the victor.

I heard and I agree with Congressman from Oklahoma, my good friend who says natural gas could be the next great transportation fuel. I part company from him, a piece of legislation like H.R. 1380 which says to the taxpayers, you will choose that technology. I understand like no one else how important getting that next right technology is, but I think consumers will get us there. I believe these markets will choose it. I understand that there are opportunities and challenges when you allow the market to work, but when I listen to decades and decades of folks at EPA and DOE talk about how they have got it all figured out and if we could just get one more grant. If we could just take a little bit more money from the taxpayers, we would cross that hurdle. And when you look 1380, look at its subsidies for natural gas vehicles, I hope natural gas

makes it. I hope it does it in its own way with the money from the industry. And that is really where I come back to.

I heard a question or I heard you say, Mr. Davis, today talk about there being a shortage of risk capital. Did it ever occur to you that that shortage of risk capital might be a direct result if we are taxing too much? That is my question for you this morning. The under—that there is a connection between. You said DOE made investments, but DOE doesn't have any money, right? Is that correct, Mr. Davis?

Mr. DAVIS. We only have funds that are provided by Congress.

Mr. POMPEO. By Congress and those monies come——

Mr. DAVIS. And those come from taxpayers.

Mr. POMPEO [continuing]. In every case from the taxpayers, United States taxpayers.

Mr. DAVIS. Absolutely.

Mr. POMPEO. So is it possible in your mind, is it possible that if we had not taken those monies and made a decision—a political decision about where to direct that money that we might be further along in finding out the next great technology?

Mr. DAVIS. Well, I don't believe so. I would say that the President has said there is no silver bullet. I have been working transportation area for a couple decades. If anyone knew the absolute one answer, you can believe that we would be concentrating on it.

Mr. POMPEO. I appreciate that Mr. Davis. I actually agree with you.

Mr. DAVIS. Yes.

Mr. POMPEO. This is not about this President. It is not about the President before him. This is about all of us trying to centralize the decision making process and trying to pick that silver bullet. I think it is a fool's errand. And I think 50 years of energy subsidy history demonstrates that quite clearly. Ms. Oge, do you think it is possible that if we had left more resources with the taxpayer over the last 50 years we would be further along in finding the next great American energy technology.

Ms. OGE. Well, you know——

Mr. POMPEO. Just—it is impossible.

Ms. OGE. Let me say this. I agree with you that we should not be choosing winners and losers when it comes to technology. And actually I just want to bring to your attention a very important program that the President just announced last year and another important program that we are going to announce this year is to reduce the fuel consumption from on road vehicles both light duty and heavy duty. So last May our office worked with the Department of Transportation jointly to have a national program 2016 will improve the fuel efficiency by 35.5 mpg equivalent.

Now the consumer will pay something. We are not telling them that—we are not telling the audience how to get there. We are not telling them to use hybrids or electrics. It is a neutral standard so companies will get there by using the best market innovations. And the consumer saves money. You know they will save about $3,000 from fuel saving.

Mr. POMPEO. I appreciate that. I do appreciate that. Consumers are going to pick the right solution. Today you can see it. They are driving less. Right? When gasoline is at 3.50 or 3.80 in Kansas or

$4.00, consumers will conserve. And I just—I have more faith in the American people and innovators than I do in Government bureaucrats.

Ms. OGE. And I do, too.

Mr. POMPEO. I think that is where we part company.

Ms. OGE. And I do, too, but there can be a hybrid we will both work together.

Mr. POMPEO. Yes, I think if we would lower marginal income tax rates, lower corporate tax rates and shrink the size of the EPA and the Department of Energy, we would get cheaper, better fuels much more quickly. And so those are just different world views. I appreciate that and I am going to work hard every day that that is the direction that this Congress goes. Mr. Chairman, I yield back my time.

Mr. WHITFIELD. Thank you, Mr. Pompeo. And at this time recognize Mr. Griffith from Virginia for 5 minutes.

Mr. GRIFFITH. Mr. Gruenspecht, am I correct in stating that your office has predicted that coal share of electricity in the generation mix will only decline slightly in the future?

Mr. GRUENSPECHT. We project the supply and the share of electricity——

Mr. WHITFIELD. Microphone?

Mr. GRUENSPECHT. I am sorry. Yes, we do foresee a decline. We see very few new coal plants being—few, if any, new coal plants being built, but the ones in use under existing laws continuing to be used.

Mr. GRIFFITH. And it is also correct to state that the electric needs of this country will increase?

Mr. GRUENSPECHT. They increase slowly in our reference case projection, about one percent a year.

Mr. GRIFFITH. OK. If you take an increase and a slight decrease in coal and no new power plants built with coal, we are still going to need more coal for power generation. Isn't that true?

Mr. GRUENSPECHT. I think we have slow, very slow growth in coal production—mostly going to power generation as you point out. Significant export potential for coal as well.

Mr. GRIFFITH. Because other countries don't have the regulations that restrict them that we have?

Mr. GRUENSPECHT. Well——

Mr. GRIFFITH. Wouldn't that be true? Yes or no? Sorry to——

Mr. GRUENSPECHT. I am not an expert in regulations in all other countries, but——

Mr. WHITFIELD. I think that is true.

Mr. GRUENSPECHT. Note that was a statement from the chairman, not from the witness.

Mr. GRIFFITH. Does the EIA see an achievable path for increasing our energy security without using coal if you completely did away with it?

Mr. GRUENSPECHT. Coal is a very significant domestic resource. Natural gas is a very significant domestic resource. Renewables are significant domestic resources. Oil is less of a domestic resource than the others. But again, there is significant oil reserves and resources as well. So I think there are—clearly, almost 100 percent of our coal use comes from domestic production.

Mr. GRIFFITH. All right, Mr. Davis, President wants to have a million electric cars by what—2015?

Mr. DAVIS. Yes, sir.

Mr. GRIFFITH. And do you anticipate that coal will be pretty much passé?

Mr. DAVIS. I don't believe so.

Mr. GRIFFITH. I don't believe so either and so therefore, in order to use the electric cars on the highway, we are going to have to have a lot of coal, aren't we?

Mr. DAVIS. Well, we would call the—when you plug your vehicle into the wall to charge it, we normally refer to that as the grid mix, which is a mix of coal, nuclear, renewables, all types of generation.

Mr. GRIFFITH. But right now that mix—and we are only four years away from 2015—would be more than 50 percent coal, would it not?

Mr. DAVIS. I am not an expert on our generation capacities by fuel, but I will take your word on that.

Mr. GRIFFITH. All right, it doesn't sound off base to say that?

Mr. DAVIS. No.

Mr. GRIFFITH. All right.

Mr. DAVIS. It is somewhere in the 40s.

Mr. GRIFFITH. Oh, it has moved into the 40s?

Mr. DAVIS. Yes.

Mr. GRIFFITH. I just know in my district it is still up in the high 70s. And so let me ask you some questions, ma'am, if I might. Would I be correct in assuming that the EPA supports the electric vehicles?

Ms. OGE. We support advanced technologies including electric vehicles and plug in hybrids because it really does offer a tremendous opportunity.

Mr. GRIFFITH. And you are aware of the situation that with coal we are in the 40s according to one gentleman?

Ms. OGE. Yes.

Mr. GRIFFITH. I have heard, you know different parts of the country different numbers. And I guess the problem is when you hear the President saying he wants a million cars, I am trying to figure out—and you hear the EPA talking about you know coal is bad and we—they are putting all these restrictions on coal. How do you expect informed citizens of the United States who know that a significant portion of our electric grid and I am sorry I don't have that term right is coming from coal production, but we are going to save the environment with electric cars. How do you expect informed Americans to reconcile those two positions and to think that eliminating coal and stopping permits and doing all this stuff is actually in the best interest of the environment and the economy long term?

Ms. OGE. Sir, I am here as an expert in the transportation field. I am not an expert on permits and secondary services——

Mr. GRIFFITH. But you would, you would—I understand that, but you can understand——

Ms. OGE. If I may, if I may——

Mr. GRIFFITH [continuing]. That as a reasonable person——

Ms. OGE. Yes.

Mr. GRIFFITH [continuing]. It would be difficult for other reasonable people to reconcile those two positions. Would you not?

Ms. OGE. So we believe that——

Mr. GRIFFITH. You think——

Ms. OGE [continuing.] Electric vehicles——

Mr. GRIFFITH [continuing]. Yes or no? Is it easy for people to understand that or is it not?

Ms. OGE. To understand?

Mr. GRIFFITH. To understand that on the one hand we want a million cars but we are still using somewhere around 50 percent, maybe in the 40s now, of our electricity coming from coal. Do you understand that it is incongruent for most people to grasp how we are going to have a million electric cars save the environment, put coal out of business, and have the two work together?

Ms. OGE. The assumption is that EPA's trying to put the coal industry out of business. I cannot comment on that. I cannot comment on that.

Mr. GRIFFITH. Yes, ma'am, that is my assumption. It seems to be evident in my district.

Ms. OGE. I cannot comment on that, sir.

Mr. GRIFFITH. I yield back my time.

Mr. WHITFIELD. Gentleman from Texas, Mr. Olson is recognized for 5 minutes.

Mr. OLSON. I thank the Chair and I would like to welcome our witnesses. Thank you for your patience today and thank you for your expertise. And I have got a couple of questions for you, Mr. Gruenspecht. And first of all I would just like to talk about some of your projections, EIA's projections of the past years. And earlier this year, President Obama said that, and this is a quote "oil production from federal waters in the Gulf of Mexico has reached its highest level in 7 years." Although this makes a great sound bite I believe that the full picture in the Gulf tells a different story. Can you tell me what EIA's projections in the Gulf production were for 2010?

Mr. GRUENSPECHT. Close to 1.6 million barrels a day for 2010. I think all the data, MMS collects all of the data from operators over time, so I am not sure that all of the end-of-year data is in yet. Probably close to 1.6 million barrels, approximately.

Mr. OLSON. OK, sir.

Mr. GRUENSPECHT. Excuse me, probably close to 1.6 million barrels a day.

Mr. OLSON. OK. Thank you, but did actual Gulf production meet those—your expectations?

Mr. GRUENSPECHT. I believe that actual Gulf production, it is well up close to 1.6 million barrels a day in 2010.

Mr. OLSON. But what were your projections? Was that 1.6 your projection?

Mr. GRUENSPECHT. I am not sure when the—I am not sure. The projection evolves over time as——

Mr. OLSON. OK. I appreciate that, sir. I have some numbers that show it is 20 percent less than you projected in 2007. That the actual——

Mr. GRUENSPECHT. 2007, OK.

Mr. OLSON. And again, that is the President saying that production is higher and again it is his policies didn't get that. We have actually had a reduction in production because we have loosed our expiration and the moratorium had a significant impact on that. I have got a question, another one for you, Mr. Gruenspecht and you, Mr. Davis, as well. And can you guys tell me what your agencies are doing to ensure that the small refiners can comply with the RFS mandates and that they are not being overly burdened? I mean, I have many, many refineries, small refineries in the district I represent and I—they are concerned about increase costs for compliance. They want to compete. Can you assure us that they can compete that these mandates aren't going to affect them negatively?

Mr. GRUENSPECHT. Well, I am aware that another part of the Department that is not represented here—the policy office—I recently completed a study on small refiners and I believe some of that information was sent to EPA. So maybe Ms. Oge would be able to——

Mr. OLSON. Ms. Oge, if you have comments, please.

Ms. OGE. Yes, yes. Actually you know Eastside actually required that small refineries are given an exemption all the way through 2010, December of 2010. And then the Department of Energy was required to undertake a study and advise EPA's administration how to proceed with additional exemptions of small refineries. DOE completed that study I believe in 2009. They commended new exemption. Congress asked DOE to go back and take another look at that. So last week Secretary Chu sent Administrator Jackson a letter outlining a number of refineries that DOE is recommending to be exempted based on actual data. And we are in the process to notify all those refineries by the end of the week.

Mr. OLSON. Can I have a copy of that list?

Ms. OGE. This is two year's exemption from RFS.

Mr. OLSON. Yes, ma'am. Can I get a copy of that list? Because again, I have got many, many refiners would qualify on my district.

Ms. OGE. Would be glad to provide it to you.

Mr. OLSON. Thank you very much. I appreciate that. And I have another question for you, Ms. Oge. Can you assure the members of this committee and my constituents back home that EPA's waiver for E–15 blends in vehicles will not cause excessive wear and tear on the vehicles?

Ms. OGE. Sir, we understand the concerns that have been expressed and what I can assure you is that the findings of the waiver were based on a very robust and sound science. So we are very confident that E–15 will not damage any vehicle 2001 and newer. However, we have concern about off-road equipment and we are concerned about altered vehicles. And we are taking steps to minimize misfueling and putting labeling, appropriate labeling on across the country.

Mr. OLSON. Thank you, and one follow-up question. Why was the exemption for vehicles model years before 2001? Why did EPA give that exemption?

Ms. OGE. The exemption—sir, right now what we are saying is that for 2001 and newer, E–15 will not under—you know will not damage emission control systems. So we are very confident the

newer vehicles can use E–15 gasoline blend. But for older vehicles, 2001 and older and older equipment, both lack of data and engineering judgment about how those engines were built gives us a lot of concern. So we are not allowing at this point E–15 to be used for those for those vehicles.

Mr. OLSON. Appreciate that and again I represent the 22nd Congressional District of Texas. There is a huge off-shore recreation, private recreation industry right in the shadow of the Johnson Space Center and they have been really hurt by the impact of E–10 on those marine engines, those outboard engines. And I don't want that to happen with our vehicles, so thank you for your time.

Mr. WHITFIELD. Gentleman from California is recognized 5 minutes.

Mr. WAXMAN. Thank you, Mr. Chairman. Ms. Oge, you have been working closely with the National Highway Traffic Safety Administration and the California Air Resources Board to develop vehicle, tailpipe, and efficiency standards for 2017 to 2025. These standards will reduce our oil dependence through increased vehicle efficiency and use of alternative fuel and advanced technology vehicles.

Last September, NHTSA and EPA released the technical analysis of the potential vehicle technologies, fuel savings, and emissions reductions, and costs of various alternatives. Could you please describe the results of this analysis in terms of the potential efficiency improvements and cost savings for consumers?

Ms. OGE. I will, thank you, sir. Last September, we put forward a document over 300 pages document based on an extensive dialogue with major car companies, major OEM suppliers, but also experts in the Department of Energy, laboratories, academics and looking at extensive peer review data, plus work that we have done in our office, Department of Transportation. And as you know we are working——

Mr. WAXMAN. Give me the answer to that question of the potential efficiency improvements and cost savings to consumers.

Ms. OGE. So it is three—we looked from three percent to six percent annually from 2017 to 2025 and the cost for those type of improvements were anywhere from $900 to $3,400 for six percent. But the payback to the consumer from fuel savings could be as much as $7,000.

Mr. WAXMAN. You talked about the work that went into this analysis. You said you talked to the auto industry. Did you look at recent peer reviewed literature?

Ms. OGE. Yes, we did.

Mr. WAXMAN. OK. Technical staff experienced auto—technical staff of experienced automotive engineers, used most recent technical information, and many peer reviewed technical papers and reports, commission new studies. You also talked to DOE about forecasting work for battery costs, right?

Ms. OGE. Yes.

Mr. WAXMAN. Right, oK. I understand that EIA has also done some analysis of potential vehicle standards. Did EIA talk to you about their analysis and do you know if they spoke with NHTSA?

Ms. OGE. No, actually I spoke with a colleague from EIA yesterday about this analysis.

Mr. WAXMAN. OK.

Ms. OGE. I don't know if they spoke with NHTSA.

Mr. WAXMAN. OK. Are the EIA results consistent with NHTSA EPA analysis?

Ms. OGE. They are not.

Mr. WAXMAN. They are not. I think we should make sure that all of these analyses used the best available data and incorporate realistic assumptions. For example, EIA hasn't released the details of the analysis but it appears that EIA's analysis may use quite different assumptions from EPA and NHTSA's analysis about how consumer's value improved fuel economy and the resulting savings at the pump when they make a decision about buying a new vehicle. This is a critical assumption in getting it right and they have a big impact on the results. As you said earlier in the hearing, Mr. Gruenspecht, right now we are seeing the effect of the price of gasoline on what consumers buy. The auto industry has just had a great month. GM sales went up by 27 percent and the industry is telling us that gas prices are driving consumers to choose more efficient cars. Don Johnson, GM's Vice President for U.S. Sales said "rising fuel prices have led many to rethink vehicle of choice."

Last time gas prices went up over $4.00 a gallon, the American automakers weren't prepared. This time thanks in part to the new emphasis on efficiency they have an expanded and attractive lineup of smaller cars and more efficient trucks and SUV's and sales and profits are up. Ms. Oge, is what we are seeing now consistent with your analysis of how the 2012, 2016 standards would affect the auto industry? Did you project that more efficient lower polluting vehicles would actually increase sales?

Ms. OGE. Yes, we did. Actually for our 2012, 2016 Program that was announced last year, we estimated about 600,000 to 800,000 vehicle sale increase due to that regulation. And clearly, sir, as you know the car companies have supported this analysis.

Mr. WAXMAN. Well, it makes sense if owning a new car will cost less because fuel savings outweigh any price increase people have more money to spend. And we certainly need to have a good understanding of this as NHTSA and EPA develop a new round of standards. I had some other questions, but Mr. Chairman, my time is expired, so I will cease.

Mr. WHITFIELD. Thank you. Mr. Gardner, you are recognized for 5 minutes.

Mr. GARDNER. Thank you, Mr. Chairman, and thank you to the witnesses for your time today. I appreciate the opportunity to learn from you and wanted to follow up, Ms. Oge, with something you had said, Ms. Oge at the beginning of your statements regarding cellulosic ethanol. And I think you had said it wasn't developing quite as quickly as the administration or the EPA had thought. I wondered if you could go into that a little bit more and the reasons why.

Ms. OGE. In both my oral and written statement what I said is that it was not developed, actually then what the Congress intended back in 2007 when ESA was signed into law where the expectation was 100 million gallons of cellulosic fuel in 2010, and 250 million gallons. But also, Congress I believe recognized the innovative nature of that industry and how new it is. So they gave us the

opportunity to adjust those levels which we have done for 2010 and 2011.

And as I said earlier there are two major issues that we are seeing. One is capital investment. You know Department of Energy and Department of Agriculture is investing in a number of companies but what they really need to be on Government investments so we are seeing limited capital investment for some of the companies. And the second is they are learning a lot lessons as they are going so there have been a lot of technological challenges to move from a small R&D, you know pilot project to a commercial project. But also we have been discussing this issue with a number of companies including some oil companies that are making investments on these advanced biofuels. So we are moderately optimistic that this industry is going to come up with the volumes that Congress expected in 2007 time frame.

Mr. GARDNER. Thank you. And recently the GAO, Government Accountability Office recent—issued a report a couple of months ago as a requirement of the last time the debt ceiling was increased—a report that identified duplication, inefficiencies in the Government. One of the areas that that report talked about was the volumetric ethanol excise tax credit. And are you familiar with that report?

Ms. OGE. I am not.

Mr. GARDNER. OK. Then I can submit that question for the record then. Wanted to just follow-up a little bit to more on parity across the tax code when it comes to various kinds of alternative fuels. Is there do you believe a parity in the tax code when it comes to alternative fuels and if not, could you explain why some get more credits than others?

Ms. OGE. Sir, that is not my area of expertise, so I cannot comment.

Mr. GARDNER. And I don't know if——

Mr. DAVIS. I would just make one comment and that is you know when you talk about parity, I would say that the tax incentives are greatly different. For instance you mentioned the tax incentive for ethanol. That is a great—that incentive is greatly different than the $7,500 tax incentive when you buy an electric vehicle. So there are great differences. I don't know of anyone who has done a comprehensive study that looked at those various incentives to compare them.

Mr. GARDNER. Thank you. And Mr. Chairman, I yield back my time.

Mr. WHITFIELD. Thank you. This time recognize the gentleman from Illinois, Mr. Shimkus, for 5 minutes.

Mr. SHIMKUS. Thank you, Mr. Chairman. I apologize for being late. The electric mix of—in electricity generation today as I understand it is coal 45 percent, nuclear 20, natural gas 23, hydro seven, and renewable 3.6. Just to get that on the record because my colleague Congressman Griffith and I obviously are big coal supporters and it still has a major impact and it will. There is an expectation that electricity creates, without even the electric fuel debate, will increase 30 percent by 2035. I think that is EIA's estimation. Anyone confirm that or——

Mr. GRUENSPECHT. We are a little bit lower than that.

Mr. SHIMKUS. And what is your——

Mr. GRUENSPECHT. In the 20s. In the 20s.

Mr. SHIMKUS. So and that is without a massive increase in electric vehicles?

Mr. GRUENSPECHT. Right. Right.

Mr. SHIMKUS. Well, at least a 20 percent increase which will speak to the argument of needing more generation not less generation. Even with efficiencies as some people would profess, we are going to need more generation. I would wish that the administration would look at empowering new power plants, looking at older facilities, and moving to more supply in this debate. The 2007 debate on the Energy Security Act is a curious debate because we are in a very similar position as we are today: high gas prices, the reality and political reality was we were pushing for more supply. My friends on the other side were not—the only way they could do it environmentally was go through and hope that the cellulosic science would be there to meet this new demand. It is not there yet. So it brings me the question is for EPA what about raising—there is a debate based upon the ethanol side, much discussion on the blend wall and or a second generation being considered to meet the next generation renewable fuel portions. What is your position on that?

Ms. OGE. For 2011, there is as you may know we lower the volume from 250 million gallons to 6.6. But what we did not do, we did not lower the advance biofuel.

Mr. SHIMKUS. And that is what I meant to say. Then——

Ms. OGE. Yes, exactly. It is because today if clearly if you look at various sources of biodiesel we believe the capacity is there to make up for the difference of the 200 million gallons of cellulosics. And I believe the second question that you ask has to do with the blend wall. We believe that the blend wall, the blend wall meaning that by 2014 time frame we believe 100 percent approximately of the fuel won't be—will contain 10 percent of ethanol. So the question then is how do you distribute the remaining of the renewable fuel mandate into the marketplace? And that is where we believe the E–15 it can play a——

Mr. SHIMKUS. Yes, and let me reclaim my time just to get some other work done here. Mr. Chairman, I would like to submit for the record a couple letters: one from the Methanol Institute on the Economic Impact of the Methanol Economy On an Open Field Standard; also from the—from Admiral—former Admiral Blair who is a member of the Energy, Security, Leadership Council member on electric vehicle issues. Also, comments for the record submitted by Propel Energy, an ethanol company in the Bay area of California and very supportive of that. If I may for the record.

Mr. WHITFIELD. Without objection.

[The information follows:]

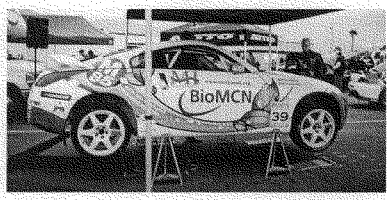
Economic Impact of Methanol Economy

A Look at Potential Benefits of the Open Fuel Standard Act

The Open Fuel Standard Act

The Open Fuel Standard Act is an innovative bill that will dramatically reduce the strategic importance of gasoline and oil to our economy while greatly accelerating the development and deployment of alternative fuels and technologies for transportation. The legislation would require that most new cars enable fuel competition, specifically by being capable of operating on another fuel in addition to, or instead of, gasoline – whether natural gas, electricity, bio-diesel, alcohol fuel, hydrogen or something else. An OFS creates a marketplace where these energy technologies can compete and breaks the virtual transportation fuel monopoly of oil; a fuel we know harms both our national security and our nation's health, with inflated costs that are a detriment to our economic growth. Widespread deployment of fuel competitive vehicles will increase the resilience and flexibility of our economy by enabling consumers to make an on the fly choice to switch fuels based on comparative economics at the pump, instead of policy that attempts to pick any one winner in lieu of letting the marketplace drive innovation.

Put simply, the Open Fuel Standard Act is an 'all of the above' energy policy that is a solution to both the unaffordable cost of gasoline and the unsustainable hold that oil has on our economy. It is a pathway to a clean energy future, which starts with employing proven domestic resources and technologies and creating greater domestic security. The OFS will enable an economy fueled by innovation in the marketplace by making vehicles a platform where fuels can compete, which will continue the advancement of sustainable fuels by creating demand and a market that can support infrastructure deployment.



As an example of the economic benefits of the OFS, we have put together this scenario of the economic impact of widespread adoption of alcohol flexible fuel vehicles from replacing just a portion of our current dependence on gasoline with clean burning methanol, one facet of this multi-platform legislation.

Alcohol Fuel's Impact with the OFS

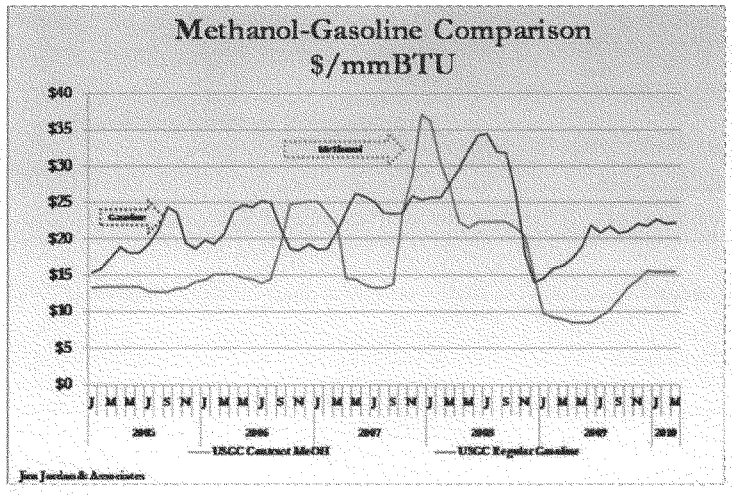
Alcohol fuels, such as methanol - made from natural gas, biomass, agricultural waste, coal and, perhaps in the future, recycled CO2 - and ethanol are cleaner-burning replacements that require only slight modifications to current engines to power our vehicles, and they do not require large investment in new infrastructure due to their similarities with gasoline. For around $100 per car – less than half of one percent the cost of the average car - automakers can manufacturer a vehicle where liquid fuels can compete on a single platform. A flexible fuel vehicle can operate on gasoline, and blends of ethanol and methanol up to 85%, which forces each fuel to compete for a consumer's dollars based on convenience, environmental benefit, and most importantly, cost. The deployment of these vehicles means consumer demand for alternative fuels will continue to grow as millions more vehicles will be able to operate on them, and the market will be able to economically invest in infrastructure to meet this demand without massive expenditures by the government.

The methanol fueling infrastructure in particular will grow quickly as costs for the clean fuel are very low, the industry has large production capacity to meet demand and the installation cost for a methanol fueling pump is minor compared to other technologies, with the average pump only about $60,000[1]. FFV drivers will immediately be able to make use of methanol, which at wholesale currently sells for $1.04 a gallon–without any subsidies. Accounting for state and federal taxes, distribution, and retail mark up, M-85 would retail for $1.83 a gallon. As methanol has less BTUs per gallon than gasoline, a consumer would use $3.19 of M-85 to travel the same distance – well below the current national average of $3.95 for regular unleaded[2].

---

1 'Methanol Refueling Station Costs' by EA Engineering, Science and Technology February 1, 1999.

2 AAA Daily Fuel Gauge (May 1, 2011) - http://fuelgaugereport.aaa.com/?redirectto=http://fuelgaugereport.opisnet.com/index.asp



Methanol Savings vs. Gasoline

For every 10% of the gasoline that we currently use that is replaced by methanol, just over 75 million gallons of methanol would be consumed each day at a cost of $110.6 million to drivers – compared to the $149.3 million for the same amount of gasoline at current retail prices. This would create an average savings of $38.7 million a day for consumers, and over $14.1 billion a year. Each household would be benefited by over $1,000 average cost savings every year if they filled up with M-85 every day.

Methanol's price advantage over gasoline is apparent in the above graph of historic prices. The most common feedstock for making methanol today is natural gas, requiring only 100 cubic feet of natural gas to produce one gallon of methanol. Methanol is also the most effective and immediate way to take advantage of the price difference between natural gas and crude oil prices. In fact, researchers from Massachusetts Institute of Technology completed a study entitled "The Future of Natural Gas" in which they determined that methanol was "the liquid fuel that is most efficiently and inexpensively produced from natural gas," due its mature production technology and the affordability of deploying FFVs capable of running on all alcohol fuels.

To replace 10% of our current gasoline demand we would use about 2.6 trillion cubic feet of natural gas each year. At a current cost of $4.50 per thousand cubic feet for natural gas, that would mean over $11 billion worth of natural gas would be consumed. This represents a mere 10% of our current annual production of natural gas in the U.S. – which is expanding with new discoveries and technologies - and allows us to conserve consumer money, tap into domestic resources, and reduce harmful engine emissions like particulate matter, cancer causing agents and smog that come from gasoline.

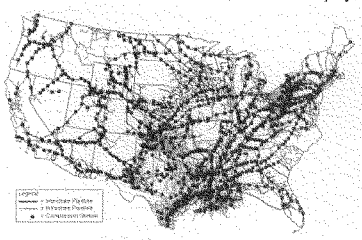
Methanol also benefits from polygeneration – in that anything that is, or ever was, a plant can be used to produce this biodegradable fuel. Natural gas, coal, biomass, agricultural waste, landfill gas, industrial waste and even CO_2 itself can all be used for methanol production based on existing mature technologies, as well as cutting edge science. The U.S. has abundant supplies of all of these resources available to meet our transportation needs, and methanol serves as a gateway technology to advanced biofuels adoption. Renewable methanol fuel – and derivative fuels such as bio-diesel and bio-dimethyl ether (DME) – can also help efficiently and economically achieve the U.S. Renewable Fuel Standard targets.

Methanol Production in the U.S. and Jobs Impact

The number of permanent jobs in present-day large scale methanol from natural gas production plants is about 120 jobs per facility, producing 1.7 million gallons of methanol per day. Thus, displacing 10% of the gasoline market with domestically-made methanol would create between 5,000-7,000 highly-skilled, high-paying jobs in engineering, chemistry and advanced sciences. Using the EIA's jobs multiplier for indirect jobs in the communities of these facilities, it is estimated that another 70,000–90,000 jobs would be created as well as tens of thousands more in the natural gas supply sector.

For methanol manufacturing plants that use biomass, researchers at MIT average that there are 50 permanent jobs per biomass-to-methanol plant - due to their generally smaller scale of about 160,000 gallons a day. Additionally, to satisfy the biomass collection requirements for these facilities if 10% of gas were replaced, researchers at MIT cited that over 300,000 jobs would be created around the country. As with most biofuels, these are primarily rural jobs that can help bring vitality back into small and rural towns decimated by the economic downturn and aid in development of biomass in the heartland and timber regions of America.

With the demand created by the Open Fuel Standard Act, during the initial construction phase for these facilities, a large economic benefit would be immediately realized by communities. About 40% of the cost of a new methanol plant is labor for installation, with some of the largest new plants costing upwards of $1.2 billion each. With more than 40 of these plants needed to offset gasoline consumption by 10% with all domestically produced fuel, there would be up to $20-22 billion of short-term, immediate investment and then over $7 million in payroll at each facility each year.



This would also be distributed production of fuel where regions could tap into the resources that are most abundant in their area – natural gas in Texas, Louisiana, and Colorado; timber in the Northwest, agricultural waste in the Heartland, and landfill gas by our major cities. And with our transportation fuel being produced in multiple regions, our economy would be more resistant to price spikes and displacement caused by production shut downs in any one area – like currently when hurricanes impact the Gulf Coast.

The OFS Big Picture

The Open Fuel Standard Act of 2011 offers a way to not only reduce our dependence on foreign oil, but also jumpstart our own domestic energy economy while reducing harmful emissions and keeping more of our money in the U.S. The accelerated deployment of alternative fueling vehicles will spur innovation in the transportation sector. And instead of 'picking winners and losers' like other energy strategies, the OFS is a no-cost piece of legislation that will only pick one loser, our dependence on gasoline, and let marketplace and consumer demand drive the selection of technologies and fuels that will succeed in the long-term.

This bill is truly an ''All-of-the-Above' energy strategy that will help put Americans back to work creating the energy that drives our economic growth. The technologies included in this legislation represent the full spectrum of alternative fuels and vehicle technologies, promoting all vehicles that can run on something other than gasoline. The above forecasts for job creation and economic impact from methanol represent only one piece of the larger puzzle – and tens of thousands of more jobs and billions more in economic benefit can be realized by implementation of this legislation, all while increasing our energy security and strengthening our technology and innovation sectors.

The economy and American consumers are calling out to lawmakers to take action that addresses the rapidly increasing cost of transportation and the harmful health effects we are exposed to by gasoline additives and emissions. The Open Fuel Standard Act will force gasoline to compete at the pump with other technologies which are cleaner and more affordable, and decrease the strategic importance of oil and its numerous harmful effects on our economy and domestic security.

Testimony of Admiral Dennis Blair
United States Navy, Retired
Former Director of National Intelligence

Former Commander in Chief, U.S. Pacific Command

Member, Energy Security Leadership Council Member
Before the U.S. House
Subcommittee on Energy and Power
May 5, 2011

Good morning, Chairman Whitfield, Ranking Member Rush, and members of the Committee. I would like to thank you for giving me this opportunity to speak to you regarding the very real and pressing threats posed by our dependence on petroleum, and the equally real opportunities before this Congress to address those threats.

It has been clear to me for decades that our addiction to oil poses a significant national security threat, and it is one that has taken us far too long to recognize and confront. Oil dependence distorts our foreign policy, strains our military and intelligence resources, and puts our young men and women in uniform in danger. Recent events in Egypt and Libya only serve to underscore the vulnerability of our position—a position we have allowed ourselves to fall into, but from which we also have the power to extricate ourselves.

The heart of the problem lies in the Persian Gulf, which is home to the five countries with the greatest proven conventional petroleum reserves. When I first joined the Navy in 1968, the entire U.S. military presence in that part of the world was a one-star Navy admiral and two destroyers that would deploy to hold simple exercises with Gulf countries. The Persian Gulf was a rare duty station for members of the armed forces.

Today, we have three four-star generals, a dozen three star generals and admirals, aircraft carrier battle groups, and more than 100,000 troops in the region.

How did we get in this fix?

In the late 1970s, two serious threats to Persian Gulf oil were identified by the Carter administration, which became seized by the issue. The first was a potential Soviet invasion from the north into the oil regions around the Gulf, a concern heightened by the Soviet occupation of Afghanistan. The second was an aggressive and fundamentalist Iran, which was led by a regime that had permitted and then exploited the takeover of the American Embassy in Tehran.

In response, the Department of Defense created the Rapid Deployment Joint Task Force, a planning headquarters and contingency unit that could quickly deploy to the Gulf to defeat a major land invasion. In 1983, as part of its general military build-up against the Soviet Union, the Reagan administration upgraded this task force to a regional command—like the European Command and the Pacific Command I had the honor to lead for several years. It was called Central Command.

Central Command had full-time responsibility for U.S. interests in the region. So every commander of Central Command has had the mission of ensuring the security of oil from the Persian Gulf since that time.

In response to the 1987 attacks on tankers by Iran and Iraq as part of their war, the United States gave Kuwaiti tankers U.S. registry and provided naval escorts for them as well as for tankers of allied nations. By 1990, America had a functioning military command structure, had deployed major forces to the Gulf both for exercises and for combat operations, and—most importantly—had firmly established a military commitment to oil security.

U.S. security policy in the Gulf since then has been in the headlines, familiar to everyone, and dominated by the use of major military force:

- Operations Desert Shield and Desert Storm in 1991 to expel the Iraqis from Kuwait
- The maintenance of Air Force and Navy air wings in the Gulf on a full time basis to enforce no-fly zones in the north and the south of Iraq
- The stationing of a full time Army brigade in Kuwait
- Operations Enduring Freedom (Afghanistan) and Iraqi Freedom
- U.S. and allied intervention in Libya

Military engagement on this scale halfway around the world is expensive in dollar terms, and even more importantly, in the lives of the casualties of our interventions there. And the extensive military deployments to the region have other negative effects. Because we need bases and other forms of support, we sometimes must support regimes whose actions and values are not consistent with ours, or that are working against us in other ways and on other issues.

Even worse, the heavy military involvement in the region has made us the target for fundamentalist violence, which we have seen in the form of attacks against our armed forces themselves and against other Americans and their property in the region, and, finally, devastating attacks against the United States itself.

It was watching this spiral of more and more military involvement with unstable and non-representative regimes in a violent and hostile region of the world that led me, after I retired from the Navy, to join the Energy Security Leadership Council. This group of business leaders and retired admirals and generals all believe that ending our dependence on imported petroleum represents the best—the only—long-term solution to the threats we face.

I was proud to serve on that council with men like Frederick W. Smith, the Chairman, President and CEO of FedEx and General P.X. Kelley, the former Commandant of the U.S. Marine Corps. During my time on the Energy Security Leadership Council, I learned more about the threats oil dependence pose to our economy and our national security.

And then I was called back into service to my country as the Director of National Intelligence. When I became DNI, I saw raw intelligence and analysis, both classified and unclassified, that convinced me that the challenge of energy security was even more pressing and more difficult than I had known previously.

I've already talked about the Middle East. Let me briefly review some of the other areas in which oil is located in the world. Central Asia, around the Caspian Sea, is another area of large oil and natural gas deposits that is critical to the world's oil supply.

Access to the region is difficult, involving long pipelines that run through politically volatile areas like Georgia and Azerbaijan. The countries in the region often have at best immature governments, often authoritarian and unstable, and there is intense competition by Russia, Iran, and China, who mistrust the United States and have little interest or stake in working with us on assured access.

Military operations in these countries are as difficult and dangerous as those in the Middle East. One exercise I recall several years ago involved the longest range parachute drop that had been conducted in history, from the Eastern United States to Kazakhstan. This is not a region that will be a reliable and friendly oil production source for the United States and its friends.

You can see why my time as Director of National Intelligence confirmed even more strongly my belief that we must change our energy security path. Our enemies know that we need oil, and they are determined to exploit this strategic vulnerability.

The United States is the world's largest oil consumer, accounting for more than 20 percent of global demand. Americans consume approximately 19 million barrels of oil each day.

At the crux of America's oil dependence is the energy demand of the transportation sector. At roughly 14 million barrels per day, our transportation sector alone consumes more oil than any national economy in the world. Our cars and trucks are 94 percent reliant on oil-based fuel for their energy, with no substitutes immediately available in anything approaching sufficient quantities.

There is a solution. The lynchpin of any plan that is serious about confronting oil dependence must be the transformation of a transportation system that today is almost entirely dependent on petroleum. The solution can be found in something that nearly every single one of us uses every day. The lithium ion batteries that power our cell phones and laptop computers can one day form the nucleus of an electrified transportation sector that is powered by a wide variety of domestic sources: natural gas, nuclear, coal, hydroelectric, wind, solar, and geothermal. No one fuel source—or producer—would be able to hold our transportation system and our economy hostage the way a single nation can disrupt the flow of petroleum today.

Electricity represents a diverse, domestic, stable, fundamentally scalable energy supply whose fuel inputs are almost completely free of oil. It would have clear and widespread advantages over the current petroleum-based system:

1) **Electricity is Diverse and Domestic:** Electricity is generated from a diverse set of largely domestic fuels. Among those fuels, the role of petroleum is negligible. In fact, just 1 percent of power generated in the United States in 2008 was derived from petroleum. An electricity-powered transportation system, therefore, is one in which an interruption of the supply of one fuel can be made up for by others.

This ability to use different fuels as a source of power would increase the flexibility of an electrified light-duty vehicle fleet. As our national goals and resources change over time, we can shift transportation fuels without having to overhaul our transportation fleet again. In short, an electrified transport system would give us back the reins, offering much greater control over the fuels we use to support the transportation sector of our economy.

Moreover, while oil supplies are subject to a wide range of geopolitical risks, the fuels that we use to generate electricity are generally sourced domestically. All renewable energy is generated using domestic resources. We are a net exporter of coal, which fuels about half of our electricity. Although we currently import approximately 16 percent of the natural gas we consume, more than 90 percent of those imports were from North American sources (Canada and Mexico) in 2008. And in fact, recent advancements in the recovery of natural gas resources from unconventional reservoirs like shale gas, coal bed methane, and tight gas sands have led to wide consensus that our domestic undiscovered technically recoverable reserves are well in excess of 1,000 trillion cubic feet. We do import a substantial portion of the uranium we use for civilian nuclear power reactors. Forty-two percent of those imports, however, are from Canada and Australia.

2) **Electricity Prices are Stable:** Electricity prices are significantly less volatile than oil or gasoline prices. Over the past 25 years, electricity prices have risen steadily but slowly. Since 1983, the average retail price of electricity delivered in the United States has risen by an average of less than 2 percent per year in nominal terms, and has actually fallen in real terms. Moreover, prices have risen by more than 5 percent per year only three times in that time period.

   This price stability, which is in sharp contrast to the price volatility of oil or gasoline, exists for at least two reasons. First, the retail price of electricity reflects a wide range of costs, only a small portion of which arise from the underlying cost of the fuel. The remaining costs are largely fixed. In most instances, the cost of fuel represents a smaller percentage of the overall cost of delivered electricity than the cost of crude oil represents as a percentage of the cost of retail gasoline. Second, although real-time electricity prices are volatile (sometimes highly volatile on an hour-to-hour or day-to-day basis), they are nevertheless relatively stable over the medium and long term. Therefore, in setting retail rates, utilities or power marketers use formulas that will allow them to recover their costs, including the occasionally high real-time prices for electricity, but which effectively isolate the retail consumer from the hour-to-hour and day-to-day volatility of the real-time power markets.

   By isolating the consumer from the price volatility of the underlying fuel costs, electric utilities would be providing to drivers of grid-enabled vehicles (GEVs) —vehicles propelled in whole or in part by electricity drawn from the grid and stored onboard in a battery—the very stability that oil companies cannot provide to consumers of gasoline.

3) **The Power Sector has Substantial Spare Capacity:** Because large-scale storage of electricity has historically been impractical, the U.S. electric power sector is effectively

designed as an 'on-demand system.' In practical terms, this has meant that the system is constructed to be able to meet peak demand from existing generation sources at any time. However, throughout most of a 24-hour day—particularly at night—consumers require significantly less electricity than the system is capable of delivering. Therefore, the U.S. electric power sector has substantial spare capacity that could be used to power electric vehicles without constructing additional power generation facilities, assuming charging patterns were appropriately managed.

4) **The Network of Infrastructure Already Exists:** Unlike many proposed alternatives to petroleum-based fuels, the nation already has a ubiquitous network of electricity infrastructure. No doubt, electrification will require the deployment of charging infrastructure, additional functionality, and increased investment in grid reliability, but the power sector's infrastructural backbone—generation, transmission, and distribution—is already in place.

Based on these and other advantages, a wide array of automakers are beginning to introduce vehicles that draw motive power from the electric grid, or grid-enabled vehicles (GEVs). There are important differences in drivetrain architectures, with some vehicles relying solely on battery power (electric vehicles, or EVs) and others augmented by liquid fuels as well (plug-in hybrid electric vehicles, or PHEVs). All told, automakers worldwide are developing dozens of plug-in hybrid and electric vehicles. By 2013, more than 40 models could be available to consumers.

From just a handful of units introduced in 2010, the industry is beginning to scale up. Announced North American production capacity will exceed 100,000 vehicles in 2012 and 350,000 by 2014. (These figures do not include trucks.) Additional volumes will reach the U.S. market from OEM plants overseas, particularly in the next two years.

High penetration rates of GEVs could radically minimize the importance of oil to the United States, strengthening our economy, improving national security, and providing much-needed flexibility to our foreign policy while clearing a path toward dramatically reduced economy-wide emissions of greenhouse gases. No other alternative to petroleum can claim these widespread advantages.

Winston Churchill once famously remarked, "On no one quality, on no one process, on no one country, on no one route, and on no one field must we be dependent. Safety and certainty in oil lie in variety and variety alone." Today, safety and security still lie in diversity—but diversity beyond any one fuel source, especially oil.

The logical next question is how we can successfully devise and deploy an electrified transportation system. Here's what we need to avoid: it has now been more than 10 years since traditional hybrids were first introduced in the United States. And despite government supports and record high gas prices for part of that time, there are still only 1.5 million of them on the road out of more than 250 million light-duty vehicles in the fleet.

We cannot let electric vehicles turn into another niche product. We cannot allow their use to be limited to the environmentalists and technological enthusiasts who will buy those first waves of

them. To make our nation's investment worthwhile—and, more importantly, to truly combat our oil dependence—we must put ourselves on the pathway toward millions, then tens of millions, and then hundreds of millions of electric cars and trucks.

It is not as simple as flipping a switch. Electrification on a mass scale is an enormously complex undertaking. The issue is not simply one of putting electric cars into showrooms. At the most basic level, the first commercially available EVs and PHEVs will be significantly more expensive than their internal combustion engine counterparts. The existing tax credits help offset that cost, but they hardly represent a transformative policy framework that will give consumers the necessary confidence to adopt a fundamentally new technology. For electrification to appeal to consumers, it will truly 'take a village.'

For example, drivers will want to know that installing a charger in their garage will be a seamless and simple process that isn't bogged down by weeks of red tape. For EV drivers, they will want access to some amount of public charging infrastructure so that they can feel confident as they complete a Saturday full of errands and shopping—or take the family on the highway for the great American road trip.

The proactive engagement and support of utilities will be absolutely critical. Smart charging will make EVs and PHEVs an asset for the grid, but dumb charging will make them a liability. One analysis by EPRI found that plugging in just one PHEV to charge at 220 volts overloaded 36 of 53 transformers examined during peak hours and 5 of 53 transformers during off-peak hours. We are all excited about the benefits of using EVs and PHEVs to fill valleys in utility load curves, but this will only work if consumers have the ability to receive information that incentivizes them to charge their cars at night. Yet, most public utility commissions don't encourage or allow time-of-use pricing.

The bottom line is that, for this technology to succeed, the vehicles will need a network of support—both in terms of regulations and infrastructure. Without that, they will be relegated to niche product status. Consumers will have poor experiences, many of the 3,000 utilities in the U.S. will play an absentee role—at best—in the process, and we will have invested billions of dollars in a battery industry that finds stronger roots in Europe (where fuel prices are higher) and in China (where the public imperative is already stronger). We have to recognize that such a network of support does not currently exist in most places in the U.S.

That is where legislation like the recently re-introduced Electric Drive Vehicle Deployment Act of 2011 comes in.

This bill—sponsored by Representatives Biggert, Markey, Eshoo, and McNerney—would initiate a competition in which specific geographic areas would vie to be selected as large-scale deployment communities: areas in which all of the elements of an electrified transportation system are deployed simultaneously and at scale, thereby providing a crucial first step toward moving electrification beyond a niche product into a dominant, compelling, and ubiquitous concept. These deployment communities would be selected on a competitive basis. The most attractive regional bids would demonstrate a clear path to successful integration of GEVs, including:

- A supportive regulatory environment that facilitates concepts like utility investment in upgraded physical and IT assets; time-of-use pricing; and a seamless process for permitting and installing level II EVSEs in residential consumer garages.

- Support and participation from a broad swath of stakeholders, including state and local governments, utilities, utility regulators, large local employers, universities and others.

- A diversity of business plans, allowing innovators and entrepreneurs to explore the most effective and efficient models for deployment.

In sum, successful bids should be those in which all of pieces have been brought together—autos, infrastructure, favorable regulatory environment, interested consumers—to ensure that large scale deployment of GEVs has the best chance of success.

Once selected, deployment communities would be eligible for amplified, targeted, and temporary financial incentives for consumers, infrastructure providers and utilities. We believe this approach is critical to avoiding the pitfalls of the past. These deployment communities would:

1) **Drive Economies of Scale:** Concentrating resources in a limited number of geographic areas will allow participants in the GEV value chain to take advantage of economies of scale, particularly with respect to the deployment of charging infrastructure. Utilities will incur fixed costs to support the operation of GEVs; those costs will be more affordable if spread over a greater number of vehicles. Power providers also can reduce the cost of charging infrastructure through economies of scale. While it is unclear how many public vehicle chargers will be necessary for a GEV transportation system to operate smoothly in a given community, it is clear that some public charging facilities will be needed. Previous pilot studies demonstrate that the cost of installing charging facilities can be reduced significantly when groups of facilities are installed at once. Furthermore, these geographic concentrations will stimulate demand for grid-enabled vehicles at a rate that is likely to be far greater than if the vehicles are simply purchased by early adopters scattered around the United States. Early on in the process, this higher level of demand will simply be the result of magnified consumer incentives. Subsequently, as individual metropolitan areas gain exposure to GEVs and confidence increases, adoption rates should be measurably expedited.

2) **Demonstrate Proof of Concept Beyond Early Adopters:** By demonstrating the benefits of grid-enabled vehicles in a real world environment, this deployment plan will make consumers, policymakers and industry aware of the tremendous potential of electrification of transportation. In general, consumers are probably unaware that GEVs have evolved to the point where they can meet most individuals' daily driving needs. In addition, electric drive vehicles generally have faster acceleration and operate more quietly than internal combustion engine vehicles. They hold out the promise of offering drivers a wide range of features, based on the electronic package in the vehicle, that are beyond our imagination today in the same way that iPhone applications would have been beyond our imagination a decade ago. The problem is that consumers are not aware of the

opportunities presented by GEVs and are not yet convinced that they can operate reliably and affordably at scale. Concentrating investments and other efforts in a limited number of communities will accelerate the opportunity to demonstrate that grid-enabled vehicles can meet drivers' needs. In addition, these projects will demonstrate that a community is capable of putting the infrastructure in place, operating the vehicles over their lifetimes, and disposing of them after their useful life has ended, all in a manner that profits the participants in the value chain.

3) **Facilitate Learning by Doing:** While GEVs present a great opportunity, their deployment also raises a number of questions. Deploying large numbers of GEVs in concentrated areas will allow for the collection of information and experience that is needed to successfully deploy GEVs nationwide. It will help automakers learn how much consumers are willing to pay up front for a car that costs less to operate and has a lower total cost of ownership over its lifetime. It will allow utilities and charging station providers to learn when and where drivers want to charge their vehicles. It will allow utilities and other aggregators to learn who can best sell power to drivers and what types of rate structures meet both drivers' and utilities and aggregators' needs. It will help determine whether there is a viable business model for public charging infrastructure. It is clear that for GEVs to succeed there must be a model in which each party in the value chain is able to operate profitably, or in which the government determines that, as a matter of public policy, certain aspects of the system should be publicly supported in a manner that facilitates further competition. Deploying GEVs in a series of geographic regions around the country where resources can be concentrated and data can be collected and studied will ultimately accelerate wide-scale GEV deployment. Therefore, rather than allowing the market to develop scattershot across the country, it is critical that the market be encouraged to develop at a deliberate pace in clearly identified geographic regions in which a large number of vehicles can be deployed in a relatively short period of time.

In order to be selected, a community will need to present a comprehensive proposal, similar to bids to host the Olympic Games. Such a proposal would need to show capability and buy-in from a wide range of public and private players, including local governments, utilities, major employers, and more.

Cities and communities throughout the nation will be eligible to compete for selection as a deployment community. And the bill makes it clear that in selecting deployment communities, DOE should seek areas that are diverse regionally, geographically, climactically, in terms of their urban and suburban composition, size, typical commuting patterns, and type of electric utility.

We believe we will also see an important diversity in the business models that innovators and entrepreneurs will present to explore the most effective and efficient models for deployment. Again, the advantage of a competitive, market-based plan like this is that the best ideas have the opportunity to rise to the top.

We believe the result of passing this legislation will be a great competition, a race to the top as communities fight to present the most fertile ground for an exciting new technological rollout. Even those that are not ultimately selected will have, in order to compete, taken steps that will

ultimately make the adoption and deployment of electric vehicles and infrastructure more achievable within their borders.

We've already seen cities and other localities across the country taking the first steps toward electrification, whether it is installing charging infrastructure, buying the vehicles for city fleets, or some combination of both and more. They see the benefits and are eager to take the next step. If we pass this legislation, I think we will see cities once again, as they have in the past, playing the role of experimenters and leaders in this exciting new technology.

Incidentally, let me address a concern that others have brought up about this very aspect of the deployment community idea: that it overly concentrates resources in a small number of communities.

I strongly disagree with this criticism.

First, these plans do nothing that would limit or impede the current nationwide incentives for electric vehicles. Today, a maximum tax credit of $7,500 on qualified electric drive vehicles exists nationwide. Additional credits exist for infrastructure. This bill does not in any way impact the maximum vehicle tax credit available to consumers nationwide. What we are talking about is added incentives, which will spur added demand.

Second, the benefits accrue far beyond the deployment communities themselves. While money will flow into these communities, they should more correctly be thought of as funnels through which a substantial portion of the funds will flow on their way elsewhere around the country. Much of the money that flows through deployment communities will end up in the towns and cities where the vehicles and charging infrastructure and their components are manufactured. When a factory reopens in a depressed area to build or support these vehicles—as we've already seen in places like Elkhart, Indiana and Livonia, Michigan—that is a real and tangible benefit for hardworking Americans.

Third, if this program succeeds, it will drive down costs for electric vehicles for consumers throughout the nation. It will also set the nation on a path toward greater energy security and economic prosperity through sharply reduced oil dependence. This effort is about building a new transportation system from the ground up in a fiscally responsible, competitive fashion. That's good for the entire nation.

The deployment community proposal recognizes a simple fact: electrification will not move past niche product status without careful policy coordination designed to overcome early obstacles. Grid-enabled vehicles require a network to thrive—a network that includes regulatory support, some amount of infrastructure, and progressive utilities. There are very few communities where such an environment exists today. And this says nothing of the higher costs of purchasing a GEV and consumers' general uncertainty in adopting an unfamiliar technology.

A targeted regional deployment program featuring a competitive selection process will sharply increase the number of places where a supportive GEV network exists. Strong financial incentives for vehicles and infrastructure in these regions will drive high concentrations of cars

onto the road in a short period of time and help achieve scale in battery manufacturing. The program will drive businesses and investment into deployment communities and help create jobs. The consequences of this approach will be to associate GEVs with renewed economic growth in deployment communities while setting the stage for a broader rollout in phase two.

Finally, let me say this: we understand that this is a challenging time for suggesting increased government expenditures for any project, no matter how worthwhile. We also, however, believe that certain aspects of the threat of oil dependence and the solutions we recommend make this a unique issue.

First is the urgent national security threat posed by our dependence on oil. While we cannot and should not ignore costs, threats to national security have always occupied a unique place of priority in our budget considerations. And make no mistake: the dangers posed by our oil dependence are not theoretical. Our safety and security are threatened by oil dependence, and every single day that we do not act is another day that we remain vulnerable.

Second is the economic cost of inaction. Department of Energy researchers have estimated that the economic costs of U.S. oil dependence were $500 billion in 2008 alone—and more than $5 trillion since 1970. In 2008, when oil prices peaked, the U.S. sent $388 billion—56 percent of the total trade deficit—overseas to pay to import crude oil and petroleum products. In 2010, with oil prices averaging close to $80 per barrel, the U.S. trade deficit in crude oil and refined products returned to its pre-crisis level of more than $260 billion.

Between 2001 and 2008, the average retail price of gasoline increased from $1.46 to $3.27, costing typical households $2,115 a year in increased fuel expenses. To put that into perspective: the total effect of changes to the federal tax code from 2001 to 2008 code was a cut in annual federal income and estate taxes by about $1,900 for the median household. But a typical household's energy costs rose more than that. In other words, every penny that the most Americans saved due to federal income and estate tax cuts over those eight years was spent on higher gasoline bills.

And perhaps most telling: every American recession for almost four decades has been preceded by—or occurred concurrently with—an oil price spike.

The public is demanding action. Gas prices are skyrocketing once again. How long can we continue to go through these spikes? This threat is real, but so is the opportunity before this Congress. If we support this new path, if we build these deployment communities that are so crucial to jumpstarting a new, national transportation system, then that is a game changer. A new future is ours for the taking, but only if we choose it and support it.

Propel™ Fueling Change.

COMMENTS FOR THE RECORD

SUBMITTED TO

COMMITTEE ON ENERGY AND COMMERCE
SUBCOMMITTEE ON ENERGY AND POWER
U.S. HOUSE OF REPRESENTATIVES

Hearing on:

The American Energy Initiative: Challenges and Opportunities for Alternative Transportation Fuels and Vehicles

Submitted by:

Matt Horton, CEO

Propel Fuels, Inc.

May 5, 2011

Propel™
Fueling Change.

Propel Fuels, Inc.
2317 Broadway St, #350
Redwood City, CA 94063
800-871-0773

Honorable Ed Whitfield, Chairman
House Subcommittee on Energy and Power
2368 Rayburn House Office Building
Washington, D.C. 20515-1701

Honorable Bobby L. Rush, Ranking Member
House Subcommittee on Energy and Power
2268 Rayburn House Office Building
Washington, D.C. 20515-1301

May 5, 2011

Dear Chairman Whitfield and Ranking Member Rush,

I wished to express my appreciation to the Energy and Power Subcommittee of the House Energy and Commerce Committee for holding a hearing to discuss the Challenges and Opportunities for Alternative Transportation Fuels and Vehicles. The purpose of this correspondence is to offer comments for your consideration and the record in regard to the importance of supporting alternative transportation fuels.

Propel Fuels is a California-based provider of high-blend ethanol (E85) and biodiesel with 22 fueling sites currently in operation and an additional 43 under construction or in permitting in the states of California and Washington. Within the next 12 months, our plans are to expand our retail E85 and biodiesel fueling sites to other states, at which time Propel will operate the largest network of E85 and biodiesel fueling sites in the nation.

Our locations are co-sited on existing retail fueling locations. Our business partners with the existing site owner to install an additional underground storage tank, install a UL certified dispenser and related equipment, construct a Propel-branded canopy, and establish a centralized electronic communications system with our home office. From these locations, we actively market the fuel to drivers and fleets with a heavy emphasis on education and outreach to first-time consumers.

Working with the U.S. Dept. of Energy, Propel is the largest single recipient of federal ARRA funds for E85 fueling infrastructure. In addition, we have received grant funds from the California Energy Commission. Propel has matched these funds with an additional $20 million in private venture capital.

As our nation continues to transition away from our dependence on gasoline to other forms of transportation fuels, it is critical to recognize that E85 is as an alternative fuel and not a gasoline additive in the manner of E10. As an alternative fuel;

- E85 is a high-quality, clean-burning fuel that reduces CO2 output and smog-forming pollution;
- E85 improves vehicle performance due to a higher octane rating, which provides more horsepower and torque;
- E85 has helped the ethanol market cut crude oil consumption by one million barrels per day;
- E85 is used in specially designed and manufactured Flexible Fuel Vehicles that are available at dealerships across the nation, and in 9 million vehicles on the road today;
- E85 requires no special on-board fueling tanks and;
- E85 will be produced from cellulosic and other advanced feedstocks in the near future .

E85 is but one of several excellent forms of alternative fuels. Compressed natural gas, propane, electricity, biodiesel, and others are all forms of transportation fuel that are available in the U.S. and significantly reduce the nation's continued importation of petroleum.

The petroleum industry has been around for over 110 years and has received significant incentives to encourage fuel production and consumption. We ask that the Committee support incentives that will continue to grow and advance alternative transportation fuels in the same manner. Specifically, the Committee should consider the adoption of short-term incentives that assist with reducing the price of alternative transportation fuels on a Gasoline Gallon Equivalent (GGE), and supporting the development of infrastructure necessary to introduce such alternative fuels into the market place, and creating a competitive market for fuel choices.

Fuel Incentives:

As the Committee considers the imposition of federal incentives in an effort to advance the use of alternative transportation fuels, we would encourage the Committee to understand that a fuel comprised of 85% ethanol and 15% gasoline, i.e. E85, is an Alternative Fuel as defined by 10 CFR 490.2 and Title III §301 of the Energy Policy Act of 1992. Thus, E85 should be treated as an alternative fuel and not as a gasoline additive, as is the case with a 10% ethanol blend. Rather than being subject to the provisions of the Volumetric Ethanol Excise Tax Credit (VEETC) as is E10, we believe that E85 should be characterized and treated in a manner similar to that of Compressed Natural Gas and Liquefied Petroleum Gas pursuant to IRC §6426 and 6427.

Propel supports the extension of Alternative Fuel Incentives as described in H.R. 1380, the NAT GAS Act but strongly encourages the inclusion of E85 as an eligible recipient of such incentives.

The use of E85 as an alternative transportation fuel in a manner similar to that of compressed natural gas will allow for the continued use of this excellent fuel in the more than 9 million Flexible Fuel Vehicles currently on the nation's highways. Extending the $0.50 per gallon Alternative Fuel Credit as outlined in HR 1380 will also support existing federal renewable fuel mandates and targets set by the automotive industry. General Motors, Ford, Chrysler have pledged to produce 50% of their total vehicle production as FFVs by 2012. In addition to the Detroit 3, Toyota, Mazda, Isuzu, Nissan, Hyundai, Mercedes-Benz, and other automakers produce flexible fuel vehicles capable of operating on E85.

Infrastructure Incentives:

As a significant provider of alternative fuels in the form of both E85 and biodiesel, Propel believes that the federal government must participate in establishing the alternative fuel infrastructure of the future. While it is not the government's role to choose the fuel of the future, government can and should assist the private sector with offsetting the costs of such new infrastructure. We believe that the establishment of an infrastructure income tax credit represents the most appropriate role of government in this effort.

A federal income tax credit currently exists, as promulgated in the Energy Policy Act of 2005 (P.L. 109-58). Section 1342 of the Act established a 30% (up to $30,000) federal income tax credit to offset in part the expenses associated with installation of new alternative fuel infrastructure. While these provisions have been helpful, the amount of the incentive has been limited by an IRS interpretation that only the incremental costs of the alternative fuel equipment could be used towards the credit.

Additionally, the effectiveness of the existing infrastructure tax credit has been limited by the fact that 62% of all retail fueling sites are owned by single store operators. As such, many of these small businesses either do not have a tax liability of significance or have been impacted by the imposition of the Alternative Minimum Tax and cannot utilize the existing income tax credit. For this reason, this credit has not been sufficient to catalyze the adoption of renewable fuel infrastructure.

In order to establish the alternative fuel infrastructure needed by the nation to dispense existing forms of alternative fuels and the fuels of the future, Propel recommends the establishment of a federal income tax credit with the following components:

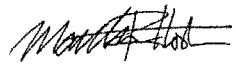
- A tax credit of up to 50% of the total project costs, limited to $100,000 per site.
- Ability to utilize the credit for the complete value of the improvements that are associated with the establishment of the fuel equipment.
- The ability of the retail operator who is incurring the equipment costs to transfer the value of the credit to a third party.

We believe that the establishment of such a federal income tax credit to support alternative fuel infrastructure development is preferable to instituting another grant program. While grant programs are certainly beneficial (as they have been to Propel via the ARRA funding), many small business owners are unable to negotiate the complexities of grants applications and guidelines. Additionally, grant programs are subject to the annual appropriations process, require large numbers of oversight staff, and can require more than 36 months to initiate subsequent to the passage of authorizing language. Additionally, we would point out that Section 244 of the Energy Independence and Security Act of 2007, P.L. 110-140, authorized $1 billion to establish renewable fueling infrastructure. Unfortunately, no funds have been appropriated to implement this section of EISA.

Propel supports the Alternative Fuel Infrastructure Tax Credit incentives as included in HR 1380, the NAT GAS Act, but also strongly encourages the inclusion of E85 as an eligible recipient of such incentives.

In closing, I would again reiterate the significant financial contributions that both public and private sector investors have made in Propel's efforts to build alternative fuel infrastructure. Congressional support for both alternative fuel incentives and tax credits for infrastructure would allow Propel to continue to expand, create jobs, use domestically produced alternative fuels, and promote energy independence. We appreciate the opportunity to provide these comments and are available to provide additional information or respond to any questions that you or the Committee may have.

Sincerely,



Matt Horton, CEO
Propel Fuels

Copies: House Committee on Energy and Commerce

Mr. SHIMKUS. And let me just take this time to—and if Eliot was here, Eliot Engel, my colleague from New York, he would have taken time to do this also. He is with the President in New York City in my understanding—led the charge on a debate called an Open Field Standard. I mean imagine a world where we have a set standard for vehicle design and people can drive up to a—instead of a gas station, a refueling station and allow commodity products to compete at the pump for the use of a transportation fuel. And that is what the open fuels standard would do whether that is fuel produced by methanol, cold to liquid, biofuels, crude oil, I take this time to make sure I put that into the record, give credit to Elliot Engel who has been leading this charge. I am now the key sponsor because of course Republicans are in charge. He allowed me to be the head sponsor of that legislation. It is bipartisan with Steve Israel and Roscoe Bartlett. The roll out is right now. You are lucky to be here. And I would encourage all my colleagues to look at that. Remember we are constrained by crude oil. We have to have different commodity products that will compete at the pump that will increase energy security and it is best for America. And I yield back my time.

Mr. WHITFIELD. John, thank you for letting us share this roll out with you today. All right, that culminates our questions, so I want to thank the first panel for your time and testimony. And at this time I would like to call up the second panel. And on the second panel, we have Mr. James Bartis, Senior Policy Researcher of the Rand Corporation; Mr. Richard Kolodziej, President NGVAmerica; Mr. Diarmuid O'Connell, who is Vice President of Business Development for Tesla Motors; Mr. Jeffrey G. Miller, who is Chairman of the Board of the National Association of Convenience Stores; Mr. Michael McAdams, President of the Advanced Biofuels Association; Mr. Robert Dinneen, President and CEO Renewable Fuels Association; and Mr. Lucien Pugliaresi, President of the Energy Policy Research Foundation. So we welcome all of you to the committee. We appreciate your taking time to be with us. And I am going to be recognizing each one of your for your opening statement and you will be given five minutes for that. And there is a little device on the table that will turn red when your time is up. So I hope that you would focus on that as well. So at this time, Mr. Bartis, we will recognize you for—huh? How do we know that? Well, let us just go on. Go ahead, Mr. Bartis. You are recognized for 5 minutes.

STATEMENTS OF JAMES T. BARTIS, SENIOR POLICY RESEARCHER, RAND CORPORATION; LUCIAN PUGLIARESI, PRESIDENT, ENERGY POLICY RESEARCH FOUNDATION, INC; JEFFREY G. MILLER, CHAIRMAN OF THE BOARD, NATIONAL ASSOCIATION OF CONVENIENCE STORES; DIARMUID O'CONNELL, VICE PRESIDENT OF BUSINESS DEVELOPMENT, TESLA MOTORS; RICHARD KOLODZIEJ, PRESIDENT, NGVAMERICA; MICHAEL J. MCADAMS, PRESIDENT, ADVANCED BIOFUELS ASSOCIATION; AND ROBERT DINNEEN, PRESIDENT AND CHIEF EXECUTIVE OFFICER, RENEWABLE FUELS ASSOCIATION

STATEMENT OF JAMES T. BARTIS

Mr. BARTIS. Mr. Chairman and distinguished members, thank you for inviting me to testify on the opportunities for the greater production and use of alternative fuels for transportation. My remarks today are based on Rand studies that cover a spectrum of alternative fuels including oil shale, coal derived liquids, oil sands, and biofuels. An important finding from this research centers on the vastness of the resource base from alternative fuels in the United States. The largest deposits of oil shale in the world are located in Western Colorado and Eastern Utah. The potential yield is about triple the oil reserves of Saudi Arabia.

Our coal resource base is also the world's largest dedicating only 15 percent of recoverable coal reserves to coal to liquid production would yield roughly 100 billion barrels of liquid transportation fuels, enough to sustain 3 million barrels per day for more than 90 years. Our biomass resource base is also appreciable offering to yield over 2 million barrels per day of liquid fuels. And over the longer term, advanced research and photosynthetic approaches for alternative fuels production offers the prospect of even greater levels of sustainable production.

Today I will be giving particular emphasis through our recently published congressionally mandated study on alternative fuels for military applications. In this research we examined near term alternative fuels that could substitute for conventional jet fuel, diesel fuel, and marine fuel. While our focus was on military applications, many of our findings also hold for the much larger civilian consumption of these fuels. In particular, the combined demand in the United States for these fuels is currently over 5 million barrels per day most of which is directed at transportation.

Of the various options that we examined we found that the Fisher-Tropsch Method to be the most promising near term option for producing diesel, jet, and marine fuels in a clean and affordable manner. The Fisher-Tropsch Method also produces gasoline. The method can accept a variety of feedstocks including natural gas, coal, and biomass. Modern commercial plants are in operation but none are located in the United States.

When using coal, our best available information suggests production would be competitive when world crude oil prices exceed $70 per barrel. This estimate includes the cost of capturing and sequestering nearly all of the carbon dioxide generated at the coal to liquids production facility so that life cycle greenhouse gas emissions would be in line with those of petroleum derived fuels.

We also looked at using a combination of coal and biomass as the feedstock to a Fisher-Tropsch facility while again capturing and sequestering carbon dioxide emissions. In this case, production would be competitive when crude oil prices exceed $100 per barrel. Moreover, life cycle greenhouse gas emissions can be less than half of petroleum derived fuels. In particular, with sequestration, a feedstock consistent of a 60/40 coal to biomass blend should yield alternative fuels with life cycle greenhouse gas emissions that are close to zero.

Other nearer term sources of diesel and jet fuel are renewable oils. These oils can be prepared from animal fats or vegetable oils obtained from seed-bearing plants. Biodiesel from soybean oil is the most well-known of this class of fuels. When treated with hydrogen, these renewable oils can be converted to hydrocarbon fuels that are suitable for both military and civilian applications.

Unfortunately the prospects for these renewable oils are dim. For sea oils the main problem is the low oil yield per acre. Consider producing 200,000 barrels per day which is only one percent of current U.S. oil consumption. Producing this amount from seed oils would require about 10 percent of the total crop land under cultivation in the United States. There are also serious issues regarding greenhouse gas emissions, production costs, and adverse effects on food prices. Taking together waste oils, animal fats, and seed oils, it is highly unlikely that domestic production can exceed 100,000 barrels per day. From a national energy policy perspective, this class of fuels will not contribute much.

Our research also examined advanced alternative fuels such as oil shale and fuels based on algae or microbial processes. With regard to oil shale, most of the high grade resources are on federal lands. Six years ago when we published our examination of oil shale, we concluded that the prospects for development were uncertain. They remain so today.

The key to progress lies in formulating a land access and incentive policy that rewards those private firms willing to take on the substantial risks associated with investing in pioneer production facilities. However, it would not be appropriate to develop detailed regulations that would pertain to full blown commercial development until more information is available on process performance. Algae and other microbial processes may yield alternative fuels without the limitations and adverse land use changes associated with seed oils. But these approaches are in the early stages of the development cycle.

Large investments in research and development will be required before confident estimates can be made regarding production costs and environmental impacts. In my written testimony I have also highlighted the national importance of alternative fuels, and further discuss policy issues associated with gaining early commercial experience in emerging alternative fuel technologies. This concludes my remarks. Thank you.

[The prepared statement of Mr. Bartis follows:]

90

TESTIMONY

Opportunities for Alternative Fuels Production

JAMES T. BARTIS

CT-360

May 2011

Testimony presented before the House Energy and Commerce Committee, Subcommittee on Energy and Power on May 5, 2011

This product is part of the RAND Corporation testimony series. RAND testimonies record testimony presented by RAND associates to federal, state, or local legislative committees; government-appointed commissions and panels; and private review and oversight bodies. The RAND Corporation is a nonprofit research organization providing objective analysis and effective solutions that address the challenges facing the public and private sectors around the world. RAND's publications do not necessarily reflect the opinions of its research clients and sponsors. **RAND®** is a registered trademark.

Published 2011 by the RAND Corporation
1776 Main Street, P.O. Box 2138, Santa Monica, CA 90407-2138
1200 South Hayes Street, Arlington, VA 22202-5050
4570 Fifth Avenue, Suite 600, Pittsburgh, PA 15213-2665
RAND URL: http://www.rand.org/
To order RAND documents or to obtain additional information, contact
Distribution Services: Telephone: (310) 451-7002;
Fax: (310) 451-6915; Email: order@rand.org

James T. Bartis[1]
The RAND Corporation

Opportunities for Alternative Fuels Production[2]

Before the Committee on Energy and Commerce
Subcommittee on Energy and Power
United States House of Representatives

May 5, 2011

Chairman and distinguished Members: Thank you for inviting me to speak on the opportunities for the greater production and use of alternative fuels for transportation. I am a Senior Policy Researcher at the RAND Corporation with over 30 years of experience in analyzing and assessing energy technology and policy issues. At RAND, I have been actively involved in research directed at understanding the costs and benefits associated with the use of domestically abundant resources, such as coal, oil shale and biomass, to lessen our nation's dependence on imported petroleum. The findings that I will discuss today are drawn from studies sponsored and funded by the National Energy Technology Laboratory (NETL) of the U.S. Department of Energy, the United States Air Force, the Federal Aviation Administration, the National Commission on Energy Policy, the U.S. Chamber of Commerce, and the Defense Logistics Agency.

Today, I will discuss the strategic importance of alternative fuels, our assessment of the most promising candidates for near-term production, the barriers impeding alternative fuel production, and potential measures that Congress could pursue to promote a commercially-competitive subsidy-free domestic alternative fuels industry. My key conclusions are as follows. First, successfully developing a competitive alternative fuels industry in the United States would bring significant economic and national security benefits. But achieving those benefits requires an industry capable of producing millions of barrels per day. Second, the Fischer-Tropsch method, which is a thermochemical conversion method, is the only near-term approach capable of producing large amounts of alternative fuels beyond the level currently supplied by corn-derived alcohol fuels. Other near-term approaches, such as seed and waste oils and animal fats have extremely limited production potential. Third, alternative fuels production is being impeded by continuing uncertainties regarding world oil prices, uncertain production costs for first-of-a-kind facilities, and an uncertain regulatory environment, especially regarding the management of

[1] The opinions and conclusions expressed in this testimony are the author's alone and should not be interpreted as representing those of RAND or any of the sponsors of its research. This product is part of the RAND Corporation testimony series. RAND testimonies record testimony presented by RAND associates to federal, state, or local legislative committees; government-appointed commissions and panels; and private review and oversight bodies. The RAND Corporation is a nonprofit research organization providing objective analysis and effective solutions that address the challenges facing the public and private sectors around the world. RAND's publications do not necessarily reflect the opinions of its research clients and sponsors.
[2] This testimony is available for free download at http://www.rand.org/pubs/testimonies/CT360/.

greenhouse gas emissions. Finally, a federal program directed at reducing these uncertainties and obtaining early, but limited, commercial experience in alternative fuels with a high production potential appears to offer the greatest strategic benefits. Federal policies that favor renewable fuels irrespective of energy security or environmental benefits should be reexamined.

The Importance and Value of Alternative Fuels

The United States' consumption of liquid fuels is about 19 million barrels per day (bpd). Meeting this demand requires importing about 10 million bpd of petroleum, mostly in the form of crude oil. In a world that consumes about 85 million bpd of petroleum products, the United States holds first place in total consumption and the magnitude of its imports. Currently the average price of crude oil imports is over $105 per barrel. At these prices, oil imports would cost U.S. oil consumers nearly $400 billion per year. Considering both direct and indirect expenditures on energy, each $10 increase in the price of world oil costs the average U.S. household over $550 per year.

The national security consequences of the dependence of the United States, and its allies and trading partners, on imported oil are well-documented.[3] All oil consumers are vulnerable to increased payments for oil when oil exporters are able to reduce supplies on the world oil market. Most serious would be the economic impact of a large and extended disruption in global oil supplies as a result of conflict or natural disaster.

The governing regimes of some oil exporting nations, such as Libya, Venezuela and Iran, pursue policies that run counter to the national security interests of the United States and its allies. When oil prices are high, these nations have more funds to invest in purchasing armaments and building their own industrial bases for manufacturing munitions. High oil prices also provide more funds that may eventually find their way to large terrorist organizations such as Hamas and Hizballah.

Alternative fuels are already being produced in many countries. Examples include corn-derived ethanol in the United States and sugar-derived ethanol in Brazil, synthetic crude from oil sands in Canada, coal-to-liquids production in South Africa, natural gas-to-liquids production in Qatar and Malaysia, and small amounts of biodiesel production in the United States and Europe. Expanding alternative fuels production beyond these initial efforts would offer economic and national security benefits to the United States. Because it provides a substitute for products refined from crude oil, increased production of alternative fuels will reduce demand for crude oil, resulting in lower world

[3] *Imported Oil and U.S. National Security*, Crane et al., Santa Monica, Calif.: RAND Corporation, MG-838-USCC, 2009.

oil prices to the direct benefit of all oil consumers. Lower world oil prices and greater supply diversity also mitigate the adverse national security impacts of imported oil.

About 45 percent of the operating refinery capacity of the United States is located in the hurricane-prone states of Texas, Louisiana, and Mississippi. Because alternative fuel production would likely occur in diverse locations throughout the United States, a domestic alternative fuels industry would improve the resiliency of the petroleum supply chain, especially against natural disasters. Increasing the geographical diversity of fuels production implies that a smaller fraction of supplies would be affected by any natural disaster. As such, we anticipate less economic disruption as the remaining supplies are allocated to users.

But if alternative fuels are to achieve these economic and security benefits, combined global and domestic production of alternative fuels must be an appreciable fraction of global and domestic demand for liquid fuels. Specifically, the need is for an alternative fuel portfolio that can competitively produce millions of barrels per day in the United States. Alternative fuel advocates often use gallons per year when describing production potential. For perspective, one million barrels per day is 15.3 billion gallons per year.

An important finding from our research in alternative fuels centers on the vastness of the resource base for alternative fuels in the United States. The largest deposits of oil shale resources in the world are located primarily in western Colorado and eastern Utah. The potential yield is about triple the oil reserves of Saudi Arabia. Our coal resource base is also the world's largest. Dedicating only 15 percent of recoverable coal reserves to coal-to-liquid production would yield roughly 100 billion barrels of liquid transportation fuels, enough to sustain production of three million barrels per day for more than 90 years. Our biomass resource base is also appreciable, offering to yield over two million barrels per day of liquid fuels. And over the longer term, advanced research in photosynthetic approaches for alternative fuels production offers the prospect of even greater levels of sustainable production.

Assessment of Alternative Fuels

The Duncan Hunter National Defense Authorization Act for Fiscal Year 2009 contained a provision calling for the Secretary of Defense to select a federally funded research and development center (FFRDC) to conduct a study of the use of alternative fuels in military vehicles and aircraft. Responding to Congress, the Department of Defense asked the RAND National Defense Research Institute, an FFRDC, to conduct an examination of alternative fuels for military applications. Our report on this study was published and delivered to the Secretary of Defense

and Congress in January 2011.[4] As part of that study, RAND researchers examined the opportunities to produce alternative fuels in a way that reduces lifecycle greenhouse gas emissions relative to emissions from the production and use of the petroleum products that they would replace.

Because this Congressionally-mandated study was directed at military applications, we focused our attention on alternative fuels that could substitute for jet fuel, diesel fuel, and marine distillate fuel, since these are the major liquid fuels consumed by military aircraft, ships, ground vehicles, and associated combat support systems. These fuels are often referred to as distillate fuels to distinguish them from the more volatile and more easily ignited gasoline used in spark-ignition automobiles.

As a group, distillate fuels account for over 95 percent of military fuel purchases, which are currently averaging about 340,000 barrels per day. Distillate fuels are also important in the civilian sector, fueling commercial transport and serving as an important home heating fuel in some parts of the United States. Current consumption of distillate fuels in the United States is about 5 million bpd. For comparison, recent gasoline demand is running at slightly below 9 million bpd.

While the emphasis of our assessment of alternative fuels was on military applications, our results also apply to alternative fuels that could displace petroleum-derived distillate fuels that are used in civilian application. Please note, however, that as part of this Congressionally-mandated study, we did not examine options for producing alternative fuels that can substitute for gasoline, such as alcohol fuels. For safety and operational reasons, these more volatile fuels are not appropriate for military applications. Since RAND has not conducted an in-depth examination of alcohol fuels, my remarks today will not cover this family of fuels.

Also included here is a brief statement regarding the oil shale resources located in the Green River Formation of Colorado, Utah, and Wyoming. Here our findings derive from the RAND 2005 examination of oil shale and our continuing monitoring of progress in this area.[5]

Fischer-Tropsch fuels are the most promising near-term options for producing middle distillate fuels cleanly and affordably. The Fischer-Tropsch (FT) method was invented in Germany in the 1920s. It can produce alternative liquid fuels that can substitute for petroleum-derived civilian and military fuels, including civilian and military jet fuels, marine fuels, and

[4] Alternative Fuels for Military Applications, Bartis and Van Bibber, Santa Monica, Calif.: RAND Corporation, MG969-OSD, 2011.
[5] Oil Shale Development in the United States: Prospects and Policy Issues, Bartis et al., Santa Monica, Calif.: RAND Corporation, MG 414-NETL, 2005.

automotive diesel fuel, and home heating oil. Generally, gasoline is produced as a co-product in FT facilities, and one commercially proven variant can be configured to produce only gasoline. The method accepts a variety of feedstocks. For example, a commercial facility operating in South Africa uses coal, one operating in Qatar uses natural gas, and forest product firms in the United States are examining the viability of small facilities that would use biomass. Blends of up to 50 percent FT-derived jet fuel and petroleum-derived jet fuel have been certified for use in commercial aircraft. Ongoing work by the services strongly suggests that appropriately formulated FT fuel blends can be safely used in tactical military systems as well.

Both coal and biomass are abundant in the United States. Together, they are sufficient to support a multimillion-barrel-per-day alternative fuel industry based on FT fuels. But if FT fuel production is to occur without compromising national goals to control greenhouse gas emissions, the following must hold:

- For **biomass-derived FT fuels**, the biomass feedstock must be produced in a sustainable manner; specifically, its production should not be based on practices that lead to sizable emissions due to direct or indirect changes in land use. If this is achieved, lifecycle greenhouse gas emissions can be near zero.
- For **coal-derived FT fuels**, carbon dioxide emissions at the FT fuel production facility must be captured and sequestered. If this is achieved, lifecycle emissions can be in line with those of petroleum-derived fuels.
- For **FT fuels derived from a mixture of coal and biomass**, carbon dioxide capture and sequestration must be implemented. The biomass must also be produced in a sustainable manner. If this is achieved, lifecycle emissions can be less than half those of petroleum-derived fuels. In particular, a feedstock consisting of a 60/40 coal/biomass blend (by energy) should yield alternative fuels with lifecycle greenhouse gas emissions that are close to zero.

The above approaches can result in FT fuels with lifecycle greenhouse gas emissions that are less than or equal to those of their petroleum-derived counterparts and thereby fuels that are eligible for government purchase per the provisions of Section 526 of the Energy Independence and Security Act of 2007.

Considering economics, technical readiness, greenhouse gas emissions, and general environmental concerns, FT fuels derived from a mixture of coal and biomass represent the most promising approach to producing amounts of alternative fuels that can meet military, as well as appreciable levels of civilian, needs by 2030. But whether this technology will reach its potential depends crucially on gaining early production experience—including production with carbon

capture and sequestration—in the United States. To our knowledge, no agency of the U.S. government has announced plans to promote early commercial use of FT fuels derived from a mixture of coal and biomass.

It is highly uncertain whether appreciable amounts of hydrotreated renewable oils can be affordably and cleanly produced within the United States or abroad. Hydrotreated renewable oils are produced by processing animal fats or vegetable oils (from seed-bearing plants such as soybeans, jatropha, or camelina) with hydrogen. Various types of algae have high oil content and are another possible source of oil for hydrotreatment. Fifty-fifty blends of hydrotreated oils have already been successfully demonstrated in flight tests sponsored by the commercial aviation industry. Laboratory analyses and testing strongly suggest that hydrotreated renewable oils can also be formulated for use in the Department of Defense's tactical weapon systems. Technical viability is not an issue.

The problem lies in uncertainties regarding production potential and commercial viability, especially affordability and lifecycle greenhouse gas emissions. Animal fats and other waste oils may offer an affordable low-greenhouse-gas route to hydrotreated renewable oils. But these fats and waste oils are also traditionally used in other nonfuel applications, including animal feed additives and the manufacture of soaps, household cleaners, resins, and plastics. Because the supply of these feedstocks is limited, substitutes would need to be found for use in these other applications. These substitutes may cause additional greenhouse gas emissions. Production potential is also a clear issue with animal fats and waste oils: The available supply of these feedstocks will likely limit production to no more than 30,000 barrels per day.

With regard to feedstock vegetable oils, to keep lifecycle greenhouse gas emissions at levels lower than those of petroleum-derived fuels, these oils must be derived from crops that do not compete with food production and that minimize nonbeneficial direct and indirect changes in land use. Jatropha and camelina are often mentioned as ideal plants to meet these requirements, but there exists little evidence to back these claims. Even if low-greenhouse-gas approaches can be established and verified, total fuel production is likely to be limited. Producing just 200,000 barrels per day (about 1 percent of daily U.S. petroleum consumption) would require an area equal to about 10 percent of the croplands currently under cultivation in the United States.

Advanced approaches, such as photosynthetic approaches using algae or other microbes as a feedstock, may yield renewable oils without the limitations and adverse land-use changes associated with seed oils. But all of these advanced approaches are in the early stages of the

development cycle. Large investments in research and development (R&D) will be required before confident estimates can be made regarding production costs and environmental impacts.

Considering (1) the very limited production potential for fuels derived from animal fats and waste oils, (2) the highly uncertain prospects for affordable, low greenhouse-gas fuels derived from seed crops, and (3) the early development status of algae/microbe-based concepts, renewable oils do not constitute a credible, climate friendly option for meeting an appreciable fraction of civilian or military fuel needs over the next decade. Because of limited production potential, fuels derived from animal fats, waste oils, and seed oils will never have a significant role in the larger domestic commercial marketplace. Algae/microbe-derived fuels might, but technology development challenges suggest that algae/microbe-derived fuels will not constitute an important fraction of the commercial fuel market until well beyond the next decade.

The prospects for oil shale development in the United States remain uncertain. With regard to oil shale, most of the high-grade shale is on federal lands. Six years ago, when we published our examination of oil shale, we concluded that the prospects for development were uncertain. They remain so today. The Bureau of Land Management has made available small amounts of acreage so that private firms can perform research and development and demonstrate technology performance before committing to the construction of full-scale commercial plants. It is our understanding that privately-funded research activities are on-going but that no private firm is prepared to commit to commercial production. Meanwhile, the Department of the Interior has announced a review of the commercial rules for the development of oil shale resources on public lands. In part, this review will examine approaches for assuring a fair return for providing access to oil shale lands. This part of the review is consistent with recommendations provided by RAND to the Congress in 2007.[6] The key to progress lies in formulating a land access and incentive policy that rewards those private firms willing to take on the substantial risks associated with investing in pioneer production facilities. It would not be advisable to develop detailed regulations that would pertain to full-blown commercial development until more information is available on process performance and impacts.

Impediments to Alternative Fuel Production

Presently, just about all alternative fuels production in the United States is motivated by a combination of federal subsidies and the Renewable Fuel Standards that are mandated by the Energy Independence and Security Act of 2007. This combination has promoted the production of

[6] "Policy Issues for Oil shale Development," Testimony by James T. Bartis presented before the House Natural Resources Committee, Subcommittee on Energy and Mineral Resources, April 17, 2007. Available for download at http://www.rand.org/pubs/testimonies/CT279.

diesel fuel from seed oils and to a much lesser extent from animal fats. As previously discussed, both of these approaches have extremely limited production potential and may result in lifecycle greenhouse gas emissions that exceed those of conventional petroleum-derived products. In addition, the diversion of croplands to energy production adversely affects food prices. From an energy policy perspective, neither of these two approaches have been productive. The primary impact of the current law promoting diesel fuel production from renewable oils is a transfer of wealth from U.S. oil consumers to the agricultural sector.

Alternative fuels produced via the Fischer-Tropsch method using biomass as a feedstock would qualify under the Renewable Fuel Standards. However, biomass-only FT fuels are expensive to produce, especially when compared to the case when the feedstock is only coal or a combination of coal and biomass. Our best estimate is that unsubsidized production would not be economic unless world oil prices exceeded $130 per barrel. This high cost is due to two factors. First, biomass is generally more expensive to deliver than coal. Second, biomass-only FT plants need to be fairly small (at most, producing 5000 barrels per day of fuel), due to limitations on how much biomass can be harvested within a reasonable distance of the FT fuel production facility. With current technology, such small FT plants are well below the size required to achieve economies of scale.

Our estimates of production costs of FT fuels using either coal or a combination of coal and biomass are more favorable, being competitive when world oil prices exceed $70 and $100 per barrel, respectively. But under current law, such alternative fuels do not qualify for subsidies or meet the requirements of the Renewable Fuel Standards.

Three major uncertainties continue to impede private investment in coal-to-liquid and coal/biomass-to liquid facilities in the United States.

- uncertainty about production costs
- uncertainty regarding how and whether to control greenhouse-gas emissions
- uncertainty regarding the future course of world oil prices.

Of these three factors, the greatest impediment appears to be the uncertainty regarding future world oil prices. If investors would be confident that average long-term crude oil prices would remain consistently above $100 per barrel, no government policy would be required to support the emergence of a coal-to-liquids industry and possibly a coal/biomass-to-liquids industry. But with the possibility that oil prices could fall significantly in the near to medium term, the financial risk surrounding investments in first-in-the-U.S. FT production facilities is appreciable.

Promoting Subsidy-Free Alternative Fuels Production

The current Renewable Fuel Standards are sufficient to promote alternative fuels production from commercially proven methods, including corn-derived ethanol and diesel substitutes from seed and waste oils. The energy security benefits of continuing the current subsidies are highly questionable.

As discussed earlier, the fact that an alternative fuel is "renewable" does not necessarily imply that it has value in terms of reducing oil imports or greenhouse gas emissions. While there is no doubt that additional coal mining raises safety, health, and environmental issues, inappropriate production of biomass can also lead to serious adverse environmental impacts, including loss of biodiversity, diversion of water resources, and water pollution. With regard to worker health and safety, agriculture ranks among the most hazardous industries. For these reasons, we suggest that when framing new energy legislation, Congress refrain from establishing resource-specific goals and instead focus on desired outcomes, such as conventional petroleum displaced and lifecycle greenhouse gas emissions.

The preceding remarks apply to commercially proven technologies. For alternative fuel technologies that are ready for first commercial production in the United States, federal incentives may be appropriate. At present, the strongest candidates for pioneer production facilities are FT plants, especially those that would accept a combination of coal and biomass. In the future, oil shale facilities using in-situ techniques and advanced biomass plants might also be ready for pioneer production.

At RAND, we have examined how the federal government can encourage the early participation of competent and capable companies in alternative fuels production.[7] The answer lies in the creation of incentive packages that cost-effectively transfer a portion of investment risks to the federal government. In particular, we found that a balanced package of a price floor, an investment incentive, and an income-sharing agreement is well suited to do this. The investment incentive, such as a tax credit, is a cost-effective way to raise the private, after-tax internal rate of return. A price floor provides protection in futures in which oil prices are especially low. And an income-sharing agreement compensates the government for its costs and risk assumption by providing payments to the government in futures in which oil prices turn out to be high.

[7] *Producing Liquid Fuels from Coal: Prospects and Policy Issues*, Bartis, Camm and Ortiz, Santa Monica, Calif.: RAND Corporation, MG-754-AF/NETL.

We also found that loan guarantees can strongly encourage private investment. However, they encourage investors to pursue early alternative fuel production experience only by shifting real default risk from private lenders to the government. By their very nature, the more powerful their effect on private participation, the higher the expected cost of these loan guarantees to the government. In addition, loan guarantees encourage private investors to seek higher debt shares that increase the risk of default and thus increase the government's expected cost for providing the guarantee. We strongly recommend that the government should recognize both the costs that such guarantees could impose on taxpayers and the extent to which government oversight of guaranteed loans can be effective in limiting these costs.

Finally, it is important that the Congress not falter in its support on long-range, albeit higher risk, research that offers to provide the foundation for sustainable production of alternative fuels via photosynthetic approaches.

In closing, I commend the Committee for addressing the important topic of alternative fuels. The United States has before it many opportunities—including renewable resources, coal, oil shale, improved energy efficiency, and fiscal and regulatory actions—that can promote greater energy security. But to exploit our national potential, we need laws that are more goal-oriented and less prescriptive about the means of achieving those goals.

Mr. WHITFIELD. Thank you very much. And Mr. Pugliaresi, we will recognize you for your 5-minute opening statement. Be sure to get the microphone around so it is close——

Mr. PUGLIARESI. Thank you, Mr. Chairman.

Mr. WHITFIELD [continuing]. And make sure it is turned on.

STATEMENT OF LUCIAN PUGLIARESI

Mr. PUGLIARESI. Chairman Whitfield, Ranking Member Rush, and members of the Subcommittee on Energy and Power. On behalf of myself and EPRINC, we welcome this opportunity to testify on the topic of alternative transportation fuels. I will summarize my key points of my testimony but submit the entire statement for the record.

The Energy Policy Research Foundation is a non-profit organization that studies energy economics with special emphasis on petroleum and the development of downstream petroleum markets. We have been researching and publishing reports on all aspects of the industry since 1944.

The Federal Government provides a range of subsidies, tax incentives, and regulatory mandates for multi-use of ethanol and other renewable fuels into the National Gasoline Pool. Until recently, ethanol was limited by law to a maximum of 10 percent but as well as a specialty fuel at high levels, what we call EV5 or 85 percent. Under the Renewable Fuel Standard, volumetric requirements for ethanol increased annually regardless of the growth in gasoline use.

For 2001, the renewable fuel standard requires the gasoline pool to achieve almost 10 percent of by volume and which is historically level—we have limited for conventional fuels, for conventional vehicles over concern about safety. So called obligated parties such as refiners and importers can only market additional volumes through greater sales of E–85. But E–85 has met a lot of consumer resistance through poor mileage performance. E–85 also requires a large investment in new pumps and tanks. In response to concerns over market limitations of E–85, EPA has authorized the use of a new fuel with 15 percent ethanol, or E–15. It is only available for model year 2001 and newer cars with certain exceptions. These initiatives to increase the blending volumes for gasoline have been sought as a means to create additional market access for the mandated volumes of ethanol as a 10 percent volumetric level or blend while it is reached. Could we go to the first slide?

[Slide]

Domestically produced—oK well my in—domestically produced ethanol should have provided some modest constraint on the rising cost of gasoline as turmoil in the Middle East and North Africa sent crude prices well above $100 per barrel. Instead, ethanol has seen its feedstock costs more than double over the last 10 months and increase considerably greater than the rising crude prices over the same period.

Now if we go to the second slide——

[Slide]

See that U.S. policy requiring ever larger volumes of ethanol blended into the gasoline pool is now running two distinct and im-

portant cost realities both of which are likely to contribute to an increase in the price of gasoline.

The first is a rapidly rising cost of corn. Disappointing U.S. corn yields, loss of wheat crops worldwide and the increasing domestic and international demand for corn has pushed prices from $3.50 a bushel to over $7.00 a bushel in the last 10 months. The second problem is the volumetric mandate on the use of ethanol in the U.S. gasoline pool which will soon exceed the threshold of 10 percent by volume. We have different debates on when that will happen, but this is going to cause some serious problems because this transportation fuel sector will be left with a program that mandates the blending of a fuel regardless of cost, demand, infrastructure, or value. We move to the third slide.

[Slide]

We can see in a market free of volumetric mandates, cost would be the prime determinate of evaluating the appropriate mix of ethanol and gasoline sold at the pump. EPRINC's analysis shows that the volumetric ethanol mandate for the gasoline pool is bringing more costly product to the market, but when ethanol prices are converted to a gasoline energy equivalent basis, the wholesale price of ethanol is $3.95 a gallon. Ethanol when adjusted for BTU and miles per gallon equivalents sells above the price of premium gasoline at retail outlets. This is DOE data. Now if we move to the last slide?

[Slide]

The congressional debate over the deficit has highlighted concerns over the cost of ethanol subsidies now estimated at nearly $6 billion per year. Ethanol is highly valuable and we often get criticized that we don't like ethanol, but actually ethanol's highly valuable as an octane booster and as it oxygenates. If we had no subsidies, we would use a lot of ethanol, probably 400,000 to 500,000 barrels a day. So what we are getting out of the subsidy program in the mandate is the second increment around 400,000 barrels a day and we are paying a lot for that.

It is not surprising that the volatility in the oil market are also present in the corn market. Corn is a globally traded commodity and China, the world's second largest corn producer has recently become a net importer of U.S. corn for the first time in many years. As long as both of these commodities are locked into a regulatory environment that strictly prohibits adjustments to changes in market conditions. Opportunities to temper the costs of market volatility through adjustments in the domestic fuel mix with corresponding and unnecessary cost increases for transportation fuels will remain limited.

We are well aware that ethanol producers have made expensive capital investments in the production of conventional biofuels. And EPRINC is always maintained that ethanol is an important critical component in the production of domestic transportation fuels. We should not abandon this investment, but existing law would drive the mandate above 10 percent of the gasoline pool. These higher blend rates for ethanol, one, pose major cost on the wholesale and retail distribution components of the fuel sector. In addition to these primal risks, financial risk, we may find that he mandate has foreclosed more cost effective alternatives such as drop in fuels.

Given the costs involved, we should consider holding the mandate at 10 percent until we can get a full understanding of the risks and costs of the full range of strategies to increase the volume of domestic fuels in the transportation sector. Thank you, Mr. Chair.

[The prepared statement of Mr. Pugliaresi follows:]

Testimony before U.S. House of Representatives Committee on Energy and Commerce
Subcommittee on Energy and Power
May 5, 2011

The American Energy Initiative: Challenges and Opportunities for Alternative Transportation Fuels and VehiclesSummary of Key Points

Summary of Key Points in Testimony of Lucian Pugliaresi

- One of the major obstacles to rapid increases of corn ethanol into the gasoline pool is the rising cost of ethanol's principal feedstock, corn.

- U.S. policy requiring ever larger volumes of ethanol blended into the gasoline pool is now running into two distinct and important cost realities, both of which are likely to contribute to price increases in gasoline above the rising acquisition cost for crude now faced by domestic refineries

- The RFS mandate not only increases prices at the pump as it requires blending larger volumes of a relatively expensive fuel, but it also creates market distortions and regulatory uncertainty throughout the transportation fuels supply chain.

- In a market free of volumetric mandates, costs would be the prime determinant in evaluating the appropriate mix of ethanol and gasoline sold at the pump. EPRINC's analysis shows that the volumetric ethanol mandate for the gasoline pool is bringing a more costly product to the market.

- The Congressional debate over the deficit has highlighted concerns over the cost of ethanol subsidies, now estimated at nearly $6 billion per year. The true cost is much higher. Absent volumetric mandates and blending tax credits, the U.S. would consume approximately 400,000 barrels/day of ethanol, half the amount of ethanol consumed today.

- As long as both of these commodities are locked into a regulatory environment that strictly prohibits adjustments to changes in market conditions, opportunities to temper the costs of market volatility through adjustments in the domestic fuel mix will remain limited, with corresponding and unnecessary cost increases for transportation fuels. The loss of tax payer revenue alone far exceeds the benefits from the program by nearly 3 to 1 when we factor in the lower mileage performance of ethanol.

- Congress should consider holding the mandate at 10 percent until we can get a full understanding the risks and costs of the full range of strategies to increase the volume of domestic fuels in the transportation fuels sector.

EPRINC

Testimony

before

U.S. House of Representatives Committee on Energy and Commerce
Subcommittee on Energy and Power

The American Energy Initiative: Challenges and Opportunities for Alternative Transportation Fuels and Vehicles

May 5, 2011
9:30 am
Rayburn House Office Building
Washington, DC

Submitted by:

Lucian Pugliaresi
President, Energy Policy Research Foundation, Inc (EPRINC)
Washington, D.C.
www.eprinc.org

EPRINC

Implementation Issues for the Renewable Fuel Standard

Summary

The Federal government provides a range of subsidies, tax incentives, and regulatory mandates to promote the use of ethanol and other renewable fuels into the national gasoline pool.[1] Until recently, ethanol use was limited by law to a maximum of 10% of the gasoline pool, or as a specialty fuel at high levels of concentration (a 70-85% blend called E85) for use only in "flex-fuel" vehicles.

Under the Renewable Fuel Standard (RFS), volumetric requirements for ethanol increase annually regardless of the growth in gasoline use. For 2011 the RFS requires the gasoline pool to reach approximately 10% of the national pool which has historically been viewed as the limit for safe use in conventional vehicles. So called "obligated parties," such as refiners and importers, can only market additional volumes through greater sales of E85, but E85 has met considerable consumer resistance because of its poor mileage performance. E85 also requires large investments in new pumps and tanks at retail outlets. In response to concerns over the market limitations of E85, EPA has authorized the use of a new fuel, with 15% ethanol (E15), for model year (MY) 2001 and newer cars, with certain exceptions. These initiatives to increase the blending volumes for gasoline have been sought as a means to create additional market access for the mandated volumes of ethanol as the 10% volumetric level, or "blendwall" is reached.

One of the major obstacles to rapid increases of corn ethanol into the gasoline pool is the rising cost of ethanol's principal feedstock, corn. Domestically produced ethanol should have provided some modest constraint on the rising cost of gasoline as turmoil in the Middle East and North Africa has sent crude oil prices well above $100 per barrel (bbl). Instead, ethanol has seen its feedstock costs more than double over the past 10 months, an increase considerably greater than the rise in crude prices over the same period (Slide 1 attached)

[1] The federal program promotes several categories of renewable fuels, not just ethanol. The Energy Independence and Security Act of 2007 ("EISA") proposed four renewable fuel mandates, instead of the single mandate as was the case under earlier legislation. Under EISA 2007, the Renewable Fuel Standard (RFS) program was expanded as follows:

* RFS program includes diesel, in addition to gasoline;
* The volume of renewable fuel required to be blended into transportation fuel increased from 9 billion gallons in 2008 to 36 billion gallons by 2022;
* It established new categories of renewable fuel, and set separate volume requirements for each one, among other requirements. See EPRINC report, ***A Primer on Requirements for the Use of Renewable Fuels in the U.S. Transportation Sector, July 2009.*** http://www.eprinc.org/pdf/rfsprimer.pdf

EPRINC

U.S. policy requiring ever larger volumes of ethanol blended into the gasoline pool is now running into two distinct and important cost realities, both of which are likely to contribute to price increases in gasoline above the rising acquisition cost for crude now faced by domestic refineries. [2] The first is the rapidly rising cost of corn. Disappointing U.S. corn yields, loss of wheat crops worldwide and increasing domestic and international demand for corn has pushed prices from $3.50/bushel to over $7/bushel in the last 10 months, driving up ethanol prices to levels well above the cost of gasoline when adjusted on a BTU basis.[3] Expanding access will not solve the cost problem because it cannot provide a cost competitive alternative to E10 (see slide 2 attached).

The second problem is the volumetric mandate on the use of ethanol in the U.S. gasoline pool which will soon cross the threshold of 10% by volume. The RFS requires the placement of greater volumes of ethanol into the gasoline pool every year. When the RFS program was implemented in EISA 2007 it was believed that corn ethanol would be cheaper than gasoline and that U.S. gasoline consumption would continually rise, therefore avoiding a blendwall problem. However, neither assumption has proven correct. The transportation fuels sector is now left with a program that mandates the blending of a fuel regardless of cost, demand, infrastructure, or value.

The RFS mandate not only increases prices at the pump as it requires blending larger volumes of a relatively expensive fuel, but it also creates market distortions and regulatory uncertainty throughout the transportation fuels supply chain. For example, E15 is not appropriate for heavy duty vehicles or vehicles built before 2000, nor is it appropriate for boats and small engines such as lawnmowers and chainsaws. It will require special retail blender pumps and tanks costing approximately $120,000 each and would require yet to be determined labeling.[4] The auto industry remains concerned over E15's safety in vehicle engines, and the new blend level creates the potential for misfueling – all of which raises the liability to any refiner that produces E15. Most vehicles are warrantied only for E10 fuel and it is unclear who holds the liability for any damage which might be caused by E15. It is illegal to sell blends above E10 to non flex-fuel vehicles built before 2000. These concerns are likely to limit E15's

---

[2] As the mandate grows, obligated parties will face rising costs and consumer resistance to the higher ethanol blends, but the volumes must still be marketed. Two outcomes are possible, In those cases where refiners can fully pass through rising costs for blends above E10, these costs will be passed on to the remainder of the product slate (diesel, jet fuel, E10, etc). In those cases, where refiners cannot pass through the rising costs of production, the refining industry will adjust by losing capacity to foreign imports. A middle ground is the most likely outcome, i.e., some price increases and some loss of capacity. A discussion of how refiners and prices will adjust to the higher cost structure in a post blendwall environment is discussed in the forthcoming EPRINC report ***Implementation Issues for the Renewable Fuel Standard Part II***.

[3] A large volume of U.S. corn production was hedged, i.e., ethanol producers had taken out contracts to "lock-in" corn prices at much lower levels than current production. These hedges will eventually come off and all ethanol producers will face higher feedstock costs. Also, the price of ethanol in the market is set by the marginal producer, i.e., the producer that has not hedged his production.

[4] See ***Gas Stations Get Aid to Sell More Ethanol***, Bill Tomson, *Wall Street Journal*, April 9, 2011. http://online.wsj.com/article/SB10001424052748704503104576251023724394758.html?mod=googlenews_wsj

EPRINC

introduction on a national level. In addition, production costs for E85 and E15 are not likely to be cost competitive with E10.

In a market free of volumetric mandates, costs would be the prime determinant in evaluating the appropriate mix of ethanol and gasoline sold at the pump. EPRINC's analysis shows that the volumetric ethanol mandate for the gasoline pool is bringing a more costly product to the market. Gasoline wholesale futures have recently traded (May 2011) at $3.39/gallon and wholesale ethanol prices (May 2011) at $2.65/gallon. But when ethanol prices are converted to a gasoline energy equivalent basis, the wholesale price of ethanol is $3.95/gallon. Ethanol, when adjusted for BTU and MPG equivalence, consistently sells above the price of premium gasoline at retail outlets. [5] (see slide 3 attached)

The Congressional debate over the deficit has highlighted concerns over the cost of ethanol subsidies, now estimated at nearly $6 billion per year. The true cost is much higher. Absent volumetric mandates and blending tax credits, the U.S. would consume approximately 400,000 barrels/day (bbls/d) of ethanol, half the amount of ethanol consumed today. Ethanol is highly valuable as an oxygenate, particularly since the previously used oxygenate, MTBE, was phased out of use. At current prices the natural market for ethanol is 3%-5% of the gasoline pool (see slide 4), but it could be larger under alternative pricing environments. At best, RFS is responsible only for the incremental blending of an additional 400,000 bbls/d of ethanol and that the true cost of the blender's credit is closer to $0.90/gallon rather than the nominal credit of $0.45/gallon..

The federal government estimates that programs that reduce petroleum imports are worth approximately $14 per barrel. Using estimates routinely used by EPA, the $14 per barrel benefit for import reduction yields $2.5 billion in "import savings" benefits for 2011. These benefits must be compared to the direct and indirect costs of the program. The blender's credit alone costs the federal government over $6 billion in lost revenue. In addition to these costs must be added the cost of grants, loan guarantees, loss of efficiencies in refinery and retail operations, and any impact the ethanol subsidies may have on corn prices. These additional requirements further expand the costs of the program, but even without including these additional costs of RFS, the loss of tax payer revenue alone far exceeds the benefits from the program by nearly 3 to 1 when we factor in the lower mileage performance of ethanol.

It is not surprising that the volatility in the oil market, are also present in the corn market. Corn is a globally traded commodity and China, the world's second largest corn producer, has recently become a net importer of U.S. corn for the first time in many years, slowly leaving behind a policy of grain self-sufficiency. Both the ethanol market and the gasoline market cannot be isolated from global market forces. As long as both of these commodities are locked into a regulatory environment that strictly

[5] See ***AAA's Daily Fuel Gauge Report***.
http://fuelgaugereport.aaa.com/?redirectto=http://fuelgaugereport.opisnet.com/index.asp

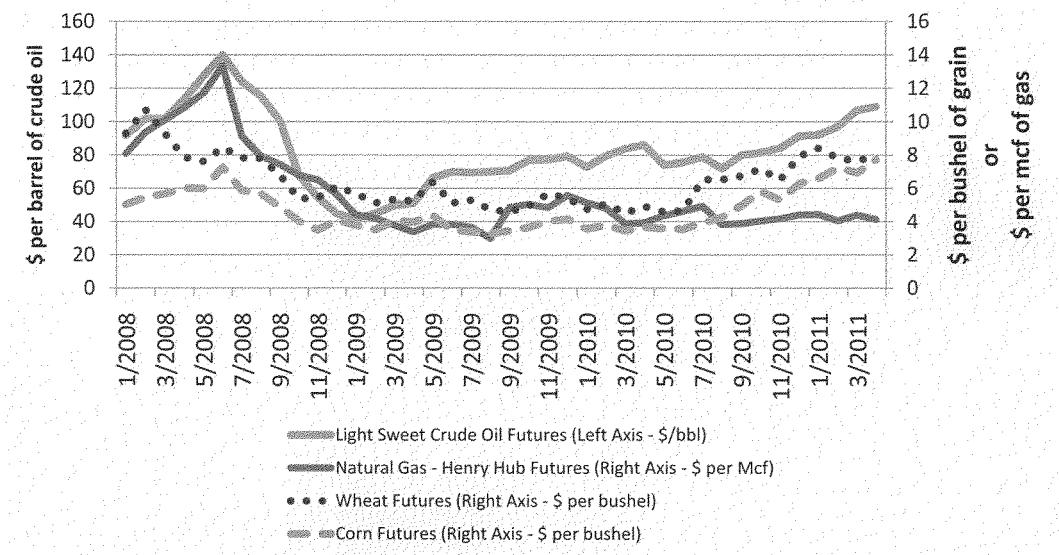
EPRINC

prohibits adjustments to changes in market conditions, opportunities to temper the costs of market volatility through adjustments in the domestic fuel mix will remain limited, with corresponding and unnecessary cost increases for transportation fuels.

We are well aware that ethanol producers have made expensive capital investments in the production of conventional biofuels and EPRINC has always maintained that ethanol is an important and critical component in the production of domestic transportation fuels. We should not abandon this investment. But existing law will drive the mandate to above 10% of the gasoline pool. These higher blend rates for ethanol will impose major costs on the wholesale and retail distribution components of the fuels sector. In addition to these financial risks, we may also find that the mandate has foreclosed more cost effective alternatives, such as drop in fuels. Given the costs involved, Congress should consider holding the mandate at 10 percent until we can get a full understanding the risks and costs of the full range of strategies to increase the volume of domestic fuels in the transportation fuels sector.

EPRINC

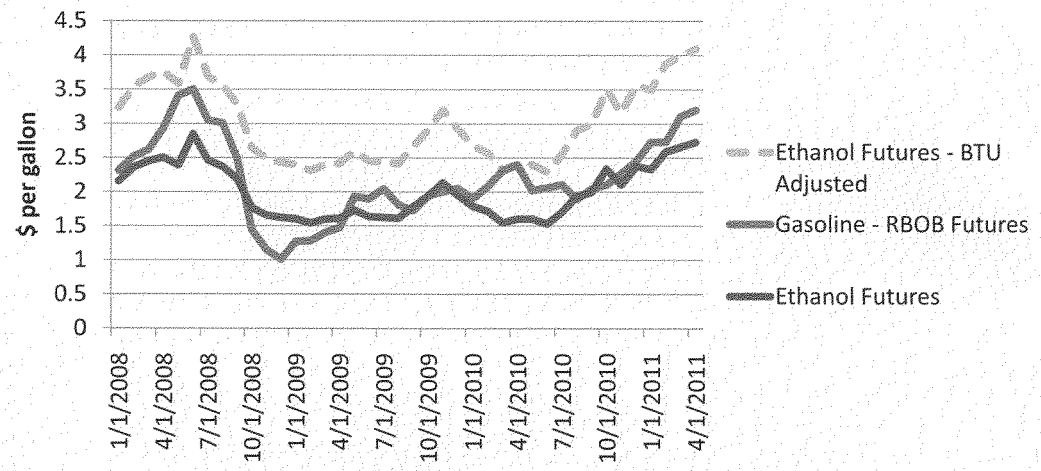
Corn, Wheat, Oil and Natural Gas Futures Prices



Source: CME Group data for front month futures contracts

EPRINC

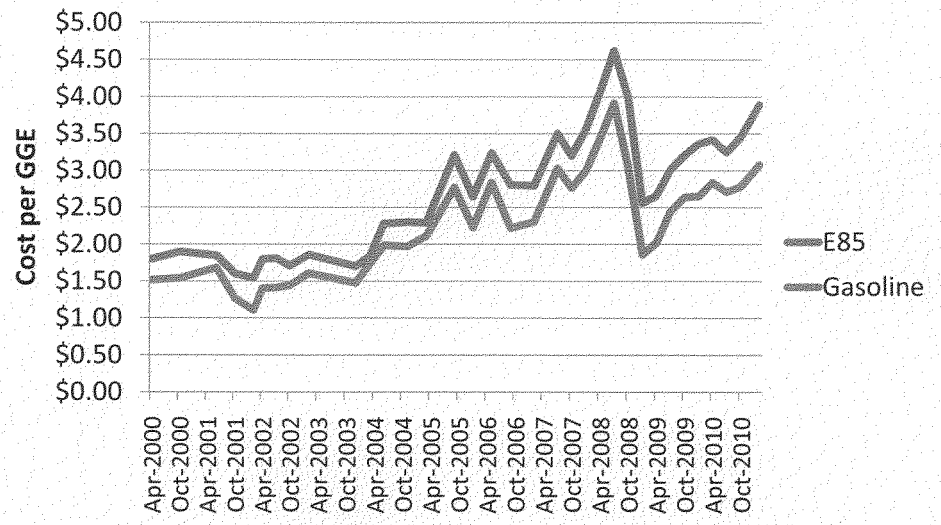
Ethanol and Gasoline Futures Prices



Source: CME Group data, EPRINC conversion for ethanol

EPRINC

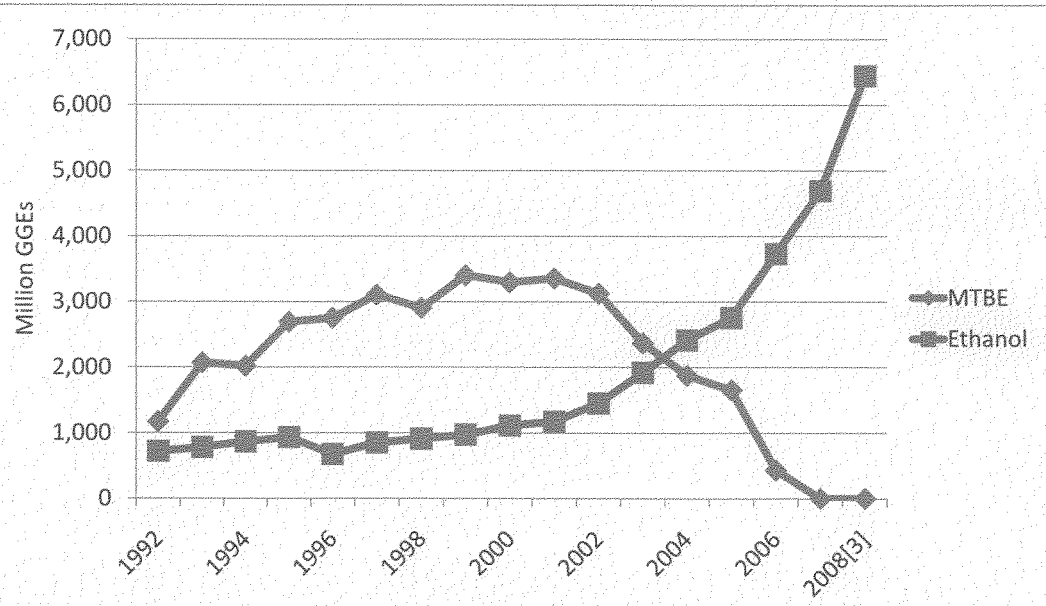
E85 and Gasoline Retail Prices: DOE Data



Source: DOE data and calculations

EPRINC

U.S. Oxygenate Consumption by Year



Source: DOE data and DOE calculations

Mr. WHITFIELD. Thank you. At this time I recognize Mr. Miller for his 5-minute opening statement.

STATEMENT OF JEFFREY G. MILLER

Mr. MILLER. Chairman Whitfield, Ranking Member Rush, members of the subcommittee, my name is Jeff Miller and I am President of Miller Oil Company headquartered in Norfolk, Virginia. I also currently serve as Chairman of the National Association of Convenience Stores or NACS. Thank you for the opportunity to testify today on the topic of renewable and alternative fuels.

The convenience and fuel retailing industry, which sells 80 percent of the fuel in the Nation to 117,000 outlets, has a unique perspective on the future of transportation fuels. Let me start by stating that we support the use of renewable fuels and are working hard to expand their use for the motoring public. However, we are in the customer service business and have to make decisions every day regarding what products to sell and which services to offer our customers.

Choosing to sell a new fuel is very different than choosing to sell a new candy bar. As new fuels come under the market, we want to have a reasonable expectation that we will be able to generate a return on our investment and we will have the option to sell them while being in compliance with all laws and regulations. But to do this we need your assistance.

I would like to highlight some of the issues retailers face when considering whether to sell a new fuel. To illustrate my points, I will use E–15 just as an example, but these issues can be applied to almost any other fuel that is being developed. First off is compatibility. By law, all of the fueling equipment I use at my stores must be listed by underwriter's laboratories as compatible with that liquid. If I use nonlisted equipment I violate OSHA regulations, tank insurance policies, and other regulatory requirements.

Because UL will not recertify any existing equipment even if it is technically compatible with the new fuel, my only legal option is to replace my dispensers. This could cost me about $20,000 per unit or roughly $80,000 to $100,000 per store depending on the number of dispensers. Further, if my underground equipment is not listed for E–15 I would have to replace that as well. Once we start breaking open concrete, my costs could easily exceed $100,000 per site. So offering E–15 could become very expensive.

But if I choose to make this investment I am then faced with a second issue: misfueling. Under EPA's partial waiver, only certain engines are authorized to fuel with E–15. So how do I prevent the consumer from buying the wrong product? If I don't I could be fined or sued under the Clean Air Act or if using the wrong fuel causes engine problems I could be sued by the consumer or the word could spread that my fuel causes engine damage. But let's say I am willing to take this chance. I come to my third issue and that is long term liability exposure.

What if the future of E–15 is determined defective? There is significant concern that such a change in the law would be retroactively applied to any who manufactured, distributed, blended, or sold the product in question. We have experience with this situation and it is a major concern. Now if I am willing to change my

equipment and accept these liability risks I have to ask myself will my customers purchase the fuel. It is important to note that this is the first fuel transition in which no person is required to purchase the fuel, so there are no assurances of consumer demand.

It is also important to remember that E–15 is approved by the EPA for only certain vehicles and that the auto manufacturers do not support this decision. So it is almost impossible for me to evaluate consumer demand and this creates a great deal of uncertainty. This leads me to what Congress can do to help retailers like me reach a decision that will help renewable fuels growth in our country. Congress can take the following actions to lower the cost of entry and my exposure to unreasonable liability.

First, authorize an alternative method for certifying retail equipment. Last Congress Representatives Mike Ross and John Shimkus introduced H.R. 5778 which would do this. Secondly, insure that retailers that comply with the EPA's labeling regulations cannot be held liable for self service customer misfueling of nonapproved engines. H.R. 5778 also included provisions for this. Third, provide regulatory and legal certainty that compliance with certain laws and regulations will protect us from retroactive liability should the laws and regulations change at some time in the future. And finally, support the development of vehicle and infrastructure combatable fuels also known as drop-in fuels.

If Congress takes these actions to lower the cost of entry and to remove the threat of unreasonable liability more retailers may be willing to take a chance and offer new renewable fuels. The market then will be able to determine the fate of the new fuels. Thank you for the opportunity to share my perspectives.

[The prepared statement of Mr. Miller follows:]

NACS®

Statement of

Jeffrey Miller,
President of Miller Oil Company, Norfolk, VA

On behalf of the

National Association of Convenience Stores (NACS)

Before the

House Energy and Commerce Committee,
Subcommittee on Energy and Power

May 5, 2011

Hearing on

"The American Energy Initiative"

The Association for Convenience & Petroleum Retailing
1600 Duke Street • Alexandria, VA 22314-3436 • (703) 684-3600 • FAX (703) 836-4564 • www.nacsonline.com

INTRODUCTION

Chairman Whitfield, Ranking Member Rush, members of the Subcommittee. My name is Jeff Miller. I am President of Miller Oil Company headquartered in Norfolk, VA. My company operates 34 stores in Virginia and 2 in Florida. In addition, we supply fuel to 65 independent retail operators in Virginia and 40 in Florida. I also currently serve as Chairman of the National Association of Convenience Stores (NACS).

NACS is an international trade association comprised of more than 2,200 retail member companies and more than 1,800 supplier companies doing business in nearly 50 countries. As of December 31, 2010, the U.S. convenience and fuel retailing industry operated 146,341 stores of which 117,297 (80.2%) sold motor fuels. In 2009, our industry generated $511 billion in sales (one of every 28 dollars spent in the United States), employed more than 1.5 million workers and sold approximately 80% of the nation's motor fuel.

Thank you for the opportunity to testify today on the topic of renewable and alternative fuels.

Our industry is committed to complying with today's laws and regulations, to provide our customers with the best products and services we can offer and to adapt to new technologies and market opportunities. My company is constantly striving to identify the best new products and services we can bring to our stores. Consequently, we are not beholden to any specific product – we simply want to sell what our customers want to buy and, as new fuels come onto the market, we want to have the legal option to sell them. To accomplish this, we will need Congressional assistance to remove existing barriers to new market opportunities.

I would like to focus my comments today on the current situation facing the retail marketplace and then present some recommendations for Congress as you consider options for increasing the use of alternative and renewable fuels.

COMPOSITION OF THE RETAIL FUELS MARKET

To fully understand how fuels enter the market and are sold to consumers, it is important to know who is making the decision at the retail level of trade.

Our industry is dominated by small businesses. In fact, of the 117,297 convenience stores that sell fuel, 57.5% of them are single-store companies – true mom and pop operations. Overall, nearly 75% of all stores are owned and operated by companies my size or smaller – and we all started with just a couple of stores.

Many of these companies – mine included – sell fuel under the brand name of their fuel supplier. This has created a common misperception in the minds of many policymakers and consumers that the large integrated oil companies own these stations. The reality is that the majors are leaving the retail market place and today own and operate fewer than 2% of the retail locations. Although a store may sell a particular brand of fuel associated with a refiner – I operate under the Shell, BP and Exxon brands - the vast majority are independently owned and operated like mine. Our relationship to the brand we sell ends there – it is a brand.

We are in the customer service business. We have to make decisions each day regarding what products to sell and which services to offer our customers, and we often take some risks – you cannot be successful without doing so. But taking a chance by offering a new candy bar is very different from switching my fueling infrastructure to accommodate a new fuel. So when a new fuel product becomes available, our decision to offer it to our customers takes more time. We need to know that our customers want to buy it, that we can generate enough return to justify the investment, and that we can sell the fuel legally. These are the fundamental issues that face the introduction of new renewable and alternative fuels.

CURRENT RENEWABLE AND ALTERNATIVE FUEL OPTIONS

Today, most of the fuel sold in the United States is blended with 10% ethanol. The transition to this fuel mix was not complicated, but it was not without challenges. When ethanol became more prevalent in my market, we realized what a powerful solvent it is. Ethanol forced us to clean our storage tanks and change our filters frequently to avoid introducing contaminants into the fuel tanks of our customers' vehicles. Despite our best efforts, however, there were times when the fuel a customer purchased caused problems with their vehicles. In those situations, it was our responsibility to correct the damage. And while the transition to E10 required no significant changes to equipment or systems, it taught us some lessons that influence our decisions concerning new fuels.

Retailers are now hearing reports from Washington that the use of fuel containing 15% ethanol is authorized. Some of our equipment manufacturers are telling us that our equipment can accommodate these fuels and that some dispenser warranties have been extended to cover 25% ethanol blends. Ethanol advocacy groups are marketing a Blend Your Own Ethanol program to encourage retailers to use blender pumps to sell higher ethanol blended fuels. There is a lot of encouraging news and reports – but this is really only confusing the situation.

We know there are several challenges we must overcome to sell new fuels and we need your help to do so. Unfortunately, some think that discussing such challenges is undermining the value of the new fuel under consideration. That is simply not the case. Rather, how can credible challenges be overcome if they are not discussed and made part of the strategy to implement new fuel programs? So, I would like to highlight some of the issues retailers face when considering whether to sell a new fuel. To illustrate my points, I will use E15 as the fuel under consideration – but these issues can be applied to almost any other fuel that is being developed.

COMPATIBILITY

By law, all equipment used to store and dispense flammable and combustible liquids must be certified by a nationally recognized testing laboratory[1] as compatible with that liquid.

Currently, there is essentially only one organization that certifies our equipment – Underwriters Laboratories (UL). UL establishes specifications for safety and compatibility and runs tests on equipment submitted by manufacturers for UL listing. Once satisfied, UL lists the equipment as meeting a certain standard for a certain fuel.

---

[1] 29CFR1926.152(a)(1) "Only approved containers and portable tanks shall be used for storage and handling of flammable and combustible liquids." "Approved" is defined at 29CFR1910.106 (35) "Approved unless otherwise indicated, approved, or listed by a nationally recognized testing laboratory."

Prior to last spring, however, UL had not listed a single motor fuel dispenser (a.k.a, pump) as compatible with any fuel containing more than 10% ethanol. This means that any dispenser in the market prior to last spring – which would represent the vast majority of my dispensers - is not legally permitted to sell E15, E85 or anything above 10% ethanol – even if it is technically able to do so safely.

If I use non-listed equipment, I am in violation of OSHA regulations and may be violating my tank insurance policies, state tank fund program requirements, bank loan covenants, and potentially other local regulations. Furthermore, if my store has a petroleum release from that equipment, I could be sued on the grounds of negligence for using non-listed equipment, which would cost me significantly more than the expense of cleaning up the spill.

So, if none of my dispensers are UL-listed for E15, what are my options?

Unfortunately, UL will not re-certify any equipment. Only those units manufactured after UL certification is issued are so certified – all previously manufactured devices, even if they are the same model, are subject only to the UL listing available at the time of manufacture. This means that no retail dispensers, except those produced after UL issued a listing last spring, are legally approved for E10+ fuels.

In other words, the only legal option for me to sell E15 is to replace my dispensers with the specific models listed by UL. On average, a retail motor fuel dispenser costs approximately $20,000.

It is less clear how many of my underground storage tanks and associated pipes and lines would require replacement. Many of these units are manufactured to be compatible with high concentrations of ethanol, but they may not be listed as such. In addition, the gaskets and seals may need to be replaced to ensure the system does not pose a threat to the environment. If I have to crack open concrete to replace seals, gaskets or tanks, my costs can escalate rapidly and can easily exceed $100,000 per location.

MISFUELING

The second major issue I must consider is the effect of the fuel on customer engines and vehicles. Having dealt with engine problems associated with fuel contamination following the introduction of E10, I am very concerned about the potential effect a fuel like E15 would have on vehicles. The EPA decision concerning E15 is very challenging. Under EPA's partial waiver, only vehicles manufactured in model year 2001 or more recently are authorized to fuel with E15. Older vehicles, motorcycles, boats, and small engines are not authorized to use E15.

How am I supposed to prevent the consumer from buying the wrong fuel? I can deal with the responsibility for fuel quality and contamination control, but self-service customer misfueling is a much more difficult challenge to control.

In the past, when we have introduced new fuels – like unleaded gasoline or ultra-low sulfur diesel - they were backwards compatible; i.e. older vehicles could use the new fuel. In addition, newer vehicles were required to use the new fuel, creating a guaranteed market demand.

Such is not the case with E15 – legacy vehicles are not permitted to use the new fuel. Doing so will violate Clean Air Act standards and could cause engine performance or safety issues. Yet, there are no viable options to retroactively install physical countermeasures to prevent misfueling. Consequently, my risk of liability if a customer uses E15 in the wrong engine – whether accidentally or intentionally - is significant.

First of all, I could be fined under the Clean Air Act for misuse of the fuel – this has happened before. When lead was phased out of gasoline, unleaded fuel was more expensive than leaded fuel. To save a few cents per gallon, some consumers physically altered their vehicle fill pipes to accommodate the larger leaded nozzles either by using can openers or by using a funnel while fueling. Retailers had no ability to prevent such behavior, but the EPA often levied fines against retailers for not physically preventing the consumer from bypassing the misfueling countermeasures.

My understanding is EPA has told NACS that the agency would not be targeting retailers for consumer misfueling. But that provides me with little comfort – EPA policy can change in the absence of specific legal safeguards. Further, the Clean Air Act includes a private right of action and any citizen can file a lawsuit against a retailer who does not prevent misfueling. Whether the retailer is found guilty does not change the fact that defending against such claims can be very expensive.

Finally, I am very concerned about the effect of E15 in the wrong engine. Using the wrong fuel could void an engine's warranty, cause engine performance problems or even compromise the safety of some equipment. A consumer may seek to hold me liable for these situations even if my company was not responsible for the misfueling. Defending my company against such claims is financially expensive, but also expensive from a customer-relations perspective.

GENERAL LIABILITY EXPOSURE

Retailers are also concerned about long-term liability exposure. Our industry has experience with being sued for selling fuels that were approved at the time but later ruled defective. What assurances are there that such a situation will not repeat itself with new fuels being approved for commerce?

For example, E15 is approved only for certain engines and its use in other engines is prohibited by the EPA due to associated emissions and performance issues. What if E15 does indeed cause problems in non-approved engines or even in approved engines? What if in the future the product is determined defective, the rules are changed and E15 is no longer approved for use in commerce? There is significant concern that such a change in the law would be retroactively applied to any who manufactured, distributed, blended or sold the product in question.

Retailers are hesitant to enter new fuel markets without some assurance that our compliance with the law today will protect us from retroactive liability should the law change in the future. It

seems reasonable that law abiding citizens should not be held accountable if the law changes in the future. Congress could help overcome significant resistance to new fuels by providing assurances that market participants will only be held to account for the laws as they exist at the time and not subject to liability for violating a future law or regulation.

MARKET ACCEPTANCE

The final challenge we face is the rate at which consumers will adopt the new fuels. Assume all the other issues are resolved, I have to ask myself: Will my customers purchase the fuel? It is important to note that this is the first fuel transition in which no person is required to purchase the fuel, unlike prior transitions to unleaded gasoline and ultra-low sulfur diesel fuel.

In the situation facing E15, only a subset of the population (about 65% of vehicles) is authorized to buy it. Yet the auto industry is not fully supportive of its use in anything except flexible fuel vehicles (about 3% of vehicles). This situation could dramatically reduce consumer acceptance. The risk of misfueling and potentially alienating customers if E15 causes performance issues also is a serious concern.

With these unknowns, how can I calculate an accurate return on my investment to install E15 compatible equipment? Again, this is not like offering a new candy bar – to sell E15 I will likely have to spend significant resources.

As new fuels enter the market, their compatibility with vehicles and their performance characteristics compared to traditional gasoline will be critically important to determining consumer acceptance. In addition, the cost of entry for retailers will influence the return on investment calculations required to determine whether to invest in the new fuel.

OPTIONS

NACS believes there are options available to Congress to help the market overcome these challenges. I have referenced E15 in this testimony because it is a fuel with which we are all familiar due to its current considerations at EPA. However, E15 alone will not satisfy the renewable fuel objectives of the country. Other products must be brought to market and how they interact with the refueling infrastructure and the consumer's vehicles should be critical considerations to Congress when deciding whether to support their development and introduction.

Regardless which fuels are introduced in the future, the following recommendations can help lower the cost of entry and provide retailers with greater regulatory and legal certainty necessary for them to offer these new fuels to consumers:

- First, because UL will not retroactively certify any equipment, Congress should authorize an alternative method for certifying legacy equipment. Such a method would preserve the protections for environmental health and safety, but eliminate the need to replace all equipment simply because the certification policy of the primary testing laboratory will not re-evaluate legacy equipment. NACS was supportive of legislation introduced in the House last Congress Reps. Mike Ross (D-AR) and John Shimkus (R-IL) as H.R. 5778. This bill directed the EPA to develop guidelines for determining the compatibility of

equipment with new fuels and stipulates equipment that satisfied such guidelines would thereby satisfy all laws and regulations concerning compatibility.

- Second, Congress can require EPA to issue labeling regulations for fuels that are authorized for only a subset of vehicles and ensure that retailers who comply with such requirements satisfy their requirements under the Clean Air Act and protect them from violations or engine warranty claims in the event a self-service customer ignores the notifications and misfuels a non-authorized engine. H.R. 5778 also included provisions to achieve these objectives.

- Third, Congress can provide market participants with regulatory and legal certainty that compliance with current applicable laws and regulations concerning the manufacture, distribution, storage and sale of new fuels will protect them from retroactive liability should the laws and regulations change at some time in the future.

- Finally, Congress should evaluate the prospects for the marketing of infrastructure-compatible fuels and support the development of such fuels. These could aid compliance with the renewable fuels standard and save retailers, engine makers and consumers billions of dollars. Policymakers might consider establishing characteristics that new fuels must possess so that equipment and engines can be manufactured or retrofitted to accommodate whichever new fuel provides the greatest benefit to consumers and the economy.

If Congress takes action to lower the cost of entry and to remove the threat of unreasonable liability, more retailers may be willing to take a chance and offer a new renewable fuel. By lowering the barriers to entry, Congress will give the market an opportunity to express its will and allow retailers to offer consumers more choice. If consumers reject the new fuel, the retailer can reverse the decision without sacrificing a significant investment, but new fuels will be given a better opportunity to successfully penetrate the market.

The nation's convenience and fuel retailers are ready to assist Congress in its consideration of policies that will promote a stable and efficient market for transportation fuels. There are many factors to consider and we hope that policymakers will proceed cautiously and avoid imposing unnecessary and costly burdens on the system.

I hope my comments on the current status of the fuels market and the prospects for future use of alternative and renewable fuels have been constructive.

I thank you for the opportunity testify today and look forward to answering any questions you might have.

Mr. WHITFIELD. Thank you very much. Mr. O'Connell, you are recognized for 5 minutes.

STATEMENT OF DIARMUID O'CONNELL

Mr. O'CONNELL. Thank you very much. Start again. Thank you very much, Mr. Chairman, distinguished members of the committee. It is an honor to be here as a representative of the electric vehicle industry, an emerging industry and of the leader of the technology leader in that industry Tesla Motors, a California based company.

Tesla Motors was founded in 2003, 2004 by a group of entrepreneurs, engineers, and venture capitalists with the idea of creating a company to achieve the mission of catalyzing the market for electric vehicles. The motivation behind this mission was a combination of factors. One, our analysis of the cost of the dependence effective monopoly of oil in our transportation infrastructure and the fact that has as many of our representatives have mentioned; a serious negative economic, environmental, and perhaps most importantly national security implications, I myself having come from out of the national security sector to this situation.

Also there is a fact of an absence by virtue of this monopoly and by virtue of the policy that is effectively supportive of an incumbent lack of a market or policy signal that we are seriously interested in approaching any of these advanced technology fuels or vehicles in a serious fashion. Also, in terms of facilitating factors is the emergence of a new suite of battery technologies, batteries having been the major gating factor for electric vehicles over the course of time. As the Chairman's mentioned, electric vehicles have been on the scene since as early as the turn of the last century and were a serious contender absent the emergence of a facilitating battery technology to be the car of the future in the early 1900s.

But the fact is that a new suite of lithium ion battery technology largely growing out of the demand for consumer—mobile consumer electronics has made a new class of electric vehicles possible. Plus in terms of technology addressing such issues as range as well as increasingly addressing the important issues of economic access.

Finally and perhaps most importantly was the suitability of our project to the application of the disruptive technology introduction model. This is the model of bringing together innovation, venture capital, and available bench technologies which has led to the emergence of just about every industry that we have either mentioned here today or could think of. Most recently in mobile technology whether it is the cell phone, the personal computer, or all the associate technologies there, but going back even further in history the fashion in which airline travel became a commercial reality. Or in the automotive sector the fashion in which safety technology such as airbags and antilock brakes have emerged. And that is that initial technology, early technology tends to be expensive. It is expensive because of the substantial investments that we make in the R&D. It is also expensive because economies of scale and manufacturing are not available for widespread deployment and thus early unit costs are low.

So in just about all of these technologies and services that I have just referenced initial costs were high. It was effectively a luxury

item or characterized as such accessible only to wealthy early adopters. But with commercial viability proven at that point, further investments are attracted to the project, economies of scale are increasingly achieved, but most importantly iteration of that technology, improvement of that technology is achieved. You will note that the early generations of this technology, the 1984 version of the cell phone were substantially bigger and more cumbersome, also much more expensive.

Tesla Motors has made great progress over the course of time. Our first project was to develop an electric drive train that would achieve the necessary efficiency and cost profile. Our second project was to deploy it. And our first car, the Tesla Roadster, which is a vehicle which there are over 1,600 vehicles on the road in over 30 countries. Our third project is to develop an electric vehicle sedan, less than half as expensive as the Tesla Roadster at less than $50,000 which will optimize the vehicle to the power train in the same fashion that cars optimized the early internal combustion technology evolved from horse carriages powered by internal combustion engines to more suitable platforms.

Along the way, we have attracted serious investment interest and validation from the auto industry. Daimler has invested in our company almost $50 million, so too, Toyota. Both of those companies are customers for our technology. Their deploying our batteries and our power trains in their own EVs and this is helping us to achieve on an accelerated basis our overall goal which is to create a mass market for EVs. We are getting there on our own by making increasingly larger volumes of lower cost vehicles. But the way that we are working with the industry to effectively borrow their economies of scale to allow them to put their own vehicles on the road. And already on the road is the Smart under the Daimler family, the Smart EV in the U.S. and Europe. They are deploying an A class vehicle in Europe and coming next year will be the Toyota RAV4 SUV powered entirely by a Tesla developed and manufactured drive train.

One other point I would like to make and that is with respect to infrastructure. In truth, electricity is in terms of its feedstock and as my friend Pat Davis mentioned, it is mixed. The ultimate flex fuel vehicle in that the grid is powered by diversity of historic and new technologies, those will only get cleaner and better over the course of time. And it is—the infrastructure is already in place. Mr. Chairman, you could plug one of our cars into the outlet behind you and charge that. That exits in every home in America and requires no investment in large scale infrastructure. Thank you very much.

[The prepared statement of Mr. O'Connell follows:]

Testimony before the House Committee on Energy and Commerce, (May 5, 2011)
Diarmuid O'Connell, Vice President, Teals Motors Inc

The Promise of Electric Vehicles

The Problem – The Oil Monopoly in Transportation

We have arrived today as a nation at a place where we are no longer in control of our own destiny. Due to a convergence of geopolitical, macroeconomic, natural resource and environmental issues, we find ourselves overwhelmingly dependent on a dwindling economic resource which is controlled by largely inimical foreign actors and the competition for which is increasing at a radical and accelerating rate. Oil, the natural resource upon which the growth and strength of our national economy and our global dominance was built is now the source of our greatest vulnerability from the perspective of both national and economic security.

The facts are plain. Where once we were a surplus producer of oil, we have since the 1970's, become a net importer wherein the delta between our domestic supplies and domestic demand is continuing to grow. More broadly, most projections for the known attainable global supply of this resource suggest that we are at or near the historical peak of discovery and production. All of this at a time when literally billions of new consumers are emerging out of poverty in China, India and other parts of the developing world to demand the basics of a modern middle class lifestyle – the universal totem of which is the automobile. Competition for this increasingly scarce resource is accelerating at an alarming pace and while that competition has thus far expressed itself in largely economic terms, there is every expectation that that competition will increasingly manifest itself in kinetic and mortal terms - if it hasn't already. Our national economy is subject to the wild swings and volatility of oil prices as experienced in the oil shocks of the 70's, the price spikes of 2008 and today - even as a fragile economic recovery from an historic recession is clawing for life. And this is to say nothing of the environmental effects that attend the proliferation of internal combustion of oil and gasoline in the tens of millions of new cars that hit the road every year and in the risks attendant in the exploration and production of oil in increasingly remote and challenging venues.

To say that we do not have a strategic problem is to bury one's head in the sand and deny basic realities and plain facts. And while one might argue (as some do) that policies such as the increase of domestic production ("Drill Baby Drill") can improve the basic equation of supply and demand in the short run, such measures are pitifully marginal in the global scheme of supply and demand of a global commodity and even in the best case scenario simply kick the can down the road for our children to address – the same children who if we are not proactive and responsible will in the best case live lives of diminished economic opportunity and lifestyle and in the worst case will be issued a gun to go compete for this resource in the far and hostile reaches of the world.

The following contains proprietary information that Tesla Motors, Inc. requests not be released to persons outside the Government, except for purposes of review and evaluation.

The Opportunity – Electric Vehicles

Against all of this doom and gloom, there is (as always) a sound, analytical and strategic fashion in which this problem can be approached and redressed. In the U.S, over 70% of all oil consumption takes place in the transportation sector. Moreover, within that sector, more than half of that oil is consumed as gasoline (or like derivatives) in passenger cars and light trucks. A sound strategic approach thus focuses on this sector as the point for greatest leverage, i.e. if you can radically reduce oil consumption in this class of vehicles, you will have the greatest catalytic and accelerative effect. Moreover, there are a host of potential alternatives the gasoline internal combustion engine (ICE), including, ethanol, biofuels, fuel cells, hybridized drive trains and so-called "clean diesel technologies. However, the hands-down winner among all of these based on a matrixing of cost, mechanical efficiency, emissions reduction and overall capability is the battery powered electric vehicle ("EV" or "BEV").

EV's are not new technology, per se. There was a time at the advent of the automobile where there were nearly as many EV's on the road as ICE's. EV's have many advantages, At the engine/motor level, EV's are as much as 4X as efficient as ICE's due in no small part to the radical reduction of moving parts - EV motors have one part – the result of which is that there is less friction heat (waste) loss and thus more than 4X of the source energy is delivered as mechanical energy to turn the wheels. EV's burn ZERO oil as they operate and even in the worst electrical generations scenario – i.e. if you plug them into the dirtiest sector of the national grid, they produce the lowest emissions per mile travelled. Moreover, distribution of electricity is pervasive and ubiquitous – even more so than gasoline stations – where an EV, properly engineered, can be easily and charged in the home environment, thus obviating the need for massive infrastructure investment by either public or private entities. In fact, with the torque profile of an electric motor, it is even arguable that one can make a better more exciting automobile based on an EV powertrain.

The one factor that has held back the meaningful market penetration of EV's has been the limitations of battery technology to produce a vehicle capable of long range driving and/or rapid refueling. Happily, there have been radical improvements in this sector in recent years. Owing to the global demand for mobile rechargeable electronic devices such cell phones, lap tops and video devices, new classes and chemistries of battery technology have emerged such as the family of lithium ion technologies. These batteries have radically improved our ability to store large quantities of electrical energy for long periods of time.

Tesla Motors has been the pioneer in transitioning these new battery chemistries and form factors to the automotive industry. We are commercializing our technology advances by pursuing the proven technology introduction model that has led to the widespread commercialization of airline travel, lap tops, cell phones, air bags and anti-lock brakes, wherein first generation technology is introduced at high price points and in limited quantities and consumed by early adopters thereby permitting the iteration and cost and capability improvement the technology and applying economies of scale to achieve lower price points and higher volumes. We firmly believe that we are setting the table for the mass adoption of a new generation of EVs. Our mission is to catalyze the development of a mass market for electric vehicles and to do so as rapidly as possible.

The following contains proprietary information that Tesla Motors, Inc. requests not be released to persons outside the Government, except for purposes of review and evaluation.

Creating an EV Mass Market – Tesla Motors the Technology Leader and Market Catalyst

Tesla Motors designs, develops, manufactures and sells high-performance fully electric vehicles and advanced electric vehicle powertrain components. We have intentionally departed from the traditional automotive industry model by both exclusively focusing on electric powertrain technology and owning our vehicle sales and service network. We were the first company to commercially produce a federally-compliant highway-capable electric vehicle, the Tesla Roadster, which combines a market-leading range on a single charge (245 miles) with attractive design, driving performance and zero tailpipe emissions.

Introducing the Tesla Roadster required us to develop a proprietary electric powertrain that incorporates four key components—an advanced battery pack, power electronics module, high-efficiency motor and extensive control software. We believe the core intellectual property contained within our electric powertrain will form the foundation for our planned future vehicles. Since our team combines the innovation and speed to market characteristics of Silicon Valley firms with the experience of leading automotive companies, we believe that we will be able to rapidly and cost effectively introduce additional vehicles, such as our planned Tesla Model S sedan, and stay at the forefront of the electric automobile industry.

We operate in a fundamentally different manner and structure than traditional automobile manufacturers to pursue what we believe is a historic opportunity—to create an integrated company which successfully commercializes electric vehicles without compromising on range, performance or styling. In addition to designing and manufacturing our vehicles, we sell and service them through our own sales and service network. This is different from the incumbent automobile companies in the United States who typically franchise their sales and service. We believe our approach will enable us to operate more cost effectively, provide a better experience for our customers and incorporate customer feedback more quickly into our product development and manufacturing processes. We are continuing to expand our distribution network globally and as of May 1st, 2011, operated 18 Tesla stores in North America, Europe and Asia.

The following contains proprietary information that Tesla Motors, Inc. requests not be released to persons outside the Government, except for purposes of review and evaluation.

First Generation Vehicle – Tesla Roadster

The Tesla Roadster, our first vehicle, showcases our technology and illustrates our leadership in electric vehicle innovation. Introduced in 2008, the Tesla Roadster can accelerate from zero to 60 miles per hour in 3.7 seconds and produces zero tailpipe emissions. The Tesla Roadster has a battery pack capable of storing approximately 53 kilowatt-hours (kWh) of usable energy, almost double the energy of any other commercially available electric vehicle battery pack. The Tesla Roadster has a range of 245 miles on a single charge, as determined using the United States Environmental Protection Agency's, combined two-cycle city/highway test. The Tesla Roadster reportedly set a new world distance record of 313 miles on a single charge for a production electric car in a rally across Australia as part of the 2009 Global Green Challenge. To date, our customers have driven their Tesla Roadsters an estimated aggregate of over 10 million miles. With the active cooperation of our customers we are collecting the data and associated learning from these vehicles miles driven to improve and optimize our new powertrain components and vehicles.

The Company will continue to introduce its cars and powertrain components to an ever-growing pool of consumers, ensuring both the sustained growth of the company and the growth in the total number of electric miles driven worldwide. Tesla Motors' strategy to enter at the high end of the automobile market has demonstrated the viability of its technology, catalyzed the automotive industry, and excited American consumers about the vast potential for advanced technology vehicles. In fact, the Tesla Roadster was named the second best invention of 2008 by *Time Magazine*. Bob Lutz, the Vice chairman of General Motors, confirmed Tesla's success in an interview with *Newsweek*, saying *"If some Silicon Valley start-up can solve this equation, no one is going to tell me anymore that it's [the production of an electric automobile] unfeasible."* As a result of Tesla's accomplishments, General Motors has introduced the Chevy Volt, a hybrid-electric vehicle, in 2010.

In July 2009, less than one year after the date of the commercial introduction of the Tesla Roadster, we introduced a new Roadster model, the Tesla Roadster 2, with improved electric powertrain performance and interior styling, and lower

The following contains proprietary information that Tesla Motors, Inc. requests not be released to persons outside the Government, except for purposes of review and evaluation.

production costs. At the same time we introduced the Roadster Sport, which accelerates from zero to 60 miles per hour in 3.7 seconds. We delivered our first right-hand drive model of the Tesla Roadster in January 2010, which we believe further demonstrates our ability to rapidly launch new products. Using a 240-volt, 40-amp outlet that is widely available in many homes in the United States for electric appliances, charging the Tesla Roadster battery pack to full capacity will take approximately 7 hours, which can be reduced to 4.5 hours with a professionally installed 70 amp circuit. As of Aug 31, 2010 we had sold 1,270 Tesla Roadsters to customers in 22 countries.

Second Generation Vehicle – Tesla Model S

We intend to continue to develop our electric powertrain technology and introduce additional vehicles, such as the Model S sedan, currently under development. The Model S is a four-door, five-passenger premium sedan that offers exceptional performance, functionality and attractive styling with zero tailpipe emissions at a compelling cost of ownership. We are designing the Model S to include a third row with two rear-facing child seats, subject to applicable safety regulations and requirements, allowing us to offer a seven passenger sedan. The drivable early prototype of the Model S was revealed to the public in March 2009 and despite a limited marketing effort, as of May 1st, 2011, we had received over 4600customer reservations with a minimum refundable payment of $5,000.

The Model S, which will compete in the premium vehicle market, has a significantly broader customer base than the Tesla Roadster. We currently intend to begin volume production of the Model S in 2012 with a target annual production of up to approximately 20,000 cars per year. We currently anticipate the base Model S will have an effective price of $49,900 in the United States, assuming and after giving effect to the continuation of a currently available United States federal tax

The following contains proprietary information that Tesla Motors, Inc. requests not be released to persons outside the Government, except for purposes of review and evaluation.

credit of $7,500 for the purchase of alternative fuel vehicles. Even without this tax credit, we believe the Model S will be competitive from a pricing perspective with other premium vehicles.

In order to meet customer range expectations, we are designing the planned Model S to offer a variety of range options from 160 miles to 300 miles on a single charge, as projected using the EPA's combined two-cycle city/highway test. The EPA has announced its intention to develop and establish new energy efficiency testing methodologies for electric vehicles, which we believe could result in a decrease to the advertised ranges of all electric vehicles, including ours. The Model S is being designed to be charged at home, but we are also planning to offer the capability to fast charge the vehicle in as little as forty-five minutes at commercial charging stations that we anticipate may be available in the future. The Model S battery pack is also being designed with the capability of being rapidly swapped out at specialized commercial battery pack exchange facilities that we anticipate may be available in the future.

The Model S is designed to have an adaptable platform architecture and common electric powertrain in order to allow us to efficiently create other electric vehicles, which may include, as examples, a crossover/sport utility vehicle, van or a cabriolet. By developing our future vehicles from this common platform, we believe we can reduce their development time and, as a result, reduce the required additional capital investment. Our long-term goal is to offer consumers a full range of electric vehicles, including a product line at a lower price point than the planned Model S. In May 2010, we publicly announced our intent to develop a third generation electric vehicle to be produced at our manufacturing facility in Fremont, California. We intend to offer this vehicle at a lower price point and expect to produce it at higher volumes than our planned Model S. We expect that this vehicle will be produced in Q3 2015, a few years after the introduction of the Model S.

Tesla Motors technology leadership and business prospects are further enhanced by the fact that 2 of the leading global automakers, Daimler AG (parent of Mercedes Benz) and Toyota Motors Corporation have both invested in Tesla as has the global leader in battery technology, Panasonic. But of perhaps greater import is the fact that both Daimler and Toyota purchase and deploy Tesla Motors EV powertrains in their own branded EVs. This is a powerful testament to the Tesla's technology leadership but also helps us to fulfill our mission to accelerate the advent of capable and low cost EVs as both Daimler and Toyota can apply their already low cost production models and deliver more price accessible EV's while Tesla is building that same capacity internally to create low cost Tesla branded offering. Tesla batteries and charging technology can be found in the Daimler's Smart EV and Mercedes A-Class vehicles and Tesla has developed the full powertrain for an EV version of the Toyota RAV4 which will go on sale in early 2012.

What Policy Works

Introducing an early stage technology product to the market and obtaining some traction for it is always a challenge. But when the incumbent technology enjoys a duration of primacy, an imbedded low cost infrastructure and market penetration such as that enjoyed by oil, the challenge is indeed daunting. Moreover, when one adds in the fact that oil and gas

The following contains proprietary information that Tesla Motors, Inc. requests not be released to persons outside the Government, except for purposes of review and evaluation.

interests have a virtual monopoly on the energy and transportation policy and regulatory arena, the task looks virtually insurmountable.

Tesla Motors was launched out of the purest of free market financing models – the application of risk capital to a promising new technology – venture capital. Our long term success will only be insured by the adoption of our product by paying consumers and our ability to make and sustain a product while delivering it on a profitable basis. However, for this and other promising early stage energy technologies to gain a foothold in a market that it is monopolized by the mega-incumbents, policy makers and legislators must take action and create breathing room for these new technologies to gain a foothold in the commercial marketplace. This must happen if we ever have a hope to achieve the larger national and economic security advantages of a diversified transportation energy sector. So what can be done?

Economists would tell you that the strict application of objective principles in support of such a diversified energy sector would involve the application of a tax on the incumbent technology - petroleum. At a philosophical level, this would have the effect of pricing in the moral hazard associated with low cost gasoline and more explicitly reflect the externalities that are not priced into the cost of gasoline at the pump in the U.S. Moreover, there is empirical evidence that such policy works. The application of meaningful gas taxes in Europe and Japan have resulted in the emergence and meaningful market presence of multiple advanced technology vehicles on the roads there. These include hybrid technology in Japan where the hybrid Toyota Prius has been the leading car purchase in recent years and in the dominance of clean diesel vehicles in Europe. In both cases these societies have recognized their vulnerability as non-petroleum producers and have taken active steps to spur alternatives. For the same reasons, China has recently announced plans to mandate the development of an EV market as a response to their poor domestic oil supplies and their crushing problems with environmental degradation. But politician will quickly point to the fact that a gas tax is never going to happen in the U.S., or at the very least not until or unless we are faced with a pressing national security or economic crisis.

Where that leaves us is the implementation of modifications to the tax code with the goal being help to ameliorate the initially high cost early generation vehicles so that enough of them get on the road for consumers to try them and like them and for producers to be able to justify the billion dollar investments in design and tooling for newer, better, cheaper EV's. This is a model that worked successfully to spur the market for hybrid technology – an income tax credit that phased out with time and as certain volumetric milestones were achieved. There is currently such an EV tax credit on the books, but it is imprecise in its methodology and does not fully incentivize the desired technology development. Its flaw is that it caps the available credit value at a battery pack size of roughly 17 kilowatt hours (KwH). In contrast, given the fact that the more KwH's of storage on board results in fewer oil driven miles, a well constructed tax credit would not cap the KwH credit and instead would reward each onboard KwH. This would incentivize the right behavior and would address the most important and currently most expensive component in the car – the battery.

Access to low cost capital to incentivize manufacturers to invest in the development and manufacture of EV's and other plug –is is also of critical importance. In this respect, the DOE's Advanced Technology Vehicles Manufacturing Program is a model for how the USG can through commercial style loans, accelerate the development of viable electric vehicles.

The following contains proprietary information that Tesla Motors, Inc. requests not be released to persons outside the Government, except for purposes of review and evaluation.

Finally there are a number of low cost local market policies that can help to encourage the adoption and trial of EV's. In this regard, access to HOV lanes on commuter arteries and free parking in densely populated areas already serve to incentivize EV adoption in places where they are applied.

What's the Point?

If you don't believe that there is anything wrong with the monopoly that oil has on our transportation sector, if you don't believe that we spend at least $75B in our national defense budget every year on securing access to foreign sources of oil and associated supply routes, if you believe it's okay that our domestic economy is buffeted be the least disturbance in the oil supply market and that the average American household, spending roughly $4K/year on gasoline, is left vulnerable to dependence on this increasingly scarce resource, then there is nothing that can be said in support of Electric Vehicles that will sway naysayers to support the development of a market for this technology.

If however, one believes in the power of American innovation to fundamentally change and improve our individual lives and our larger societal interests then there is no question that this is the right time to step up and support the development of a viable EV market in the U.S. and to encourage in word and deed the American companies that are fighting to establish this product in the marketplace. If we do not, the proverbial frog will continue to boil...

Mr. WHITFIELD. Thank you. Mr. Kolodziej, you are recognized for 5 minutes.

STATEMENT OF RICHARD KOLODZIEJ

Mr. KOLODZIEJ. Mr. Chairman, Mr. Rush, members of the committee, subcommittee, my name is Rich Kolodziej. I am President of NGVAmerica. We are the National Trade Association for vehicles that are powered by natural gas and biomethane. Thank you for the opportunity to be here today to discuss how increased use of natural gas can reduce our dependence on foreign oil while also reducing greenhouse gas production and reducing urban pollution. And we are doing all this while creating more jobs here at home.

It is now clear that we have massive amount of natural gas right here within America's borders. The U.S. information—Energy Information Administration, the Potential Gas Agency, other expert bodies have now estimated that we have up to 100 years supply of natural gas as technology improves, that number is going to continue to go up.

For petroleum, America must pay a well price which is out of our control. We are a price taker. But because there is no way to ship large quantities of natural gas off of North America, the supply and demand of natural gas here is set by prices here—is actually set to price here. So we have much more supply than we have demand, so natural gas prices are forecast to be way below oil. The question is how do we use all that gas? Well the market tells us that the vehicles, four vehicles that is the highest valued application of all natural gas uses. That is why we are seeing such rapid growth in the NGV market worldwide.

In fact, NGVs are the fastest-growing alternative fuel, alternative to petroleum in the world. In 2003, we had only about 2.8 million NGVs globally. Today we have over 13.2 million, and according to the forecast by the International NGV Association, but 2020, we are going to have 65 million vehicles on the world's roads.

Most of those are smaller sedans, but for a number of reasons including the sheer size of America, the strategy of the U.S. NGV industry has been to focus on high fuel use fleets: trash trucks, transit buses, short haul, 18 wheelers, school buses, urban delivery vehicles, shuttles of all kinds, taxis. We estimate that last year these vehicles used about 43 billion cubic feet of natural gas. That is the equivalent of 320 million gallons of gasoline we did not have to import. However, with proper government policies, the number could reasonable grown to 1.25 trillion cubic feet or the equivalent of about 10 billion gallons within 15 years.

Now some of this will displace gasoline, but the majority would displace diesel. Diesel represents about a quarter of on-road petroleum use. While there are many options to displace gasoline in light duty vehicles, there are very few options to displace diesel in trucks and busses and other heavier vehicles. Of those options, natural gas can make the biggest impact the fastest. This is important since trucks are the economic lifeblood of America. Everything we buy moves by truck. If we reduce the cost of trucking, we reduce the cost of everything and that is going to benefit businesses and consumers alike. And NGVs can help do that.

Right now the cost of NGVs are—the cost to buy an NGV is high. It is higher than gasoline and diesel. But the cost to operate those vehicles is less, therefore, the more miles driven, the faster the payback. For some fleets, the most intensive fuel use fleets, NGVs are economic today. But to expand the use of NGVs and maximize NGVs oil potential—oil displacement potential, we need to bring down the cost of NGVs, that first cost of NGVs. We have to make them more economic for more fleets. And that is going to happen through economies of scale and through a more large scale production. That is why the industry is so excited about the bill recently introduced by Mr. Sullivan, H.R. 1380, the NAT Gas Act of 2011.

That bill would provide federal incentives for the production, purchase, and use of natural gas vehicles and the expansion of NGV fueling infrastructure. That bill which was introduced on April 6 as Mr. Sullivan had mentioned already has 180 bipartisan cosponsors. It would only be in place for 5 years. It is only a 5 year program, but during that time and long thereafter this would make a big impact on the number of NGVs for which the fleets would be found and economically attractive.

This is going to accelerate the NGV use in this country which in turn would bring more NGV manufacturers into the market, increase competition, and drive down that first course premium. NGVs are here and now technology. We don't need any major technological breakthroughs. What we do need is to grow faster and the NAT Gas Act would help jumpstart that growth. Thank you for your attention.

[The prepared statement of Mr. Kolodziej follows:]

NGVAMERICA
Natural Gas Vehicles for America

STATEMENT OF RICHARD KOLODZIEJ

ON BEHALF OF

NGVAMERICA

UNITED STATES HOUSE OF REPRESENTATIVES

ENERGY AND COMMERCE COMMITTEE

SUBCOMMITTEE ON ENERGY AND POWER

May 5, 2011

The American Energy Initiative: Challenges and Opportunities for Alternative Transportation Fuels and Vehicles

Introduction

NGVAmerica is pleased to offer the following written statement with regard to this hearing. NGVAmerica is a national organization dedicated to the development of a growing and sustainable market for vehicles powered by natural gas and biomethane. NGVAmerica represents more than 130 member companies, including: vehicle manufacturers; natural gas vehicle (NGV) component manufacturers; natural gas distribution, transmission, and production companies; natural gas development organizations; environmental and non-profit advocacy organizations; state and local government agencies; and fleet operators

Today, natural gas vehicles are uniquely positioned to help the United States achieve a number of critical policy priorities. The increased use of natural gas vehicles can reduce our dependence on foreign oil while reducing greenhouse gas emissions and urban pollution. And, equally important, increased use of natural gas vehicles will benefit the economy by stimulating demand for domestic natural gas and by lowering fuel cost to businesses, fleets and consumers that operate natural gas vehicles.

An Abundant and Economical Domestic Resource

Reliance on foreign oil exacts a high toll on the U.S. in terms of direct economic costs and indirect energy security costs. In the past three years (2008 – 2010), the US spent nearly $700 billion on imported petroleum. In the coming decade, the EIA forecasts total expenditures for petroleum imports to top $3.3 trillion dollars. See EIA, *2011 Annual Energy Outlook* , Table 11 (April 2011). Our reliance on oil not only affects our trade balance but makes us vulnerable to price spikes and supply disruptions. And high oil prices results in a windfall for regimes that may not be friendly to the U.S. Fortunately, the U.S. has an unprecedented opportunity to displace petroleum with domestic natural gas. In the past several years, a wealth of new data has been developed demonstrating that the U.S. has an abundant supply of readily available, economically priced, natural gas.

The U.S. Energy Information Administration, the Potential Gas Agency and other expert bodies now estimate that we have up to a 100 years supply of natural gas. The Potential Gas Committee's 2011 bi-annual report indicates that the U.S. now has a

total future supply of 2,170 trillion cubic feet of natural gas. This is 89 Tcf more than estimated in the 2009 report. As was the case with the 2009 report, the 2011 report includes the highest resource estimate in the Committee's history; PGC has now been estimating natural gas supplies for 46 years.

Increased demand for natural gas helps to keep our economy growing by supporting new jobs and economic development. In 2008, U.S. production of 20 Tcf of natural gas supported nearly 3 million jobs ("The Contributions of the Natural Gas Industry to the U.S. National And State Economies", IHS Global Insight 2009, p.1) Even a modest increase in demand for natural gas as a transportation fuel could create tens of thousands of jobs associated with producing natural gas.

Natural gas also benefits our economy because it is a low cost energy that helps businesses grow while at the same time controlling costs. Natural gas is priced much lower than petroleum. The two fuels no longer track one another and haven't for many years. The current contract price for natural gas (NYMEX May delivery) is $4.377 per million Btu, which equates to a per barrel of oil price of only $25.39 at a time when oil is trading well above $100 a barrel. The difference in price relates to the fact that petroleum prices are set by world markets. An increase in demand in China or India leads to an increase in the cost of oil consumed here in the U.S. However, the same is not true for natural gas. The U.S. market for natural gas is currently insulated from most overseas events. Given the fact that there is no way to readily ship large quantities of natural gas from North America to other markets, the supply and demand for natural gas here in the U.S. set the price that consumers pay. Given the abundant supply of natural gas that exists here in the U.S., natural gas prices relative to oil prices are expected to remain much lower in the coming years. In fact, the EIA estimates that differential between diesel fuel and natural gas for transportation could be as much as $2 per diesel gallon equivalent in the future.

Translating Opportunity into Advantage

How should we use this natural gas? Market price signals tell us that transportation fuel and vehicles are the highest valued application of all natural gas uses. Outside the U.S., demand for natural gas vehicles is growing at a rapid pace. In the last seven years the market for NGVs has more than tripled with a compound growth rate of over 17 percent per year. In fact, NGVs are the fastest growing alternative to petroleum vehicles in the world. In 2003, there were only about 2.8 million NGVs globally. Today, there are over 13.2 million NGVs in operation worldwide. This rapid growth points to the fact that rapid scaling up of NGVs is possible. The International NGV

Association forecasts that, by 2020, there will be 65 million NGVs on the world's roads. Unfortunately, the U.S. currently ranks fourteenth in the world in total number of NGVs.

Most of the new natural gas vehicles sold outside the U.S. are either conversions of light-duty gasoline vehicles or are produced by light duty OEMs, including: Ford, GM, Toyota, Honda, Nissan, Hyundai, Fiat, Volkswagen and Mercedes. Fiat alone makes 14 separate NGV models, and more than 100,000 NGVs were sold in Italy in 2009, comprising some 7% of the new vehicle market. Most U.S. manufacturers currently offer natural gas vehicles in places like Europe, South America and Asia, but only Honda currently offers a light duty OEM NGV product, the Honda Civic GX.

For a number of reasons, including the sheer geographic size of America, the strategy of the US NGV industry has been to focus on high fuel-use fleets: trash trucks, transit buses, short-haul 18-wheelers, school buses, urban delivery vehicles, shuttles of all kinds, and taxis. Today, the U.S. only has about 120,000 NGVs in the US. Vehicle demand has been growing at a slow pace. However, because of the large use per-vehicle, fuel demand actually has been increasingly at a robust pace. NGVAmerica estimates that, last year, natural gas vehicles used about 43 billion cubic feet of natural gas. That equates to about 320 million gallons of gasoline that was not imported. At today's fuel prices, this represents about a billion dollars not spent on foreign petroleum products. Fortunately for the U.S., we currently lead the world in offerings of new medium and heavy duty NGVs. In the past several years, virtually all the major truck and bus manufacturers in the U.S. have stepped up and are now offering factory-built NGVs. The impressive list of manufacturers includes: Kenworth, International/ESI, Peterbilt, Mack, American LaFrance/Condor, Crane Carrier, AutoCAD Truck, Capacity, Thomas Built Bus, Blue Bird Bus, Optima, NABI, El Dorado, New Flyer, Daimler/Orion, Freightliner, Gillis, Workhorse Chassis, Elgin, Allianz/Johnston, Schwarz, and Tyco.

Manufacturers are betting that the U.S. will get serious about its desire to displace petroleum demand and increase the use of alternative fuels like natural gas. With proper government policies and incentives, sales of these trucks and use of natural gas could grow substantially in the coming years. NGVAmerica estimates that current fuel consumption of natural gas for vehicles could grow to one and a quarter *trillion* cubic feet or the equivalent of about 10 billion gallons within 15 years. At the level of fuel prices currently projected, that would lower fuel costs to businesses by up to $20 billion a year and reduced payments for imported petroleum by more than $40 billion per year.

NGVAmerica believes that there could be a substantial market for natural gas vehicles in all applications. However, the most immediate opportunity for displacing petroleum and increasing the use of natural gas as transportation fuel lies with light-, medium- and heavy-duty fleets – especially trucks, buses and other heavier vehicles. As noted above, we currently have a large selection of medium and heavy duty vehicles available here in the U.S. This is significant since trucks are the economic lifeblood of America. Everything we buy moves by truck. Reducing the cost of trucking reduces the cost of everything, benefiting businesses and consumers alike.

Enacting Meaningful Incentives

Right now, NGVs cost more to buy than comparable gasoline or diesel powered vehicles. But they cost less to operate. The more miles a vehicle is driven each year, the faster the payback and the more likely the owners can justify the investment in NGVs. For some of the most fuel intensive fleets and vehicle applications, NGVs already are economic. However, to expand the use of NGVs and maximize NGVs' oil displacement potential, we need to rapidly bring the first-cost or incremental cost of NGVs down. And this will only happen with large scale production and increased economies of scale.

H.R. 1380, the New Alternative Transportation to Give Americans Solutions (NAT GAS) Act of 2011 provides the means to accelerate demand for NGVs and to help us achieve economies of scale and build-out much needed fueling infrastructure. That is why we strongly support this legislation. HR 1380 would provide federal incentives for the production, purchase and use of natural gas vehicles and the expansion of the NGV fueling infrastructure. Highlighting broad support for this bill, although only introduced on April 6, H.R. 1380 already has 178 bipartisan co-sponsors. As proposed, these incentives would be available for only a five year period. During that time and long thereafter, it would make NGVs the economic choice for many more fleets. This legislation would accelerate NGV use, which, in turn, would bring more NGV manufacturers into the market, increase competition and drive down the first-cost premium of NGVs.

NGVs are a here-and-now technology. This fact is highlighted by the investments and commitments by fleets already taking place in the market place in the U.S. Highlighted here are some of the growing examples of how natural gas is helping meet the needs of fleets:

- AT&T operates more than 2,400 vehicles powered by natural gas and has a goal of expanding the fleet to 8,000 by 2013;
- UPS has more than 1,100 natural gas powered vehicles, and is expanding its fleet of vehicles powered by liquefied natural gas. The company has said it would convert a much larger share of its trucking fleet to LNG if the fueling infrastructure was in place;
- The Los Angeles County Metropolitan Transportation Authority earlier this year held a retirement ceremony for its last diesel bus, and 2,221 of its buses are now running on compressed natural gas; a number of the other smaller transit agencies around the country have successfully switched their entire fleet over to using natural gas. In Washington, DC, the local transit authority operates nearly 500 natural gas transit buses, and several feeder systems (outlying counties) also operate natural gas buses.
- Ryder System Inc. is purchasing 202 heavy-duty natural gas vehicles that will be used in its Southern California network;
- Waste Management, the largest refuse company in the country, has more than 900 vehicles running on either compressed natural gas or liquefied natural gas;
- The Dallas Area Rapid Transit system recently announced it will purchases 452 natural gas powered transit buses – the largest single order of natural gas transit buses currently in place.

As these fleet examples highlight, we do not need technical breakthroughs to capitalize on the potential of natural gas as a transportation fuel. What we need most is to grow demand for these vehicles faster. Federal leadership in leading the way and providing incentives will make this happen. The NAT GAS Act by providing critical incentives would help jumpstart that growth. In addition, Federal agencies can help by implementing rules that are favorable to the increased use of natural gas and by leading by example through the purchase of natural gas vehicles for their fleets. The NAT GAS Act does not change the current purchase requirements for federal agencies but it does help by allowing the seller or manufacture to take the tax credits for NGVs that are sold to tax-exempt entities like federal fleets.

Conclusion

The U.S. has an unprecedented opportunity to displace petroleum with domestic natural gas. Now is the time to act to incentivize the increased use of natural gas vehicles. We have an abundant supply of readily available, low-cost domestic natural gas. The fact that this fuel is domestic, low-cost, and clean means that we can achieve

multiple national goals (energy security, clean air, economic security) all the while helping fleets and businesses to lower their costs, thus improving economic prosperity. There has never been a better time than today to take action. Nearly every major truck or bus manufacturer here in the U.S. is now offering factory-built NGV models. We urge the Congress to move swiftly and enact the NAT GAS Act.

Mr. WHITFIELD. Thank you. Mr. McAdams, you are recognized 5 minutes.

STATEMENT OF MICHAEL J. MCADAMS

Mr. MCADAMS. Chairman Whitfield, Ranking Member Rush, and members of the committee, I am honored to be with you this morning.

The Advance Biofuels Association represents 36 of our Nation's and world's leading advance biofuels companies and feedstock producers. Since its inception, the Association has advocated technology neutrality, feedstock neutrality, and subsidy parity. Said another way, put everyone on a level playing field and please do not pick a winner.

Speaking to the focus of today's hearing, recent energy information data showed that we as a country use 290 billion gallons of various fuels products in 2010. Most of those gallons came in the form of gasoline, diesel, jet, marine fuels, and heating oils. Over 50 percent of this demand was met using foreign oil or imported products. Advance biofuels and cellulosic producers are uniquely positioned to produce fuels that can meet this demand while delivering more sustainable environmental performance.

The Association and its members believe that all the various renewable and alternative fuels have an opportunity to make a contribution towards reducing the dependence on foreign oil. We urge Governments to provide stable, long term, common sense policies which allow everyone to compete to achieve a clear set of National energy objectives. Recent developments in the advance biofuels technologies enable our companies to make significant contributions in diversifying our transportation fuels.

One of the most noteworthy developments in advance sector is the ability of many companies to manufacture gasoline, jet, diesel, heating oil, and crude oil from renewable resources. These fuels are called drop-in fuels. They are fungible in today's planes, trains, boats, and automobiles. They do not require changing current infrastructure or transportation fleets. Many of them are economically competitive with current products on the market today.

There are some that would like you to believe that advanced and cellulosic biofuels are a long way off, but nothing could be further than the truth. These fuels are commercially being produced today with many more gallons on the way. In fact, dynamic fuels, a joint venture between Tyson Fuels of Arkansas and Centroleum of Oklahoman is currently producing 75 million gallons of renewable diesel and jet fuel. This plant makes diesel and jet fuels as if they were made from a traditional refinery out of a traditional barrel of oil.

In addition, I am pleased to report that several advanced biofuels companies have gone public with great success. This is the private sector's money, not the Governments. GVO as a result of its recent $127 million offering 40 days ago has begun its plans to retrofit traditional corn ethanol plants to produce 18 million gallons of isobutanol next year. They further have plans to develop 350 million gallons of production by 2015.

These developments would simply not be occurring if it were not for the vision of this committee and Congress to enact the RFS. Our Association and member companies strongly believe that the

current RFS is the most important federal policy in supporting the development of all biofuels in this country. We specifically urge the committee and the Congress not to tinker with this statute at this time. One issue we would like to bring to the committee's attention today is the regulatory process at EPA and the certification of RIN credits.

When Congress expanded the statue in 2007, the intent was to back out as many types of gallons of foreign fuel products as possible. Currently the EPA and their RIN certification process is showing a tendency to be prescriptive and narrow in approving some determinations for qualified pathways as well as qualifying some potential feedstocks. We would urge the Congress to remain closely engaged with the Agency on these determinations.

Many are moving forward at this time and could have a significant chilling effect if not resolved correctly. While we support EPA's efforts to protect the environment and the existing commercial change of delivery, we encourage them to air on the side of bringing as many types of renewable advance biofuels to the market as reasonably possible.

Additionally we need to acknowledge for the last 20 years our regulatory structure has regulated gasoline and ethanol and a number of new types of fuels will need to be harmonized with existing regulatory system so we are able to compete on a level playing field. We should not allow the regulatory elements of the past to be barriers of entry for these new high performance fuels of the future. As most of you are aware, the chief challenge of the advance and cellulosic industries has been acquiring the necessary funding to build the next generation facilities.

One of the primary reasons is the disappointing lack of commercial funding has been our biofuels tax policy. The current code is inconsistent and what it rewards according to the molecule, the feedstock, or the process used. Advanced and cellulosic biofuels tax policy does not provide parity and in many cases the credit is not in the right form to enable the companies to monetize their value. The depending on the size and scale of the company, many in the advanced or cellulosic believe they would have been more successful if they had had a similar investment tax credit to the solar and wind industries rather than the production tax credits afforded under the law.

In conclusion, a significant amount of progress has been made over the last two years by the advance biofuels sector. Much more is on the way as these fuels continue to make significant contributions to America's world's transportation pool. Thank you for the opportunity to be with you and I look forward to your questions.

[The prepared statement of Mr. McAdams follows:]

Subcommittee on Energy and Power
Energy and Commerce Committee
U.S. House of Representatives

The American Energy Initiative: Challenges and Opportunities for Alternative Transportation Fuels and Vehicles

Testimony
Michael J. McAdams
President, Advanced Biofuels Association

May 5, 2011

Chairman Whitfield, members of the Committee, I am honored to be with you this morning to discuss the great potential of alternative transportation fuels in America.

The Advanced Biofuels Association represents 36 of our nation's and the world's leading advanced biofuels companies and top feedstock producers. Since its inception our Association has advocated for public policies that call for technology and feedstock neutrality and parity for subsidies.

These are the businesses that are creating new jobs today to build the next generation of fuels.

Speaking to the focus of today's hearing, recent Energy Information Administration data (attached) shows that we used 290 billion gallons of various fuel products in 2010. Most of these gallons came in the form of gasoline, diesel, jet, and marine fuels, and heating oils. Over 50 percent of this demand was met using foreign oil or imported products. Advanced biofuels and cellulosic producers are uniquely positioned to produce fuels that can meet this demand while delivering more sustainable environmental performance.

The Association and its members believe that all the various renewable and alternative fuels should have an opportunity to make a contribution towards reducing our dependence on foreign oil. Stable, long term, common sense government policies will expedite this transition by helping to provide the market with certainty, which will spur private sector investment. We believe that a

Advanced Biofuels Association
2099 Pennsylvania Avenue, NW • Suite 100 • Washington, DC 20006
P: 202.469.5140 • F: 202.955.5564
www.advancedbiofuelsassociation.com

sensible, economically driven approach that drives commercialization will lead to the strengthening of our national and economic security, while creating a significant number of new jobs for our country.

Recent developments in advanced biofuels technologies enable our companies to more rapidly make significant contributions in diversifying our transportation fuels pool. In fact, one of the most noteworthy developments in the advanced sector is the ability of many of the companies to manufacture gasoline, jet, diesel, heating oil and crude oil from renewable sources. These fuels are called "drop-in fuels" and are fungible in today's planes, trains, boats and automobiles. They do not require changing the current infrastructure or transportation fleets. Additionally, many of these fuels will focus on the part of the fuels pool that has had very little biofuels penetration to date, such as jet fuel, diesel, and heating oil, which comprise over half of the 290 billion gallons we use each year.

There are some who would like you to believe that advanced biofuels are a long way off, but nothing could be further from the truth. These fuels are being commercially produced today, with many more gallons on the way. In fact, Neste Oil has built 400 million gallons of renewable diesel production capacity, and Dynamic Fuels, a joint venture between Tyson Foods of Arkansas and Syntroleum of Oklahoma, is currently producing 75 million gallons of renewable diesel and jet fuel in Louisiana. These products meet the specifications for diesel and jet fuels as if they were made in a refinery out of a traditional barrel of oil.

In addition, I am pleased to report that recently several advanced biofuels companies have gone public with great success. As a result of its recent successful initial public offering ($127 million) Gevo has begun its plans to retrofit a traditional corn ethanol plant to produce 18 million gallons of isobutanol, an energy dense fungible fuel, in Minnesota by June of next year. They have also announced plans to develop over 350 million gallons of production by 2015. This technology has the ability to ease the current pressure on existing blend wall restrictions. Similarly, Amyris out of California recently completed a successful $84.8 million IPO and plans to deploy 75 million gallons of renewable diesel in 2012, while Solazyme and Kior, companies that also produce fungible "drop-in fuels," also announced their intentions to go public this year.

Several of our members including Rentech, Kior, Coskata, Sundrop Fuels, Honeywell, and LS9 are currently in the negotiating phase for loans to begin breaking ground on commercial facilities that will make significant quantities of drop-in or cellulosic fuels. BP and DuPont have formed a joint venture for

biobutanol, which, like isobutanol, can be made by retrofitting existing corn ethanol facilities, and is fungible in all on-road vehicles and pipeline systems.

Other notable successes can be found at companies like Virent Energy of Wisconsin, whose biogasoline was recently used in a Scuderia Ferrari at the South Korea Grand Prix. Sapphire Energy of New Mexico who had their biojet fuel used by Continental Airlines, and Rentech of Colorado tested their renewable jet fuel with United Airlines, while last year Solazyme of California sold 20,000 gallons of their renewable jet fuel to the US Navy.

These developments would simply NOT be occurring if it were not for the vision of this Committee and the Congress from 2005 to the present in enacting a framework to expedite the development of advanced and cellulosic biofuels. These fuels will make an immediate and significant contribution to backing out foreign oil and delivering a more sustainable and environmentally friendly future.

Our Association and member companies strongly believe the current RFS is the most important federal policy in supporting the development of a biofuels industry in this country. We would specifically urge this Committee and Congress to not tinker with the statute at this time. Since the rules were only finalized last July, we strongly urge the Congress to allow the markets and the players in the market to work within the current framework to see how much progress we make toward the overarching goals of the original legislation in the short term.

As far as specifics in the RFS rules, we want to complement the EPA on bringing forward the energy density and equivalency provisions from the original RFS 1 program. This is very important in rewarding more consumer-friendly energy dense drop-in fuels.

In addition, we support the manner in which the EPA has allowed the advanced pool mandates to continue despite shortfalls in some categories under the statute. This will help to drive more gallons in the short term using technologies that are economically competitive with the current oil prices.

One issue we would like to bring to the committee's attention today is the regulatory process at EPA and the certification of RIN credits. When Congress expanded the statute in 2007, the intent was to back out as many types and gallons of foreign fuel products as possible. Currently the EPA in their RIN certification process is showing a tendency to be very prescriptive and narrow in allowing some of the determinations of new qualified pathways as well as qualifying some

significant potential feedstocks. For instance, renewable bio-crudes from processes such as algae and pyrolysis can be refined using excess capacity at conventional refineries. We would urge the Congress to stay closely engaged with the Agency on these determinations. Many are moving forward at this time and could have a significant chilling effect if not resolved correctly. We support the EPA's efforts to protect the environment and existing commercial delivery chains, but encourage them to err on the side of bringing as many types of renewable advanced biofuels to the market as reasonably possible. We should take full advantage of the ability to back out all the various components of the market that use foreign barrels of oil.

As most of you are aware, the chief challenge of the advanced and cellulosic industries has been acquiring the necessary funding to build the next generation of facilities. The same has been true for others who would like to retrofit current first generation assets in both the ethanol and biodiesel sectors.

One of the primary reasons for the disappointing lack of commercial funding has been our biofuels tax policy. The current code is inconsistent in what it rewards according to the molecule, or feedstock or process used. Advanced and cellulosic biofuels tax policy does not provide parity and in many cases the credit is not in the right form to enable companies to monetize their value. For instance, producers using algae or other second generation technologies to make a gasoline receive a $0.50 credit per gallon, while biodiesel and renewable diesel producers receive $1.00 per gallon, and cellulosic ethanol $1.01 per gallon.

Depending on your size and scale as a company, many in the advanced or cellulosic industry believe they would have been more successful if they had a similar Investment Tax Credit to the solar and wind industries rather than the production credits afforded under current law.

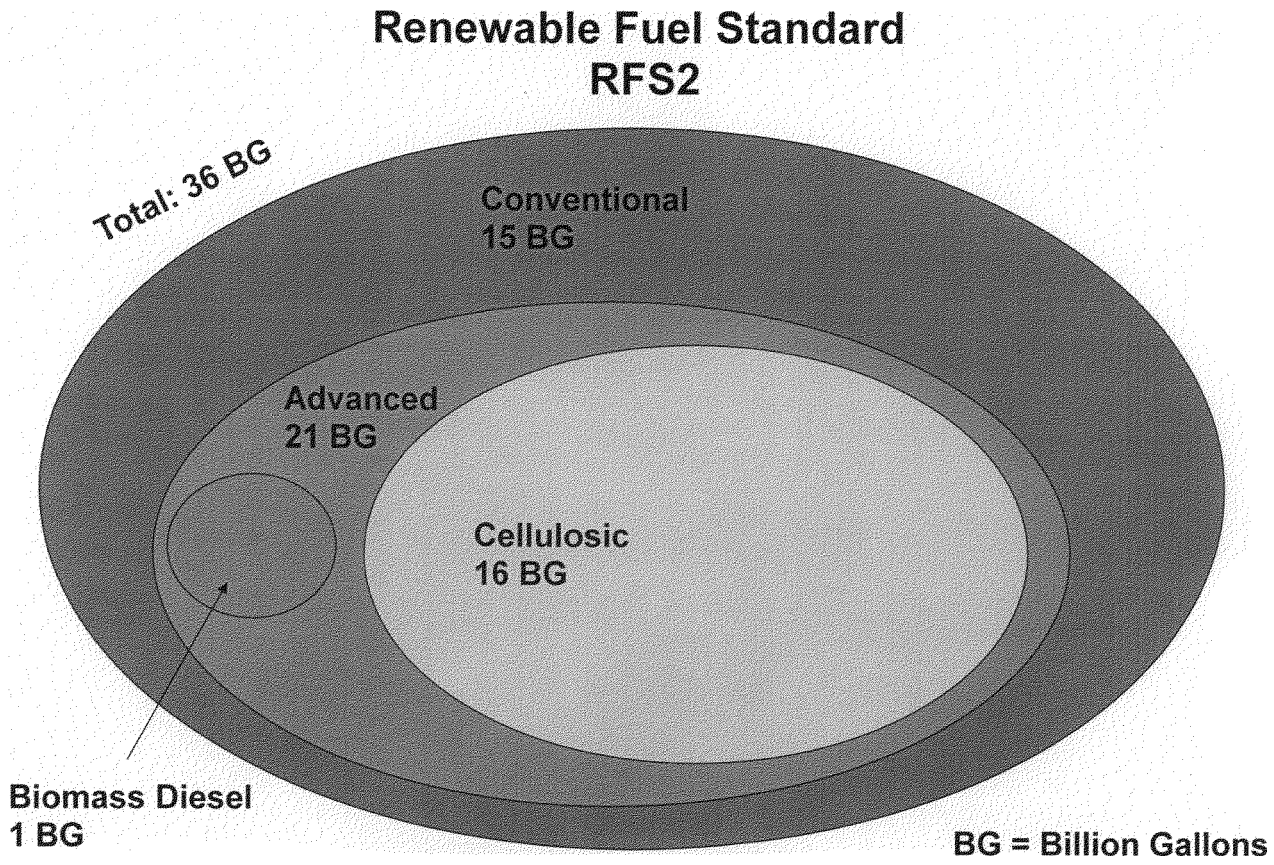
Our system of loan guarantee programs has been challenging at best. These provisions have been the subject of much controversy, and at a minimum we support the current levels of funding and would urge the Congress not to allocate money away from those funds. Many companies have already spent significant resources to apply and it would be unfair to pull the plug on the program at this time.

Lastly, on the procurement side it would be very helpful if Congress would extend the period of time in which the military can purchase advanced and cellulosic biofuels. The current fuels markets do not have long term purchase contracts similar to the power industry. Extending contracting length would help provide a

collateral event and enable commercial lenders to have confidence over a longer period of time, removing some of the risk and spurring investment. For this reason we support S. 212, The Freedom Fuels Act of 2011, which would grant the Department of Defense the authority to contract for biofuels produced in the United States for up to 10 years.

In conclusion, a significant amount of progress has been made over the last two years by the advanced biofuels sector. Much more is on the way as these fuels continue to make significant contributions towards diversifying America's, and the world's transportation fuels.

Thank you for the opportunity to be with you today. I look forward to your questions.

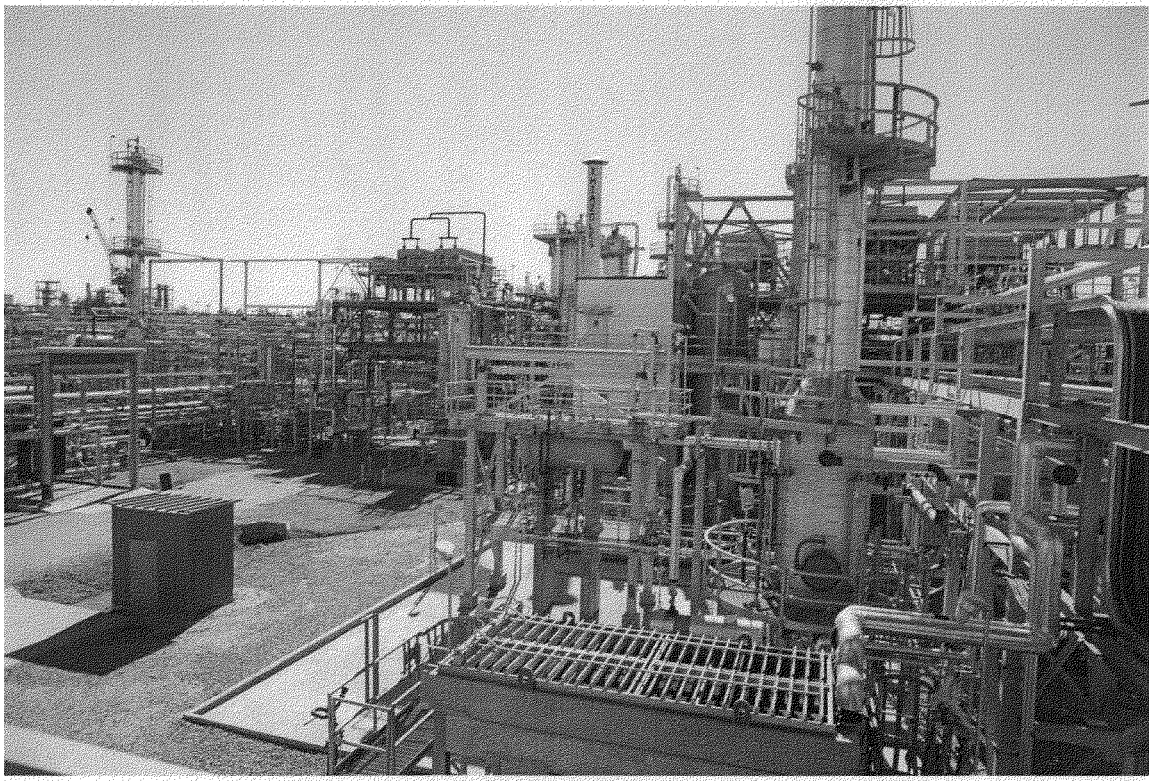

Renewable Fuel Standard
RFS2
Total: 36 BG
Conventional
15 BG
Advanced
21 BG
Cellulosic
16 BG
Biomass Diesel
1 BG
BG = Billion Gallons

Domestic Oil Demand

Demand (1,000 bpd)	EIA data	EIA & Estimates	Projected		(Billion Gallons)
USA	2009	2010	%	2015	2010
Gasoline	8990	**9040**	0.0	**9030**	138.6
Diesel	3631	**3660**	1.7	**3985**	56.1
On Road Transport	2270	2290	*1.5*	2467	35.1
Off Road Transport	202	204	*1.0*	214	3.1
Agricultural	184	185	*1.0*	194	2.8
Industry	460	460	*0.5*	472	7.1
Com.& Res. Heating Oil	405	406	*-2.0*	367	6.2
Bunkers	110	115	*18.7*	271	1.8
Residual Fuel Oil	522	**505**	**-4.1**	**410**	7.7
Bunker Fuel	370	370	*-5.7*	276	5.7
Jet Fuel	1396	**1410**	**1.0**	**1482**	21.6
Kerosene	17	**18**	**2.1**	**20**	0.3
Naphtha	350	**360**	**0.0**	**360**	5.5
Other	927	**1020**	**1.0**	**1072**	15.6
LPG/Ethane	1840	**1910**	**0.8**	**1988**	29.3
Coke	428	**425**	1.1	**450**	6.5
Refinery Oils	646	**660**	-0.3	**650**	10.1
Total	18747	19008		19447	291.4

Other includes petrochemical feedstocks, aviation gasoline feedstocks, still gas, misc. products

Dynamic Fuels 75 Million Gallon a Year Renewable Diesel Plant



Geismar, LA

Mr. WHITFIELD. Thank you. Mr. Dinneen, you are recognized for 5 minutes.

STATEMENT OF ROBERT DINNEEN

Mr. DINNEEN. Thank you, Mr. Chairman. Chairman Whitfield, Ranking Member Rush, members of the committee, I want to thank you for the opportunity to be here today. I do believe as others have stated that this is an incredibly important and timely hearing. Look, CNN yesterday had a poll of economists across the country and every single one of them said—suggested that the single most important threat to our Nation's economy today is the skyrocketing price of gasoline. We need to get a hold of this issue as many of you have noted so far this morning.

But I can tell you that as a consequence of this committee's actions over the past several years, no matter who has held the gavel with the 2005 Energy Bill and the 2007 Energy Bill, we are making some progress. As a result of that bill we now have 200 ethanol plants in operation across the country. Companies, Mr. Chairman, like Commonwealth Agrienergy in Kentucky. Certainly, Mr. Rush, many in Illinois, in Nebraska, in Kansas, in Colorado. And even, Congressman Griffith, we have a plant now in Virginia in Hopewell, Virginia, that is processing ethanol from barley, a cover crop. It is exactly what the renewable fuel standard was hoping to do. It was hoping to evolve this industry to new feedstocks and new technologies. It is having some success.

As a result of this committee's work in 2005 and 2007, our industry is now producing some 13 billion gallons. Our industry is now responsible for some 400,000 jobs across this country. This industry is responsible for $53 billion to the gross domestic product. We are displacing some 445 million barrels of oil that would otherwise be used in the production of gasoline.

But most importantly and critical to the debate going on today with respect to gasoline prices, the fact that we are producing 13 billion gallons, the fact that ethanol is now blended in 10 percent of the Nation's fuel is having a dramatically positive impact on gasoline prices. A report that was released earlier this week by Iowa State University and professors at the University of Wisconsin concluded that in 2010, the blending of ethanol actually reduced consumer gasoline prices 89 cents a gallon. That is a savings to household incomes of about $800 a year. That is a meaningful impact and it is just going to grow as the ethanol industry and other biofuels continue to grow and evolve. But a couple things still need to happen.

As Mr. McAdams just noted, the renewable fuel standard that has helped propel this industry in this fashion needs to stay in place as it is. You ought not be tinkering with it. I would suggest, however, and my testimony goes into many areas where the Environmental Protection Agency needs to pay a little bit closer attention to the statute and congressional intent in implementing this program. There are a number of areas where they have hampered the continued development and evolution of biofuels in the implementation of the renewable fuel standard. And my testimony goes into many—I will just maybe mention one.

The process by which the Agency approves new feedstock and new pathways is extraordinarily cumbersome and limiting and it is keeping new fuels from gaining access to the marketplace. In addition to that, though, we have to find a way to get through the blend wall. If the 36-billion-gallon renewable fuel standard requirement is going to be met, we have to blend more than 10 percent ethanol into gasoline. Now EPA has made some useful steps in the right direction by allowing E–15 for 2001 in newer vehicles, and I applaud them for that. But quite frankly by placating the market in the way that they have, by only making it available to those newer vehicles and not making it available to consumers that have an older vehicle, they are causing issues with the implementation of that.

We support efforts and legislation that would address some of the issues that marketers have brought to bear on this issue. We do need to find a way to the—assure that the liability and the implementation issues that the marketers have raised are addressed.

We supported in the last Congress H.R. 5778. I look forward to that being introduced again, but ultimately we need to get beyond just the blend market anyway. We need to be utilizing some of these biofuels and alternative fuel markets as E–85. And so we are very supportive of the legislation that Congressman Shimkus introduced yesterday, H.R. 1687, the Open Fuel Standard. That will empower consumers to make the choices that are best for them. Look, every one of you today has talked about our desperate energy situation, the need to have more energy choices. We need to stop demonizing domestic energy supplies no matter where they are whether it is coal or corn-based ethanol. We need to be empowering consumers to make the choices that are best for them. Things like the Open Fuel Standard would do that. Things like making sure the RFS is implemented as Congress intended will do that. But the inexorable march toward more domestic renewable fuels like ethanol, like cellulosic ethanol, like other advanced biofuels, has got to continue. It is too important for our Nation's economy, and energy security. Thank you.

[The prepared statement of Mr. Dinneen follows:]

RFA RENEWABLE FUELS ASSOCIATION

30 Years of Leadership

House Energy and Commerce Committee
Subcommittee on Energy and Power
United States House of Representatives

Hearing on
The American Energy Initiative

Testimony of

Bob Dinneen
President & CEO, Renewable Fuels Association

May 5, 2011

Good morning, Chairman Whitfield, Ranking Member Rush, and Members of the Subcommittee. My name is Bob Dinneen and I am president and CEO of the Renewable Fuels Association (RFA), the national trade association representing the U.S. ethanol industry.

RFA is the leading trade association for America's ethanol industry. Its mission is to advance the development, production, and use of fuel ethanol and co-products by strengthening America's ethanol industry and raising awareness about the benefits of renewable fuels. Founded in 1981, RFA's 300-plus members are working to help America become cleaner, safer, more energy secure and more economically vibrant.

This is a timely and important hearing. Gasoline prices are inching closer to record high levels and consumers are seeing higher oil prices drive up the cost of everything from food to clothing. I am pleased to be here today to discuss how our nation's ethanol industry is already helping to decrease our reliance on foreign oil and keep volatile gasoline prices in check, and how the industry is poised to make even more significant contributions in the future.

The 109th Congress put our nation on a path toward greater energy diversity, enhanced national security, and increased economic activity when it passed the Energy Policy Act of 2005. That visionary and innovative policy, originally introduced by Rep. Joe Barton (R-Tex.), established the first-ever Renewable Fuels Standard (RFS) requiring the use of increasing volumes of domestically produced renewable fuels. Recognizing the benefits of renewable fuels, the 110th Congress expanded the RFS to 36 billion gallons per year by 2022, an amount that would virtually eliminate the need for foreign oil imported from OPEC nations, several of which are hostile to the United States and our way of life. EISA has stimulated unprecedented investment in the U.S. biofuels industry and, as a consequence, the U.S. now leads the world in the production and use of clean, renewable, domestic liquid transportation fuels.

However, the U.S. Environmental Protection Agency (EPA) took great liberty when writing the rules for the expanded RFS, and the agency's tortured reading of several important provisions in EISA threatens to put Congress' goals in jeopardy. In many instances, we believe Congress' intent, as clearly established in EISA, has been misconstrued by EPA in the rulemaking and implementation process. Renewable fuel

producers and the obligated parties alike have been frustrated by many elements of EPA's implementation of the RFS program.

For EISA's ultimate goal of 36 billion gallons of renewable fuel use to be realized, EPA must endeavor to faithfully honor Congress' intent and refrain from legislating through rulemaking and regulation. In addition, EPA must strictly adhere to the objectives and goals outlined by Congress in future legislative efforts to open renewable fuel markets, stimulate investments in new biofuel technologies and assist in the development of infrastructure for these new fuels. Further, Congress should resist the calls of some critics to re-open and modify the RFS.

Background

Today, ethanol is blended into roughly 90 percent of the gasoline sold in the U.S., the majority as E10 (10 percent ethanol and 90 percent gasoline) – a blend component adding octane, displacing toxics and helping refiners meet Clean Air Act specifications. Ethanol is a thoroughly tested, safe, and effective motor fuel. Americans spend nearly $1 billion a day importing oil, often from hostile regions of the world. If the recent chaos in the Middle East and the subsequent escalation of oil prices teaches us anything, it should be that America must more aggressively pursue the path of energy self-reliance. Increasing the use of domestic renewable fuels like ethanol is the first, and arguably, the easiest step we can take.

At a time when American drivers are facing gas prices at record or near-record levels, ethanol is helping to hold pump prices lower than they would be otherwise. On Monday, economists from Iowa State University and the University of Wisconsin released a paper showing that the increased use of ethanol reduced wholesale gasoline prices by an average of $0.89 per gallon in 2010. The new analysis, an update to a 2009 Energy Policy paper authored by professors Dermot Hayes and Xiaodong Du, also found that the growth in ethanol production reduced gasoline prices by an average of $0.25, or 16 percent, over the entire decade of 2000-2010. U.S. Department of Energy data shows U.S. gasoline use averaged 138 billion gallons per year from 2000 to 2010, meaning annual savings due to ethanol during the decade averaged $34.5 billion.

According to the new analysis, the impact of ethanol on gasoline prices in 2010 was even more pronounced, as oil prices rose and ethanol production expanded to 10 percent of the gasoline pool. In 2010 alone, ethanol reduced the average American household's gasoline bill by more than $800.[1]

The study also examined what would happen to U.S. gasoline prices if ethanol production came to an immediate halt -- something that is unlikely to ever occur, but also something that has been advocated by some misguided opponents of biofuels. The authors found that, "Under a very wide range of parameters, the estimated gasoline price increase would be of historic proportions, ranging from 41 percent to 92 percent." At today's prices, that means gasoline prices would increase from roughly $4 per gallon to $5.60-$7.70.

That finding should serve as a wake-up call to those who are seeking to reduce or eliminate the role of ethanol in the U.S. energy market at a time when oil markets are increasingly volatile. As the economic recovery is fragile and oil markets are unstable, policymakers should be embracing -- not shunning -- ethanol's ability to add to domestic fuel supplies and hold prices in check. If we woke up tomorrow morning and the 10 percent of our gasoline supply that comes from ethanol was gone, it is easy to see

[1] Data from the Federal Highway Administration, Environmental Protection Agency, and Department of Energy show the average household consumed 900 gallons of gasoline at an average price of $2.74 per gallon in 2010. That means the average family's annual gasoline bill was $2,470, but it would have been closer to $3,270 without ethanol.

how gasoline prices could nearly double. That type of increase would be absolutely crippling to the American economy. The new study is attached to this testimony as Appendix A.

Additionally, ethanol production is contributing to our nation's financial well-being as well as that of American households. In 2010, ethanol production contributed $53.6 billion to the national Gross Domestic Product and added $36 billion to household incomes.

According to an economic analysis from Cardno ENTRIX, 70,600 Americans are employed directly in the production of ethanol and in industries providing goods and services to ethanol producers. The economic activity generated by ethanol production supported a total of more than 400,000 Americans in 2010.

It can be argued that ethanol production is virtually paying for itself. The increased economic activity and income generated by America's ethanol industry added some $12 billion to Federal, state and local governments through increased tax revenue.

Moreover, domestic ethanol production improves our nation's balance of trade while also reducing our reliance on foreign oil. The production of 13 billion gallons of ethanol means that the U.S. needed to import 445 million fewer barrels of oil in 2010 to refine gasoline. That is more oil than America imports from Saudi Arabia annually. Displacing these imported oil barrels saved the U.S. $34 billion in 2010.

Unfortunately, opponents of biofuels have propagated the false notion that increased use of grain for ethanol is somehow causing a food crisis and driving retail food prices higher. They wrongly argue that grain is being diverted away from livestock feed markets for the purpose of producing biofuel -- this myth has been dubbed as "Food vs. Fuel." The truth is food inflation rates have been historically normal over the period of rapid ethanol growth. In fact, the 2010 food inflation rate of 0.8 percent was lowest since 1962. Further, a number of recent economic analyses have confirmed that a number of factors, including oil prices and speculation in commodities markets, have a much more significant effect on food prices than ethanol production or corn prices. A more detailed discussion of the "Food vs. Fuel" issue is found in Appendix B.

RFS Implementation Challenges

As discussed above, the benefits of expanding renewable fuel production and use in accordance with the RFS are clear. But, as alluded to earlier, the long-term goals of the RFS -- and the economic and environmental benefits related to those goals -- are in jeopardy of not being met because of several issues related to EPA's implementation of the program.

There are many challenges associated with the RFS that have stemmed from, or been aggravated by, EPA's misinterpretation of EISA. One recent example is EPA's approach to carrying out a triennial study of the impacts of the RFS. The requirement for this study was clearly articulated by Congress in Section 204 of EISA, which compelled EPA to study and report on the "impacts to date and likely future impacts" of the RFS program. Unfortunately, EPA's recently released draft of this required study disregarded and clearly exceeded the intended scope as established by Congress. While EISA explicitly requires EPA to assess "...the likely future impacts" of the RFS, the EPA draft report seems to identify every conceivable potentially negative impact associated with biofuels expansion, rather than focusing only on those future impacts of the RFS that appear most likely or most damaging. Further, EISA Section 204 requires EPA to assess only the likely future environmental impacts of the RFS, not the potential future impacts of total "increased biofuel production and use." EPA also crosses the line by discussing potential international indirect effects of biofuels expansion -- something that clearly was not included in the scope intended by

Congress. RFA believes the draft report's general approach and content must be substantively revised before finalization and submission to Congress.

Another problem created by the EPA's interpretation of EISA is the continual waiving and reducing of the RFS cellulosic biofuel targets. EPA's rulemaking made it extremely easy to waive the cellulosic biofuel requirements, meaning the RFS fails to serve as a true mandate for these fuels and fails to provide the investor surety and risk mitigation that Congress intended.

Other RFS challenges resulting from EPA's handling of the rulemaking and implementation of the regulation include the agency's exclusion of certain biofuel feedstocks that do not meet the narrow definition of "renewable biomass"; confusion over the process to approve new biofuel pathways; failure to keep up with advances in lifecycle GHG analysis; problems with the reporting system; and, other issues. A detailed account of some of these challenges is offered in Appendix C.

These challenges highlight the need for EPA to revisit Congress' intent when it passed EISA in 2007. Rather than throwing up red-tape roadblocks to biofuels expansion, Congress meant for EISA to serve as the blueprint for a rapid evolution of the U.S. fuel supply toward greater volumes of renewables and less imported oil.

The E10 "Blend Wall"

First and foremost, full implementation of EISA will require the use of ethanol beyond the traditional 10 percent blends, as 36 billion gallons of renewable fuels represents about 25 percent of the gasoline pool. Unfortunately, current regulations essentially limit the amount of ethanol can be blended with gasoline to 10 percent for conventional automobiles. EPA has approved E15 blends to for use in cars, pickups and SUVs built in 2001 and later, or about two-thirds of the vehicles on the road today.

While this is a good start, EPA's bifurcation of the vehicle fleet raises a number of practical concerns and challenges for gasoline blenders, marketers and retailers. The RFA continues to urge EPA to quickly extend the waiver for E15 use to all conventional light-duty vehicles. A report by the highly regarded automotive engineering firm, Ricardo Inc., concluded there were no unique emissions, material compatibility or drivability issues with older vehicles compared to 2001 automobiles. Our nation can and should move in the direction of ethanol blends in excess of 10 percent in conventional, gas-only vehicles. As with any new fuel, additional testing and some regulatory issues relating to the fuel's properties must be addressed before widespread E15 use can occur. The RFA is working with EPA and others to address those issues and accelerate the commercial use of E15.

It will be critical to the future growth opportunities for cellulosic and advanced ethanol to promote ethanol's important role as an alternative fuel as well. Currently, the E85 market represents just a fraction of the overall U.S. ethanol market, but it is growing. We estimate that there are about 8.5 million flexible fuel vehicles (FFV) on America's roadways today. That is up significantly from recent years and a testament to the leadership and commitment of General Motors and Ford; but it still represents just 3 percent of the total automotive fleet. Likewise, we estimate E85 and mid-level blends are offered at approximately 2,700 retail gas stations across the U.S. That is a huge improvement over the handful of E85 stations just a decade ago, but it still represents just 1.5 percent of the nation's gas stations. Obviously we have a long way to go if consumers are to be given the flexibility to maximize their use of domestic renewable fuels like ethanol. Efforts to expand FFV technology must be a part of our energy future. Putting more Americans behind the wheel of an FFV is a critical component of our strategy to transform current ethanol policy and the current ethanol industry. Together with more blender pumps, investment in infrastructure is one leg of the approach that recognizes the need to put the market back in ethanol policy.

Overcoming this "blend wall" issue is paramount to the success of the RFS. Cellulosic and advanced ethanol will largely represent the renewable fuel supply beyond the E10 blend market. To leave the market artificially constrained further limits market opportunities for next generation biofuels very close to commercialization, missing an opportunity to meaningfully increase America's use of renewable fuels and reduce our dependence on imported oil.

Conclusion

The ethanol industry greatly appreciates the continued commitment of the 112th Congress and this Subcommittee to the further development of a robust and dynamic domestic renewable fuels industry. Chairman Whitfield and Ranking Member Rush, you have made clear your commitment to the hardworking men and woman across America who are today's newest energy producers. The RFA looks forward to working with you to further develop and implement sound policies that provide the proper incentives to grow the U.S. ethanol industry.

Thank you.

APPENDIX A

The Impact of Ethanol Production on US and Regional Gasoline Markets: An Update to May 2009

Xiaodong Du and Dermot J. Hayes

Working Paper 11-WP 523
April 2011

Center for Agricultural and Rural Development
Iowa State University
Ames, Iowa 50011-1070
www.card.iastate.edu

Xiaodong Du is an assistant professor in the Department of Agricultural and Applied Economics, University of Wisconsin-Madison. Dermot Hayes is a professor of economics and of finance at Iowa State University.

Acknowledgments: The authors acknowledge the Renewable Fuel Association for their financial support. The views expressed in this paper are those of the authors and do not necessarily represent the views of the Renewable Fuel Association.

This paper is available online on the CARD Web site: *www.card.iastate.edu.* © The authors. All rights reserved. Permission is granted to quote this information with appropriate attribution to the authors.

Questions or comments about the contents of this paper should be directed to Xiaodong Du, 405 Taylor Hall, University of Wisconsin, Madison. Ph: (608) 262-0699; E-mail: xdu23@wisc.edu

Iowa State University does not discriminate on the basis of race, color, age, religion, national origin, sexual orientation, gender identity, genetic information, sex, marital status, disability, or status as a U.S. veteran. Inquiries can be directed to the Director of Equal Opportunity and Compliance, 3280 Beardshear Hall, (515) 294-7612.

Abstract

This report updates the findings in Du and Hayes 2009 by extending the data to December 2010 and concludes that over the sample period from January 2000 to December 2010, the growth in ethanol production reduced wholesale gasoline prices by $0.25 per gallon on average. The Midwest region experienced the biggest impact, with a $0.39/gallon reduction, while the East Coast had the smallest impact at $0.16/gallon. Based on the data of 2010 only, the marginal impacts on gasoline prices are found to be substantially higher given the much higher ethanol production and crude oil prices. The average effect increases to $0.89/gallon and the regional impact ranges from $0.58/gallon in the East Coast to $1.37/gallon in the Midwest. In addition, we report on a related analysis that asks what would happen to US gasoline prices if ethanol production came to an immediate halt. Under a very wide range of parameters, the estimated gasoline price increase would be of historic proportions, ranging from 41% to 92%.

Keywords: crack ratio, crack spread, import elasticity.

Introduction

In a 2009 analysis published in *Energy Policy* (Du and Hayes 2009), we evaluated the impact of US ethanol production on national and regional gasoline prices. This article was based on data that was available prior to 2008. Since then, US ethanol production has increased significantly, and two years of additional historical data has become available. The purpose of this report is to update the earlier analysis. We calculate the average impact of ethanol production both nationally and regionally over the period January 2000–December 2010 and specifically for 2010. Estimation results indicate that, on average, over the whole sample period and all five PADD (Petroleum Administration for Defense District) regions, the growth in ethanol production reduced wholesale gasoline prices by $0.25/gallon. The Midwest region (PADD II) experienced the biggest impact with a $0.39/gallon reduction, while the East Coast (PADD I) had the smallest impact at $0.16/gallon. Based on the data of 2010 only, the marginal impacts on gasoline prices are found to be substantially higher given the much higher ethanol production and crude oil prices. The national average effect increases to $0.89/gallon and the regional impact ranges from $0.58/gallon on the East Coast to $1.37/gallon in the Midwest.

In addition, we now report on a related analysis that asks what would happen to US gasoline prices if ethanol production came to an immediate halt. This analysis is topical because a 2011 drought might force a shutdown of corn-based ethanol production and also because world energy stocks are tight. Moreover, the ethanol industry now provides approximately 10% of the gasoline used in automobiles, an amount that exceeds the spare capacity of US oil refineries. This "missing" fuel would have to be imported in the short run, and the required volume would be large relative to available import supplies. The only way to solve this short-term supply problem would be to use high gasoline prices to ration demand. The size of the required gasoline price increase cannot be calculated with any certainty because key parameters are not known with certainty. However, we can say that under a very wide range of parameters, the gasoline price increase would be of historic proportions, ranging from 41% to 92%.

The impact of ethanol production on wholesale gasoline prices

In this section, we briefly describe the updates and changes to Du and Hayes 2009. In the current study, the sample period is extended to January 2000 through December 2010.

Dependent variables

As in Du and Hayes 2009, two dependent variables are employed:

(a) The crack ratio (π_{CR}), the relative gasoline price to the price of crude oil, is defined as

(1) $\pi_{CR} = P_G * 42 / P_O$

where P_G is the average wholesale gasoline price (\$/gallon), and P_O is the US crude oil composite acquisition cost to refiners (\$/barrel).

(b) The crack spread (π_{CS}) is defined as

(2) $\pi_{CS} = \frac{2}{3} P_G * 42 + \frac{1}{3} P_H * 42 - P_O$

where P_H is the wholesale price of No. 2 distillate fuel (\$/gallon). The crack spread is then deflated by the Producer Price Index of crude energy material. Monthly data of all related prices are collected from the Energy Information Administration (EIA) website.

Explanatory variables

As in the previous study, besides the monthly US ethanol production, other explanatory variables include monthly dummies (January to November), monthly crude oil ending stocks (excluding the Strategic Petroleum Reserve), total motor gasoline ending stocks, complexity-adjusted refinery capacity, HHI index for regional refinery market concentration, dummy variables for September and October 2005 representing the unexpected supply disruptions induced by Hurricanes Katrina and Rita, and regional gasoline imports. Please see Du and Hayes 2009 for the justifications for included variables.

One change worth noting is that since EIA discontinued the Amsterdam-Rotterdam-Antwerp gasoline price series after September 2008, in the current study, the regional gasoline imports are not instrumented as described in Du and Hayes 2009, and the estimation method is changed accordingly.

Estimation

A fixed-effects panel data model is specified as

(3) $\pi_{it} = \alpha_i + X_{it}'\beta + \varepsilon_{it} \quad i = 1,...,N; t = 1,...T$

where $i = 1,...,N$ denotes the cross-section dimension, the PADD regions, and $t = 1,...T$ denotes the time-series dimension. π_{it} is the crack ratio (crack spread) on the ith region for time period t. X_{it} is the K-dimensional vector of explanatory variables discussed above.

The parameter estimates for the crack ratio and crack spread are presented in Table 1. All explanatory variables have the expected signs and are largely consistent with our previous study.

Evaluating at the sample mean, the wholesale gasoline price is lowered by \$0.25/gallon because of ethanol production, which is about 16% of the sample average. We use the crack ratio to quantify the gasoline price impact. Specifically, the change in the wholesale gasoline price, -0.25/gallon, is calculated as

$$\begin{aligned}\text{Price change} &= \text{estimated coefficient} \times \text{Average ethanol production} \times \text{Average crude oil price (\$/gallon)} \\ &= -0.000031 \times 10916.95 \times \frac{53.67\ (\$/\text{barrel})}{42} \\ &= -0.2525\ (\$/\text{gallon})\end{aligned}$$

where the average ethanol production and crude oil price are averaged over the whole sample period.

Regional analysis

We use wholesale gasoline prices for this portion of the analysis. The crack ratio is employed as the dependent variable. The ordinary least squares estimation results are reported in Table 2. The results indicate that ethanol production has a significant and negative effect on wholesale gasoline prices in all regions. The Midwest has the largest impact at \$0.39/gallon. The East Coast experiences the smallest negative ethanol impacts, with gasoline prices lowered by \$0.16/gallon. The Gulf Coast has a \$0.20/gallon reduction in retail gasoline prices. The downward gasoline price changes in the West Coast and the Rocky Mountains are about \$0.17/gallon and \$0.38/gallon, respectively. The change in gasoline price in a regional market, for example, \$0.39/gallon in the Midwest region (PADD II), is calculated as

$$\text{Price change} = \text{estimated coefficient} \times \text{Average ethanol production} \times \text{Average crude oil price (\$/gallon)}$$
$$= -0.0000276 \times 10916.95 \times \frac{53.67\ (\$/\text{barrel})}{42}$$
$$= -0.3850\ (\$/\text{gallon})$$

Based only on the 2010 data, we calculate the marginal impact of increasing ethanol production on wholesale gasoline prices. We find that the average national effect increases to \$0.89/gallon and the regional impact ranges from \$0.58/gallon in the East Coast to \$1.37/gallon in the Midwest. The average and marginal effects of ethanol production on the US and regional markets are summarized in Table 3.

The impact of eliminating ethanol production on wholesale gasoline prices

Here we attempt to predict what would happen to domestic wholesale gasoline prices if ethanol production was totally eliminated. We treat ethanol as a perfect substitute for gasoline and then quantify the impact of reduced ethanol supply on domestic gasoline prices in a partial equilibrium model. The domestic gasoline demand, domestic supply including ethanol, and imports are modeled in a simultaneous equation system as

$$(4) \qquad \begin{cases} D_1 = D(p_1) \\ S_1^d = S_1^d(p_1) \\ S_1^i = S_1^i(p_1) \end{cases}$$

where D, the domestic gasoline demand, is defined as a function of domestic gasoline price p. S_d and S_i denote domestic gasoline supply including ethanol and gasoline imports, respectively. The demand and supply equations are assumed to be linear with slopes given by short-run price elasticities. Specifically, given demand elasticity $\varepsilon_d \left(\equiv \frac{D_1 - D_0}{p_1 - p_0} \times \frac{p_0}{D_0} \right)$, the demand price relation is derived as $D_1 = \varepsilon_d D_0 (p_1 - p_0) / p_0 + D_0$. We use the market data of 2010 as starting points (D_0 and p_0) in the system. The domestic supply and import equations can be similarly defined as functions of gasoline prices.

The short-run demand elasticity is obtained from the literature as -0.06 with a range of -0.034 to -0.077 (Hughes, Knittel, and Sperling 2008). The short-run elasticity of domestic supply is

estimated to be 0.06 with a range of 0.03–0.07.[1] Following Lee and Sumner (2010), the import elasticity is approximated as[2]

$$(5) \qquad \varepsilon_i = (Q_{tu} / Q_i)\varepsilon_d - [(Q_{tu} / Q_i) - 1]\varepsilon_s$$

where Q_{tu} / Q_i is the inverse of the import share in the domestic gasoline market, which is approximately 5% in our case. ε_s and ε_i denote domestic supply and import elasticities, respectively.

In the scenario in which ethanol is totally eliminated from domestic supply, the system specified in (4) is used to simulate the gasoline price responses after taking into account (i) the gasoline stocks at the level of 2010, and (ii) the full utilization of the spare capacity of US oil refineries in 2010. Three sets of simulation results are generated under different levels of elasticities (high, medium, and low). The results summarized in Table 4 indicate that if the ethanol supply were eliminated from the domestic gasoline market, wholesale gasoline prices may change by 41%–92% in the short run depending on the sensitivity of producers and consumers to prices.

References

Du, X., and D.J. Hayes. 2009. The Impact of Ethanol Production on US and Regional Gasoline Markets. *Energy Policy* 37: 3227-3234.

Lee, H., and D.A. Sumner. 2010. International Trade Patterns and Policy for Ethanol in the United States. Ch. 19 in *Handbook of Bioenergy Economics and Policy*, ed. M. Khanna, J. Scheffran, and D. Zilberman, 327-345. New York: Springer.

Hughes, J.E., C.R. Knittel, and D. Sperling. 2008. Evidence of a Shift in the Short-Run Elasticity of Gasoline Demand. *Energy Journal* 29: 113-134.

[1] The results are available upon request.
[2] The equation is found on page 333 of Lee and Sumner 2010.

Table 1. Estimation results for a fixed effects model on the crack ratio and crack spread

Variable	Crack Ratio		Crack Spread	
	Estimate	Std. Err.	Estimate	Std. Err.
Oil stock	3.42e-06***	6.46e-07	7.2e-5***	1.2e-5
Gasoline stock	-3.62e-07	1.7e-06	-6.0e-5*	3.1e-5
Equivalent Refinery capacity	1.18e-06	2.47e-6	0.00013***	4.6e-5
Ethanol production	-.000018***	8.12e-07	-.00019***	1.5e-5
Supply disruption	.09**	.04	.18	.69
Gasoline import	-6.6e-6**	2.80e-06	-9.2e-5*	5.1e-5
HHI	5.1e-6	3.7e-5	.0023***	.001
January	0.004	.02	-.12	.39
February	0.01	.02	.44	.39
March	.08***	.02	1.45***	.39
April	.13***	.02	2.64***	.40
May	.16***	.02	3.20***	.39
June	.11***	.02	2.46***	.39
July	.06***	.02	1.76***	.39
August	.06***	.02	2.17***	.40
September	.07***	.02	2.70***	.40
October	.03	.02	2.01***	.35
November	.007	.02	.59	.39

Note: Single (*), double (*), and triple (***) asterisks denote significance at the 0.10, 0.05, and 0.01 levels, respectively.

Table 2. Regression results on the crack ratio with individual PADD regional data

Variable	PADD I	PADD II	PADD III	PADD IV	PADD V
Oil stock	5.1e-6	7.7e-6***	2.3e-6***	.000022	3.8e-6
Gasoline stock	-6.8e-6***	-5.8e-6	-9.7e-8**	-.000022	-2.4e-6
Refinery capacity	-1.8e-5**	.00001	1.7e-6	.0002	-.000065***
Ethanol production	-.0000116***	-0.000028***	-.000015**	-.000027***	-.0000124**
Supply disruption	.19***	0.06	.17**	.11	.08
Gasoline import	-3.8e-6	.0005**	-1.3e-5	.003	.0001***
HHI	-.00011**	-.0003*	-.0002	.0004**	.00006
January	.04	.06	.01	-.02	-.01
February	.002	.05	.003	-.00002	.02
March	.04	.06	.04	.05	.09
April	.11***	0.09**	.09**	.10*	.16**
May	.15***	.17***	.11***	.17***	.12*
June	.09**	.13***	.06	.13**	.10
July	.042	.07	.02	.09*	.05
August	.0006	.09**	.01	.10**	.01
September	-.01	.09**	.01	.12**	.07
October	-.05	.03	-.01	.06	.04
November	-.03	-.002	-.03	.03	.02
Constant	2.3***	1.31***	1.11***	.29	3.31***
R^2	.65	.69	.60	.64	.61

Note: Single (*), double (*), and triple (***) asterisks denote significance at the 0.10, 0.05, and 0.01 levels, respectively.

Table 3. The negative impact of ethanol production on wholesale gasoline prices (in $/gallon)

	Average across regions	PADD I	PADD II	PADD III	PADD IV	PADD V
Average effect (based on whole sample period)	0.25	0.16	0.39	0.20	0.38	0.17
Marginal effect (based only on 2010 data)	0.90	0.58	1.37	0.72	1.35	0.62

Table 4. Simulation results of the impact of eliminating ethanol production

	Equilibrium gasoline price ($/gallon)	Domestic gasoline demand (million gallons)	Domestic gasoline supply (million gallons)	Gasoline import (million gallons)
2010 baseline	2.16	138496	131571	6925
Low elasticities				
$\varepsilon_d = -0.034$; $\varepsilon_s = 0.03$; $\varepsilon_i = 0.11$.	4.15	134168	126544	7625
Medium elasticities				
$\varepsilon_d = -0.06$; $\varepsilon_s = 0.06$; $\varepsilon_i = 0.06$.	3.29	134168	127027	7141
High elasticities				
$\varepsilon_d = -0.077$; $\varepsilon_s = 0.07$; $\varepsilon_i = 0.21$.	3.04	134168	126653	7515

Appendix B
Discussion of Food vs. Fuel Issue

Background

Food versus fuel is a term used to suggest that the increased production of biofuels has caused food prices to increase. The theory is that using grain for fuel increases the demand for grain, which in turn drives up grain prices and increases the cost of producing or gaining access to food. The food versus fuel headline is important to all biofuel sectors because its chief proponents are using the theory to underpin an effort to rollback or curtail the RFS, which requires the use of a wide variety of conventional and advanced biofuels.

Discussion

From 1974 to 2005, real food prices (adjusted for inflation) dropped by roughly 75 percent. From 2005 to 2008, food and grain prices increased steadily. During this period, both the price of oil and the use of ethanol rose significantly. These correlations led to a robust public debate, starting in 2008, about whether ethanol or oil was the primary cause of food and grain price increases.

Recent events greatly inform the food versus fuel debate. After increasing sharply, oil prices dropped dramatically in late 2008 and 2009. During the same period, the Consumer Price Index (CPI) for groceries showed the steepest year-over-year decline since 1950, with the Bureau of Labor Statistics citing the 27.3 percent decline in the energy index as the primary cause. And as food prices declined steeply in 2009, biofuel production continued to increase to record levels. In sum, since the inception of "food versus fuel" in 2008, the correlation between oil price and food price has continued, while the brief correlation between ethanol use and food price has broken.

There are other facts strongly suggesting that the food versus fuel theory is overblown:

- Corn is well-supplied. U.S. agriculture has doubled its production of corn over the last thirty years while expanding corn acreage by only 3 percent.
- U.S. agricultural exports have not decreased as grains have allegedly been "diverted" to biofuel production. In most cases, they have increased.
- A recent campaign called FoodPriceTruth.org revealed that profit margins among the major food producers in the United States (e.g. Kraft, Cargill, etc.) increased significantly, in some cases more than 100 percent, during a time when their major trade association, the Grocery Manufacturers Association, blamed biofuels for price spikes.

The purpose of the food versus fuel campaign appears to be to roll back the clock on corn ethanol policies to facilitate a reduction in grain prices. There are several problems with this approach: (1) biofuel critics want to open and amend the RFS, which would cause great harm to the advanced biofuel industry; (2) the correlation between ethanol use and food prices does not exist to any significant degree, which suggests that reducing ethanol use would not provide significant food or price relief; and, (3) using less renewable fuels will increase fuel prices, according to Merrill Lynch and others, which is the primary cause of food price increases.

Appendix C
Discussion of RFS Implementation Issues

EPA's misinterpretation of several important provisions of EISA has resulted in a number of significant RFS implementation challenges that threaten to undermine the original goals of the policy. The following implementation problems have resulted from EPA's liberal interpretation of the statute and overly intrusive rulemaking process.

- **Renewable biomass**: EPA's interpretation of the "renewable biomass" definition is overly narrow and may unintentionally preclude certain economically and environmentally sustainable feedstocks from generating credits under the RFS. For example, certain waste streams that would otherwise be landfilled are not likely to qualify as "renewable biomass," even though they can be used economically to produce biofuels.

- **Process for approving new feedstocks/pathways**: We applaud EPA for finalizing provisions that allow petitions to be submitted for the approval of new feedstocks and biofuel pathways. However, the process for petitioning the agency is somewhat unclear, as is the timeline and criteria for petition approval. We note that no feedstock/pathway petitions have been approved by EPA at this point. EPA must better define the requirements for petitioners and establish a transparent process and timeline for approvals.

- **Cellulosic biofuels waiver provision**: Continual waiving and reducing of cellulosic requirement threatens to undermine progress toward commercialization. The RFS cellulosic biofuel requirements fail to function as true mandate and fail to provide investor surety and risk mitigation.

- **Lifecycle Greenhouse Gas (GHG) accounting**: It is unclear how EPA will keep up with advances in lifecycle analysis and improvements in crop and biofuels production technology. EPA's lifecycle analysis is already outdated, as recent analyses of corn ethanol direct GHG effects have shown significant improvement over EPA's assumptions. Further, recent indirect land use change analysis by Purdue University produced results for corn ethanol that are 50 percent lower than EPA's analysis. EPA must be flexible and receptive to integrating new lifecycle GHG analysis into the RFS regulation.

- **Renewable Identification Number (RIN) transaction reporting and EMTS issues**: Renewable fuel producers and obligated parties alike have encountered a number of issues regarding RIN transactions and reporting. One example is EPA's insistence that the RIN transaction date must be the actual date that title of the renewable fuel is transferred, rather than the established RFS1 practice of allowing the use of the invoice date for the RIN transaction date.

- **RIN rollover cap**: EPA took great liberty in constructing the provisions for allowing surplus RINs to carry forward. The 20 percent rollover allowance is excessive and permits obligated partied to bank amounts of RINs that are substantial enough to distort and manipulate the renewable fuels market.

- **Technology requirements for new/expanded (i.e. non-grandfathered) corn ethanol**: The RFS2 final rule specifies that new or expanded corn ethanol capacity will only be deemed compliant with the 20 percent GHG requirement if that capacity uses prescribed "advanced technologies" chosen by EPA. The truth is there are a multitude of new technologies, process improvements, and production practices that could feasibly move new or expanded capacity past

the 20 percent GHG threshold. EPA should be flexible in its approach to determining whether new or expanded corn ethanol capacity meets the 20 percent GHG reduction threshold. Producers should be allowed to demonstrate that their new or expanded capacity meets the threshold without going through the tedious and uncertain petition process for new pathways.

Mr. WHITFIELD. Thank you, and thank all of you for your testimony. We have four votes on the House floor and unfortunately one of them is a Motion to Recommit in which it is not only a 10-minute debate on each side, but also 15 minutes. So I am just—I am going to go on and ask my questions. We will get you, Mr. Rush, and maybe we won't use all of our time and try to get as many in as we can. And then we will decide what we are going to do. But, Mr. Dinneen had indicated that the renewable fuel standard hadn't reduced the price of fuel by 89 cents a gallon. And I think in your testimony, Mr. Pugliaresi, you had indicated that the renewable fuel standard had actually increased the cost. Is that correct?

Mr. PUGLIARESI. Yes, I mean, we can — talking the blend wall provides that such a threat. It is really crossing the blend wall is what the major problem is. I can explain while I think that Mr. Dinneen got his numbers, they removed, their study removes all ethanol from the gasoline supply. Ethanol has a value, a very high value at small volumes, three to five percent because it boosts octane and then it provides an oxygenator. After five percent in the gasoline pool its value is less than gasoline because it has 30, 35 less BTUs. So the real question is what is the cost of the fuel? And when corn prices go up the price of the fuel goes up. And so when we have a mandate you force that into the system even if they are a competitive environment you wouldn't call for that. You could see conditions in which people would want blended or 10 percent, just depending on relative prices. But in the prices of corn, the feedstock goes way up, we have got a problem.

Mr. WHITFIELD. Yes.

Mr. DINNEEN. Could I just——

Mr. WHITFIELD. Yes.

Mr. DINNEEN [continuing]. Clarify?

Mr. WHITFIELD. Yes.

Mr. DINNEEN. This was not Mr. Dinneen's numbers. This was a study done by Iowa State University and the University of Wisconsin.

Mr. WHITFIELD. OK.

Mr. DINNEEN. And you know really what they were looking at was ethanol today. We are more than a dollar cheaper than gasoline at the rack and just by the fact that we are 13 clean gallons of the U.S. motor fuel market we are having a downward pressure on gasoline prices.

Mr. WHITFIELD. OK.

Mr. DINNEEN. And they concluded 89 cents benefit.

Mr. WHITFIELD. Mr. Miller, I really appreciated your points because renewable fuels is good for farmers, certainly good for a lot of people in this country and it helps us become less dependent. But it sounds like it presents a lot of just practical problems for the retailer who is trying to get it out to the consumer. And do you feel like that most convenience store owners around the country have this same experience that you have?

Mr. MILLER. Yes, sir. I think the issue for us you know is the equipment incompatibility with the higher blend of ethanol.

Mr. WHITFIELD. So if it is certified for EPA–10 it cannot be recertified for EPA–15 that is on equipment?

Mr. MILLER. The certification process now that we go by is under writers laboratories and they will not go backwards. They will only certify equipment going forward which was why a provision was put in the bill last Congress about establishing a method for certifying older equipment, because some of the older equipment may work. But we don't have a method of getting it certified so therefore we would be out of compliance.

Mr. WHITFIELD. Dr. Bartis, the Fisher-Tropsch's technology, it is my understanding that they will not license it for use in the United States. Is that true or not true?

Mr. BARTIS. That is not true.

Mr. WHITFIELD. Not true. OK. All right, thank you. That was easy.

Mr. BARTIS. Some of my members are planning to use it.

Mr. WHITFIELD. OK. Mr. O'Connell, in your company with these electric cars, I know they are quite expensive, but it sounds like you are obviously doing very well with it. And right now how far can the car go if it is fully charged?

Mr. O'CONNELL. We saw our first generation Tesla Roadster had the ability—has the ability to drive at the EPA of—using EPA roles, 244 miles on a single charge. They have been driven in demonstrations over 300 miles. Our next generation sedan—so that's sports car, two-seater, nice weekend car. The sedan, five plus two seating so a regular everyday driver will have the ability to drive up to 300 miles on a single charge.

Mr. WHITFIELD. OK. Thank you. Mr. Rush, you are recognized.

Mr. RUSH. Thank you, Mr. Chairman. I—Mr. Dinneen, your passion is certainly commendable. I am from a corn state—ethanol-producing state and I just want to ask you and maybe I will ask this of Mr. Pugliaresi also. I am sorry if I am mispronouncing your name. Please accept my apology. But it seems to me that the most striking arguments against the ethanol is impact on overall food supply. Can you address that, Mr. Pugliaresi? If you could also address those issues? What do you think about that argument?

Mr. DINNEEN. Thank you for giving me the opportunity to address that issue. With 5 minutes it is a little bit hard to get everything in and I certainly wanted to address that because it has been mentioned so far here today. Look, ethanol is absolutely not driving crude price inflation today. What is? It is the skyrocketing price of gasoline. It impacts everything from the fertilizer the farm utilizes to the diesel fuel to get the product to the stores, to the packaging that is used to package the fuels, to the marketing. I mean, petroleum drives all of our economy today. So that is the single most important impact.

The second might be the speculation in the marketplace that is going on today. I mean, it has been a phenomenon just really over the past five or six years, but you know hedge funds today with long positions on grain supplies control more corn ethanol—I am sorry, more corn that does the entire ethanol industry would utilize in the year. So the role that speculators is having an incredibly important role in this.

But at the end of the day, Congressman, we are just utilizing the starch in the processing of corn. All of the protein, all of the vitamins, the feed value of the corn is retained and is then used in live-

stock and poultry markets across this country. We have produced some 36 million tons of feed products last year; enough feed to feed every cattle that is fed on a feed lot. So this is not a food versus fuel industry. This is a food and feed industry and people need to take a step back, leave the hyperbolic scaremongering aside and recognize that the industry is continuing to grow, it is continuing to evolve, and we need it if we are ever going to get a handle on skyrocketing prices of energy.

Mr. PUGLIARESI. Congressman Rush, I think the issue is not really—you can talk to the Department of Agriculture, the long run—we can produce a log more corn at relatively low cost. It is when we get into these situations in which there is a lot of volatility in the market that the producers aren't able to adjust their fuel mix to deliver the product at the lowest possible cost. So we put this—it is the mandate where we have the problem. The mandate says we don't care what the cost of ethanol is, you have to use it. And what we really need is a lot more flexibility so that when the cost of one feedstock goes up producers can alter their mix to deliver the product at the lowest possible costs to the consumer.

Mr. RUSH. Thank you so much. Mr. Kolodziej—I am sorry. Are you familiar with the administration's initiative to green the fleet? Yes, are you familiar with the administration's initiative to green our fleet?

Mr. KOLODZIEJ. Green the federal fleet?

Mr. RUSH. Right.

Mr. KOLODZIEJ. Yes.

Mr. RUSH. OK. What role could natural gas play an advance in that objective of using more Government owned vehicles that run on alternative and more efficient fuels?

Mr. KOLODZIEJ. Well, it is a—just like with all the alternatives, if the Federal Government moves to alternative fuels you are going to use less fuel. Natural gas has the benefit of being also less expensive, significantly less expensive so that you would help reduce the cost of operating those vehicles especially in the bigger vehicles. I mean, in the Federal Government has a lot of light duty fleets; you know vans, pickups, sedans. But they have a number of—a significant number of larger vehicles where the option is diesel and we are the best alternative to that.

Mr. RUSH. Mr. Chairman, this is the time I am going to yield back my time.

Mr. WHITFIELD. Thank you. Mr. Pompeo, you are recognized.

Mr. POMPEO. Great. Thank you. I will try to do this in less than 5 minutes so we can get on our way. I want to ask Mr. O'Connell, Kolodziej—we get you pronounced right?

Mr. KOLODZIEJ. Yes.

Mr. POMPEO. I get mine pronounced wrong all the time, too, so——

Mr. KOLODZIEJ. I know.

Mr. POMPEO [continuing]. And Mr. McAdams, I heard each of your three testimonies they sounded eerily similar. Each of you has got industries that have made technological progress. Each of you has got vehicles that are in production phase. Each of you believe that you have got the low cost future technology. You should know that you are the three of 12 industries that have been in my office

in 100 days to tell me that you have provided the great next American energy solution. I have heard from 12 different industries. I wish you would go to the capital markets and not Washington, D.C. for your solutions. I want to ask each of you, this is a yes or no—are you prepared for your personal tax dollars to go to the other two guys to support the tax credits and subsidies that they are looking for?

Mr. KOLODZIEJ. Yes.

Mr. MCADAMS. Absolutely.

Mr. O'CONNELL. Yes, sir.

Mr. POMPEO. So we should subsidize all 12? So everybody who comes to my office with a great energy solution, the taxpayers should underwrite each and every one of those industries?

Mr. KOLODZIEJ. No, we should look at—I would suggest is look at each technology on its own. And with respect to natural gas vehicles, I can tell you that that is one of the reasons we have 65 million—we will have 65 million natural gas vehicles on the road eventually in 2020. We have 13 million now is because primarily because Governments are supporting that activity to get oil out of the market. There is very few—and again there is very few options with respect to diesel vehicles. And if you want—if the goal of the Federal Government is to reduce independence on foreign oil and diesel is one of the problems, natural gas has to be one of the alternatives.

Mr. O'CONNELL. And let me expand by giving you the businessman's answer on this. If you don't believe that there is a moral hazard in the cost of gasoline, if you don't believe the cost of national security and protecting supply lines, if you don't believe that there are subsidies in that I can't convince you of anything. What I would suggest is that if the Federal Government or the decision makers in this city decide that we are going to move away from gasoline, that the best strategy would be that of an investor which is a portfolio strategy. Now I believe I have got the best—the best solution. I will fight it out on those terms both against the incumbents as well as against the new entrance, but I think that the best strategy for the investor of the Federal Government if they decide to go that way is a strategy of variety.

Mr. POMPEO. I agree. I—let me reclaim my time. We will get out of here. I agree. The best portfolio strategy is exactly right and the best portfolio strategy is to not invest in any of them. It creates an infinite number of possible solutions and outcomes where the best technology will advance. And I happen to have industries that I think are closest, too. I happen to think natural gas is the place where we are very, very likely to get there, but just one guy and I am afraid I may just not be smart enough to get it right. So my inclination is just very, very different. And so with that I will yield back my time.

Mr. WHITFIELD. OK. Thank you. I want to thank the panel very much. We have certainly looked at all of your testimony. We appreciate you presenting it today. I know that there were a lot of other questions, but because of this sort of erratic schedule on today particularly I am not going ask you all to stay around for another hour and half or so. So we are going to keep the record open for 10 days for additional questions to the panelists and with that we look for-

ward to working with all of you as we continue our efforts to solve the problems facing our country in relation to transportation and if there is anything the committee can do to be of assistance to any of you, please let us know. And with that we will adjourn the hearing. Thank you very much.

[Whereupon, at 1:00 p.m., the subcommittee was adjourned.]

[Material submitted for inclusion in the record follows:]

Opening Statement of the Honorable Joe Barton
Chairman Emeritus, Committee on Energy and Commerce
Subcommittee on Energy & Power
"The American Energy Initiative VI"
Challenges and Opportunities Facing Alternative
Transportation Fuels and Vehicles.

May 05, 2011

Thank you, Chairman Whitfield for holding this important hearing today. It is important to revisit these opportunities and challenges in alternative transportation fuels. It is certain that we need to decrease our dependence on foreign oil demands. Increasing our energy security portfolio by considering these alternative fuel sources, such as coal to liquids, biodiesels still holds great promise. I have long been in favor of the highest energy efficient and clean renewable fuel programs that have proven to be economically responsible.

Gasoline prices are now $4.00 a gallon on an average. To date, the technology in alternative fuels is still lagging behind. We cannot afford further impacts on pricing.

I continue to have a deep concern with our increased utilization of Ethanol. With over 40% of our corn crop production going for this fuel source, we have increased the cost of corn as a feed stock supply to our livestock industries. Many of our small farms have had to sell out or go bankrupt as a result.

We must not forget that we have been pumping billions of dollars since the 1970's into alternative fuel source research and we have made some progress, but we must keep our focus on America's greatest KNOWN resources. These resources are sitting out in the Gulf of Mexico, the Outer Continental Shelf, and those projects sitting right here with leases where permits have been denied or held.

I look forward to hearing the testimony of our witnesses today. We need to get an update on where you feel there may be some ground breaking, cost effective technologies out there that meet emission standards.

Diversification of fuel sources is the key to our energy security. We need to put forth great effort in releasing the chokehold that has been put on America with regards to permits being denied or pulled unconstitutionally and undo regulatory requirements not approved by Congress. This will refuel our economy with jobs and increase our energy security and decrease the prices at the pump.

Department of Energy
Washington, DC 20585

June 23, 2011

The Honorable Ed Whitfield
Chairman
Subcommittee on Energy and Power
Committee on Energy and Commerce
U. S. House of Representatives
Washington, DC 20515

Dear Mr. Chairman:

On May 5, 2011, Howard Gruenspecht, Deputy Administrator, Energy Information Administration, testified regarding "The American Energy Initiative."

Enclosed is the answer to one question that was submitted by Congressman Gene Green to complete the hearing record.

If we can be of further assistance, please have your staff contact our Congressional Hearing Coordinator, Lillian Owen, at (202) 586-2031.

Sincerely,

Jonathan Levy
Deputy Assistant Secretary
for House Affairs
Congressional and Intergovernmental
Affairs

Enclosure

Printed with soy ink on recycled paper

QUESTION FROM REPRESENTATIVE GREEN

Q1 180 Members in the House have cosponsored the Nat Gas Act, which would pave the way for consumers to change how they power their vehicles by encouraging private investment in natural gas refueling stations and by providing incentives for the production and purchase of natural gas vehicles. Is there any way for the EIA to look at what the passage of such a bill might mean for our energy outlook? If you have already done this, can you please report on the results?

A1 (This answer was prepared by the Energy Information Administration (EIA).) The provisions of the proposed New Alternative Transportation to Give Americans Solutions Act (NAT GAS Act) include a variety of measures, only some of which may affect the transportation sector. EIA has not conducted a full analysis of the NAT GAS Act. However, EIA's *Annual Energy Outlook 2010 (AEO2010)* (http://www.eia.gov/oiaf/archive/aeo10/index.html) included two scenarios (Reference Case 2019 Phaseout With Base Market Potential and Reference Case 2027 Phaseout With Expanded Market Potential) that analyzed policy incentives aimed primarily at heavy duty vehicles (HDVs). Based on assumptions concerning the level of incentives for vehicles, refueling stations, and natural gas fuel; and on the rate of market penetration that could be achieved, these scenarios projected a wide range of potential growth in natural gas HDVs. Both scenarios include policy incentive assumptions that are similar to those in the proposed NAT GAS Act, but last longer, until 2019 and 2027, respectively. The 2027 Phaseout analysis also considers an expanded market penetration assumption that represents more widespread acceptance of natural gas vehicles among HDV users. By 2035, the 2027 Phaseout case combined with expanded consumer acceptance results in a projection that 40 percent of the HDV market would be made up of natural gas vehicles. Under this scenario, annual HDV natural gas usage climbs to 1.6

trillion cubic feet. This would result in a reduction in oil use of 0.67 million barrels per day by 2035, the vast majority of it imported.

FRED UPTON, MICHIGAN
CHAIRMAN

HENRY A. WAXMAN, CALIFORNIA
RANKING MEMBER

ONE HUNDRED TWELFTH CONGRESS

Congress of the United States
House of Representatives
COMMITTEE ON ENERGY AND COMMERCE
2125 RAYBURN HOUSE OFFICE BUILDING
WASHINGTON, DC 20515–6115

Majority (202) 225–2927
Minority (202) 225–3641

May 20, 2011

Ms. Margo T. Oge
Director, Office of Transportation and Air Quality
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, N.W.
Washington, D.C. 20460

Dear Ms. Oge,

Thank you for appearing before the Subcommittee on Energy and Power on May 5, 2011, to testify at the hearing entitled "The American Energy Initiative."

Pursuant to the Rules of the Committee on Energy and Commerce, the hearing record remains open for 10 business days to permit Members to submit additional questions to witnesses, which are attached. The format of your responses to these questions should be as follows: (1) the name of the Member whose question you are addressing, (2) the complete text of the question you are addressing in bold, and then (3) your answer to that question in plain text.

To facilitate the printing of the hearing record, please email your responses, in Word or PDF format, to the legislative clerk (Alex.Yergin@mail.house.gov) by the close of business on Friday, June 3, 2011.

Thank you again for your time and effort preparing and delivering testimony before the Subcommittee.

Sincerely,

Ed Whitfield
Chairman
Subcommittee on Energy and Power

cc: The Honorable Bobby Rush, Ranking Member,
Subcommittee on Energy and Power

Attachment

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

JUN 2 2 2011

OFFICE OF CONGRESSIONAL AND
INTERGOVERNMENTAL RELATIONS

The Honorable Ed Whitfield
Chairman
Subcommittee on Energy and Power
Committee on Energy and Commerce
U.S. House of Representatives
Washington, DC 20515

Dear Mr. Chairman:

Thank you for the opportunity to respond to questions for the record that followed a May 5, 2011 hearing entitled "The American Energy Initiative." I hope the information contained in these responses will be helpful to you and members of the Committee.

If you have any further questions, please contact me at (202)564-5200 or your staff may contact Diann Frantz at (202)564-3668.

Sincerely,

David McIntosh
Associate Administrator

Enclosure

The Honorable Ed Whitfield

1. EPA has only approved 2 feedstocks to make cellulosic ethanol even though there are many more out there that may yield better results. One of those is arundo donax. What is the status of the petition to utilize this feedstock?

   Response: In March EPA received a petition requesting we add Arundo donax as an eligible feedstock for biofuel production under the provisions of the RFS2 regulations. As required by the Energy Independence and Security Act of 2007 (EISA), EPA is completing a lifecycle greenhouse gas (GHG) emissions assessment of such biofuel pathways. In coordination with the U.S. Department of Agriculture and Department of Energy, our lifecycle assessment will determine whether Arundo donax will qualify as a feedstock which can be used to produce biofuels meeting the cellulosic biofuel GHG performance threshold established by EISA. After completing this analysis, EPA will, if appropriate, adopt a change to the RFS2 regulations to add Arundo donax as a feedstock for producing cellulosic biofuel.

2. Are there any other feedstocks besides the two already approved (switchgrass and miscanthus) that the agency is considering, and what is the timeline for the approval process?

   Response: In addition to switchgrass and miscanthus, the current RFS2 regulations have approved cellulosic biofuel pathways for feedstocks including agricultural residues such as corn stover, slash, forest trimmings and forest product residues, cellulosic components of separated yard wastes, cellulosic components of separated food wastes, and cellulosic components of municipal solid wastes. Additionally we are developing a lifeycle GHG assessment of energy cane as a potential feedstock source for cellulosic biofuel production. As in the case of Arundo donax, after completing our GHG assessment, we would add energy cane to the RFS2 regulations via rulemaking.

The Honorable John Shimkus

1. The NHTSA/EPA joint Model Year 2012-16 fuel economy/greenhouse gas rulemaking states that it is "harmonized and consistent." In the Energy Independence and Security Act of 2007 (EISA), Congress specifically extended the flex fuel (FFV) credit, and phased it out entirely by 2020.

   Congress extended the flex fuel program in 2007 by statute specifically because Congress wanted to encourage the production of vehicles that can run on E-85.

   The EPA's program also allows FFV credits in line with the limits set by Congress in EISA, but only during the period from model years 2012 to 2015. After model year 2015, EPA will only allow FFV credits based on a manufacturer's demonstration that the alternative fuel is actually being used in the vehicles.

a. How can this rule be characterized as "harmonized and consistent" if the way EPA treats FFV vehicles is markedly different than the way Congress mandated FFV credits be treated under CAFE?

b. The joint EPA/NHTSA fuel economy rule states on page 25,433:"Unlike EPCA, CAA section 202(a) does not mandate that EPA treat FFVs in a specific way. Instead EPA is required to exercise its own judgment and determine an appropriate approach that best promotes the goals of this CAA section." Could the logical reason for Congress' silence on FFVs in section 202(a) be that Congress never envisioned the Clean Air Act would be used to regulate fuel economy?

c. Please provide this Subcommittee with a list of areas in the EPA/NHTSA joint rulemaking of May 7, 2010 where EPA's rules are contrary to the program designed by Congress in EPCA as amended by EISA, and why EPA chose to substitute its judgment over the clear, specific policy preferences passed by Congress.

Response: In setting standards for model years 2012-2026 light-duty vehicles, EPA and NHTSA worked jointly to develop a closely coordinated set of GHG and CAFE standards that together comprise the "National Program." In developing the National Program, the agencies harmonized many elements of program design, such as the form of the standard (the footprint-based attribute curves) and the definitions of cars and trucks, developed the same or similar compliance flexibilities to the extent allowed under their respective statutes, such as averaging, banking, and trading of credits, and harmonized the compliance testing and test protocols used for purposes of the fleet average standards.

On the specific issue of FFVs, EPA is treating FFV credits the same as under EPCA for model years 2012–2015. Starting with model year 2016, EPA is using a different approach that should promote greater use of alternative fuels. EPA recognizes that under EPCA automatic FFV credits are entirely phased out of the CAFE program by MY 2020, and apply in the prior model years with certain limitations, but without a requirement that the manufacturers demonstrate actual use of the alternative fuel. EPA treats FFVs for model years 2012–2015 the same as under EPCA. Starting with model year 2016, EPA believes the appropriate approach is to ensure that FFV emissions are based on demonstrated emissions performance, which will correlate to actual usage of alternative fuels. This approach was supported by several public comments. If a manufacturer wants to earn FFV credit after MY 2016, a manufacturer would have to demonstrate that a portion of its FFVs are using an alternative fuel in use (by extrapolating from national average E85 usage data, for example), and FFV emissions compliance values would be calculated based on the vehicle's tested value using gasoline and the alternative fuel, prorated based on the percentages of the fleet using gasoline and the alternative fuel in the field. This approach will promote greater use of alternative fuels, consistent with the agency's overall commitment to the expanded use of renewable fuels.

On the question of differences between the CAFE and GHG portions of the joint 2012-2016 light-duty vehicle rulemaking, EPA's program for those years allows manufacturers the

flexibility to comply with the standards through improvements in air conditioning related emissions, but NHTSA's does not for those years. EPA also finalized certain compliance flexibilities, and takes those flexibilities into account in its technical analysis and modeling supporting its final program. EPCA places certain limits on certain statutorily-provided compliance flexibilities for CAFE, and expressly prohibits NHTSA from mandating compliance with standards based on assumed use of those compliance flexibilities.

The CAA specifies different civil penalty provisions for noncompliance than EPCA does, and EPA cannot therefore adopt the CAFE penalty structure.

In summary, given the common technical issues before each agency, the similarity of the factors each agency is to consider and balance, and the authority of each agency to take into consideration the standards of the other agency, both EPA and NHTSA have established standards that result in a harmonized National Program.

The Honorable Cory Gardner

1. On September 30, 2010, EPA and NHTSA issued a "Notice of Intent" stating the Obama Administration plans to raise the fuel economy standard between 47 to 62 miles per gallon for cars and light trucks by 2025. On January 28, 2011, you were quoted in the press (EPA urges 'civility' in fuel-efficiency debate," E&E Daily, 1/28/11) saying, "There are environmental groups on one side calling for 62 mpg and the last time I checked, they hadn't done any work to show why that's the case."

   The Notice of Intent indicates EPA is actively considering raising the fuel economy standard to 62 mpg. Such a standard would hurt the ranchers and farmers I represent who rely on full size pickup trucks to make a living. In light of your quote above, can you assure this Subcommittee that the EPA will not propose a 62 mpg fuel economy/GHG standard?

Response: Let me be clear that EPA has not made any decisions regarding the recommended level of the proposed greenhouse gas standards for model year 2017-2025 light-duty vehicles. EPA and DOT are working jointly to develop a proposal and we are still in the process of assessing the best available science and data to inform our decisions. EPA and DOT, in collaboration with California, have met with a wide range of stakeholders to gather input, including all of the major automakers, suppliers, the UAW, NGOs and state and local governments. Our current plans are to issue a joint proposal with DOT in September.

The Notice of Intent issued by EPA and DOT in September 2010 was meant to describe the agencies' initial assessment of potential levels of stringency for the model year 2017-2025 standards. The agencies were clear in the Notice of Intent that we have not reached any decisions on the levels of stringency that would ultimately be proposed: "[t]he agencies have not reached any conclusions at this time regarding the appropriate level of stringency for [model year] MY 2017 and later, and the assessment presented in this Joint Notice does not preclude the agencies from considering standards outside of this range for the upcoming rulemaking." However, the agencies are continuing to consider, as we did for the 2012-2016 rule, an approach

which sets standards based on a vehicle "footprint" attribute, where each vehicle has a different GHG/CAFE emissions target depending on its size. Generally, the larger the vehicle, the higher the emissions target, and each auto manufacturer has a different overall fleet target depending on the individual vehicle models it produces. In this way, manufacturers are not compelled to build vehicles of any particular size or type, thus preserving consumer choice.

Finally, it is important to point out that all consumers – including the ranchers and farmers you mention – will benefit from the significant savings realized by improved vehicle fuel efficiency. In our initial assessment presented in the Notice of Intent, the net lifetime consumer savings were nearly $5,000 to $7,400 across the level of standards evaluated. We can mitigate the impact of high fuel prices on American families and businesses by setting improved fuel efficiency standards that enable people to travel the same distance with less fuel while maintaining a wide range of vehicle choices to meet consumers needs (due to the footprint approach described above.

The Honorable Gene Green

1. What is the agency's estimate for misfueling in the first few years of E15's existence at the gas pumps?

   Response: We are not currently in a position to estimate the extent to which any misfueling with E15 would occur in the first few years of E15 becoming available at gas pumps. Misfueling rates would depend on a number of factors that are difficult if not impossible to quantify at this time (e.g, the extent and rate of expansion of E15 into the marketplace, how E15 is marketed at the pump). This is particularly the case because the E15 partial waiver decisions allow, but do not require, E15 to be introduced into commerce. It is now up to businesses to decide whether and how to market E15, and there are number of steps that need to be taken before E15 can be made broadly available (e.g., determining equipment compatibility, compliance with other federal, state and local requirements).

   Moreover, EPA has taken significant steps to minimize potential misfueling with E15 when it becomes commercially available in the market. We conditioned the partial waivers on E15 providers submitting a misfueling mitigation plan for approval by EPA. The plan must provide for E15 pump labeling, tracking of E15 through the supply chain, and implementation surveys of E15 content and labeling requirements. A plan may also include other measures as appropriate to address misfueling. No one has yet submitted a misfueling plan.

   In addition, we proposed a misfueling mitigation regulatory program that will further reduce the potential for misfueling by establishing a prohibition on misfueling, as well as requirements for national labeling, product transfer and surveys. We expect to issue the final misfueling mitigation rule soon. We also plan to work with stakeholders on public education and outreach on E15 use and to periodically evaluate the effectiveness of the mitigation

measures put in place under the waivers and final rule. Our goal and expectation is that the E15 misfueling mitigation program, like the similar program for ultra low sulfur diesel fuel, will be highly effective.

2. There are a number of consumers that actively seek clear gasoline and who must have no higher blend than E10 in order to avoid violating their engine warranty.

   a. What is your plan to ensure the availability of these fuels and what do you see for their future availability as RFS2 forces more ethanol on consumers?

   b. What should be done to ensure the availability of low-ethanol blends or clear gasoline for such legacy products?

Response: While the Agency, after extensive review of test data, approved the use of up to 15 volume percent ethanol in gasoline for 2001 and newer light-duty vehicles, it is important to remember that E15 is not required. Further, as noted above, we proposed a program for mitigating potential misfueling with E15 when it becomes commercially available in the market, and we received several comments regarding concerns about the continued availability of E10 (and possibly E0) for the vehicles, engines and equipment not covered by the E15 partial waivers. We are committed to working with stakeholders to monitor the transition to E15 in order to identify and address any availability issues that may develop.

3. The RFS currently requires 15 billion gallons of first generation biofuels to be blended by 2015. This amount is referred to as a soft cap, meaning it can be increased beyond 15 billion. Most experts believe that second and third generation advanced biofuels hold varying degrees of promise due to various factors. No one can say with 100 percent certainty that they will comprise the bulk of our renewable fuel supply twenty years from now.

   While the volume requirements within the RFS for second and third generation fuels remain a challenge, preserving volume space within the RFS for these second and third generation fuels is key to the achievement of the coverall policy goals of the RFS. Unless this space is preserved, ethanol is likely to continue to creep into that unfilled space, driving away venture capital investments and thus thwarting the RFS policy objective.

   Do you think Congress should consider capping first generation biofuels at 15 billion to achieve the bigger policy objectives laid out in the RFS which are to ensure a more diversified national transportation fuels supply?

Response: As mandated by the Energy Independence and Security Act of 2007(EISA) and as adopted in the RFS2 regulations, of the total of 36 billion gallons of renewable fuel to be included in the transportation fuel pool by 2022, 21 billion gallons of the total is set aside for fuels meeting the advanced biofuel performance threshold of at least a 50 percent improvement in GHG performance compared to the petroleum-based fuel it is replaced

(either gasoline or diesel). Within these 21 billion gallons of advanced biofuel, 16 billion gallons are set aside for cellulosic biofuels meeting at least a 60 percent improvement in GHG performance compared to the petroleum-based fuel they are replacing. These RFS2 provisions do "preserve space" for advanced biofuels. Although producers can sell more than 15 billion gallons of corn ethanol, under EISA, corn ethanol cannot qualify as an advanced biofuel.

May 24, 2011

The Honorable Edward Whitfield
Chairman
Energy and Power Subcommittee
Energy and Commerce Committee
United States House of Representatives
Washington, D.C. 20515

The Honorable Bobby Rush
Ranking Member
Energy and Power Subcommittee
Energy and Commerce Committee
United States House of Representatives
Washington, D.C. 20515

The Honorable John Shimkus
United States House of Representatives
Washington, D.C. 20515

Dear Chairman Whitfield, Ranking Member Rush, and Representative Shimkus:

The Renewable Fuels Association (RFA) appreciates the opportunity to respond to follow up questions from the May 7, 2011 hearing entitled "The American Energy Initiative," focusing on the challenges and opportunities facing alternative transportation fuels and vehicles.
As I stated in my testimony before the Subcommittee, the U.S. Environmental Protection Agency (EPA) took great liberty when writing the rules for the expanded Renewable Fuels Standard (RFS), and the agency's tortured reading of several important provisions in the Energy Independence and Security Act of 2007 (EISA) threatens to put Congress' goals in jeopardy. In many instances, we believe Congress' intent, as clearly established in EISA, has been misconstrued by EPA in the rulemaking and implementation process. Renewable fuel producers and the obligated parties alike have been frustrated by many elements of EPA's implementation of the RFS program.

For EISA's ultimate goal of 36 billion gallons of renewable fuel use to be realized, the EPA must endeavor to faithfully honor Congress' intent and refrain from legislating through rulemaking and regulation. In addition, the EPA must strictly adhere to the objectives and goals outlined by Congress in future legislative efforts to open renewable fuel markets, stimulate investments in new biofuel technologies and assist in the development of infrastructure for these new fuels. Further, Congress should resist the calls of some critics to re-open and modify the RFS.

Attached please find RFA's responses to questions from Members of the Subcommittee. If there is any additional information you would like RFA to provide, please do not hesitate to ask.

Sincerely,

Bob Dinneen
President & CEO

Questions from Representative John Shimkus

1. **Is ethanol, or E10, safe for use in boats and marine equipment?**

RFA Response

There are over 12 million recreational boats in the United States, some of which are vintage watercraft, so it is difficult to make a blanket statement on every make and model year. Most watercraft operate fine on E10. For instance, Honda, Kawasaki, Mercury Marine, OMC (Johnson/Evinrude), Pleasurecraft, Tigershark (Artco), Tracker and Yamaha allow the use of ethanol fuels in their products. Mercury Marine has indicated that their outboard products produced after 1979 should not have problems operating on ethanol. Further, they indicate that MerCruiser products produced after 1987 should not experience problems.

However, while the National Marine Manufacturers Association has indicated that E10 or lower usually present no problems for boat engines, it should be noted there have been isolated reports of materials compatibility issues in some vintage (pre 1980) watercraft that utilize fiberglass fuel tanks. Ultimately, the watercraft operator's manual should be consulted.

It is important to note that since marine equipment operate in a wet environment, special care and storage practices are necessary whether ethanol is used or not. The RFA has published and distributed the attached special bulletin for boat owners to encourage recommended practices and avoid any potential problems with ethanol use in marine engines.

When properly stored and handled, ethanol blended fuels work quite well in marine engines. In fact, the National Boat Racing Association (NBRA) is currently using exclusively 10-percent ethanol fuel in its Hydroplane and Runabout racing series. As noted by NBRA Spokesperson Vernon Barfield,

> "American boaters have been utilizing ethanol-blended fuel safely and effectively for years. Ethanol-blended fuel provides the high-performance engines in this series with the horsepower and performance they need to win. We are excited to show that our racing boats are able to perform to their best capability using E10 fuel, shaking the myths that ethanol harms marine engines."

2. **In an effort to expand the blend market beyond E10 and increase market opportunities for ethanol, does the RFA support an open fuel standard?**

RFA Response

First and foremost, full implementation of EISA will require the use of ethanol beyond the traditional 10 percent blends, as 36 billion gallons of renewable fuels represents about 25 percent of the gasoline pool. Unfortunately, current regulations essentially limit the amount of ethanol can be blended with gasoline to 10 percent for conventional automobiles. The EPA has approved E15 blends to for use in cars, pickups and SUVs built in 2001 and later, or about two-thirds of the vehicles on the road today.

While this is a good start, EPA's bifurcation of the vehicle fleet raises a number of practical concerns and challenges for gasoline blenders, marketers and retailers. The RFA continues to urge the EPA to quickly extend the waiver for E15 use to all conventional light-duty vehicles. A report by the highly regarded automotive engineering firm, Ricardo Inc., concluded there

were no unique emissions, material compatibility or drivability issues with older vehicles compared to 2001 automobiles. Our nation can and should move in the direction of ethanol blends in excess of 10 percent in conventional, gas-only vehicles. As with any new fuel, additional testing and some regulatory issues relating to the fuel's properties must be addressed before widespread E15 use can occur. The RFA is working with EPA and others to address those issues and accelerate the commercial use of E15.

It will be critical to the future growth opportunities for cellulosic and advanced ethanol to promote ethanol's important role as an alternative fuel as well. Currently, the E85 market represents just a fraction of the overall U.S. ethanol market, but it is growing. We estimate that there are about 8.5 million flexible fuel vehicles (FFV) on America's roadways today. That is up significantly from recent years and a testament to the leadership and commitment of General Motors and Ford; but it still represents just 3 percent of the total automotive fleet. Likewise, we estimate E85 and mid-level blends are offered at approximately 2,700 retail gas stations across the U.S. That is a huge improvement over the handful of E85 stations just a decade ago, but it still represents just 1.5 percent of the nation's gas stations. Obviously we have a long way to go if consumers are to be given the flexibility to maximize their use of domestic renewable fuels like ethanol. Efforts to expand FFV technology must be a part of our energy future. Putting more Americans behind the wheel of an FFV is a critical component of our strategy to transform current ethanol policy and the current ethanol industry. Together with more blender pumps, investment in infrastructure is one leg of the approach that recognizes the need to put the market back in ethanol policy.

The RFA supports for the Open Fuel Standard Act introduced by Representative John Shimkus.

3. **The witness from the Energy Policy Research Foundation, Inc. (EPRINC) said their new analysis shows that increased ethanol use would "contribute to price increases in gasoline." Yet, your testimony cited a recent study from the Iowa State University Center for Agricultural and Rural Development (CARD) stating that ethanol reduced wholesale gasoline prices by $0.89/gallon in 2010. How do you respond to the statement from the witness representing ERPINC? How do you explain the differences in the findings of EPRINC analysis and the CARD study?**

RFA Response

We have reviewed the EPRINC analysis in detail and have found it to be significantly flawed and misleading. The paper's assertion that increased ethanol use could lead to higher gasoline prices appears to be based on the notion that the cost of corn — the main feedstock used for ethanol — has substantially increased in recent months.[1] This assertion by EPRINC demonstrates a basic lack of understanding of ethanol economics and gasoline blend market dynamics. If gasoline prices were static in the face of higher corn prices and rising ethanol production costs, then it would stand to reason that higher corn prices could contribute to

[1] During the Subcommittee hearing, EPRINC President Lucian Pugliaresi restated the paper's assertion that rising ethanol feedstock costs are somehow contributing to higher gasoline prices. Pugliaresi stated, "Domestically produced ethanol should have provided some modest constraint on the rising cost of gasoline as turmoil in the Middle East and North Africa sent crude oil prices well above $100 per barrel. Instead, ethanol has seen its feedstock cost more than double over the last 10 months."

higher prices for finished gasoline. But gasoline prices have *not* been static while corn and ethanol prices have risen. Rather, prices for crude oil, gasoline, corn, and ethanol have all increased in tandem in recent months. Thus, the relative price relationship among these commodities that existed at lower prices (specifically, ethanol's relative discount to gasoline) has largely remained intact. In fact, ethanol's discount to gasoline has widened during the recent period of high gasoline prices.

The EPRINC paper that served as the basis of Lucian Pugliaresi's testimony before your Subcommittee acknowledges that ethanol is currently selling for $0.80 per gallon less than gasoline at the wholesale level, but then the paper argues that ethanol prices are "well above" the cost of gasoline. The authors can only make that exaggerated claim by: 1) adjusting the market price of ethanol to reflect its lower energy content; and, 2) neglecting the impact of the Volumetric Ethanol Excise Tax Credit (VEETC). Both of these methodological decisions are disingenuous efforts to cloud the reality of ethanol blending economics and gasoline blend market dynamics

Adjusting ethanol prices to reflect the fuel's lower relative energy content completely ignores the actual utility and value of ethanol in the gasoline market. Blenders and refiners don't use ethanol primarily for its energy value; rather, they use ethanol primarily for its oxygen and octane value. EPRINC itself recognizes ethanol's value as an oxygenate for reformulated gasoline and a low-cost source of octane. Indeed, during his testimony before your Subcommittee, Mr. Pugliaresi stated, "Ethanol is highly valuable…as an octane booster and as an oxygenate." Mr. Pugliaresi further suggested ethanol's value as an oxygenate accounts for as much as half of its current use.[2]

Oil refiners use high octane ethanol to upgrade otherwise unsellable low octane sources of gasoline (called "sub-octane") to the octane level needed to meet minimum specifications for regular gasoline grades. This practice reduces the refiner's cost of producing gasoline. Due to ethanol's unique properties and special niche in the gasoline market, it is completely inappropriate to adjust ethanol's market price to suggest it only has value as an energy replacement for gasoline.

Even if EPRINC could justify adjusting the ethanol price based on energy content, their analysis failed to reflect the fact that the VEETC reduces the effective price that the blender pays for ethanol by another $0.45 per gallon. So, rather than ethanol being $0.80 per gallon cheaper than gasoline, it's actually $1.25 per gallon cheaper for the blender. If EPRINC repeated its disingenuous energy adjustment calculation and included the impact of VEETC in its analysis, the energy adjusted price of ethanol ($3.20 per gallon) would still be cheaper than the price of gasoline they use ($3.40 per gallon).

The study referenced in my testimony was conducted by economists at Iowa State University and the University of Wisconsin and released by CARD. Using a detailed and rigorous statistical methodology, the researchers found that the increased use of ethanol reduced wholesale gasoline prices by an average of $0.89 per gallon in 2010. The study, which is an

---

[2] During the Subcommittee hearing, Mr. Pugliaresi stated demand for ethanol as an oxygenate is, "…probably 400,000 to 500,000 barrels per day…" out of a total demand of approximately 900,000 barrels per day.

update to a 2009 paper published in the prestigious journal *Energy Policy*, also found that the growth in ethanol production reduced gasoline prices by an average of $0.25, or 16 percent, over the entire decade of 2000-2010. Further, the study determined that gas prices could *nearly double* if ethanol production came to an immediate halt. Importantly, the CARD results take into account ethanol's primary value as an oxygen and octane source for gasoline, but also recognize the fact that the portion of ethanol used strictly as energy replacement for gasoline has lower energy content than the gasoline it replaces.[3]

4. What challenges remain to the commercialization of cellulose ethanol and next generation advanced biofuels?

RFA Response

A major policy objective of EISA was to accelerate the commercialization of new technologies and next generation biofuels. Certainly, by creating demand for at least 21 billion gallons of advanced biofuels by 2022, cellulosic ethanol and other advanced biofuels were given a tremendous boost. Importantly, the technology for cellulosic ethanol conversion is being successfully demonstrated at facilities all across the country and the globe today. Technology is not the problem. But the economic collapse of 2008 and the concurrent banking crisis made it extraordinarily difficult for these new technologies to secure financing. And, as is the case with the oil and gas industry, there is tremendous up-front cost and risk to scaling up next generation energy of all types.

If the volumes of advanced biofuels envisioned by EISA and the infrastructure to support them are to be realized, Congress must stabilize the investment marketplace to the greatest degree possible. This is critical, and warranted, because the current transportation fuel marketplace is overly reliant on one type of fuel, and as a result, is extremely unpredictable and volatile. Current landmark policies should not be opened up, as this would exacerbate an already uncertain and volatile marketplace. Existing tax incentives for the advanced and cellulosic ethanol industry should be extended, as they are for oil and gas, for periods long enough to be relied on by investors. Targeted programs such as the U.S. Department of Energy (DOE) Loan Guarantee Program must be implemented more aggressively and Federal funding to this important program should be restored. The DOE Loan Guarantee Program has been hamstrung by a bureaucracy seemingly unwilling to meaningfully reduce the risk associated with these investments.

Further, the RFS was designed in part to ensure the evolution of America's biofuels industry is successful. By reducing the standard for cellulosic biofuels, the EPA is accurately reflecting the difficulties cellulosic biofuel technologies have encountered in obtaining the capital needed to fully commercialize. However, being aware of this fact, the EPA should have been

[3] In the original paper published by Du and Hayes (*Energy Policy* 37 (2009) 3227–3234), the authors write, "...there is an obvious problem with our use of retail prices. As we mentioned earlier, typical ethanol blends (E10) contain 3.3% less energy than does regular gasoline. Therefore, as more gallons of ethanol blend are sold, we would expect weighted retail prices to eventually reflect this lower energy content. This comparison is complicated by differences in state-level subsidies to ethanol and by different local market conditions and regulations. For example, in some states ethanol is viewed as a way to improve the oxygenate level in gasoline, and as such it may not require a price reduction to clear this market. In other states, all regular gasoline is an ethanol blend. We did run the national model using national retail prices, and these results suggested that the national retail impact is very similar to the national wholesale analysis described above."

and must be careful to keep cellulosic biofuel targets ambitious so as to stimulate the kind of investment these technologies need to finish commercialization.

RFA RENEWABLE FUELS ASSOCIATION

Update for Boat Owners: Ethanol Blended Fuels for Use in Marine Equipment

Throughout the year of 2010, fuel blenders have extended the availability of fuels containing up to 10% volume ethanol (E10) to many new regions of the U.S., primarily the southeast states. Many areas across the country successfully utilize ethanol blended fuels year round and across all octane grades, proving that ethanol blended fuels can be used successfully in marine applications. E10 is interchangeable with gasoline and virtually every gallon of gasoline sold in the U.S. today contains a percentage of ethanol up to 10%. As ethanol has entered these new markets, some marine equipment owners and operators have raised questions about ethanol use in their equipment. This bulletin is meant to provide information about successful operation of marine equipment using E10 and provide information on the recent E15 (15% ethanol, 85% gasoline) approval by the Environmental Protection Agency (EPA) for use in automobiles model year 2001 and newer.

NEW! In October 2010 and January 2011, EPA announced the limited approval of E15 for strict use in gasoline powered vehicles only. The approval came after years of research on the safe and effective use of this fuel in varying model year automobiles. This approval is strictly limited to use in automobiles manufactured in model year 2001 and newer, and was NOT approved for any other engine use. EPA's E15 approval is not a mandate for use; it provides an opportunity for retailers to offer their automobile consumers an additional fuel choice. Until fuel blends containing more than 10% ethanol have been tested and approved for use in marine engines, watercraft and boat owners should *not* use these fuel blends.

Since marine equipment operate and are often stored in a wet environment, engine and fuel system design and operations must preclude any water or moisture introduction to the fuel system. Marine fuel systems are robust in nature; however the fuel system may not be conducive to a visual inspection or identification of any environmental influences that may have resulted in a poor fuel quality condition. All but the latest watercraft models have fuel systems vented to the atmosphere which may require extra precaution.

Boat owners know that following proper storage guidelines and a recommended maintenance schedule will ensure the boat is kept in proper operating condition. Additionally, the following tips should prove helpful for a boating season using E10:

- Follow the engine manufacturer's fuel use recommendations. Today, manufacturers use upgraded materials that are largely unaffected by properly formulated ethanol blends. This is evidenced by their fuel recommendation comments which permit the use of such fuels in their equipment marketed in the U.S.
- Confirm that fuel storage recommendations have been followed. Some boat manufacturers recommend storing the fuel tank full (90-95% to allow room for expansion) and/ or recommend the use of a fuel stabilizing additive if the watercraft will be idle for a long period of time. Fuels of any composition can weather or deteriorate in storage.

Copyright © 2011 Renewable Fuels Association. All Rights Reserved.

- Keep the engine in acceptable operating condition by following the maintenance schedule as recommended by the manufacturer. Simple maintenance programs include the changing of the spark plugs, spark plug wires, fuel filter and any water separating filters.
- Utilize fuel system treatment and additives as recommended. Fuel additives can help maintain fuel quality and fuel system cleanliness and engine operating conditions in many cases. Fuel system cleaners help to remove engine deposits, such as tars and gums, left behind from many years of operating on gasoline. Because of ethanol's solvency effect, extra fuel filters and the tools needed to change the filters may be needed to collect the gasoline deposits, once the equipment first begins operating on ethanol-blended fuels.

Investigate that the fuel system does not contain any water. If excessive moisture is absorbed, the ethanol and water can go into phase separation. Phase separation is the physical separation of the gasoline and the mixed ethanol and water. If an excessive amount of water is introduced to a blend of E10 or higher, the ethanol and water will mix, separating from the gasoline and sinking to the bottom of the tank. Aside from the fact that the engine would not operate on this ethanol/water blend, it can also cause corrosion of various metals with which it comes in contact. The potential for phase separation, however, must be put in perspective. It would take almost four teaspoons of water per gallon to phase separate a gasoline-ethanol blend. This is an incredibly large amount of water to be accidentally introduced into the system. To absorb this much moisture from the atmosphere (at a relative humidity of 70%) would take hundreds of days even if the gasoline cap was left off.

Note: It's important to know that phase separated fuel is impossible to correct without sophisticated engineering equipment. The phase separated material should be handled as hazardous waste and properly disposed.

To ensure that water is not introduced into the system, use a gasoline tank cap that seals properly and fill the tank before extended storage periods (note that some manufacturers recommend draining of the fuel tank and system before storage).

In rare instances, older marine and two stroke outboard engines and fuel systems have experienced incompatibility with ethanol-blended fuels, resulting in system failures. One way to avoid this situation is to know your equipment and follow the engine manufacturer's recommendations. Special concern pertains to older, in-hull fiberglass tanks. The polyester resins used in the fiberglass of older watercraft (generally prior to 1991) may not be compatible with ethanol blends. Check with the local marina if the possibility exists to retrofit or re-line the fuel tank of concern. Additionally, state regulating agencies may have fuel composition information available for your area.

More information on ethanol blended fuels is available at www.EthanolRFA.org.

Copyright © 2011 Renewable Fuels Association. All Rights Reserved.